

SAFETY AND HEALTH MANUAL WITH SITE SPECIFIC SAFETY PLAN

**POJOAQUE BASIN REGIONAL WATER SYSTEM JOB,
AAMODT LITIGATION SETTLEMENT PROJECT**

22 April 2022





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REVIEW AND REVISION HISTORY

The program administrator periodically reviews and updates this program to ensure compliance with applicable regulations, laws, new processes, procedures, and organization policies.

This program has been revised as indicated in the following table.

Revision Date	Description	Responsible Party
1 June 2016	Initial Issue	Anfeald, LLC per D Patton
23 Sep 2016	Updated to include hot-work, expanded crane section, other updates to reflect project needs	Anfeald, LLC per D Patton
28 Sep 2017	Added crystalline silica section, general formatting, and minor updates throughout to simplify document	Anfeald, LLC per D Patton
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18 Feb 2019	Complete update to improve readability and technical updates	Anfeald, LLC per D Patton
21 April 2022	Complete update to reflect project needs; significant changes to multiple programs	Anfeald, LLC per T Brem

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SYSTEM JOB, AAMODT LITIGATION SETTLEMENT PROJECT

ADMINISTRATIVE POLICIES AND PROGRAMS

21 Apr 2022





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INTRODUCTION

This document describes the overarching set of programs used to manage safety and health at this organization and it provides expectations for and guidance to employees. It includes both regulation-mandated and risk-based programs.

Application and Scope

This program applies to all places of work, all employees, and all temporary agency employees that this organization may employ from time to time. This program applies retroactively to all employees hired before the date of implementation. All employees must complete all required training as indicated in this program. This program is the minimum level of required safety, but it is necessarily non-exhaustive. Additional laws, standards, regulations, hazard controls, and safe work practices apply.

This program also establishes the minimum Occupational Safety and Health (OSH) program expectations and requirements for subcontractors, when employed.

This organization has an ongoing expectation that each employee will complete work and make decisions based on the following priority list, in the order listed:

- Work safe
- Complete work with consistent and high quality
- Work efficiently

Nothing in this program is designed to limit or constrain the selection and application of appropriate hazard controls and appropriate safe work practices.

This organization may amend existing programs or develop parallel programs designed to govern and meet the safety and regulatory requirements of a specific location, region, division, or other unique features of a work location controlled by this organization. Site specific safety plans or documents serve to refine the underlying program to improve applicability to unique circumstances. In case of a conflict between this program and any site-specific program, the more conservative approach will govern and control.

General Roles and Responsibilities

The following individuals have general responsibilities under this program:

- Program Administrator
- Competent-Persons
- Frontline Leaders
- Employees

Program Administrator

The program administrator has the following responsibilities under this program:

- Periodically assess the ongoing effectiveness of this program

- Periodically review and update this program based on legal requirements, actual exposures, and risks
- Work with managers and frontline leaders to fully implement this program
- Coordinate required OSH training and ensure its completion
- Ensure the provision of OSH related equipment, consumables, and PPE
- Ensure the retention of documents in accordance with requirements

The program administrator may delegate one or more responsibilities under this program to someone knowledgeable and qualified to perform the delegated responsibility.

Competent-Persons

A competent-person is someone capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Competent-persons are specifically assigned by this organization. They must have training in, knowledge of, and skill in the specific topics, applicable regulations, associated hazards, and the means and methods to control those hazards. The skills and knowledge required to complete competent-person responsibilities include a combination of relevant, practical job expertise and formal training though the actual mix of practical experience and formal training does vary based on the topic and the individual. Competent-persons will:

- Maintain competency in required topics
- Readily identify hazardous, dangerous, unsanitary, or otherwise unsafe work conditions
- Remove exposed employees from the immediate environment upon discovery of hazards
- Promptly correct and eliminate hazards
- Complete specific topical tasks required by regulation and as necessary to control hazards

Specific programs that require assignment of a competent-person add additional criteria and responsibilities to these responsibilities.

Competent-persons may not delegate their responsibilities under this program.

Frontline Leaders

Frontline leaders include managers, superintendents, foreman, supervisors, leads, and other job titles that directly manage employees. Frontline leaders will:

- Work with the program administrator to help ensure successful program implementation
- Ensure there is adequate time for employees to fulfill all activities required
- Monitor the workplace and proactively identifies hazards
- Consistently enforce all requirements in this program
- Report unsafe working conditions and situations to the program administrator

- Stop unsafe work and implement situationally appropriate corrective actions

Frontline leaders may not delegate their responsibilities under this program.

Employees

Employees will:

- Follow all policies, rules, and safe work practices
- Attend all required training
- Always wear required PPE
- Stop work, and resolve the problem when unsafe conditions develop
- Report unsafe working conditions and incidents to the frontline leader
- Work safely

Employees may not delegate their responsibilities under this program.

When this organization uses the services of temporary agency employees, these temporary employees are treated the same with respect to training, the provision of PPE to them, and in all respects related to OSH matters. However, temporary agency employees are not assigned jobs or tasks that are beyond their training to safely complete.

Regulations, Codes, and References

This program addresses applicable portions of the following regulations:

- §29 CFR 1910: OSHA Standards for General Industry
- §29 CFR 1926: OSHA Standards for the Construction Industry

Whenever this program lists a Federal OSHA regulation, it also refers to equivalent state OSH regulations when work is completed in OSHA state-plan states. When state OSH regulations require additional or different measures that go beyond Federal OSHA requirements, employees are obligated to follow those additional state-specific requirements.

Nothing in this plan is designed to conflict with or be less stringent than any applicable local, state, or federal law or regulation. In the event of any conflict between this program and an applicable regulation, the most applicable regulation with primacy will govern and control, and the program administrator will update this program as necessary and appropriate to address the conflict.

This program references the following consensus codes and industry standards:

- ANSI/ITSDF B56.1-2016: Safety Standard for Low Lift and High Lift Trucks
- ANSI/ITSDF B56.6-2016: Safety Standard for Rough Terrain Forklift Trucks
- ANSI A92: Vehicle Mounted Elevating and Rotating Aerial Devices
- ANSI/ISEA 105: Hand Protection Classification
- ANSI/ISEA 107: High Visibility Safety Apparel and Accessories

- ANSI/ISEA Z87.1: Occupational and Educational Eye and Face Protection Devices
- EN 388: European Standard for Protective Gloves
- ANSI/ASSP A10: Construction and Demolition Operations
- ANSI/ASSP A10.1 Pre-Project and Pre-Task Safety and Health Planning
- ANSI/ASSP Z87.1: Personal Eye and Face Protection Devices
- ANSI Z535: Criteria for Safety Signs, Tags, and Barricade Tape
- ANSI/ASSP Z358.1: Emergency Eyewash and Shower Equipment
- ANSI/ASSP Z359: Fall Protection and Fall Restraint
- ANSI/ASSP Z390.1: Hydrogen Sulfide Training
- ANSI Z89.1-20: Industrial Head Protection
- ANSI Z41: Protective Footwear
- ASTM F2413: Standard for Performance Requirements for Foot Protection
- U.S. Department of Transportation Manual on Uniform Traffic Control Devices (MUTCD)
- NFPA 51B: Standard for Fire Prevention During Welding, Cutting, and Other Hot-Work
- NFPA 70: National Electric Code (NEC)
- NFPA 70E: Standard for Electrical Safety in the Workplace
- NFPA 350: Guide for Safe Confined Space Entry and Work
- NFPA 704: Signs and Labels
- NFPA 1670: Standard on Operations and Training for Technical Search and Rescue Incidents
- NFPA 2112: Standard on Flame Resistant Garments for Protection of Industrial Personnel Against Flash Fire
- NFPA 2113: Standard on Selection, Care, Use, and Maintenance of Flame Resistant Garments for Protection of Industrial Personnel Against Short Duration Thermal Exposures from Fire

This list of consensus codes is non-exhaustive – Additional codes apply.

POLICIES AND PROGRAMS

This document describes the overarching occupational safety and health (OSH) related administrative policies and programs of this organization. These policies and programs apply to all employees at all locations.

Safety and Health Policy Statement

This organization provides workplaces free of recognized safety and health hazards through the establishment of comprehensive health and safety programs, the promotion of mutual accountability throughout this organization, and the promotion of open and honest communication about occupational safety and health hazards.

We believe:

- Our employees are our most important asset
- Adherence to reasonable and appropriate safety and risk management principles is an integral part of our organizational philosophy and is both a strategic asset and an operational necessity
- No job is too important to prevent its completion in a safe, quality, efficient, and pollution free manner
- Every individual in our organization carries personal responsibility for safety and health, quality management, and environmental protection
- Safety is good business. The prevention of incidents, injuries and illnesses helps control costs, grows business, and adds value for us, and our clients

We believe in the following operational priorities:

- Safety. Safety takes precedence over all else
- Quality. Consistent high quality and customer service
- Productivity and Schedule. Once we address safety and quality, we focus on productivity, efficiency, and the schedule

Management commits staff, time, and money, to help ensure we protect personnel from hazards, injury, and illness. In addition, management visibly leads in the design, implementation, and continuous improvement of the site's safety and health activities.

Through leadership by example and active involvement, management expects all employees to:

- Actively predict emerging hazards when reasonable and appropriate
- Actively identify existing hazards
- Promptly report hazards and unsafe working conditions, incidents, near hits, occupational injuries, and occupational illnesses to frontline leaders as discovered
- Conduct operations safely, efficiently, and within the guidelines and procedures outlined in this program and other relevant organizational documents

- Understand and support the integrity of this program
- Ensure designated competent-persons actively fulfill their roles
- Work with each other, frontline leaders, and managers to address safety and health matters

Involvement

This organization values meaningful employee involvement. Several avenues exist for employee involvement in safety and health decision making and problem solving. These avenues include:

- Act as a safety observer
- Help with or provide employee safety training
- Develop advanced skills and work as a competent-person in an area of specialty
- Exercise stop-work authority and aid in the analysis of associated hazards
- Help analyze hazards and select control methods
- Participate in incident investigations
- Participate or leading ad hoc problem-solving team
- Plan activities to heighten safety and health awareness
- Serve on a safety committee

This organization encourages employees to surface safety and health hazards, improvement opportunities, and ideas promptly. Employees should communicate these items to frontline leaders and managers, verbally, by email, by anonymous written letter, or other similar means.

HAZARD MANAGEMENT

This program describes how this organization actively identifies, evaluates, and corrects hazards and monitors the workplace on a go-forward basis.

Hazard Identification, Evaluation, and Control

The anticipation and recognition of hazards is the first step in controlling losses and potential losses. Once hazards are recognized, they must be evaluated and quantified in terms of the hazards scope and magnitude. Finally, proper, and effective hazard controls must effectively abate them.

To assist in the identification, evaluation, and control of hazards, and appropriate application of the technical aspects of the programs in this document, this organization uses the services of occupational safety and health professionals knowledgeable and skilled in these tasks, and in the associated safety and health regulations and consensus codes, whenever necessary.

Hazard Identification

Hazard identification methods include, but are not limited to the following:

- High-level hazard assessments
- Periodic hazard assessments
- Industrial hygiene surveys
- Employee on the job observations

Employee On-the-Job Observations

Employees that observe hazards, unsafe situations, or behaviors are empowered and expected to immediately address the issue and inform their frontline leader. In some cases, the hazard, or unsafe behavior can be corrected at once through prompt communication and job knowledge. In other situations, the hazard, or unsafe behavior is part of a bigger problem, requires an engineered solution, or is not easily correctable for other reasons. Frontline leaders must investigate all safety issues brought to their attention in a timely fashion and either address them or bring in additional resources as appropriate.

Hazard Assessments

This organization completes hazard assessments when:

- This program is first established
- New substances, processes, procedures, or equipment are introduced to the workplace that represent a new OSH hazard
- This organization is made aware of a new or previously unrecognized hazard
- On a periodic basis

Hazard assessments can be high-level, or they can be focused, as the situation dictates. Certain tasks incur a systemic risk, and/or an elevated risk. In these cases, an interdisciplinary team may complete a high-level hazard assessment designed to identify the risks, understand their magnitude, and set up appropriate controls. These high-level hazard assessments may conform to any assessment method setting forth each hazard, control methods, and related information. High level hazard assessments must include at least one occupational safety and health professional. Focused hazard assessments are performed by knowledgeable individuals with or without an accompanying team, but with guidance from an occupational safety and health profession, when necessary and appropriate.

Regardless, the program administrator, occupational safety and health professionals, and others will work with frontline leaders to follow-up on all findings, investigate them as necessary and appropriate, and ensure hazardous conditions, or violations are corrected in an agreed upon timeframe; however, it is the frontline leader who has the ultimate responsibility to ensure the implementation of corrective actions within their sphere of influence. The program administrator will document and retain all corrective actions and retain this documentation until the hazard is corrected and in compliance with document control requirements.

When a hazard assessment reveals an issue associated with the work of a contractor, vendor, or service-provider the organization will inform the contractor promptly and will hold that contractor accountable for corrective actions.

The results and follow-up on hazard assessments are shared with employees during meetings.

Frontline leader's will share the results of hazard assessments with the program administrator to enable sharing of lessons learned and cross level institutional OSH knowledge and experience.

Hazard Evaluation

Hazard evaluation methods include, but are not limited to the following:

- Industrial hygiene monitoring
- Job hazard analysis
- Personal protective equipment assessments

Industrial Hygiene Monitoring

The organization will periodically perform industrial hygiene (IH) monitoring as necessary and appropriate to quantify and characterize workplace health and safety issues. IH monitoring builds upon IH surveys to characterize and quantify exposures to harmful substances and enable development and deployment of appropriate engineering and other controls.

Process/Task/Job Hazard Analysis

The process, task, or job hazard analysis coequally known as job hazard analysis (JHA) is a procedure designed to identify job and task related hazards before they create a loss. The JHA will conform to generally accepted best practices including ANSI/ASSP A10.1 Pre-Project and Pre-Task Safety and Health Planning.

JHA's are reviewed with all employees during pre-job and pre-task briefings. Personal protective equipment selection is a part of the JHA process.

Hazard Control

Once identified, personnel will prevent, correct, and control hazards consistent with applicable regulations, industry, and occupational safety and health best practices, and the technical aspects and limitations of selected control methods.

Personnel will correct hazards upon discovery. However, corrective actions are sometimes complex, require additional evaluation, or need equipment or material, or require additional or specialized personnel, that may not be present at the time of discovery. In these cases, the timeline for corrective action is directly dependent on the hazard's severity. Hazards that are severe, i.e., life and limb threatening or imminent, or that involve many exposed employees, require rapid intervention and corrective action.

Regardless, assigned frontline leaders will take responsibility for managing this process, setting up corrective action deadlines, completing or delegating corrective actions, and verifying the corrective actions' appropriate implementation. Frontline leaders will also ensure continuity between other organizations to ensure that the hazard remains appropriately controlled, especially when

If the hazard is life or limb threatening or an imminent harm situation, involved employees must exercise their stop work authority. Refer to that program for details on managing stop work situations.

UNDER NO CIRCUMSTANCES WILL ANY EMPLOYEE OR SUBCONTRACTOR ALLOW A LIFE THREATENING, LIMB THREATENING, OR IMMINENT HARM HAZARD TO PERSIST.

IF IT IS NOT POSSIBLE TO IMMEDIATELY AND PERMANENTLY CORRECT THE HAZARD, PERSONNEL MUST DEPLOY TEMPORARY AND APPROPRIATE SAFEGUARDS TO PROTECT EXPOSED EMPLOYEES UNTIL A PERMANENT CORRECTIVE ACTION IS COMPLETED AND, ANY TEMPORARY SAFEGUARD MUST MEET BOTH OSH REGULATORY REQUIREMENTS AND THIS ORGANIZATION'S OSH PROGRAMS. PERSONNEL WILL COORDINATE WITH FRONTLINE LEADERS, WHO WILL IN TURN COMMUNICATE AND COORDINATE WITH THE GENERAL CONTRACTOR, HOST EMPLOYER, AND OTHER EXPOSED PARTIES, AS NECESSARY AND APPROPRIATE.

PERSONNEL ARE EXPRESSLY PROHIBITED FROM USING TIME AS A CORRECTIVE ACTION. FOR EXAMPLE: LEAVING A FLOOR HOLE IMPROPERLY GUARDED BECAUSE UPCOMING WORK OVER THE NEXT TWO DAYS INVOLVES INSTALLING EQUIPMENT OVER THE HOLE. THE HOLE MUST BE GUARDED PROPERLY, ALWAYS.

This organization will develop and implement corrective actions using one or more of the methods discussed within this section and in accordance with the generally recognized hazard control hierarchy, in the order listed:

- Elimination
- Substitution
- Engineering Controls
- Administrative Controls
- Personal Protective Equipment

Ideally, employees will apply the highest level of hazard control to a given situation recognizing that work environments present less than ideal hazard control options. Use of one hazard control method over another one that is higher in the hierarchy is appropriate for short term employee protection until hazard abatement is complete. In many cases, the deployed control measures include a layered approach of two or more methods.

This organization recognizes the difficulties in implementing a hierarchy at work locations it does not control, and that are temporary, however, it will implement this hierarchy when reasonably possible.

If one cannot eliminate the hazard or reduce the risk through substitution, use engineering controls to reduce the employee exposure to the hazard or reduce the magnitude of the hazard. These are pre-designed features of a system or process. Engineering controls include the following.

- Use structural changes to the work environment, work systems, tools, or equipment to make them safer
- Use mechanical aids or manual handling devices
- Isolate the hazard to reduce employee exposure (for example, Gates, fences, exclusion zones)
- Redirect the hazard away from the employee, for example, Local exhaust ventilation

Engineering controls are subject to mechanical failure and human (design) error or behavioral failures such as when an employee intentionally defeats a system.

When engineering controls are not possible, administrative controls are employed as the fourth tier of hazard control. Administrative controls include the following.

- Standard operating procedures, safe work practices, hot-work permits, confined space entry permits
- Exposure time limitations and job rotation
- Routine preventive maintenance and change out schedules
- Appropriate safe work procedures and permits
- Signs, signals, barricades, and alarms
- Buddy systems
- Training

Administrative controls are effective but are subject to human error. Administrative controls in the absence of other controls are never appropriate.

The final tier in the hierarchy control is personal protective equipment (PPE). PPE includes chemical or flame-resistant clothing, safety glasses, face shields, respirators, hearing protection, and hard hats, to name a few examples. PPE, when used with other hazard control methods concurrently, is acceptable as a control method in the following circumstances:

- When engineering controls are not possible or do not eliminate the hazard
- During the development and implementation of engineering controls
- When administrative controls do not provide reliable or enough protection
- During emergencies, when engineering, or administrative controls are not possible

The use of PPE as a control method has inherent problems that must be overcome or managed. These include the following:

- The use of PPE often creates significant other hazards. Examples include increased breathing resistance with respirators, heat stress associated with the use of chemical resistant clothing and reductions in vision, mobility, and hearing. Typically, risks associated with PPE increase with increasing levels of protection. Additionally, the use of some PPE triggers other safety and health regulations
- Incorrectly selected PPE can cause employee exposures or unnecessary levels of stress to the employee
- Training and workplace monitoring are required since PPE use is subject to human error. The improper use of PPE can expose the user to the hazard and in some situations, present an even greater danger than the original hazard alone as the employee enters a situation thinking he or she is safe. Additionally, employees may use PPE in situations unsuited to its design

Emergencies and Emerging Hazard Control

During emergencies, hazards can suddenly appear that are not normally found in the workplace. Examples include weather related events such as floods, high winds or tornados and human created incidents such as vehicle crashes, criminal activity, and severe non-compliance. Other events can occur within the organizations systems due to unforeseen circumstances or events.

Emergency planning to identify possible emergencies and find the best way to control or prevent the hazards they present is a part of this organizations OSH program and includes the following.

- Survey of possible emergencies and the hazards that accompany them
- Planning actions to reduce impact on the workplace
- Employee information and training
- Emergency drills as needed
- Site visits by local emergency response agencies

Employees will work with their frontline leaders to immediately correct hazards that involve imminent harm to an employee or another person. If the problem cannot be corrected, the operation must be halted until it can be made safe. Employees will not operate unsafe equipment, work in an unsafe area, or operate an unsafe process.

DOCUMENT CONTROL AND RECORDS MANAGEMENT [29 CFR 1904]

This program describes how this organization maintains injury and illness records and records related to specific programs.

Application and Scope

This program applies to all OSH records including written programs, audits, hazard assessments, exposure assessments, medical records, completed permits and forms, training records, and other similar documents and records.

If the organization develops an organizational and topic wide document-retention program and there are conflicts, the OSH document retention requirements described in this program take precedent.

Regulations, Codes, and References

This program is compliant with the following regulations:

- 29 CFR 1904: Recording and Reporting Occupational Injuries and Illness
- 29 CFR 1926: Applicable part of each applicable regulation
- 29 CFR 1910: Applicable part of each applicable regulation

This document provides overall requirements and procedures, but it does not supersede applicable federal or state law.

Version Control of Written Programs and Forms

The program administrator keeps the most recent copies of this program, any associated health and safety programs and all other records and information described in this program ensuring these documents are available in both paper and electronic form to the extent possible. The program administrator takes precautions to ensure only the most recent version of these documents are in circulation and these records, and information are sufficiently backed-up to prevent loss in case of facility damage.

Employee Access to Written OSH Programs and Form

Employees have access to written OSH programs and forms through the following methods:

- Locate and download copies from company server and/or data-storage applications
- Access paper copies through frontline leaders
- Request copies by emailing the program administrator

Topic Specific Recordkeeping Policies

This organization maintains records on all the following policies and topics when the underlying program is applicable.

Bloodborne Pathogens

When applicable and required by law:

- Employee Exposure Records: Keep for the duration of employment of each exposed employee plus 30-years
- Vaccine declination form: Keep for the length of employment or until the employee elects to receive the vaccination
- Sharps log: Keep for five years following the end of the year that it pertains to

Control of Hazardous Energy Procedure Reviews

Retain for at least one year and always until the next review is complete. The actual equipment-specific energy control procedures are kept in a perpetual fashion with annual reviews and updates as needed.

Chemical Exposure Records

Chemical exposure records include monitoring results of workplace air contaminants and other toxic or harmful substances. Retain chemical exposure records for the duration of employment of each exposed employee plus 30-years and never less than the length of time required by substance specific regulations.

Confined Spaces

Retain classification forms and supporting data for as long as the applicable facility and confined space(s) are in use/active and until they are decommissioned and dismantled or removed, or until updates are made. Retain cancelled entry permits for a minimum of one year and always until a review is completed and documented.

Hazard Assessments

Retain hazard assessments and corrective action documentation for the life of the location to which they apply, until the hazards are corrected, or one year, whichever is longer

Incident Investigations Reports

Retain incident investigation reports until all hazards are corrected, as needed to satisfy associated insurance claim needs, or one year, whichever is longer.

Process/Task/Job Hazard Analysis

Retain JHA records for the life of the project, site, task, or job at a minimum, and keep comprehensive JHA for as long as they are applicable and until replaced with revised version.

Medical Opinions and Related Records

Retain for the duration of employment of each exposed employee plus 30-years.

Noise Monitoring

Maintain sound level measurements and dosimetry records for no less than two years, but ideally for the full length of employment. Retain employee hearing test results and related documentation for no less than the full length of employment.

Powered Industrial Trucks

Retain powered industrial truck (PIT) pre-use inspection forms for the prior calendar year and the current year to date. Retain maintenance records for the life of the PIT. Retain operator certifications for not less than three years, but ideally the length of employment.

Personal Protective Equipment Assessments

Retain PPE assessments and certifications of PPE assessments for exposed employees duration of employment, or as long as the hazard exists, whichever is longer.

Preventative Maintenance

Retain documents relevant to preventative maintenance and repair for the life of the equipment plus three years.

Respiratory Protection Records

Retain respirator medical questionnaire results and opinions for the duration of employment of each exposed employee plus 30-years. Retain respirator fit-test records until the next test is completed, at a minimum.

Safety Data Sheets

Maintain SDS for each hazardous material at all organizational facilities as follows:

- Organization Facility SDS: Keep a contemporaneous file of all SDS in use
- Chemical List(s): Keep for the duration of employment of each exposed employee plus 30-years

Archive all SDS for chemicals no longer in use and keep for the duration of employment of each exposed employee plus 30-years.

Training Records

Training records includes initial and follow-up training rosters, training certificates when a regulation requires them, PIT evaluation and observation forms, and similar records, and documentation. Retain these training records for the length of employment, at a minimum unless this program states otherwise.

Environmental Records

The organization retains environmental records as required by the applicable federal, state, and local laws and regulations.

Records Not Otherwise Listed

The retention time for safety records not discussed within this program, but generated because of this OSH program, is at least 7-years, but never less than requirements discussed in the relevant regulations, laws, or as practical to achieve the aims of this program, whichever is greater. The retention time for occupational health records generated because of this program, but not discussed within it, is the duration of employment of each exposed employee plus 30-years.

Topical Forms and Permits Not Otherwise Listed

Retain the completed forms and cancelled permits for the length of the work plus an additional period to ensure these records are kept for at least 1-year, and never less than the applicable regulatory requirement.

Injury and Illness Recordkeeping

The program administrator records occupational injury and illnesses on the applicable year's log 300 within 7-days of an incident, when the occupational injuries, or illnesses meets recordability criteria. The program administrator will also complete a form 301 for each occupational injury and illness when the injury or illness meets recordability criteria.

This organization creates a file for each occupational injury and illness that contains relevant workers' compensation and related records and keeps these workers' compensation files in a secure and confidential manner. However, the program administrator maintains OSHA logs, including form 301's in separate files from workers' compensation records.

After 31 December of each year, the program administrator will complete the following tasks for the preceding year:

- Review the form 300 for accuracy and completeness
- Summarize injury and illness data on form 300 A
- Complete all necessary calculations and develop metrics
- Secure the signature of the highest organizational officer at the site, certifying the summary
- Post the previous year's OSHA form 300 A between 1 February and 30 April
- Electronically file injury and illness data for the preceding year's performance, on, or before each year's electronic recordkeeping submission deadline, as required by Federal OSHA or state OSH programs as applicable

At a minimum, the program administrator will keep all injury and illness records for 5-years following the end of the calendar year that the records cover.

Location Recordkeeping

In the even this organization operates multiple locations with variable durations, it keeps one common 300 log, and set of 301 forms for all locations less than one year in duration. However, it may keep separate 300 logs for convenience, keeping in mind each location must keep a unique set of injury and illness records for itself and each location that falls under that facility.

When the organization's employees work at a location for longer than one year, it will keep separate forms for that location. The organization will also keep separate injury and illness logs and forms for locations located in state-plan states based on the respective state requirements.

Employee Access to Medical and Exposure Records

In general, health and safety records are required by law to be kept confidential, however, employees may view their own health and safety files if they so wish. Additionally, copies of their records are available upon request, at this organization's expense. This organization allows employee's designated representative to access their own medical and exposure records with written authorization, signed by the employee. Reports of IH and exposure monitoring are made available in the same manner.

Forms

- Injury and Illness Logs and Forms: Fed OSHA 300/300A/301 or applicable state versions, when operating in state-plan states

DISCIPLINARY ACTION

All employees, including all levels of management, are accountable for helping create safe and healthy working conditions and following safety and health regulations, procedures, guidelines, and rules. This policy provides disciplinary action guidance when behavioral failures occur.

Policy

Employees that intentionally, negligently, egregiously, and/or repetitively initiate or participate in OSH violations are subject to disciplinary action that may include the following:

- Verbal warning with written notice copied to employee's file
- Written reprimand
- Suspension
- Dismissal from a workplace location
- Dismissal from employment

An "OSH violation" or "safety violation" is:

- A failure to apply or follow safe work practices, procedures, and policies
- A failure to use proper PPE
- The intentional or negligent creation of an unsafe situation or event
- An intentional exposure to or increase in exposure to a hazardous substance due to the individual's act or failure to act
- The failure to promptly correct and/or report an unsafe or hazardous condition, allowing it to persist, and expose the individual or others to that hazardous condition
- The knowing use of unsafe tools and equipment
- The intentional disregard of one's safety or the safety of another
- Any other situations or behavior that materially and negatively impact OSH matters

NOTHING IN THIS SECTION IS DESIGNED TO CONFLICT WITH RELEVANT LABOR AND EMPLOYMENT LAWS. IF SOMEONE DISCOVERS A CONFLICT BETWEEN THIS MANUAL AND THE RELEVANT LAW, THE RELEVANT LAW WILL GOVERN AND CONTROL AND THE PROGRAM ADMINISTRATOR WILL UPDATE THIS MANUAL APPROPRIATELY. IF SOMEONE DISCOVERS A CONFLICT BETWEEN THIS MANUAL AND THIS ORGANIZATION'S HANDBOOK, THE PROGRAM ADMINISTRATOR WILL REVIEW AND RECONCILE THESE DISCREPANCIES APPROPRIATELY AND UPDATE THIS MANUAL.

NOTHING IN THIS DOCUMENT IS DESIGNED TO LIMIT OR CONSTRAIN THIS ORGANIZATION'S MANAGEMENT IN ANY MANNER.

THE STATEMENTS IN THIS SECTION DO NOT SUPERSEDE MANAGEMENT, SUPERVISORY JUDGMENT, OR BUSINESS NEEDS. MANAGEMENT RESERVES THE RIGHT TO DEVIATE FROM THESE DISCIPLINARY ACTIONS, APPLY THESE ACTIONS IN A PROGRESSIVE MANNER, OR ACCELERATE THE PROCESS IF THE INFRACTION IS WILLFUL OR EGREGIOUS IN NATURE.

DRUG AND ALCOHOL POLICY

Substance abuse is of great concern to this organization because of the negative health effects on individuals, the additional risks imposed upon the individual and colleagues, and the negative impact of substance abuse on families, friends, and the community. For these reasons, this organization maintains a drug and alcohol-free workplace policy.

Drug and Alcohol-Free Workplace Policy

All employees are expected to report fit for duty for scheduled work. Employees will keep their ability to perform assigned duties safely and without any limitations due to the use or aftereffects of alcohol, illegal drugs, legally prescribed medications, and non-prescription, over the counter medications. Employees must report the use of all legally prescribed drugs and over the counter medications that will or that could interfere with safe work, and management may require that employees curtail certain or all work activities during such use.

Non-DOT Drug and Alcohol Program

This organization has developed and keeps a non-DOT drug and alcohol program that applies only to chosen job-titles not regulated under Federal DOT drug and alcohol testing regulations. Please refer to the referenced program for further details.

INCIDENT, INJURY, AND ILLNESS REPORTS AND INVESTIGATIONS [29 CFR 1904]

This section describes the types of incidents that require reporting, what must be investigated, how employees must make reports, and related requirements.

Application and Scope

This program applies to all organizational locations and employees. It covers reporting and investigation of the following events:

- Actual or suspected occupational injury, illness, or fatality cases
- Damage to owned or rented equipment
- Damage to this organization's facilities or another's
- Damage to products and operations completed
- Environmental contamination or possible environmental contamination
- Injury to third-parties
- Motor vehicle incidents involving vehicles owned by this organization
- Motor vehicle incidents involving vehicles rented by this organization
- Motor vehicle incidents involving personal vehicles used for business purposes
- Serious safety and health related incidents without a corresponding injury
- Vandalism, theft, and other similar crimes
- Workplace violence, including threats of bodily harm

This program covers the internal reporting of occupational injuries and illnesses to this organization's designated personnel and external reporting of selected occupational injuries and illnesses to Federal OSHA, or the applicable state OSHA office when the workplace is in a state-plan state. However, procedures and guidance on documenting occupational injuries and illnesses is covered in Document Control and Records Management.

The stop work program covers stop work and initial reporting of imminent harm situations, other OSH hazards, and near-misses/near hits. However, a stop work intervention may require formal written reports under this program, in addition to the first verbally issued stop work, and the optional use of the stop work form described within the stop work program.

Regulations, Codes, and References

This program is compliant with the following regulations:

- 29 CFR 1904: Recording and Reporting Occupational Injuries and Illness

Functional Roles and Responsibilities

The following employees have specific function responsibilities under this program:

- Program administrator
- Frontline leaders
- Employees

Program Administrator

The program administrator will:

- Report injuries and illness to OSHA following legal requirements
- Report insurance claims to insurance carriers
- Report incidents and claims to managers and executives
- Conduct incident investigations

The program administrator may delegate tasks to OSH professionals or other qualified individuals.

Frontline Leaders

Frontline leaders will:

- Ensure that employees properly report all incidents, suspected, and actual occupational injuries and illnesses
- Facilitate prompt employee reporting, helping as necessary to complete required forms
- Ensure that forms and information are properly transmitted to the program administrator
- Complete follow-on tasks including easing post-recovery return to work for injured employees, completion of investigations, implementation of corrective actions, and related tasks

Frontline leaders may not delegate their responsibilities under this subsection except, however, that they may delegate certain investigative functions, or the entire investigation, when specialized knowledge is required by the investigator to enable proper investigation; in that case, a third-party OSH professional or other qualified-person is required.

Employees

Employees will:

- Report all incidents, workplace injuries, and illness to frontline leaders as soon as practical
- Complete the first report of injury form within 24-hours of injury or the next business day
- Complete other incident forms as directed

Employee's Obligation to Report All Incidents

Employees have an ongoing obligation to report all incidents, including workplace injuries and illnesses, to their frontline leader verbally, immediately upon discovery, regardless of whether medical treatment occurred. Employees must then file a written report right for the circumstances.

In the case of an occupational injury or illness, employees must complete and sign a first report of injury form (FROI) themselves, unless they are unable to do so because of that injury. If an employee is unable to complete the FROI, their direct supervisor will do so. Completed FROI forms are due as soon as possible after injury but no later than 24-hours or the next business day. The injured or ill employee will provide the completed form to their frontline leader who will then send the document to the organizations' workers' compensation administrator (WCA) together with any physician's reports during the first medical visit.

Injuries and Illnesses Reporting to OSHA

As soon as reasonably possible but not longer than 8-hours of the incident, the program administrator will report the following to Federal OSHA or the applicable OSH agency for state-plan states:

- The death of any employee from a work-related incident

As soon as reasonably possible but not longer than 24-hours of the incident, the program administrator will report the following to Federal OSHA or the applicable OSH agency for state-plan states:

- The inpatient hospitalization of an employee
- Any amputation, even if no bone is involved (an avulsion is not considered an amputation)
- Loss of an eye

If the program administrator or other manager at the organization does not learn about an incident right away, but the incident meets the oral report requirement described in this section, then the organization will report the incident as soon as reasonably possible but not longer than 8-hours of the notification time, documenting the details of notification. The host employer will be informed as soon as reasonably possible but no longer than 8-hours of any OSHA reportable injury unless owner requirements require faster reporting.

When notifying OSHA, the program administrator will make the report by telephone or in person to the Area Office of the Occupational Safety and Health Administration, U.S. Department of Labor (OSHA) nearest to the site of the incident or will call OSHA at 1-800-321-OSHA (1-800-321-6742) or will report this online (<https://www.osha.gov/report.html>).

The program administrator will include the following information in the oral notification:

- The establishment's name
- The location of the incident
- The time of the incident
- Type of incident (that is, fatality, inpatient hospitalization, amputation, or loss of an eye)
- The number of employees who suffered the incident
- The names of any injured employees

- The organization's contact person and his or her phone number
- A brief description of the incident
- Any other information required by state law for reporting in state-plan states

The organization recognizes that it is not required to report the following:

- A fatality, inpatient hospitalization, amputation, or eye loss incident that involves a commercial airplane, train, subway, or bus accident
- A fatality, inpatient hospitalization, amputation, or eye loss because of a motor vehicle incident when the motor vehicle incident occurred on a public street or highway, and did not occur in a construction zone
- A fatality that occurs 30-days or longer of an incident
- An inpatient hospitalization, amputation, or eye loss that occurs greater than 24-hours of an incident
- An inpatient hospitalization for diagnostic testing or observation only
- An inpatient hospitalization due to a heart attack, if the heart attack resulted from a work-related incident

Investigations and Follow-Up Reports

This organization expects employees to report incidents verbally followed by a written incident report. Once the situation is reported, an incident investigation must begin. The nature and extent of investigations is dependent on the severity of the situation and the relative risk of a repeat situation. At a minimum, the incident types described at the start of this section all require a documented investigation.

The program administrator is responsible to ensure the completion of an incident investigation and will take reasonable and proper actions based on the nature and severity of the incident. Once reported, the frontline leader will initially investigate the incident.

Depending on the outcome of the investigation and severity of the incident, the program administrator may:

- Close the investigation with no action taken
- Solicit further investigations and recommendations by other qualified persons
- Correct the issue immediately through ad hoc plan corrective actions
- Correct the issue systematically and comprehensively

When the situation is complex, or when specialized knowledge is needed, the program administrator requires that the frontline leader work with an OSH professional or other qualified individual to complete the investigation. An OSH professional or other qualified person will subsequently complete or complete in parallel, a detailed incident investigation to discover the root causes, contributing causes, and find the full range of possible corrective actions.

The results of all investigations and related required are fully documented and retained in accordance with this organizations document retention policy and never less than completion and validation of correction actions.

Forms

- First report of injury (FROI) form
- Incident investigation form
- Insurance report forms (Auto, Property, General Liability) – Obtain from insurance carrier

REGULATORY INSPECTION PROCEDURES

This guide provides basic procedures for receiving OSHA Compliance Safety and Health Officers (CSHOs) and completing compliance inspections.

Inspection Procedure

OSHA may send CSHOs to this organization's locations to inspect this organization directly or, this organization may be brought into an OSHA inspection that involves a contractor or service-provider when they are onsite. Regardless, when this organization receives an inspection or is involved in the inspection of another, this guide applies.

The typical inspection process includes an opening conference, the actual inspection, and a closing conference. The opening and closing conferences vary in length and formality, depending on the nature and scope of the inspection. The actual walkaround inspection also varies in length and scope.

During the opening conference, the CSHO will discuss:

- The reason for the inspection
- The extent of the inspection or of the limits of the inspection
- Approximately how long the inspection will take
- How the inspector will conduct the inspection
- Other pertinent facts

The CSHO will then conduct the walkaround inspection of the location and or the facility. The CSHO will take pictures, record video, ask many questions, and take notes. The CSHO will typically:

- Ask to speak with employees
- Ask to speak with leads, supervisors, and managers

Finally, the CSHO will conduct a closing conference to discuss findings and next steps. Depending on the course and scope of the inspection, and the number and severity of findings, the closing conference may occur immediately or several days later.

In some circumstances, the CSHO will say they need to come back and take air samples or bulk samples to test for the presence of hazardous substances.

Response to the Opening Conference

Positively identify the CSHO upon arrival. Get a business card, examine their badge, and Department of Labor/OSHA identification card. Ask who the CSHO is there to inspect and ask why the CSHO is conducting the inspection. If it is a complaint, ask for a copy of that complaint.

Contact the following people:

- This organization's OSH professional
- Any organizations that have employees on site
- When employees are unionized, union representatives must be notified

Ask the CSHO to wait by their vehicle or in a conference room until notifications have been complete and appropriate personnel have arrived. Assign someone the responsibility of staying with the CSHO to prevent them from wandering around, until everyone arrives. Do not allow the inspection to begin without the presence of at least the OSH professional and the frontline leader. Having the CSHO wait is acceptable, provided it is not excessive.

While it is acceptable and common practice to ask the CSHO to wait a short time before the inspection starts to allow the appropriate personnel to arrive, do not deny OSHA entry, and do not request a warrant or a subpoena unless you have been directed to do so by the program administrator, an OSH professional, or an executive of this organization.

Response to Walkaround Inspections and the Closing Conference

During the walk around inspection, the CSHO will try to ascertain:

- Conditions or situations that did or could violate a regulation
- Hazardous substance exposures
- Employees that were or could be exposed to hazards or hazardous substances
- If this organization knew or should have known of the violating condition or hazard
- If feasible means exist to correct the hazards and violations

Observe all the following during an inspection:

- Remain calm and cooperative. Act in a professional, businesslike manner. Be as polite as possible regardless of the inspector's behavior or attitude. Do not let the CSHO antagonize or otherwise upset you. Never enter into personal arguments with the CSHO and avoid small talk
- Keep all publications and documents given to you by the CSHO, noting who gave it to you, and the date and time of its receipt
- Make a list of documents the CSHO wants; these will be assembled and submitted after the inspection
- Take detailed notes of everything discussed and use the regulatory inspection form to help keep track
- Whenever possible, collect the same data the CSHO collects, take pictures and video from the same angle, if the CSHO records video or audio, record simultaneously

Take the time after the inspection to complete a closing conference. Ask about the CSHO's findings and find out what the CSHO intends to do next. If the CSHO determines a follow-up visit is required to obtain air samples, they will request to schedule this at this time.

Document Requests

The organization has a legal obligation to provide several types of documentation to OSHA, however, avoid supplying written documentation or copies of programs to the CSHO immediately since this can result in the transmission of incorrect documents or information and cause confusion. Instead, make a complete list of all requested documents and files and inform the CSHO that the organization will gladly supply the requested information all at one time, once the workplace inspection is complete. The OSH professional and the program administrator will work together to collect the requested documents and send them to OSHA.

Interview Requests

This organization must allow CSHOs to confidentially speak with employees, will not obstruct any investigation or inquiry, and will never direct any employee on what to say or not say to a CSHO. However, if the circumstances necessitate, this organization will request that the CSHO interview employees at dates and times that do not interfere with work.

The employee may ask to be accompanied by someone during the interview, but it is the employee's choice of who goes with them during the interview, and this organization may not mandate who.

If the CSHO asks to speak with management, this is by appointment, and only when an OSH professional is present with the manager during the interview.

Forms

The following forms are included.

- Agency Inspection Form

CONTRACTOR MANAGEMENT

This organization requires contractors and service providers to work safe and address hazards. This organization reserves the right to pre-qualify contractors during the contracting phase, and to maintain safety files on each.

Minimum Requirements

All contractors must have a comprehensive written health and safety program that covers relevant work and exposures. All employees must understand the basic elements of this program prior to starting work. The program, depending on scope of work, must address all legally-required topics and risk-based topics associated with the subcontractor's work and trade.

All contractor employees must have OSH training based on legal requirements and the risks associated with the subcontractor's work and trade. Contractors will make all training records available to this organization upon request.

Contractor employees will take part in all workplace training, toolbox talks, pre-job briefings, JHA reviews, and similar training sessions, and meetings provided by this organization, as requested to support their work for this organization.

Contractors will follow the same incident and injury reporting procedures described in this OSH program.

Subcontractors will make all contemporaneous safety records available to this organization as requested.

Upon completion of a job, the contractor will conduct a post-job safety performance review with this organization and will provide relevant written records to this organization.

Contractors are made aware of this program and its requirements before work starts.

TRAINING AND EDUCATION

This section covers occupational safety and health related training and education. It applies to all employees and temporary agency employees.

Minimum Training Requirements

OSH programs are only effective when everyone receives enough technical training to understand what their safety and health responsibilities and opportunities are, and how to fulfill them. All employees will complete the appropriate and required health and safety training. Temporary agency employees must receive the same training provided to direct employees that would perform the same role.

Training and instruction is provided:

- When this program is first established
- To all new employees, except for construction employees, who are provided training through a construction industry OSH training program approved by Cal-OSHA (when this program is applied in California)
- To all employees given new job assignments for which training has not previously provided
- Whenever new substances, processes, procedures, or equipment are introduced to the workplace and represent a new hazard
- Whenever the employer is made aware of a new or previously unrecognized hazard
- To frontline leaders to familiarize them with the safety and health hazards to which employees under their immediate direction and control may be exposed
- To all employees with respect to hazards specific to each employee's job assignment
- When a specific regulation requires training

This organization provides training using the following methods:

- New Hire Orientation
- Initial Topical and Refresher Training
- Pre-Job/Pre-Task Safety Briefings
- Toolbox Talks
- Substance Specific Training
- Equipment Operator Training
- Site Specific Orientation and Training

This organization may keep a separate training matrix that summarizes its training topic and training frequency requirements. The classes, frequencies, and similar criteria described in the training matrix supersede the training criteria in this document when so indicated within the training matrix, or the training matrix may simply summarize the contents of these requirements from this OSH program. Refer to the training matrix for details. Regardless, under no circumstance will training classes, content, and frequencies be less than the applicable regulatory requirements.

OSH professionals or other qualified instructors conduct training. Employees are encouraged to suggest qualified trainers, including themselves. In some situations, online training is used.

Training is provided in a language and delivery method that is readily understandable by the intended audience.

Training rosters are completed for each training session and kept with other health and safety records. For some topics, training certificates are also kept. When required by regulator, the records retention time is the length of employment of the trainee, at a minimum. Training records include the following minimum information:

- Topic(s)
- Date and time of training
- Length of training
- Facilitator/instructor name and signature (and entity if not this organization)
- Name and signatures of each participant

New Hire Orientation

Each new employee will undergo a new hire orientation that includes, in addition to any job specific training, general health and safety training and hazard communication training, at a minimum. This training takes place before the new employee begins their assignment. Someone competent in the delivery of the material and knowledgeable about this organization's health and safety programs, policies, and procedures will conduct the training. Managers and frontline leaders must ensure that this training process is followed for all new employees and for any employee beginning a new job at the workplace.

Initial and Refresher Topical Training

Before any employee engages in a specific activity that requires training under one or more safety regulations or organizational policies, the employee must complete the required training. Each employee is responsible for ensuring that he or she masters each training topic. Frontline leaders are required to provide ample time to allow employees to complete the required training.

Periodic refresher sessions are required. It is up to each employee and their frontline leader to ensure that they complete the requisite training.

The specific training requirements at this organization vary by job-title and are listed in the topical section in this program and/or in the training matrix associated with this program.

When employees are exposed or could be exposed to selected hazardous materials, this organization will provide the right level of substance specific training consistent with the employee's exposure, the risks, and the associated legal requirements.

Pre-Job/Pre-Task Safety Briefings

This organization conducts pre-job and pre-task safety briefings when necessary to support safe operations. These briefings acquaint employees and contractors with information on the anticipated hazards, safe work practices, required PPE, communication methods, applicable JHAs, and other relevant information.

Toolbox Talks and Safety Huddles

Toolbox talks and safety huddles are short, topical safety talks led by frontline leaders. This organization conducts periodic talks with employees and contractors on an as-needed basis. When applicable, these include:

- Short topical safety briefings, trainings, and reminders
- A request for employees to discuss any relevant safety concerns
- Kudos and shout outs for safety excellence
- Other relevant OSH matters

Heavy Equipment Operator Training

Heavy equipment operators must be qualified to operate assigned equipment by training, experience, or a combination of both. This organization requires the successful completion of equipment operator training, or satisfactory experience as shown by a qualification examination, when the employees operate equipment that includes, but is not limited to the following:

- Aerial lifts
- Portable and gantry cranes
- Heavy equipment
- Powered industrial trucks (forklifts, telehandlers/rough-terrain forklifts)
- Scissor lifts

Refer to the relevant topical section of this manual for full details.

CONFINED SPACE

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CONFINED SPACE ENTRY

This program describes the organizations' minimum requirements for the identification, classification, and safe entry into permit required confined spaces.

Application and Scope

This program applies to all permit-required confined space entry operations for all permit-spaces at all locations. It covers all employees, temporary employees, contractors, and subcontractors.

Functional Roles and Responsibilities

Employees tasked with the functional roles described in this section have specific responsibilities. These program-specific functional roles include the following:

- Program Administrator
- Entrants
- Attendants
- Entry Supervisors
- Competent-Persons

All participants involved with confined space entry operations complete all required training. Reference the training section of this document for details.

Program Administrator

The program administrator is responsible for ensuring the completion of annual permit reviews.

Entrants

Entrants prepare the permit space for safe entry and enter the space to perform work. Entrant responsibilities include all the following:

- Prepare the permit or assist in its preparation
- Attend the pre-entry briefing
- Understand the nature and extent of the hazards in the space
- Select and use appropriate engineering controls
- Select and use appropriate PPE
- Select and use appropriate entry equipment
- Help isolate the space and complete all lockout/tagout requirements
- Each entrant must have their own lock placed on each isolation point or a group lockout/tagout is required. Entrants must retain their own keys

- Verify safe entry conditions before the initial entry
- Rescind any permit for noncompliance with permit requirements, safety regulations, or this program

Entrants must immediately evacuate if:

- An alarm is activated
- Communication is lost
- Unknown exposures are encountered
- Ordered to do so by the attendant or the entry supervisor

Attendant

Attendants help prepare the space for entry and they ensure the safety of entrants. Attendant responsibilities include all the following:

- Prepare the permit or assist in its preparation
- Attend the pre-entry briefing
- Understand the nature and extent of the hazards in the space
- Understand the symptoms of entrant overexposure to atmospheric contaminants, including behavioral changes
- Establish and maintain ventilation
- Assist the entrant to select and use appropriate engineering controls, PPE, entry equipment, and to complete the lockout-tagout/isolation
- Verify safe entry conditions before the initial entry and observe the space for safety during the entire entry operation
- Ensure continuing and effective operation of ventilation equipment
- Control access to the space
- Maintain an accurate headcount of entrants in the space
- If an unauthorized entrant enters the space, immediately call an evacuation, terminate all entry operations, and notify the entry supervisor
- Maintain communication with entrants
- Perform atmospheric monitoring during entry operations and document contaminant levels on the permit unless another person is assigned this task
- Require the entrant to evacuate the space if unsafe conditions develop, including, but not limited to a hazardous atmosphere
- Must have and test a reliable communication method to allow contact with the entry supervisors and emergency services

- Summon emergency services (if needed) and assist rescue efforts from outside the space
- Never leave the immediate vicinity of the space without first evacuating the entrant
- Rescind any permit for noncompliance with permit requirements, safety regulations, or this program

An attendant may observe more than one permit space at a time if:

- The attendant has direct line of site with each entry point
- The attendant can maintain contact with all entrants reliably
- The attendant can easily and quickly travel between the entry points (that is, they are all on the same level, they are all in the same room, ladders are not necessary for attendant access)
- The entry supervisor believes the level of safety is acceptable and agrees with the program
- An emergency occurs, the attendant immediately calls an evacuation of all confined spaces under observation to enable the attendant to focus on the problem, including activation of emergency response activities. Entry operations in all confined spaces halt until the entry supervisor indicates it is safe to resume operations
- Entry supervisors may disallow multiple permit space monitoring at their discretion

Entry Supervisor

Entry supervisors oversee all entry operations, verify preparations, and take responsibility for the safety of everyone involved. Entry supervisor responsibilities include all the following:

- Remain on site during entry operations
- Understand the nature and extent of the hazards in the space
- Approve or disapprove the permit
- Approve or disapprove of entry operations involving one attendant monitoring multiple spaces
- Conduct the pre-entry briefing
- Advise the entrant, as requested or needed, in the following areas: Select and use appropriate engineering controls, appropriate PPE, appropriate entry equipment, and Isolate the space and complete all lockout/tagout requirements
- Verify safe entry conditions before the initial entry
- Ensure personnel are evacuated when necessary and never enter the space
- Ensure a rescue program is in place and all necessary communications have occurred prior to entry
- Ensure permits are complete and removed when work is finished
- Ensure all necessary equipment is returned to its proper location
- Conduct the post-entry briefing

- Rescind any permit for noncompliance with permit requirements, safety regulations, or this program
- Ensure cancelled confined space entry permits get returned to the program administrator in a timely fashion

There are additional entry supervisor responsibilities triggered when one or more of the entrants to the permit space work for another employer. These additional responsibilities include the following:

- Provide information on existing permit spaces, the associated hazards, and hazard controls
- Ensure all non-company entrants apply their own locks and tags to each lockout/tagout point or the group lockout/tagout box
- Conduct pre-entry briefings with non-company entrants
- Conduct post-entry briefings with non-company entrants
- Complete any other multiemployer coordination activities discussed in this program

These additional responsibilities do not apply when the confined space is new, the permit space is not yet tied into existing systems and company employees are not working on or in the space. Reference the multiemployer communication section of this document for additional details.

Competent-Person

Competent-persons have specific knowledge, specific responsibilities, and they are specifically assigned by the company. Competent-persons provide both program support and technical assistance. Competent-persons (for confined spaces), when assigned, have the following responsibilities:

- Identify confined spaces and permit required confined spaces
- Classify spaces as either non-permit or permit required confined spaces
- Reclassify spaces as necessary and appropriate
- Aid in the evaluation of permit space hazards
- Approve or disapprove of temporary declassification of permit spaces to non-permit spaces
- Approve or disapprove of alternate entries
- Provide technical assistance when called upon

The program administrator may designate one or more competent-persons to perform responsibilities under this program, including qualified outside parties.

Multiemployer Roles and Responsibilities

Mandatory, functional roles exist when more than one employer works in a permit space; this occurs when a contractor installs a new permit space, or modifies an existing space, at a host employers facility or jobsite, or as a subcontractor to a general contractor. Good communication and coordination are required.

In situations where there are temporary agency employees and independent contractors, each effectively acting as employees working for a common employer, and the situation does not involve a host-employer to contractor relationship, or a host-employer to general contractor to subcontractor relationship, these multiemployer coordination requirements do not apply since there is only one organization involved with confined space entry.

When applicable, the multiemployer roles are established based on the following employer categories:

- Host employer
- Controlling contractor
- Entry employer

Host Employer

The host employer is the employer owning or managing the property where the permit space work is taking place. This is typically the company. However, a general contractor can serve as the host employer if agreed. In no case will there be more than one host employer.

Controlling Contractor

The controlling contractor is the employer with overall responsibility for the work. If the controlling contractor also owns or manages the property, then it is both a controlling contractor and a host employer. The company is a controlling contractor when it manages its own construction work in lieu of a contractor. This is on a case-by-case basis. To determine whether the company is a controlling contractor, discuss this with the assigned competent-person or the program administrator prior to the projects start date.

Entry Employer

The entry employer is any employer who decides an employee it directs will enter a permit space or it is any employer whose employees work in the immediate vicinity of a confined space and may enter the space to complete work. Multiple entry employers are possible. If the company's employees enter a space when multiemployer worksite roles and responsibilities apply, the company is an entry employer. Entry employers jointly, when more than one, and individually ensure entry operations are safe, compliant with applicable OSHA regulations and this program.

Multiemployer Coordination

Multiemployer coordination is required when any person, other than a company employee or an independent contractor effectively working as an employee needs to enter a confined space. If there is no controlling contractor present at the worksite, the requirements for, and role of, the controlling contractor in this section must be fulfilled by the host employer or other employer who arranges to have employees of another employer perform work involving permit space entry.

Pre-Entry Coordination Requirements

Before entry operations begin, the host employer provides the following information, if available, to the controlling contractor:

- The location of each known permit space

- The hazards or potential hazards in each space or the reason it is a permit space
- Any precautions the host employer or any previous controlling contractor or entry employer implemented for the protection of employees in the permit space

Before entry operations begin, the controlling contractor must obtain the host employer's information about the permit space hazards and previous entry operations and provide the following information to each entity entering a permit space and any other entity at the worksite whose activities could foreseeably result in a hazard in the permit space:

- The information received from the host employer
- Any additional and relevant information the controlling contractor has about the permit spaces including locations, hazards, and precautions
- The precautions the host employer, controlling contractor, or other entry employers implemented for the protection of employees in the permit spaces

Before entry operations begin, each entry employer must:

- Obtain all the controlling contractor's information regarding permit space hazards and entry operations
- Inform the controlling contractor of the permit space program the entry employer will follow, including any hazards likely to be confronted or created in each permit space

The controlling contractor and entry employer(s) coordinates entry operations when more than one entity performs permit space entry at the same time. Furthermore, permit space entry is performed while any activities could foreseeably result in a hazard in the permit space.

Post-Entry Coordination Requirements

After entry operations:

- The controlling contractor must debrief each entity entering a permit space regarding the permit space program followed and any hazards confronted or created in the permit space(s) during entry operations
- The entry employer must inform the controlling contractor in a timely manner of the permit space program followed and of any hazards confronted or created in the permit space(s) during entry operations
- The controlling contractor must apprise the host employer of the information exchanged with the entry entities pursuant to this subparagraph

Contractor Rescue Procedures

The company expects contractors to coordinate rescue operations with the same agency the company uses to perform rescue work for its own entry operations unless the contractor has its own rescue program, rescue personnel, and equipment. It is the responsibility of the contractor to coordinate rescue operation preparation when the space is new, and the company has no experience with the space or its hazards.

Non-Permit and Permit Space Definitions

A non-permit required confined space (non-permit space) is a space that meets has all the following characteristics:

- Large enough and configured where an employee can bodily enter and perform assigned work
- Limited or restricted means for entry or exit and
- Not designed for continuous employee occupancy

A permit required confined space (permit space) has all the characteristics of a confined space and at least one of the following:

- Contains or has a potential to contain a hazardous atmosphere
- Contains a material having potential for engulfing an entrant
- Internal configuration where an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor sloping downward, tapering to a smaller cross section
- Contains any other recognized serious safety or health hazard

Classification and Reclassification

A competent-person must identify all permit required confined spaces (permit spaces) and evaluate the hazards of each permit space. If there are changes in the use or configuration of a non-permit required confined space (non-permit space) increasing the hazards to entrants, reclassification as a permit space is required. If a permit space changes and no longer meets the definition of a permit space, a competent-person may declassify the permit space to a non-permit space.

Classification and reclassification always require documentation and evaluation by a competent-person using the classification form accompanying this program, or another from in substantial conformance when approved by the program administrator. The program administrator must retain all classification documentation for the life of the project, in the case of jobsites, and for the life of the space, for general industry situations.

Identification and Unauthorized Entry Prevention

All permit required confined spaces require signs on or near the entry point to prevent unauthorized access and entry. At a minimum, the sign must contain the words “Danger Permit Required Confined Space. Do Not Enter” and must use the ANSI danger symbol and the red danger banner.

A permit space must never be labelled only as a “confined space” unless the sign also contains additional language such as “no unauthorized entry” and “keep out,” to differentiate it is a permit space. Signs using a mixture of pictograms and words specifically informing employees to stay out are preferred.

Signs must be consistent throughout the facility or workplace. The use of bilingual signs is encouraged. To facilitate easy identification, permit spaces may have one or more identification numbers associated with it, though this is not required.

If an unlabeled space has the characteristics of a permit required confined space or it is unclear, assume it is a permit space unless proven otherwise, in consultation with a competent-person. Report unlabeled permit required confined spaces to the program administrator upon discovery.

A controlling contractor constructing, installing, or modifying a permit space must properly classify and demark it, if not already completed by the exposed employers.

Entry Procedures

Before initial entry into the space, the entry team completes the following:

- Prepare the entry permit
- Complete and verify hazardous energy control and permit space isolation
- Setup ventilation and gas detection equipment
- Setup entry equipment
- Complete the pre-entry briefing
- Confirm acceptable entry conditions – Entrants will not enter any space where acceptable entry conditions have not been established and confirmed
- Don PPE and begin entry

Entry Permit

A permit is required for each entry operation. The entrant, attendant, or entry supervisor may generate the permit individually or jointly, however, the entry supervisor ultimately retains responsibility for the proper and appropriate generation of entry permits.

Once the entry team generates and properly completes the permit, the entrants, attendant, and entry supervisor must each approve the permit by signing in the appropriate location. All entrants must sign the permit. A permit is invalid until fully executed.

The entry supervisor ensures the permit (together with hot-work permits) the equipment/space specific hazardous energy control procedure and other applicable permits to work, are posted at the entry to the space or are available during entry by other equally effective means. The attendant ensures the permit always remains available. This allows entrants and attendants to verify the preparations were completed and makes the permit available to rescuers, should the need arise.

Each permit is valid for the time necessary to conduct the work as defined on the permit, however:

- It may not exceed the time required to complete the assigned task or job identified on the permit
- It expires at the end of each shift regardless
- It is never valid for longer than 24-hours

The entry supervisor is ultimately responsible for cancelling the permit upon completion of the work. The entry supervisor will retain the cancelled permit and return it to the program administrator for subsequent evaluation. Cancelled permits have a 1-year document retention requirement – Do not discard them.

When the work crosses multiple shifts, the oncoming shift, and personnel must generate a new permit for the work they are responsible for during their shift.

During entry operations, any member of the entry team may terminate entry and suspend the permit when previously identified and controlled hazards become uncontrollable. Furthermore, any other situation arises necessitating a halt in entry operations and a reassessment. If the situation is temporary in nature and does not change the configuration of the space or create any new hazards within it, the entry may resume when the situation is corrected, and hazards are back under control.

Permit cancellation is required if the situation involves conditions or hazards including the following:

- Space (or near it) are not allowed under the permit
- Conditions or hazards are not temporary
- Configuration of the space changes
- New hazards are created

In the event of a cancellation when work is incomplete, regardless of reason, the entry team must reassess the space, reimplement controls with adjustments to address the new situation and complete a new permit.

Hazard Categories

Confined space hazards fall into one of three categories that include the following:

- Inherent Hazards
- Introduced Hazards
- Adjacent Hazards

Inherent Hazards

Inherent hazards are permanent characteristics or attributes of the space. Examples include, but are not limited to:

- Difficult and limited access
- Size and shape of the space
- Products normally stored in the space creating engulfment, fire, toxicity, and similar hazards
- Processes normally completed in the space create fire, toxicity, and similar hazards
- Fixed mechanical equipment such as rakes, plows, and agitators

Introduced or Work Created Hazards

Introduced or work created hazards are hazards not normally associated with the space's purpose or processes; they are introduced into the space or adjoining area(s) deliberately or inadvertently. These hazards include, but are not limited to:

- Slippery surfaces from cleaning operations using liquids
- Atmospheric contamination from the evaporation or volatilization of cleaning chemicals

- Atmospheric contamination from welding, grinding, and cutting including metal fume, vapors from flux, metal dust, toxic byproducts from exposure of certain compounds to ultraviolet light

Adjacent Hazards

- Spaces containing a common wall or piping system where toxic or flammable vapors could migrate through
- Work activities conducted nearby
- External hazards surrounding the space such as traffic, equipment, smoke, fumes, contaminant producing activities, heating, cooling, and similar

Hazardous Atmospheres

Hazardous atmospheres can be inherent to the space, introduced to the space, or they can originate adjacent to the space. Regardless of source, management is required.

A hazardous atmosphere is an atmosphere exposing entrants to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

- Flammable gas, vapor, or mist more than 10% of its lower flammable limit (LFL)
- Airborne combustible dust at a concentration meeting or exceeding its LFL approximated as a condition where the dust obscures vision at 5-feet or less
- Atmospheric oxygen concentration below 19.5% or above 23.5%
- Atmospheric concentration of any substance where a dose or a permissible exposure limit can result in employee exposure in excess of its dose or permissible exposure limits described in Subpart G, Occupational Health, and Environmental Control, or Subpart Z, Toxic, and Hazardous Substances, with the following exception:
- An atmospheric concentration of any substance not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision
- Any other atmospheric condition that is immediately dangerous to life or health

Cleaning, Ventilation, and Atmospheric Monitoring

Clear the space of all chemical contaminants and other hazardous contents before entry. This includes the draining of chemicals, rinsing, neutralization, and other techniques designed to remove chemical residues.

Mechanical ventilation is also required prior to the entry and continuously during entry operations. Attendants establish positive pressure ventilation with enough volume and time to remove residual vapors and gases. Furthermore, attendants establish a safe atmosphere before entry, ensuring an ongoing safe atmosphere in the permit space during entry operations. Target approximately ten air changes prior to entry to ensure adequate dilution of airborne contaminants. When necessary, use explosion proof ventilation equipment.

Once initial ventilation is achieved, attendants will test the atmosphere with a direct read, pumped instrument, from outside the space, in the order indicated:

- Oxygen content (no less than 19.5% and no more than 23.5%)
- Flammable gases and vapors (no more than 10% of the lower explosive limit (LEL) and ideally zero)
- Toxic air contaminants are below their applicable occupational exposure limit (OEL) in consideration of the respiratory protection used, or if no respiratory protection will be used, below the applicable time weighted average (TWA), ceiling (C) and short term/short term exposure limits

Attendants will test the atmosphere prior to initial entry and on a continuous basis during all entry operations. Attendants will test the space at all levels to account for heavier and lighter than air vapors and gases.

Entrants will not enter the space when a hazardous atmosphere is present and will immediately evacuate the space if a hazardous atmosphere develops.

Attendants must share gas detection readings with entrants initially and as requested thereafter; Entrants have the unlimited right to check and recheck atmospheric hazards and must never enter a space unless they have personally observed gas detector readings.

Entrants are encouraged to wear personal gas detectors during entry, however, personal gas detectors worn by entrants will not replace a pumped gas detector used remotely by the attendant outside the space, with a sample draw tube long enough to draw air samples from all levels of the space.

For purposes of this program, a hazardous atmosphere is an atmosphere exposing employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury and acute illness from any of the following:

- Flammable gas, vapor or mist more than 10% of its LFL
- Airborne combustible dust at a concentration meeting or exceeding its LFL
- Oxygen less than 19.5% or greater than 23.5%
- Gases, vapors, dusts, and mists from any toxic or corrosive substance including, but not limited to those substances listed in 19 CFR 1910 Subpart Z and applicable ACGIH-TLVs and/or NIOSH-RELs and/or AIHA-WEELs, as applicable; consult with the assigned competent-person or an occupational safety and health professional as necessary
- Any other atmospheric condition immediately dangerous to life or health (IDLH)

A non-hazardous atmosphere is considered safe for entry.

Gas detectors used for this purpose will be in good working order, regularly calibrated, with sensors appropriate for the atmospheric hazards and intrinsically safe. The minimum acceptable gas detector is a four-gas detector with the following sensors:

- Oxygen
- LEL
- Hydrogen Sulfide
- Carbon Monoxide

Any alarm by a gas detector is cause for immediate evacuation of all entrants and an evaluation of cause, outside of the permit space. No entrant will remain in the space if a gas detector alarms.

Hazardous Energy Control and Isolation

Each permit space must be isolated from all hazardous energy. This involves the complete protection of employees from:

- The release of energy or stored energy
- Material entry into the space
- Contact with physical hazards
- Inability to egress or escape the space

Hazardous energy control involves the application of lockout/tagout principles to hazardous energy sources associated with permit spaces. Permit space isolation extends the concept of lockout/tagout. Locking and tagging a valve stops the pipes contents from entering the space, however, valves fail and thus, the space is not isolated. To isolate the space, a second valve is closed, and a bleeder valve located between the two closed valves is locked open (double block and bleed), or the pipe is physically separated at a nearby bolted flange and blank flanges are added to each open pipe section, followed by the application of locks and tags.

Appropriate techniques include, but are not limited to, blanking, blinding, misaligning, or removing sections of lines, pipes, or ducts, double block, and bleed, blocking, or disconnecting all mechanical linkages, placement of barriers combined with locks and tags and full compliance with the control of hazardous energy program, to eliminate the potential for employee exposure.

These techniques isolate the space and completely protects entrants from the release of stored energy, material entry into the space and contact with physical hazards.

The entry team must isolate the space, complete lockout/tagout requirements in accordance with the company control of hazardous energy program and the equipment specific procedure. Each entrant must affix personal locks and tags, retaining their own keys. Group lockout boxes are acceptable for use by entrants.

Exposure to health hazards is also critical. When entrants are exposed to chemicals, additional precautions apply. Refer to the ventilation, PPE, and chemicals sections of this program for additional information.

Nothing in this program is meant to limit the use of additional protective measures and isolation techniques to increase entrant safety.

Chemical Residues and Cleaning Chemical Use

Hazardous chemical residues are sometimes left behind, even after a space is cleaned. This can occur because of hidden or hard to reach areas, automated system failures, and other causes. Entrants must understand the hazards associated with prior permit space contents and take precautions, including appropriate use of PPE, recognition of these residues when present and avoidance of contact.

The intentional use of cleaning chemicals in confined spaces also presents hazards to entrants. If chemical use inside the space is required during entry operations, the typical approach involves severely limiting the volume of chemical introduced in the space to minimize the hazard in addition to other substance specific or cleaning method specific hazard controls.

Before entering a permit space with residual chemicals and before entrants bring chemicals into a permit space, the entry team must ensure the following:

- Involve a competent-person or an occupational safety and health professional
- Evaluate the flammability of the chemical, its toxicity, routes of entry, and other hazards
- Identify possible entrant behavioral effects from overexposure
- Provide guidance on controls
- Provide chemical protective clothing and respiratory protection

Always provide specialized PPE and additional precautions, as required. Consult industry and situational consensus codes on chemical cleaning use in vessels, tanks, process vessels, including but not limited to NFPA 326.

Combustible Dust

The presence of combustible dust in a permit space present considerable hazards to occupants. Hazards include the toxic effects of exposure to the dust and the consequences of fire and explosion. The requirements and procedures in the company's combustible dust management program apply when dealing with combustible dust within a confined space. The entry team must incorporate appropriate combustible dust management procedures when it is present.

Hot-Work

Hot-work in a permit space is prohibited unless all aspects of the company's hot-work program are followed, including the issuance of a hot-work permit. Refer to the hot-work program for additional details.

Inerting

Inerting is the intentional displacement of a flammable gas or vapor in a permit space with a noncombustible gas, such as nitrogen, to such an extent the resulting atmosphere is noncombustible. Inerting is permitted to control flammable gases and vapors to the extent this is appropriate to control these vapors prior to initial ventilation, however, under no circumstance may any employee enter an inerted space. Additionally, the area immediately around all air horn exhausts, local exhausts and entry/egress locations can present asphyxiation hazards. The entry team must take additional precautions to prevent inadvertent exposure to simple asphyxiants using barricades and legible warning signs. Inerting procedures must follow industry specific consensus codes, as applicable.

Compressed Gas Cylinders

Under no circumstance will any person place a compressed gas cylinder, other than breathing air on a self-contained breathing apparatus, of any kind inside a permit space for any reason. For welding and cutting tasks, identify appropriate length hoses in good repair instead.

Engulfment Hazards

When the risk of engulfment from upstream hazards is possible, such as when working in a stormwater sewer or similar type of space, provide an early warning system continuously monitoring for non-isolated engulfment hazards. The system must alert authorized entrants and attendants in enough time for the authorized entrants to safely exit the space. This can be achieved by positioning a trained employee far enough upstream to provide an evacuation warning and allow enough time for entrant egress.

Acceptable Entry Conditions

Before entry, each entry team member individually and collectively satisfies themselves that all the following conditions exist:

- The space is isolated from hazardous energy as defined in this program, the control of hazardous energy program and applicable equipment specific lockout/tagout procedures
- Continuous forced air ventilation is in use and effective
- The space does not contain a hazardous atmosphere as defined in this program
- Work created hazard controls are in place
- Appropriate PPE is available and in use
- Appropriate entry equipment is available and in use
- A rescue program is established and confirmed with rescuers consistent with this program
- All administrative tasks are complete to include the permit, pre-entry briefing and, when applicable, multiemployer coordination
- All permit conditions are satisfied

Entry is disallowed unless acceptable entry conditions exist. The team will immediately halt operations and entrants will evacuate the space if acceptable entry conditions are not met at any time during the operation.

To the extent possible, the competent-person must identify, and evaluate inherent hazards, adjacent hazards when present and, to the extent possible, introduced hazards when they are reasonably anticipated. However, the entry team must consider all hazard classes and sources and establish hazard controls prior to entry since introduced hazards and adjacent hazards are not always present or obvious during initial classification or reclassification activities by the competent-person.

Initial and periodic competent-person evaluations and classifications do not alleviate the responsibility of each entry team member to properly evaluate hazards, establish appropriate controls, and include this information on the entry permit.

Entry Equipment

Entry and retrieval equipment needs vary based on the permit space characteristics and the type of entry. The primary differentiation points are horizontal versus vertical entry and the spaces hazards. Regardless of entry type, to facilitate non-entry rescue, the company requires the use of retrieval systems and other methods whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant.

Only use equipment designed for confined space entry and fall protection, as applicable. Do not use confined space entry equipment to raise and lower or position production or other tools and equipment. Do not use rigging equipment for raising, lowering, or positioning entrants. Never attach a retrieval line to any mechanical equipment not expressly designed for work positioning or rescue. Entry equipment must be rigged to facilitate self-rescue and non-entry rescue.

Horizontal Entry

Each authorized entrant must use a full body harness with a retrieval line attached to the D-ring at the center line of the entrant's back and at shoulder level or at another point presenting a profile small enough for the successful removal of the entrant. Entrants may not disconnect from the retrieval line during the entry.

Entrants may use wristlets instead of a full body harness only under the following conditions:

- Using a full body harness is infeasible
- Using a full body harness creates a greater hazard
- Use of wristlets is the safest and most effective alternative

If the depth of the confined space is more than 5-feet, a mechanical retrieval device is required. If the depth of the confined space is 5-feet or less, a retrieval line securely attached to an anchor point outside the space is enough to comply with this provision though the use of a mechanical retrieval device is always a valid and useful option to reduce the retrieval effort.

Vertical Entry

When a fall hazard exists within a permit space and during vertical entries into spaces, appropriate fall protection equipment is typically required, in addition to entry equipment. A typical arrangement is to use shoulder D-rings with a yoke or the chest D-ring to raise and lower entrants while reserving the back D-ring for a retrieval style self-retracting lifeline. However, for spaces deeper than approximately 20-feet and for spaces where extended suspension time (over 9-minutes) may occur, raising, and lowering personnel from the back D-ring is not allowed. The attachment point in these cases will be the shoulder D-rings or chest D-ring and a Bosun's chair or a harness designed for extended suspension time (that is, equipped with a built-in seat or other arrangement taking pressure off the big leg arteries).

In addition to protecting the entrant, the attendant and other employees working near the entry of the permit space must also use appropriate fall protection if exposed to a fall either inside the permit space or outside. When a permit space presents a hazard to uninvolved individuals, such as fall hazards into the space from the outside, the entry team barricades the area, identifies suitable fall arrest equipment and other relevant precautions. The barricade setback distances are increased if the atmosphere in the space presents a hazard to personnel outside but near the entry point.

Refer to the fall protection program and consult a competent-person as necessary if clarification or assistance is required to ensure the correct use of fall protection equipment in parallel with entry equipment.

Tool Lanyards

The use of tool lanyards when working in a confined space, especially during vertical entry, is typically recommended unless the tool lanyard presents an entanglement risk. Tool lanyards minimize the risk to anyone working below. They prevent damage to confined spaces from dropped objects and they help prevent leaving tools behind.

Communication Equipment and Methods

Attendants must have a reliable communication method or methods allowing them to do the following:

- Maintain communication with attendants enough to assess entrant status and enable the attendant to alert entrants of the need to evacuate the space
- Summon the rescue team in time of need
- Communicate with entrants in other confined spaces if monitoring more than one space

Lighting

Entrants must always have adequate lighting for the task and to ensure good visibility. Typical lighting includes flashlights and helmet mounted lights though other options are permitted. In all cases, if the space has contained flammable materials, including dusts, liquids, vapors and gases, intrinsically safe lighting is required. The use of cyalume light sticks as backup lighting is also an option.

Personal Protective Equipment

The selection of PPE is based on the hazards and the entry type. At a minimum, the following PPE is required:

- Hardhat
- Safety glasses
- Hearing protection
- Gloves
- Climbing style hard hat (ANSI rated, Type II, Class G minimum)
- Sturdy work pants and shirts or coveralls

Additional PPE required for the hazards include, but is not limited to:

- Respiratory protection (air purifying respirators or supplied air)
- Chemical protective clothing
- Welding leathers and face shields with appropriate shade level for eye protection
- Hazard specific PPE

The entry team evaluates the PPE needs and document this on the entry permit.

Pre-Entry Briefing

The entry supervisor coordinates and leads a pre-entry briefing, ensuring all members of the entry team are present, observe gas detector readings, understand, and test communication methods, verify isolation, and review other items. Team members must individually and collectively satisfy themselves that acceptable entry conditions have been achieved.

If the entry will involve more than one employer, the team will follow the additional briefing requirements described in the multiemployer coordination section of this program.

Entry Operation Termination and Post-Entry Procedures

Upon completion of work in a permit space, the entry supervisor completes the following:

- Ensure the removal of all tools and equipment
- Verify the removal of all lockout/tagout devices
- Return the permit space to normal operations
- Conduct a post-entry briefing with the entry team to discuss the entry operation, deviations and necessary improvements and documents findings on the permit back as follows:
- Sign the permit acknowledging the operation is complete, equipment, and surrounding areas are clean and returned to normal operations
- Return the cancelled permit with any notes to the program administrator for further discussion and evaluation

If employees from another company are involved, they must be involved in the post-entry briefing.

Rescue

To the greatest extent possible, the company uses entry techniques and equipment that support self-rescue and non-entry rescue. These self-rescue and non-entry rescue techniques are designed to bridge the gap between incident occurrence and arrival of professional rescuers, who will always be called if a confined space incident occurs.

The company uses the local fire department to provide rescue and emergency services in addition to the self-rescue and non-entry rescue techniques. To familiarize rescue personnel with the company facility and emergency needs, the company provides access to all permitted spaces where rescue may be necessary. This access allows the rescue team to develop rescue programs and practice rescue operations. The company also informs the rescue team of the hazards they may confront when called on to perform rescue at the site. The local rescue team and the company periodically conduct tours and training exercises to ensure firefighters understand the nature and extent of permit space hazards, affecting a potential rescue to occur rapidly and as safe as possible.

Prior to entry into a confined space, the entry supervisor calls the non-emergency dispatch number and informs the dispatcher of the pending confined space operation. They request the dispatcher confirm a rescue team is available and can mobilize to the site consistent with the appropriate rescue tier. The entry team may not commence entry operations until a rescue teams' availability is confirmed. Under no circumstance may an entry proceed unless a rescue team is available based on the requirements of the space and the NFPA rescue tiers indicated in the classification form.

Third-party rescue teams and employee rescue teams are both permitted when properly trained.

When an employee-designated rescue team is tasked with technical rescue and entry-based rescue, the organization will maintain a separate rescue program appropriate for the required level of expertise.

NFPA 350 Rescue Tiers

The company applies NFPA 350-2016 rescue tiers to confined spaces to help it properly plan for rescues. NFPA 350-2016 sets forth a classification system for three different rescue response modes in paragraph 10.1.3.4.

The degree and rapidity of response should be driven principally by the anticipated hazards. Those spaces containing known hazards should receive greater scrutiny and perhaps more rapid or complex response based on the hazards. Consideration should also include those spaces where technical rescue may be required to move an ill or injured entrant to a stable environment once extracted from the space. Rescue capabilities should be evaluated to ensure they are appropriate to the response.

The three rescue modes are:

- Tier 1 Response Mode. A Tier 1 response mode may be indicated if a hazard evaluation has been performed (in accordance with Chapter 6) and although the space contains no potential for hazards, its configuration would prohibit entrants from being easily removed if they were to become incapacitated due to medical illness or injury. At the minimum, this is applicable to any vertically oriented space greater than 4-feet in height regardless if retrieval equipment is in place. A Tier 1 capability suggests a fully trained rescue team meeting NFPA 1670, confined space rescue chapter, technician level, is available to respond within 5-minutes to the site and is capable of setup and rescue entry within 15-minutes of arrival on site
- Tier 2 Response Mode. A Tier 2 response mode is indicated if a space contains no IDLH or other potentially immediate life-threatening hazards but does contain other actual or potential hazards that could incapacitate entrants or prevent them from exiting the space without assistance (self-rescue). A Tier 2 capability suggests a fully trained rescue team meeting NFPA 1670, confined space rescue chapter, technician level, is on site with appropriate capability to make safe entry for rescue. The rescue team should be equipped, mobile, capable of setup, and rescue entry within 12 to 15-minutes of incident occurrence
- Tier 3 Response Mode. A Tier 3 response mode is indicated if work is occurring inside a space containing an IDLH or other immediately life-threatening hazard, either actual, or potential. A Tier 3 capability suggests a fully trained rescue team meeting requirements stated in NFPA 1670, confined space rescue chapter, technician level, is standing by in the immediate area with appropriate capability to ensure safe entry for rescue. This team should be completely setup and capable of rescue entry within 2-minutes of incident occurrence. The rescue team should be dedicated to this singular entry with no other responsibilities

Temporary Declassification Procedure

On a limited basis, a competent-person may declassify a permit space as a non-permit space if the permit space:

- Poses no actual or potential atmospheric hazards and
- All hazards within the space are eliminated without entry into the space.

The permit space may be reclassified as a non-permit confined space for as long as the non-atmospheric hazards remain eliminated. The control of atmospheric hazards through forced air ventilation does not constitute elimination of the atmospheric hazards.

If it is necessary to enter the permit space to eliminate hazards to achieve a temporary declassification, the entry must follow full permit space entry requirements found throughout this document. If testing and inspection during entry demonstrate the hazards within the permit space have been eliminated, the permit space may be declassified as a non-permit confined space for as long as the hazards remain eliminated.

If hazards arise within a permit space previously declassified to a non-permit space, entrants must immediately evacuate the space. The competent-person must reevaluate the space and determine whether it must be reclassified as a permit space in accordance with other applicable provisions of this section.

The competent-person certifies all hazards in a permit space have been eliminated. A certification contains the date, space location, and certification person's signature. The certification is available to each employee entering the space.

Alternate Entry Procedure

On a limited basis, a competent-person may evaluate a permit space and, if conditions permit, may allow entrants to complete operations using alternate entry procedures. Alternate entry procedures are permitted when a competent-person determines:

- The only hazard posed by the permit space is a potential or actual hazardous atmosphere
- Continuous forced air ventilation alone is enough to maintain a safe for entry permit space
- The employer develops supporting atmospheric monitoring and inspection data, making this data available to each employee entering the space
- If initial entry into the permit space is necessary to obtain data, the entry must be performed in full compliance with the permit space entry requirements found throughout this program

The alternate entry procedure involves the following:

- Eliminate any conditions making it unsafe to remove an entrance cover before the cover is removed
- Once entrance covers are removed, guard the opening promptly with a railing, temporary cover or other temporary barrier to prevent an accidental fall through the opening and to protect each employee working in the space from foreign objects entering the space

- Before an employee enters the space, test the internal atmosphere with a calibrated direct reading instrument, for atmospheric contaminants in the order listed: (1) Oxygen content, (2) Flammable gases and vapors, (3) Potential toxic air contaminants
- A hazardous atmosphere is not allowed when any employee is inside the space

Test the atmosphere within the space continuously to ensure the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere and provide monitoring results to all employees who enters the space. If a hazardous atmosphere is detected during entry:

- Each employee must evacuate
- Evaluate the situation to determine how the hazardous atmosphere developed
- Implemented corrective actions to protect employees from the hazardous atmosphere before any subsequent entry takes place

Continuous forced air ventilation is required, as follows:

- Employees do not enter the space until the forced air ventilation has eliminated any hazardous atmosphere
- Direct the forced air ventilation to ventilate the immediate area where an employee is or will be present within the space and continue ventilation until all employees have left the space
- Ensure the air supply for the forced air ventilation is from a clean source so it does not increase the hazards in the space
- If at any point ventilation is lost, the entry must terminate

Written certification is required and demonstrates the space is safe for entry and the pre-entry measures required by this section have been taken. Certification is before entry and available to each employee entering the space or available to the employee's authorized representative.

Training

The company provides training to all employees involved in permit required confined space entry operations:

- Before first assignment to permit required confined space entry operations
- When there is a change in assigned duties and the new duties involve permit required confined space entry operations
- Whenever changes in permit required confined spaces present a new hazard
- When there are procedural deviations
- When there are inadequacies in an employee's knowledge or use of these procedures
- On a periodic basis absent any other reason not less than once every year

The company uses toolbox talks, classroom sessions, department specific training, practical sessions, and online training to meet this training need. The training establishes employee proficiency in the required duties and will introduce new or revised procedures as necessary.

Initial training in permit required confined space entry for entrants, attendants, and entry supervisors must be face-to-face training at least 8-hours long though proficiency is required of each participant. It must include training on all aspects of entry together with any unique hazards associated with the spaces at the facility. This training must include a discussion of the contents of this written program, how to access this written program, classification forms, blank entry permits, and related information, and a discussion to solicit feedback on program improvements.

Periodic retraining is required with a frequency sufficient to maintain proficiency and when procedures, hazards, or equipment change, and when new permit-spaces are constructed.

Employees tasked with rescue must attend face-to-face, hands-on rescue training consistent with the nature and scope of the hazards they must address and the rescue techniques they must use. At least annual rescue retraining is required though more frequent rescue re-training is encouraged.

Training must be in a language and vocabulary that employees can understand.

The company maintains training rosters for all training participants. The roster contains each trained employee's name, the signatures, or initials of the trainer(s) and the dates and times of training.

Document Retention

At a minimum, this organization retains the program records indicated below.

- Permit-space inventory maintained on a contemporaneous basis
- Permit-space classification documents for each
- Non-permit space classification documents if it is unclear on a space's classification
- Cancelled entry permits for at least one year
- Training for the length of employment plus one year

The program administrator is the custodian of all records.

Forms

The following forms are included in this program:

- Permit-Space Inventory
- Confined Space Classification Form
- Confined Space Entry Permit

CONSTRUCTION METHOD

21 Apr 2022





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EXCAVATION SAFETY

This section applies to all excavation work performed by this organization by all employees at all job-sites. All excavation work is performed in accordance with the requirements in this program and 29 CFR 1926 Subpart P. In most cases, the requirements in this section are prescriptive and employees may not deviate from them except as specifically permitted.

Excavations and Trenches Defined

An excavation is any human created cut, cavity, trench, or depression in an earth surface, formed by earth removal. A trench is a narrow excavation with a depth greater than its width, but the width measured at the bottom is not greater than 15-feet. All trenches are excavations, but not all excavations are trenches.

Sometimes, excavations become trenches when workers install forms or other structures in an excavation, and reduce the dimension between the forms or structure and the side of the excavation to 15-feet or less, measured at the bottom of the excavation.

When measuring the depth of a trench, the deepest point is considered, not the average depth, when identifying cave-in protection methods.

Excavation and Trench Hazards

Excavation and trench hazards include the following:

- Cave-in and collapse
- Falls, falling loads, and falling equipment (into the excavation)
- Hazardous atmospheres
- Permit-required confined spaces within the excavation
- Underground utilities
- Water infiltration
- Nearby structures
- Nearby traffic
- Other hazards

Each hazard requires evaluation and implementation of mitigative techniques and corrective actions by a competent-person, and in some cases a qualified-person, as defined in this program.

Functional Responsibilities

Competent-persons have the following responsibilities associated with this program:

- Conduct inspections of the excavations, adjacent areas, and protective systems before the start of work, every day or shift before work starts, and as needed throughout the shift

- Detect failures, hazardous atmospheres, and other hazards, and take prompt corrective action to remove exposed employees and correct the hazards

The competent-person must possess the following:

- The ability to recognize hazards associated with excavation work
- Knowledge of 29 CFR 1926 Subpart P and other applicable regulations
- The knowledge and ability to use gas detectors, to test for hazardous atmospheres, and to understand the results of gas detector readings
- The ability to analyze and classify soils
- Knowledge of the design and use of protective systems
- The authority and ability to take prompt corrective actions

Duty to Remove Employees from Unsafe Situations

Competent-persons and frontline leaders have an ongoing duty to remove exposed employees from the excavation at once upon observation of a situation that could result in a possible cave-in, indications of protective system failure, hazardous atmosphere development, or other hazardous conditions.

Stop Work and Excavations

Stop-work authority applies to excavation work. Employees completing excavations, or working in an excavation, will stop work and remove themselves from the excavation, if they detect unsafe situations. Reentry is prohibited until a competent-person completes an inspection and deems it safe, or implements corrective actions.

Initial Site Inspection and Hazard Assessment

Before work starts, the assigned competent-person visits each excavation job-site and completes an inspection and hazard assessment to assess conditions. This process involves a physical inspection of the job-site against the intended work and includes the following, at a minimum:

- Identify and evaluate surface encumbrances
- Evaluate the stability of nearby structures
- Identify underground installations by calling for appropriate locates and verifying the completion of locates
- Identify any overhead utilities
- Evaluate nearby vehicular traffic
- Evaluate nearby pedestrian traffic
- Evaluate potential vibration sources near the job-site

- Identify the estimated depth of ground water and likelihood of ground water intrusion into the excavation
- Identify the proximity to surface water and likelihood of migration into the excavation
- Determine the anticipated weather conditions during the excavation work
- Identify the anticipated soil types

This assessment may include test bores and other subsurface analysis to help classify soil, identify depth to ground water and identify any subsurface structures or debris that may impede safe excavation.

Once excavation begins, and before employees enter any excavation, the competent-person must inspect the excavation further, confirm soil classification, confirm appropriate protective systems, identify other appropriate hazard controls, and ensure that all hazard controls are in use and effective.

Cave-In Protection

Protective systems prevent cave-ins, or they shield employees from cave-ins, and they protect employees from material that could fall or roll from an excavation face or into an excavation or from the collapse of adjacent structures. Protective systems include the following:

- Sloping
- Benching
- Shoring
- Shields

Employees must be protected from the collapse of excavations and trenches when the depth is 5-feet or more.

Protective systems are not required when excavations are made entirely of stable rock or when the excavation is less than 5-feet deep and the competent-person verifies that there are no chances of potential cave-in. Protective systems may be necessary in excavations that are less than 5-feet in depth when required by the competent-person.

A registered professional engineer must design and approve protective systems for excavations that are more than 20-feet in depth.

Regardless, the selection and application of protective systems must conform to 29 CFR 1926 Subpart P, applicable manufacturer's instructions, competent-person instructions, and any instructions, or requirements from the assigned professional engineer, as applicable.

Soil Types

Proper selection of protective systems necessitates soil classification by the competent-person. While there are many soil types consisting of a wide variety of minerals in nature, 29 CFR 1926 Subpart P allows for only four.

- Stable Rock
- Type A

- Type B
- Type C

Stable Rock

Stable Rock is natural solid mineral matter that can be excavated with vertical sides and that remains intact when exposed.

Type A Soil

Type A soil is cohesive soil with an unconfined, compressive strength of 1.5 tons per square foot (TSF) (144 kPa) or greater. Examples of cohesive soils include clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam, and sandy clay loam. Cemented soils such as caliche and hardpan are also considered type A. However, no soil is type A if:

- Soil is fissured
- Soil is subject to vibration from heavy traffic, pile driving, or similar effects
- Soil has been previously disturbed
- Soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1 V) or greater or
- The material is subject to other factors that would require it to be classified as a less stable soil

Type B Soil

Type B soil is cohesive soil with an unconfined compressive strength greater than 0.5 TSF (48 kPa) but less than 1.5 TSF (144 kPa); or granular cohesionless soils including angular gravel (like crushed rock), silt, silt loam, sandy loam, and in some cases, silty clay loam, and sandy clay loam or:

- Previously disturbed soils except those which would otherwise be classed as type C
- Soil with unconfined compressive strength or cementation of type A but is fissured or subject to vibration
- Dry rock that is not stable
- Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1 V), but only if the material would otherwise be classified as type B

Type C Soil

Type C soil is soil with an unconfined compressive strength of 0.5 TSF (48 kPa) or less or granular soils including gravel, sand, and loamy sand or:

- Submerged soil or soil from which water is freely seeping
- Submerged rock that is not stable or
- Material in a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1 V) or steeper

Fissured soil is soil that tends to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface. Fissured soil cannot be type A soil.

Soil Classification Process

During the initial excavation stages and before anyone enters an excavation, soil testing, and classification is required, followed by the selection, and installation of appropriate protective systems. This initial soil classification consists of the following:

- Inspect the site and the soil visually
- Complete at least one manual test
- Use an instrument to confirm results (Pocket Penetrometer or Shearvane)
- Document results on this form

The completion of multiple tests assures the competent-person results are accurate. When in doubt, complete additional tests to verify results and/or consult with a professional engineer.

Competent-persons must complete all tests in full conformance with 29 CFR 1926 Subpart P and relevant instrument manufacturer's instructions for test equipment.

Visual Inspection

The competent-person completes a gross visual observation of the site and the soil, looking for any of the following:

- Tension cracks near the excavation
- Layered geological strata
- Signs of sliding, sloughing, toppling, subsidence, bulging, heaving, or squeezing
- Signs of surface water seeping into the excavation
- Signs of subsurface water intrusion
- New damage to adjacent structures
- Vibration from nearby equipment or traffic
- Other hazards and problems

Manual Tests

Complete at least one manual test. Test on fresh soil from the excavation or the spoils pile. Test several samples.

- Dry Strength Test
- Drying Test
- Plasticity Test
- Thumb Penetration Test

Drying Test

The drying test differentiates between fissured cohesive material, unfissured cohesive material, and granular material. Obtain a soil sample 1-inch thick and 6-inches in diameter, allow to thoroughly dry, and observe. If sample has cracks, it is fissured. For unfissured samples, break by hand then break smaller clumps by hand or foot.

- If the sample develops cracks as it dries, the soil is fissured
- Samples that dry without cracking are broken by hand
- If considerable force is necessary to break a sample, the soil has significant cohesive material content, the soil is classifiable as unfissured cohesive material and it is likely type B – Determine the unconfined compressive strength to confirm
- If a sample breaks easily by hand, it is either a fissured cohesive or granular. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them
- If the clumps do not pulverize easily, the material is cohesive with fissures (never type A but likely type B)
- If they pulverize easily into very small fragments, the material is likely granular (type C)

Dry Strength Test

Obtain a fresh soil sample and manually attempt to crumble it in your hand.

- If the soil is dry and crumbles on its own, or with moderate pressure, into individual grains, or fine powder, it is granular, any combination of gravel, sand, or silt, and is likely type C
- If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand, or silt, and is probably type B
- If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered unfissured and is probably type A

Plasticity or Wet Thread Test

Mold a moist or wet sample of soil into a ball and attempt to roll it into 1/8-inch diameter threads. Cohesive material can be successfully rolled into threads without crumbling. If at least a 2-inch (50 mm) length of 1/8-inch thread can be held on one end without tearing, the soil is cohesive, and is type A, or B. If the soil breaks, it is granular, and type C.

Thumb Penetration Test

This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicable after excavation to keep to a minimum the effects of exposure to drying influences.

Press thumb firmly into soil to penetrate if:

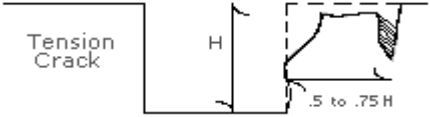
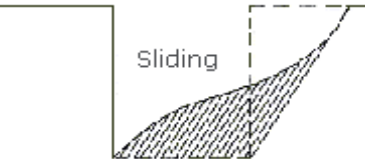
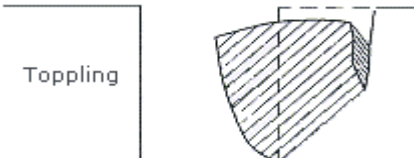
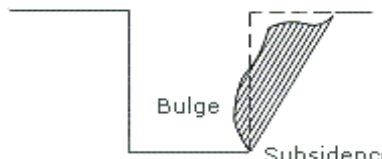
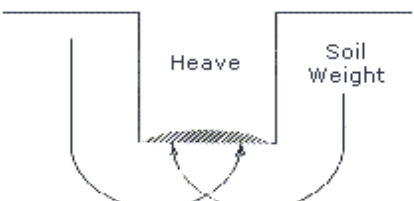
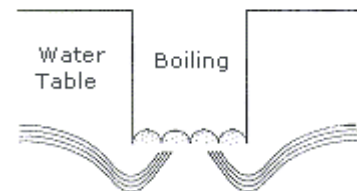
- An indentation in the soil occurs only with great difficulty, the soil is probably type A soil
- No further than the length of the thumb nail penetrates, it is probably type B soil

- The full length of the thumb penetrates, it is probably type C soil

The thumb test is subjective and is therefore the least accurate of the three methods.

Instrument Tests

An instrument such as a pocket penetrometer or shear vane determines the soils unconfined compression strength. Complete these tests in conformance with the instrument manufacturer's instructions and limitations.

Tension Cracks. Tension cracks usually form at a horizontal distance of 0.5 to 0.75 times the depth of the trench, measured horizontally from the top of the trench face	
Sliding or sluffing may occur because of tension cracks	
Toppling. In addition to sliding, tension cracks can cause toppling. Toppling occurs when the trench's vertical face shears along the tension crack line and topples into the excavation	
Subsidence and Bulging. An unsupported excavation can create an unbalanced stress in the soil, which, in turn, causes subsidence at the surface and bulging of the vertical face of the trench. If uncorrected, this condition can cause face failure and entrapment of workers in the trench	
Heaving or Squeezing. Bottom heaving or squeezing is caused by the downward pressure created by the weight of adjoining soil. This pressure causes a bulge in the bottom of the cut, as illustrated in the drawing above. Heaving and squeezing can occur even when shoring or shielding has been properly installed	
Boiling is evidenced by an upward water flow into the bottom of the cut. A high water-table is one of the causes of boiling. Boiling produces a "quick" condition in the bottom of the cut and can occur even when shoring or trench boxes are used	

The weight of soil varies with type and moisture content. One cubic foot of soil can weigh from 110 pounds to 140 pounds or more, and one cubic meter (35.3 cubic feet) of soil can weigh more than 3,000-pounds

Protective System Selection and Use

There are four protective systems:

- Sloping
- Benching
- Shields, a support system
- Shoring, a support system

Excavations can use one or more methods based on the soil type and the needs of the work, subject to specific limitations, and requirements defined in 29 CFR 1926 Subpart P and that are briefly discussed below. Protective systems used in excavations that are 20-feet or more in depth require a professional engineer. Layered systems often require a combination of methods.

Sloping and Benching System Selection

When sloping and benching systems are used, a slope of 1-1/2:1 (34-degrees) is required or the design must conform to one of the following options, and only one of the following options.

- Use the configurations and slopes defined in 29 CFR 1926 Subpart P, Appendix A, and Appendix B
- Design the system in accordance with written and tabulated data that identifies the parameters that affect selection, that contains limitations on the use of the data, and that contains explanatory material to enable proper use of the tables and the data
- Designed by a registered professional engineer with configurations specific to and safe for the specific project

When tabulated data or a specific design is used, they must identify the approving engineer, at least one copy of the data or design must be onsite during construction of the protective system, and a copy of the documents must be maintained after the job-site is complete.

Sloping

Sloping is permitted on all soil types, however, the less stable the soil, the less steep the slope, resulting in increasingly wider excavations and increasingly larger amount of soil removal. Slopes must conform to the values below.

Soil Type	Maximum Allowable Slope – H:V (degrees from horizontal)
Stable Rock	Vertical (90-degrees)
Type A	3/4:1 (53-degrees)

Type A	½:1 (63-degrees) – Only for short term (≤ 24-hours with 12-foot maximum depth)
Type B	1:1 / (45-degrees)
Type C	1-1/2:1 (34-degrees)

Benching

There are two basic types of benching, simple, and multiple. The type of soil determines the horizontal to vertical ratio of the benched side. As a general rule, the bottom vertical height of the trench must not exceed 4-feet for the first bench. Subsequent benches may be up to a maximum of 5-feet vertical in type A soil and 4-feet in type B soil to a total trench depth of 20-feet. Benching is only allowed in cohesive soil and is therefore disallowed in type C soil.

Layered Soil

When soils are configured in layers, classify it based on the classification of the weakest soil layer. Alternatively, each layer may be classified individually if a more stable layer lies below a less stable layer, i.e., where a type C soil rests on top of stable rock. Sloping and benching may be combined in layered soil systems.

Figure 2: Two Bench Options for Type B Soil

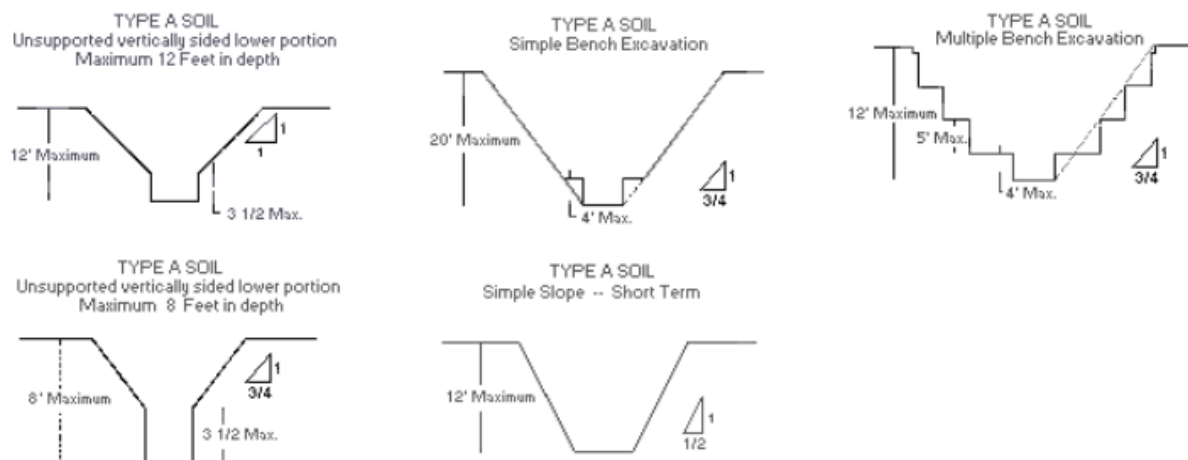
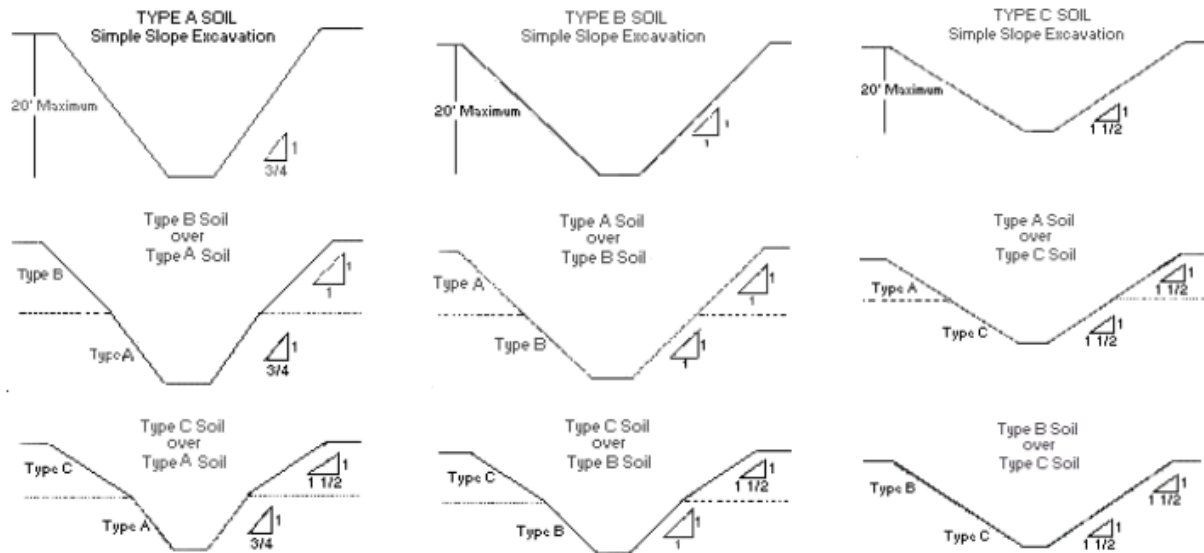


Figure 3: Sloping and Benching Options in Layered Soil





Support Systems

When shields, shoring, and other support systems are used, system selection must conform to one of the following options, and only one of the following options.

- Design timber shoring in accordance with 29 CFR 1926 appendix A and appendix C
- Design aluminum hydraulic shoring in accordance with manufacturer's tabulated data or appendix D
- Design the system in accordance with written and tabulated data that identifies the parameters that affect selection, that contains limitations on the use of the data, and that contains explanatory material to enable proper use of the tables and the data
- Design by a registered professional engineer, in writing, with the material sizes, types, and configurations

When tabulated data or a specific design is used, they must identify the approving engineer, at least one copy of the data or design must be onsite during construction of the protective system, and a copy of the documents must be maintained after the job-site is complete.

Manufacturer's instructions for all shoring should be kept on site during the work.

Pre-Use Inspections and Other General Requirements for All Support Systems

Always complete and document a pre-use inspection of support systems and do not use shields that fail inspection. Ensure that all inspections include items unique to the manufacturer of that system. Only repair support systems when allowed by the manufacturer and only use manufacturer-approved replacement parts. Do not mix and match systems and manufacturer's unless specifically approved by the manufacturer.

Defective components require a competent-person inspection and, when necessary, a registered professional engineer inspection if the component will be put back into service. However, defective components that do not meet the original design specifications and manufacturer's requirements are never used.

Always locate copies of the instruction manuals and specification sheets for all support systems and ensure these documents are present at the job-site during all excavation activities during use.

Always verify the support systems dimensions, structural characteristics, and features against the intended use to ensure it is the correct support system for the application – The intended use must be consistent with the manufacturer's recommendations. Do not exceed load ratings and always observe manufacturer's limitations.

Closely coordinate support system installation with initial excavation and backfill progressively as work is completed and support systems are removed to optimize safety.

Excavation of earth below support systems to a maximum additional depth of 2-feet is allowed only if the support system is designed for this application and only when the competent-person deems it safe to do so since bulging, heaving, boiling, excessive surcharge, and other circumstances effect excavation face stability.

The design, installation, and use of shoring systems must conform to 29 CFR 1926 Subpart P, Appendices C, D, and E as applicable.

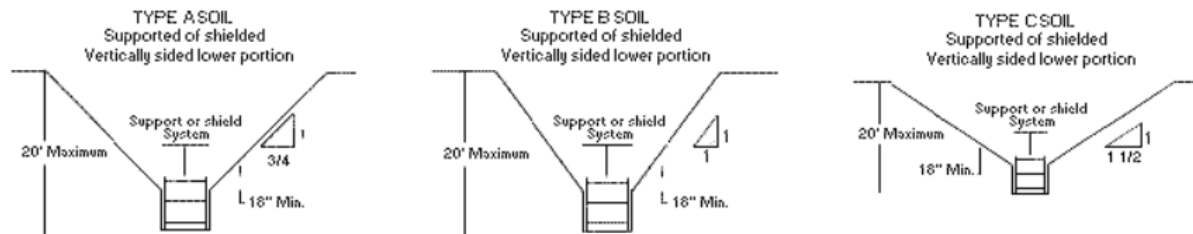
Shield Set-Up and Use

Shield use must conform to the following:

- Select rigging and lifting equipment appropriate for the load
- Only lift the shield by the manufacturer approved pick points, keep the shield as low to the ground as possible when moving it, and always use a tagline
- Install shields in a manner that restrict laterals or other hazardous movement of the shield in the event of the application of sudden lateral loads. This can be accomplished by keeping the trench as narrow as possible or backfilling the area between the shield and the trench after installation. The maximum allowable space between the shield and the trench face is determined by the competent-person but as a rule, the shield must be very close to the excavation face on both sides
- Install shields so that the top of the shield extends at least 18-inches above the top edge of the excavation and slope the excavation away from the edge (Exception: Shields may be installed so the top edge is flush with a blacktop or concrete surface, but never soil)
- Employees are not allowed in shields when shields are being installed, removed, or moved vertically
- Protect employees from cave-ins when entering or exiting the areas protected by shields through appropriate methods
- Do not subject shield systems to loads exceeding those which the system was designed to withstand
- Do not stack shields unless they are so designed

- The use of stacked shields with different structural ratings is allowed when the competent-person determines that the loads imposed upon each do not exceed manufacturer's specifications and the manufacturer allows such use
- Follow requirements and best practices for rigging, signaling, powerline safety, and excavation safety – Reference these programs for details

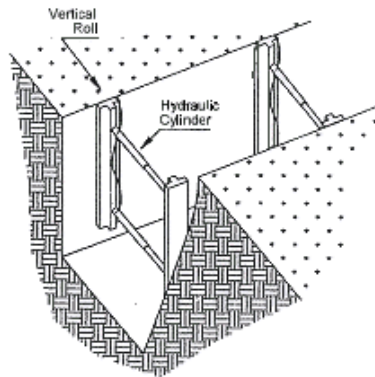
Shield use can be combined with sloping as indicated in 29 CFR 1926 Subpart P, Appendix B, and as illustrated below provided that all sloping and benching conforms to legally-mandated requirements.



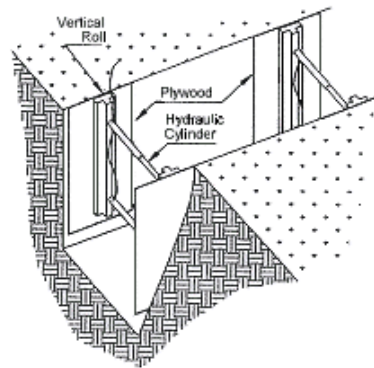
Shoring System Materials, Installation, and Removal

Shoring system installation and use must conform to the following:

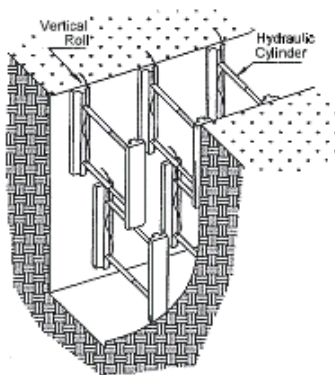
- When shoring is selected, the preferred shoring type is aluminum hydraulic due to their adaptability, lightweight nature, the fact that a compressor is not needed as it is with pneumatic aluminum shoring, and the relative simplicity of design and use compared to timber shoring
- One or more individuals that are competent in the installation of shoring systems must supervise their installation, adjustment, and removal since there are several types of systems each with their unique requirements and limitations
- Install and remove in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support system
- During installation, ensure that connections are secure to prevent sliding, falling, kickouts, and other predictable failures
- Individual members of support systems shall not be subjected to loads exceeding those which those members were designed to withstand
- Removal shall begin at, and progress from, the bottom of the excavation. Members shall be released slowly so as to note any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation
- Take additional precautions before temporary removal of individual members begins, to ensure the safety of employees, such as installing other structural members to carry the loads imposed on the support system
- Backfill as support systems are removed



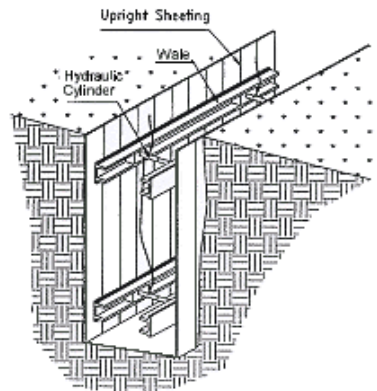
Vertical Aluminum Hydraulic Shoring
(Spot Bracing)



Vertical Aluminum Hydraulic Shoring
(With Plywood)



Vertical Aluminum Hydraulic Shoring
(Stacked)



Aluminum Hydraulic Shoring Waler System
(Typical)

Other Safety Requirements

This section describes additional requirements applicable to all excavations, regardless of the cave-in protection system.

Access and Egress Requirements

Each excavation will have a safe means of access and egress for employees when the excavation is 4-feet or more in depth. When the excavation is a trench, access and egress points are required at intervals of no more than 25-feet of lateral travel for employees in the trench, or every 50-feet. Access and egress points can consist of ladders, ramps, or steps.

When ladders are used, they must conform to all ladder safety requirements and employees must observe setback distances for electrical lines.

Ramps used for employee access and egress require design by a competent-person. Ramps used for equipment access require design by a competent-person with experience and knowledge in structural design. Ramp design must conform to 29 CFR 1926.651(c)(1), generally recognized design criteria, and good engineering practices.

Confined Spaces and Hazardous Atmospheres

Excavations are typically not defined as confined spaces or permit-spaces by OSHA. However, when an excavation contains a permit-space, conformance with the permit-required confined space program and the underlying regulations is required during entry into that permit-space, but not necessarily the excavation. Examples of permit-spaces within an excavation include pipelines and vaults that meet the permit-space definition in 29 CFR 1926 Subpart AA.

Regardless, atmospheric hazards sometimes occur in excavations. An atmospheric hazard is one that involves any one of the following:

- Atmospheres that contain less than 19.5% oxygen or greater than 23.5% oxygen
- Flammable gases or vapors that exceed 10% of the LEL
- Toxic and/or corrosive gases or vapors that exceed applicable occupational exposure limits

When atmospheric hazards exist, or could exist, special precautions are employed to safeguard employees that include:

- Eliminate the source of the hazardous atmosphere
- Measure the atmosphere with an appropriate, calibrated gas detector initially, and during the work
- Use ventilation equipment to introduce fresh air into the excavation
- Other appropriate control methods applicable to the situation
- Maintain emergency rescue equipment, make it available for immediate use, and ensure the equipment is attended by trained rescue personnel

Atmospheric testing procedures include the following:

- Use a properly calibrated direct reading gas detector equipped with an audible and visual alarm
- Calibration is per the manufacturer's recommendations
- Bump-check the gas detector before use to ensure proper operation
- Complete atmospheric testing before the excavation is entered and continuously during all work in the excavation when the hazardous atmosphere site could be present
- The competent-person will maintain the logs of the test results at the job-site

Employees entering deep and confined excavations such as bell-bottomed piers, pits, or similar locations must also use a full body harness, lifeline, and a means of retrieval to facilitate rescue, with an attendant, regardless of the spaces confined space classification.

Exposure to Vehicular Traffic

When employees are exposed to vehicular traffic, appropriate traffic controls are required. In addition, each employee must wear a high visibility garment that is ANSI/ISEA 107-2015 type R, performance class 2, or better, and as further defined in the PPE program.

Falling Equipment

When the edge of an excavation is not visible to an equipment operator, stop logs, barricades, hand signals, and mechanical signals are used to warn the operator of the location of the excavation edge and to prevent the equipment from falling into the excavation. When possible, the grade near the edge of the excavation falls away from the excavation.

Falling Loads

Personnel are prohibited from standing under, working under, or passing under loads suspended by lifting or digging equipment. Personnel will stand away from vehicles which are being loaded or unloaded to avoid being struck by falling material. However, equipment operators may remain their cabs when their vehicles are being loaded or unloaded when the vehicles are equipped with adequate operator protection during the loading or unloading process. Personnel must always control suspended loads with taglines.

Falling Objects Including Loose Rocks and Soil

The organization does not allow employees to work on the faces of sloped or benched excavations above other employees unless there is adequate protection from falling materials, equipment, loose soil, rock, and debris. Use of scaling, ice, or snow removal, benching, barricading, rock bolting, wire mesh, or other protective measures are used to protect employees from falling object hazards. When the slopes of the trench or excavation may be adversely affected by weather, moisture, or vibration, the competent-person will pay additional attention.

Materials piled, grouped, or stacked near the edge of an excavation are arranged so they are stable and self-supporting and, if they place, or could place an unsafe load on the excavation face, as determined by the competent-person, they are moved away from the edge.

Boulders, stumps, and other large material which can impose a sliding or rolling hazard are removed or safeguarded.

Excavated material is placed at a minimum distance of 2-feet from the edge of the excavation though further placement is beneficial when space allows since tension cracks typically occur between 50-% and 75-% of the excavation depth and they are easily obscured. In addition, increasing the setback distance reduces the surcharge. The preferred distance for longer-term storage of spoil is the same depth as the excavation. In addition, place spoil so that it does not fall back into the excavation and so that it channels rainwater and other run-off water away from the excavation.

Fall Protection for Personnel

Fall protection is not required when the edge of the excavation is clearly visible. However, fall protection is required when the excavation is 6-feet or more in depth and the edges are obscured by vegetative material or other visual barriers. When this occurs, this organization will apply one or more allowable fall protection methods. Allowable fall protection methods for excavations, when required, include the following:

- Guardrail systems
- Fences
- Barricades

When fall protection around an excavation is required, a controlled access zone with a 6-foot or greater setback from the excavation edge is not an approved method and it is not allowed.

Protection of Personnel During Installation and Removal of Underground Vaults and Tanks

The removal and installation of tanks, vaults, and other underground confined spaces presents unique hazards. Employees must follow all requirements to prevent injury during removal and installation of spaces, and prevent falls into the space during these activities and follow-on work.

When raising and lowering vaults, tank, and similar pre-manufactured confined spaces into excavations:

- A qualified or certified rigger must rig load following using appropriate equipment in accordance with applicable regulations and best practices in consideration of the load configuration and its weight
- Employees must stay clear of the load – Employees may not work under the load, remain in the hole under the load, and may not place any part of their body between the object being raised and lowered, and any other object, including the excavation-face
- Employees must control the load during picks with adequate tag lines of sufficient length that prevent an employee from getting pulled into the excavation by a swaying load

After the installation of the space into the excavation:

- Place a sign clearly identifying the space as a permit-required confined space in accordance with confined space procedures unless a competent-person (confined space) has determined it is non-permit-space and paperwork is available documenting this fact
- If the assigned competent-person classifies the space as permit-required, no employee may enter the space unless they are trained to do so, and the proper equipment is available
- When the space is deeper than six-feet, prior to installation of a space, and prior to demolition of a space, the team must ensure that all vertical entry ways into it are sealed and protected so that a person stepping onto the entryway can't fall into the space. Allowable methods include one or more of the following: Compliant hole cover, compliant guardrail, proper use of personal fall-arrest systems
- When used, entryway and hole covers must meet the minimum requirements described in fall protection regulations (secured against displacement, marked with the word hole, designed, and installed to fully support and withstand without failure, at least two-times the intended or possible loads that may be imposed upon it)
- During work where the hole is open, protect all employees working in the vicinity using an approved fall protection method
- Employees must never cover entryways and holes with plastic sheeting because this hides the hole

Employees must pay particular attention to changing conditions at the location; if the hole covers are removed for any reason, they must be promptly replaced and, during any unprotected period, measures must be taken to prevent anyone from inadvertently stepping into the hole by the use appropriate protective measures as indicated above. Under no circumstance will any hole remain unprotected for any reason. The party that removed the hole cover maintains full responsibility for ensuring that the hole cover is properly reinstalled and fully compliant, or arranging for this to occur with no lapse in hole protection.

Hazardous Atmospheres

An atmospheric hazard is one that involves any one of the following:

- Atmospheres that contain less than 19.5% oxygen or greater than 23.5% oxygen
- Flammable gases or vapors that exceed 10% of the LEL
- Toxic and/or corrosive gases or vapors that exceed applicable occupational exposure limits

When atmospheric hazards exist, or could exist, special precautions are employed to safeguard employees that include:

- Eliminating the source of the hazardous atmosphere
- Measuring the atmosphere with an appropriate, calibrated gas detector initially, and during the work
- Using ventilation equipment to introduce fresh air into the excavation
- Other appropriate control methods

Atmospheric testing procedures include the following:

- Use a properly calibrated direct reading gas detector equipped with an audible and visual alarm
- Calibration is per the manufacturer's recommendations
- Bump-check the gas detector before use to ensure proper operation
- Complete atmospheric testing before the excavation is entered and continuously during all work in the excavation when the hazardous atmosphere site could be present
- The competent-person will maintain the logs of the test results at the job-site

When an atmospheric hazard exists, emergency rescue equipment must be available and attended by trained personnel.

Protection from Water Accumulation Hazards

Employees may not work in excavations when there is accumulated water or when water is accumulating, unless adequate water-management precautions are in place, functional, and effective. Necessary precautions can include one or more of the following:

- Dewatering of the excavation
- Lowering the ground water level near the excavation by the installation of perimeter dewatering wells and pumps

- Diversion of surface water and stormwater
- Other appropriate methods

Protection of the Public

The competent-person ensures the application of appropriate controls when members of the public are exposed to excavation hazards. At a minimum, this includes the following:

- Guardrails, fences, or barricades adjacent to walkways, driveways, and other pedestrian, or vehicle thoroughfares
- Warning lights or other illumination to ensure adequate visibility from sunset to sunrise
- Adequate warning signs
- Wells, holes, pits, shafts, and all similar hazardous excavations are effectively barricaded or covered and posted as necessary to prevent unauthorized access
- All excavations are backfilled as soon as possible

Stability of Adjacent Structures

Structures adjacent to the excavation are appropriately supported by shoring, bracing, or underpinning to ensure the stability of these structures during excavation operations. Excavation below foundation or retaining wall footings is not permitted except when:

- A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure
- The excavation is in stable rock
- A registered professional engineer has determined that the structure is sufficiently removed from the excavation to be unaffected by the excavation activity or
- A registered professional engineer has determined that the excavation work will not pose a hazard to employees

Sidewalks, pavements, and appurtenant structure are not undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

Surface Encumbrances

All equipment, materials, supplies, buildings, roadways, trees, brush, boulders, and other objects at the surface that could present a hazard to employees working in the excavation are removed or supported as necessary to protect employees.

Underground Installations

The competent-person verifies the shutdown of underground utilities and the completion of appropriate locates of all sewer, telephone, fuel, electric, water and other underground installations that are in or near the excavation site and that may be encountered during excavation work. If it is not possible to establish the exact location of these installations, the work may proceed with caution if detection equipment or other safe and acceptable means are used to locate the utility. Regardless, the call before you dig program applies – Refer to that program for full details.

The competent-person confirms that the appropriate utilities will protect, remove, shutdown, or relocate underground installations. Excavation are completed in a manner that does not endanger the underground installations or the employees engaged in the work. Utilities left in place are protected by barricades, shoring, suspension, or other appropriate methods to protect employees.

Walkways for Crossing Excavations

Crossing trenches is discouraged, however, when it is necessary, walkways or bridges for foot traffic are required when the trench is 30-inches or wider at the top and the trench is 6-feet or more in depth. The minimum design requirements for walkways and bridges includes:

- A safety factor of 4
- A minimum clear width of 20-inches
- Standard guard rails
- Extend a minimum of 24-inches past the surface edge of the trench

Vehicle crossings must be designed by and installed under the supervision of a registered professional engineer.

Water Accumulation

Employees will work in excavations when there is accumulated water, or in excavations where water is accumulating, unless adequate precautions are taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation but include one or more of the following:

- Surface water diverted away from the trench
- Installation of water removal equipment, used, and monitored by a competent-person
- Use of special support or shield systems approved by a registered professional engineer
- Safety harnesses and lifelines used in conformance with 29 CFR 1926.104
- Employees removed from the trench during rainstorms

Excavations require careful inspection by a competent-person after each rain and before employees are permitted to re-enter the trench.

Excavation Inspection Requirements

A competent-person must inspect excavations to ensure they meet all requirements and are safe to enter. Competent-person inspections are required:

- During initial excavation to classify soil type(s)
- Before employees enter the excavation for the first time each day or each shift
- Throughout the shift as necessary and appropriate to safeguard employees, based on the work, and the hazards
- After precipitation and freezing/thawing cycles
- When fissures, tension cracks, sloughing, undercutting, water seepage, bulging at the bottom, or conditions, or adverse events that impact stability occur
- When there is a change in the size, location, or placement of the spoil pile or other surface encumbrances that may impact stability
- When there is any indication of change or movement in adjacent structures
- needed during the day or shift when the competent-person observes, or other report signs of structural instability or other serious condition

The competent-person need not be present at all times during work in the excavation, but must visit the site with sufficient frequency to complete his or her functional responsibilities and ensure the excavation is safe.

Job-Site-Specific Excavation Program Development

Some job-sites require a job-site excavation program either as part of a site-specific safety plan or as a stand-alone document. Job-site-specific excavation plans are typically done when:

- The job-site is busy with many simultaneous operations and close coordination between subcontractors is required
- The excavation will be open for an extended time (e.g. it is not possible to backfill as work is completed)
- The work itself has a higher than normal hazard
- There are adjacent structures
- Water sources are nearby and water infiltration is possible or likely
- The general contractor or host employer requires it
- There are other extenuating circumstances

When necessary, a qualified safety professional, or the assigned competent-person will generate a job-site excavation program that addresses the following, at a minimum.

- Name and contact information of the designated competent-person(s)
- Confirmation that underground installations have been properly located and marked
- The anticipated soil types and the protective systems employees will use to protect from collapse
- The method used to control water intrusion and migration into the excavation
- The methods employees will use to support adjacent structures
- The methods used to protect and support underground utilities that must remain in place during excavations
- The specific controls employee will use to address all other identified hazard and the minimum regulatory requirements
- Emergency procedures should a collapse occur

The job-site excavation program is kept at the job-site during all excavations and is made available to all employees at that site.

Training

Employees that work in excavations will receive hazard awareness and safe work practices training to ensure they understand the hazards and know how to avoid those hazards.

Competent-persons must have specific experience in excavation work and must receive specialized training appropriate for the excavations they are involved with.

Document Retention

The competent-person will retain the following records for the entire length of the work:

- Soil classification and test records
- Inspection reports
- Site-specific excavation plan

Forms

- Excavation Soil Classification Form
- Excavation Safety Checklist and Information Card

CALL BEFORE YOU DIG

This program addresses the procedures excavators must follow to determine when underground locates are required, the process for making locate requests, and related requirements applicable to during excavation work.

Application and Scope

This program applies to all work that involves moving or removing earth with any tools, equipment, or explosives – It includes augering, backfilling, boring, ditching, drilling, excavating, grading, plowing-in, pulling-in, ripping, scraping, trenching, hydro-excavating, post-holing, and tunneling (collectively called “excavating work” or “excavating”).

This program excludes routine maintenance on existing planted landscapes provided that the maintenance does not involve adding new plants and trees.

All excavation work must meet the requirements in this section, the excavation safety program, the site-specific safety program (when applicable), and 29 CFR 1926 Subpart P.

In most cases, the requirements in this one-call program are prescriptive and employees may not deviate from them.

While non-destructive excavation methods such as potholing and hydro-excavation do not typically require a locate request under state law, this program requires locate requests when any method of digging is completed to ensure safety.

Definitions

The following terms are defined as indicated below.

- Excavating Work, Excavating: Moving or removing earth with any tools, equipment, or explosives – It includes augering, backfilling, boring, ditching, drilling, excavating, grading, plowing-in, pulling-in, ripping, scraping, trenching, hydro-excavating, post-holing, and tunneling
- Excavation (OSHA): Any human created cut, cavity, trench, or depression in an earth surface, formed by earth removal
- One-Call Center (OCC): The state-wide organization for receiving and fielding requests for underground facility locates; this center is different for each state
- Positive Response: Describes the two types of action taken by an underground facility owner (UFO) after it receives notification of intent to excavate. The facility owner/operator must: (1) mark its underground facilities with stakes, paint, or flags or (2) notify the excavator that the UFO has no underground facilities in the area of excavation
- Trench (OSHA): A narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth of a trench is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15-feet (4.6 m). If forms or other structures are installed or constructed in an excavation that reduce the dimension measured from the forms

or structure to the side of the excavation to 15-feet or less (measured at the bottom of the excavation), an excavation is also then considered a trench

- **Underground Facility:** Any buried cable, pipeline, and other similar buried items for use in connection with the storage or conveyance of potable water, sewage, electronic communications, telephonic communications, telegraphic communications, cable television, electricity, oil, natural gas, or other substance
- **Underground Facility Owner, Owner, Operator (UFO):** Any person or entity, including public utilities, municipal corporations, political subdivisions, and other entities that have the right to bury underground facilities in or near a public road, street, alley, right-of-way, or utility easement; both owners and operators are UFOs

Functional Roles and Responsibilities

Organizations with responsibilities under this program include:

- Underground Facility Owner (UFO)
- General Contractor (GC)
- Excavator

Underground Facility Owner

The UFO has the following responsibilities:

- Positively respond to locate requests as soon as practical but not longer than the legally required limit
- Complete all locates using visible markings within the tolerance zone, using the correct color, as agreed upon with the excavator, or communicate all-clear
- Honor each due date when multiple day requests are made
- Provide a copy of the locate map to the excavator

The terms Operator and Owner mean UFO for compliance purposes.

UFOs may not delegate their tasks under this program.

General Contractor

When present, The GC has the following responsibilities:

- Verify that each excavator and all subcontractors have properly notified the OCC
- Verify that all locates have been properly completed, including all subcontractor requests, when applicable
- Verify that all coordination and pre-dig meetings occur between excavators, subcontractors, and UFOs are completed prior to digging activities
- Help identify private underground facilities, help identify non-member UFOs, and verify all private, and non-member locates are complete, when applicable

- Verify the safe completion of all excavation activities, including the support of pre-existing underground facilities, the control of hazardous energy (as applicable)

GCs may not delegate their tasks under this program except to qualified parties specifically assigned these responsibilities documented through a written and mutually agreed scope of work.

Excavator

Excavators have the following responsibilities:

- Properly notify the OCC
- Verify that all locates have been properly completed, including all subcontractor requests
- Coordination and complete pre-dig meetings between excavators, subcontractors, and UFOs
- Identify private underground facilities and non-member UFOs, and complete private, and non-member locates
- Completion all excavation activities safely, including the support of pre-existing underground facilities, the control of hazardous energy (as applicable)
- Retain a copy of the one-call center request at the location during all excavation work and for five years thereafter
- Coordinate these activities with the assigned competent-person (excavations) and the assigned equipment operator(s)
- Only conduct excavation activities within the open ticket window or until markings are no longer visible
- Make secondary one-calls if markings are no longer visible or excavation activities are to extend past the open ticket window
- Remove all locate markings once excavations are completed

Excavators may not delegate their tasks under this program except to qualified parties specifically assigned these responsibilities documented through a written and mutually agreed scope of work.

Excavator Subcontractors

Excavator subcontractors have the following responsibilities:

- Each subcontractor involved in excavation work should notify the OCC and process a separate locate request, retaining copies of the request
- All other responsibilities under excavator also apply

Excavator subcontractors may not delegate their tasks under this program.

Procedures

Before the excavator begins any excavation work, the excavator will:

- **PLAN THE WORK:** Plan the work, including a site-specific excavation plan, as applicable

- **PRE-MARK THE LOCATION:** Clearly pre-mark the digging area in white paint or white flagging material
- **NOTIFY THE OCC:** Notify the UFO through the OCC at least two business days in advance of the excavation work, not including the day of the actual notice, but not longer than ten business days in advance of the excavation work
- **IDENTIFY NON-MEMBER UFOs AND PRIVATE LAND UNDERGROUND FACILITIES:** Identify any UFOs that are not members of the OCC, private UFOS, and contact a private locate company to complete these locates
- **LOG THE REQUESTS:** Log the OCC ticket number to verify that the locate request was properly received by the OCC
- **UFO(S) COMPLETE THE LOCATE(S):** Pre-excavation site survey completed by locators properly marking locations or noting all-clear (Note 1: If the location is unusual, large, or complex, request a meeting with the locator. Note 2: If a service interruption is needed, request a meeting with the affected UFO)
- **SUBCONTRACTORS MAKE OCC REQUESTS:** Every subcontractor involved in excavations will make their own OCC request and log the request number
- **COORDINATE WITH UFO:** The excavator and any subcontractors will coordinate any service interruptions with the UFO as applicable
- **EXCAVATOR RECEIVES POSITIVE RESPONSE:** Excavator will confirm the locate through received paperwork and markings, or will confirm an all-clear, as applicable. (Note 1: If an all-clear is received by the excavator, but the excavator has knowledge of an underground facility, the excavator will follow up with the OCC and the UFO. Note 2: Retain survey paperwork on-site during the excavation with a copy sent to the office; this paperwork is part of the site-specific excavation plan)
- **EXCAVATOR'S EQUIPMENT OPERATOR CONFIRMS LOCATE AND MARKINGS:** The equipment operator will confirm all markings to his or her satisfaction using a checklist
- **EXCAVATOR CONFIRMS THE ON-SITE PRESENCE OF DOCUMENTS:** Including: (1) Site-specific excavation plan, (2) Description of dig site, (3) A list of all UFOs with contact information, (4) UFO-provided locate documents, (5) OCC locate tickets and number(s)
- **PRE-DIG SAFETY MEETING:** The excavator and subcontractors will complete a pre-dig safety meeting including a review of all UFO-provided documents and the site-specific excavation plan
- **DIG:** Commence excavations while respecting and preserving the markings until no longer required for safe excavation
- **EXPIRED MARKINGS:** Request a relocate if digging activities will continue past the expiration date of the locate request
- **OBSCURED MARKINGS:** If markings are obscured or otherwise lost, the excavator will stop work and request a relocate through the OCC so affected UFOs can correct the markings before work restarts

- **MISMARKED/INACCURATE LOCATES:** If locates are incorrectly marked, the excavator will stop work and request a relocate through the OCC so affected UFOs can correct the markings; work may restart if the excavator exercises due caution and care to prevent damage to any underground facility, and subject to assignment of an observer
- **UNIDENTIFIED UNDERGROUND FACILITIES:** When an unexpected underground facility is encountered, all excavation work must halt until the UFO is identified, the underground facilities contents is identified, and it is marked, or, it has been abandoned
- **COMPLETE DIG AND REMOVE MARKINGS:** Once the excavation activities are completed remove any remaining line location markings

Equipment Operator's Pre-Dig Verification Steps

Prior to digging, equipment operators and assigned competent-persons will verify and check:

- The dig site matches the one-call request and is timely
- All facilities have been marked and reviews color codes if in doubt
- Service feeds from buildings and homes are isolated, disconnected, and deenergized
- Visible signs of underground facilities, such as pedestals, risers, meters, and new trench lines
- Any facilities that are not members of the OCC and contact someone to get locates, if not already done
- Verify all other requirements are complete and it is safe to dig (refer to excavation safety program and site-specific excavation program for details)

Observers

When excavations occur near underground facilities, especially when near tolerance zones, and within tolerance zones, an observer will work with the equipment operator to help avoid damage and complete digging operations safely.

Excavations within Tolerance Zones

When excavating within eighteen inches horizontally from the exterior sides of any marked underground facility, non-destructive excavation methods are required to identify underground facilities. Excavators must otherwise exercise reasonable care to protect any underground facility in or near the excavation area.

When utilizing trenchless excavation methods, the excavator will expose underground facilities and visually observe the safe crossing of marked underground facilities when requested to do so by the UFO or operator or the government agency that issued a permit for the excavation.

Examples of non-destructive digging include:

- Hand digging
- Hydro-excavating
- Potholing

- Vacuum-type methods

Emergencies

Excavators must take reasonable precautions to avoid damage to underground facilities under the specific circumstances they are working under. However, in the event of damage to an underground facility, the excavator must notify:

- 911 for life and limb-threatening situations and for potentially dangerous situations
- The OCC
- The UFO (the OCC can usually give you this information)
- Any other affected owners (the OCC can usually give you this information)

The excavator must include details of the incident and the extent of the damage.

If the damage results in an immediate life or limb threat, or other serious matter, such as leaking natural gas, the excavation must evacuate the immediate area.

In all cases, the excavator must stay on the scene, in a safe location, to receive emergency services, and repair crews, as applicable. The excavator must also keep others out of the danger zone and must not leave the location until relieved by repair crews and, when present, emergency services. The excavator will investigate the situation and compile a written report with its findings and conclusions and will update its written programs, training, and other systems with the necessary corrective actions, as applicable.

If the damage exceeds legal requirements, the UFO must complete a follow up report to the OCC, no later than allowed by relevant state law, that contains all the following information:

- Type of underground facility that was damaged
- The type of services that were interrupted
- Duration of interruption to services
- Location of the area where the underground facility was damaged
- Whether notice on the intention to excavate was provided to the OCC
- Whenever the underground facility had been validly marked prior to being damaged

Procedure for Natural Gas Line Damage

This procedure applies to leaking natural gas lines and other flammable gas lines:

- Leave the leak area immediately and warn others to keep out
- Avoid any open flames or anything that might start a fire
- Turn off all machinery
- Do not start motor vehicles or electrical equipment
- Remove ignition sources (cigarettes, cell phones, and anything that could create a spark or static electricity)
- Evacuate the area and keep people out

- Abandon any equipment being used in the area
- Call 911 or your local fire, police, or sheriff's office
- Do not try to put out a fire. If it is burning, let it burn; ask local fire fighters to observe and protect adjacent property
- Do not try to operate any pipeline valves yourself
- Never bury the broken or damaged line
- Call the OCC and UFOs

Procedure for Petroleum Line Damage

This procedure applies to petroleum lines:

- Leave the leak area immediately and warn others to keep out
- Do not make contact with the escaping liquids
- Avoid creating sparks or sources of heat that could cause the vapors or liquids to ignite
- Do not light a match, start an engine, use a telephone, or even switch on/off an electric light
- Avoid any open flames or anything that might start a fire
- Turn off all machinery
- Do not start motor vehicles or electrical equipment
- Remove ignition sources (cigarettes, cell phones, and anything that could create a spark or static electricity)
- Evacuate the area and keep people out
- Abandon any equipment being used in the area
- Call 911 or your local fire, police, or sheriff's office
- Do not try to put out a fire. If it is burning, let it burn; ask local fire fighters to observe and protect adjacent property
- Do not try to operate any pipeline valves yourself
- Never bury the broken or damaged line
- Call the OCC and UFOs

Training

The following training is required:

- Competent-person, equipment operator, and observer one-call training

Document Retention

The program administrator will retain the following documents for the length of the project and in accordance with relevant state law:

- OCC provided locate ticket numbers (per state law)
- UFO-provided locate documents (per state law)
- Completed Excavator's Pre-Dig Checklists (length of project at a minimum)

Forms

The following forms are relevant to this program:

- Excavator's Pre-Dig Checklist

CONTROL OF HAZARDOUS ENERGY (LOTO)

21 Apr 2022





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CONTROL OF HAZARDOUS ENERGY

This program establishes the minimum requirements for the control of hazardous energy when employees work on equipment, machines and prime movers (collectively called equipment) and are exposed to the unexpected energization or startup of the equipment or the release of stored energy.

Application and Scope

This program applies to employees that work on equipment (authorized-employees) and employees that work around equipment (affected-employees). All employees are required to comply with the restrictions and limitations imposed upon them during the use of the lockout/tagout system described in this program.

Nothing in this program is designed to limit the number of locks and tags applied by authorized-employees, nor limit additional safety precautions. Authorized-employees may apply additional locks and tags on as many hazardous energy sources as necessary to achieve full hazardous energy control.

WARNING: EQUIPMENT SERVICE OR MAINTENANCE WITHOUT AN ADEQUATE LOCKOUT/TAGOUT AND THE IMPROPER REMOVAL OF ANOTHER AUTHORIZED-EMPLOYEE'S LOCKS AND TAGS ENDANGERS LIVES. IT WILL RESULT IN DISCIPLINARY ACTION INCLUDING EMPLOYMENT TERMINATION.

Regulatory Applicability to Construction Work

The Federal OSHA control of hazardous energy regulation, found at 29 CFR 1910.147, does not apply directly to construction activities though several construction industry safety regulations require the implementation of lockout/tagout principles.

Accordingly, to provide safe job-sites, the organization requires the application of lockout/tagout procedures:

- When employees are exposed to hazardous energy during the installation and commissioning of new equipment
- During tie-ins of new equipment to existing equipment
- When locking and tagging electrical circuits and systems
- At other times employees are exposed to hazardous energy even when construction regulations do not specifically stipulate this fact.

Service and maintenance activities that involve exposure to hazardous energy and unexpected equipment startup that are performed at the organization's shops and other facilities require adherence to this section.

This program also addresses equipment components, part assemblies, motors and related items that were removed from the equipment and require benchtop energizing and testing to verify correct function or repairs.

Functional Roles and Responsibilities

The following employees have specific functional responsibilities under this program:

- Affected-Employees
- Authorized-Employees

Affected-Employees

Affected-employees work near equipment but are not directly involved in maintenance and repair work or the application of lockout/tagout procedures. Affected-employees have the following responsibilities under this program:

- Participate in all required training
- Never attempt to start, energize or operate any equipment having a lock and tag, or a tag only
- Never remove locks or tags from equipment
- Never operate equipment in an unsafe condition
- Report unsafe equipment and other safety concerns to a shift manager

While not specifically defined, when used, the terms qualified operator, and craftsman refer to trained equipment operators knowledgeable about the equipment and its operations.

Equipment operators are affected-employees unless they complete repair and maintenance work or other tasks that expose them to hazardous energy. Conversely, an equipment operator who maintains and repairs equipment or performs other similar work, and is therefore exposed to hazardous energy, is always an authorized-employee.

Authorized-Employees

Authorized-employees are specifically assigned by the organization to complete energy isolation procedures and apply locks and tags. Authorized-employees are assigned based on job title, knowledge, experience, and specific energy isolation training described in this program. Authorized-employees have the following responsibilities under this program:

- Participates in all required training
- Properly isolates all hazardous energy and applies locks and tags before completing work on equipment
- Never remove another authorized-employee's locks and tags unless following alternate lock and tag removal procedures described within this program
- Report inadequate procedures, missing procedures, and safety concerns
- Participate in annual energy control procedure evaluations and related activities as requested
- Strictly follows all other rules, procedures, and guidelines described within this program

Authorized-employees may not delegate responsibilities under this program.

Lockout/Tagout Triggers

This section describes the specific situations requiring the application of energy isolation and lockout/tagout procedures. A lockout/tagout is required when any of the following occur:

- An employee removes or bypasses a machine guard or other safety device
- An employee places any portion of their body into an area on a machine or a piece of equipment where work is being performed by the machine or where an associated danger zone exists during an operating cycle
- An employee is otherwise exposed to hazardous energy and/or unexpected machine startup during cleaning, repairing, servicing, setting-up, adjusting, or unjamming equipment
- For all permit required confined space entries

A lockout/tagout is not required when employees complete work on cord and plug connected electrical equipment if the equipment is effectively isolated, deenergized, and deactivated by the removal of the plug from the outlet or the energy source, there is no chance of reenergization and the plug will be in the exclusive control of the employee performing the work.

A lockout/tagout is also not required when employees perform minor tool changes, adjustments, and other minor servicing operations taking place during normal, repetitive, and integral routine production operations to machines or equipment for production, only when the activity:

- Is routine and must be performed as part of a regular and prescribed course of procedure in accordance with established practices
- Is repeated regularly as part of the production process or cycle
- Is integral and inherent to the production process
- Is part of normal production operations (that is, the utilization of a machine or equipment to perform its intended production function)
- Is performed using alternative protection as defined in the Alternate Protection section of this document
- Is evaluated and documented by the program administrator to confirm its status; employees may not individually apply this exemption in the absence of approval

Equipment Specific Energy Control Procedures

An equipment specific energy control procedure is required for each machine at this facility. The program administrator ensures the creation of equipment specific energy control procedures. Each procedure includes the following:

- The name of the equipment and relevant identifying information (that is, equipment number)
- The work covered by the procedure (for example, repair, cleaning, sanitation, and visual inspection)
- Steps for shutting down, isolating, blocking, and securing equipment to control hazardous energy

- Placement, removal, and transfer steps of lockout/tagout devices and responsibilities
- Requirements for verifying the effectiveness of the procedure

The program administrator maintains energy control procedures in a centralized location and uses paper, electronic systems, or a combination of methods. However, regardless of the employee access method, written procedures are required, and all authorized-employees must have access to the procedures for the equipment they maintain and repair

Authorized-employees identify and report any equipment and situations unaddressed by existing energy control procedures. Authorized-employees report any such situations to the program administrator or the maintenance representative to the safety team. The program administrator updates existing energy control procedures or creates one or more new procedures to address the gap.

Similar Equipment

In some circumstances, one procedure can cover a group or type of machinery or equipment, subject to limitations. This is possible if either of the following two conditions exist:

Condition One

- Equipment is substantially the same (manufacturer, model, function)
- Operational controls named in the procedural steps are configured in a similar manner
- Locations of all disconnect points (energy isolating devices) are clearly identified
- Step sequences to safely lockout/tagout the machinery or equipment are similar

Condition Two

- Covered equipment has a single, common energy supply readily identified and isolated and has no stored or residual hazardous energy

Annual Energy Control Procedure Reviews

To help ensure the ongoing effectiveness of equipment specific energy control procedures, the program administrator ensures the completion of an annual evaluation of all current procedures. Annual evaluations include:

- A review of each procedure to confirm the energy control procedures effectiveness
- Any problems with the procedure
- Confirm authorized-employees understand their responsibilities under this program and the procedures under review
- Confirm the authorized-employees follow the steps in the procedure
- Identify any lockout/tagout related incidents occurring since the last review or previous 12-months
- Identify any missing procedures or required updates

During each review, the evaluators make changes, notations, and revise each procedure appropriately.

The person completing these annual reviews must be an authorized-person not involved in the energy control procedure under consideration.

Annual reviews require certification demonstrating reviews and updates were properly completed, and each energy control procedure is accurate, effective, and compliant with regulations. Certifications must include the following:

- Machine or equipment
- Date of the inspection
- Names of employees included in the inspection
- Name of the person who performed the inspection

When tagouts are used alone, these annual reviews must include affected-persons because of the increased importance of their role in avoiding accidental or inadvertent activation of the equipment.

The Lockout/Tagout Process

This section describes the lockout-tagout-process authorized-employees follow before working on covered equipment.

Step 1 - Prepare for Shutdown. Before an authorized-employee turns off a machine, the authorized-employee must have knowledge of the energy type and magnitude. In addition, the authorized-employee knows methods, and means of controlling the energy hazards. This knowledge is obtained through a review of relevant hazardous energy control procedures combined with training and prior equipment knowledge

Step 2 - Notify Affected-Employees. Notifies all affected-employees a machine maintenance is required and a machine shutdown, and lockout are necessary

Step 3 - Shutdown the Equipment. The authorized-employee shuts down the equipment in an orderly fashion by the normal stopping and shutdown procedure (for example, depress the stop button, open switch, and close valve). Use of the normal shutdown procedure helps avoid possible increases in the magnitude of any hazards or the emergence of new hazards

Step 4 - Isolate the Equipment from Hazardous Energy. Physically locate all energy isolating devices necessary to isolate and control the energy to the equipment and physically operate those devices to isolate the equipment from the energy source(s)

- When an energy source does not accept a lock or it does not adequately isolate energy, use an appropriate energy isolation device
- Specialized energy isolation techniques are required in some circumstances (such as a double block and bleed, breaking flanges, and adding blind flanges, and related isolation methods). The relevant energy control procedure documents these requirements

Step 5 - Control Residual Energy. Release, relieve, disconnect, restrain and otherwise render safe any residual or stored hazardous energy and apply a lock as each energy source is relieved. This process may include relieving pressure, opening bleeder valves, shorting capacitors, uncompressing springs, dropping, or supporting elevated machine components, rinsing and neutralizing chemicals, and other related processes and procedures.

Step 6 – Confirm Controls are Correctly Set. Verify each integral energy control device is in the desired position maintaining a state of energy isolation.

- For most control devices, this is typically in the off or closed position.
- For selected control devices, locking in the open position is indicated. For example, in a double block, and bleed arrangement, lock the bleeder valve in the open position to prevent pressure buildup in the isolated section of pipe. It is sometimes advantageous to lock open bottom valves in a tank during a permit required confined space entry so if the tank accidentally takes on liquid, it will drain. Consult the equipment specific energy control procedure for details

Step 7 - Lock and Tag Each Energy Source. Lockout the energy isolating device(s) with assigned lock(s) and retain the keys to the locks. Consider using a hasp if other authorized-employees help work on the equipment. Tagout each energy isolating device. Apply tags with either non-reusable cable ties having a minimum breaking strength of 50-pounds or through the lock shackle

- Each lock must have a personal tag with the authorize-employees name clearly printed on the tag

Step 8 - Verify Isolation. Ensure equipment is disconnected from the energy source(s) by ensuring no personnel are exposed. Verify the isolation of the equipment by operating the push button or other normal operating control(s) or by testing the equipment to ensure that it will not operate and no hazardous energy exists. After verification:

- Return operating control(s) to neutral, off, or desired position
- Verify additional energy was not accumulated during the verification step
- Continue to control residual or stored energy until fully relieved
- Periodically verify the absence of accumulated energy if there is the possibility of a bad, leaky valve, or other similar circumstance

Step 9 - Commence Maintenance Activity. The machine or equipment is now locked, tagged, and isolated. Initiate maintenance and repairs

- If work involves exposure to electricity, including the verification of a zero energy state and troubleshooting, electrical safety guidelines apply. Reference the organization Electrical Safety Program for details

When maintenance has been completed and the equipment is ready to return to normal operating condition, the authorized-employee will take the following steps:

- Check the equipment and the immediate area around the equipment ensuring nonessential items are removed and equipment components are operationally intact
- Visually check the entire work area with emphasis on points of operation and similar hazardous areas ensuring all employees are safely positioned or removed from the area
- Verify the controls are neutral or off and all valves are in the desired state
- Remove the lockout devices and reenergize the machine or equipment. The removal of some blocking forms may require reenergization of the equipment before safe removal
- Notify affected-employees the maintenance has been completed and the equipment is ready for use

Temporary Removal of Lockout/Tagout Devices

The temporary removal of lockout/tagout devices and the reenergization of a machine during maintenance and repair is permitted only in limited situations for tasks requiring energization. For example, when power is needed to test or position machines, equipment, or components. However, this temporary exception applies only for the limited time required to perform the task requiring energization and the following steps must be performed in sequence before reenergization:

- Clear tools and materials from machines
- Clear employees from the area around the machines
- Remove the lockout/tagout devices as specified in the regulation
- Energize the machine and proceed with testing or positioning using effective protection from hazardous energy
- When testing and positioning is complete, deenergize all systems, isolate the machine from the energy source and reapply energy control measures. Additional service or maintenance required includes relief of any residual or stored energy and verification of zero energy state

The equipment specific energy control procedure must include a safe sequence of actions to follow when reenergization is required as a part of a service or maintenance activity, together with appropriate controls to safeguard employees during these tasks.

This temporary exception applies only for the limited time required for testing or repositioning the machine/equipment or its components. Authorized-employees may not disregard lockout/tagout requirements during other portions of the servicing or maintenance operation.

WARNING: EMPLOYEES MAY BE EXPOSED TO SIGNIFICANT RISKS DURING THESE TRANSITION PERIODS. EXERCISE CARE AND FOLLOW ALL PROCEDURES.

Multiple Person Lockout/Tagout

When there is more than one authorized-employee, one serves as the lead and is responsible for tracking the work status, lockout/tagout status and ensuring continuity between shifts and personnel, if applicable. The lead person completes the lockout/tagout operation, applies a hasp to the energy isolating devices and then their lock and personal tag. As authorized-employees join or leave work in progress, they will add, or remove their lock to the hasp(s) on every energy isolation device(s).

When the work is done, the lead is the last person who removes their locks and tags and walks the equipment to ensure all personnel are clear, all locks, and tags are removed, and the equipment is ready for energization.

Never use keyed alike locks for different authorized-employees. Each employee may only possess the key to their own lock. In general, the use of hasps is encouraged to facilitate easier transitions between shifts and employees.

Group Lockout Boxes

When there are multiple lockout points, multiple employees, or both, a group lockout box is helpful because it simplifies the lockout process and helps minimize the number of required locks. As above, the lead employee locks and tags each energy isolation device but places the keys to all lockout points in the group lockout box. Each employee working on the system applies their own locks and tags to the group lockout box instead of every energy isolation point.

Personnel and Shift Change Procedure

When authorized-employees must maintain a lockout/tagout condition across a shift or during personnel changes, the oncoming shift lead coordinates with the off going shift lead, applying their locks first, followed by the remainder of the oncoming team. The departing team each remove their own locks and tags, and finally, the departing lead removes their locks and tags.

Once the transition is complete, and before the oncoming personnel begin work, both the outgoing, and oncoming lead walk the equipment. The leads examine each lockout point, observing the equipment, accounting for all personnel, and ensuring the successful transition while maintaining continuity of effectiveness.

When the work is done, the lead is the last person who removes their locks and tags and walks the equipment to ensure all personnel are clear, all locks, and tags have been removed and the equipment is ready for energization.

Tags Without Locks

When an energy isolation device is discovered that is not capable of lockout, an aftermarket, or custom energy isolation device is required. If there are no aftermarket lockout devices available for purchase, and the construction of one is not feasible, and there is no way to apply the lockout device or the lock, it is permissible to use a tag only. However, full protection of employees is required as described:

- Place the tag in the location where the locking energy isolation device, firmly affixed
- Use at least one additional safety measure directly upstream of the unlockable point, providing the equivalent to a full lockout/tagout. Additional safety measures include but are not limited to the following examples: (i) Remove a fuse upstream, (ii) Open a second, upstream circuit breaker, (iii) Close a second, upstream valve, and (iv) Remove a valve handle
- Place an additional tag or a sign indicating the equipment is locked and tagged at the controls to the power source of the equipment

Adhere to all other portions of this program, and contact the program administrator, so modifications can be made to the unlockable energy isolation device, if possible, so it can accept a lock.

An energy isolating device is considered capable of being locked out if it meets one of the following requirements:

- Designed with a hasp or other part where you can attach a lock such as a lockable electric disconnect switch
- Locking mechanism built within

- Locked without dismantling, rebuilding, or replacing the energy isolating device or permanently altering its energy control capability with lockable, aftermarket, or custom energy isolating device such as a valve cover or circuit breaker blockout

Locks Without Tags

The use of locks without tags is allowed when the facility uses uniform locks with unique and personally identifiable information for the authorized-employee applying the lock to an appropriate energy isolating device.

Control Circuits and Interlocks are Inadequate

Control circuits and associated devices, including push buttons, selector switches, programmable logic controller (PLC) switches, equipment interlocks, e-stops and similar devices, are not energy isolation devices. They are never used as the sole means for deenergizing circuits or equipment because they do not physically interrupt the flow of hazardous energy, even when they are specifically designed for lockout/tagout. Authorized-employees may use these devices to help ensure the complete shutdown of equipment and as an added precaution, however, these devices never take the place of appropriate energy isolation devices that physically interrupt hazardous energy.

Benchtop Testing of Equipment Components

Authorized-employees may remove parts and part assemblies from equipment and prior to replacing these parts, conduct benchtop function checks. This functional benchtop testing sometimes includes the energization of the part or part assembly exposing the authorized-person to hazardous energy. The exposed employees must leave the area and ensure no other employees are exposed before testing starts. If it is impossible for an authorized-employee to leave the area while completing the testing, alternate means of protection is required as defined in this program.

Authorized-employees must never hold, position, or test parts and part assemblies while exposing any part of their body to hazardous energy or including becoming part of an electrical circuit.

Authorized-employees performing benchtop tests must consult a copy of the lockout/tagout procedure associated with the specific benchtop test before completing the test. If a specific procedure does not exist, the authorized-employee must create a procedure and review with the program administrator before completing the test. Each benchtop procedure must document the alternate methods used to provide protection. If accepted, the program administrator includes and fully documents the new procedure in the same fashion as all equipment specific lockout/tagout procedures.

Alternate Lock and Tag Removal Procedures

If an authorized-employee has left the site but has not removed their locks and tags, and equipment startup is required, use the followings steps:

- Attempt to locate the person by phone and have them return to the site to take off their locks and tags
- If the person is completely unavailable, the program administrator meets with an onsite authorized-employee, obtains a copy of the energy control procedure and walks the equipment ensuring removal of locks and tags can be done safely

- Check the equipment and the immediate area around the equipment ensuring nonessential items are removed and the equipment components are operationally intact
- Visually check the entire work area with emphasis on operational points and similar hazardous areas to ensure all employees are safely positioned or removed from the area
- Verify the controls are positioned neutral or off and all valves are in the desired state
- Remove the lockout devices and reenergize the equipment. The removal of some blocking forms may require equipment reenergization before safe removal
- Notify affected-employees the service or maintenance is completed, and the machine or equipment is ready for use
- Return the equipment to service

Contractor and Subcontractor Lockout/Tagout

All outside contractors and their subcontractors must have an OSHA compliant lockout/tagout program and its employees must receive an appropriate level of OSHA compliant lockout/tagout training.

When contractor's employees repair existing equipment already part of operations, an organization authorized-employee isolates, locks, and tags the equipment in accordance with this program. The contractor's employees apply their own personal locks and tags to each energy source, or they participate in a group lockout/tagout. In either case, the contractor's employees never apply locks and tags first.

When contractor's employees install new equipment and utilities (not yet tied into existing equipment and utilities), the contractor's employees apply their own locks and tags and the organization's authorized-employees need not apply locks and tags first. However, once new equipment is ready to tie into existing equipment, the organization's authorized-employees must apply locks and tags to equipment first.

Contractors and subcontractors not following this policy while performing work or whom remove the organization's applied locks and tags may be subject to dismissal from the project and appropriate legal action.

All contractors and their subcontractors are made aware of this policy prior to work.

Alternate Protection

When employees perform minor tool changes, adjustments, and other minor servicing operations during normal routine, repetitive, and integral production operations, alternative safeguarding measures are required to protect every employee exposed to the hazards. In addition, benchtop functional testing of parts and components often also requires alternate protection.

Alternate protection and safeguarding options include the following:

- Compliant machine guards
- Two hand trip or control devices
- Jog devices with two handed activation controls and dead man switches at fixed locations distant from the hazard area
- Restraint devices preventing the employee from entering the danger zone

- Safety blocks or safety slides
- Video cameras allowing remote observation of equipment function
- Plexiglas barriers allowing close operation inspection but prevents introduction of the employee's body into the point-of-operation or other danger zone

In addition, the following applies:

- The operating station where the machine is activated must be under the qualified operator or craftsman control
- All participants involved with the work must be in clear view of the operator or in positive communication with each other
- All participants must be beyond the reach of machine elements moving rapidly and presenting a hazard
- Where machine configuration or size requires the operator to leave the control station, and the elements move rapidly if activated, such elements must be separately locked out by positive means
- During repair procedures where mechanical components are being adjusted or replaced, deenergize, or disconnect the machine from its power source per the procedures in this program

While affected and authorized-employees may identify and provide advice regarding the routine and repetitive production exemption, they may not unilaterally decide a task is routine, repetitive, and integral to production. The program administrator must approve all exemptions in consultation with one or more individuals knowledgeable on hazardous energy control programs, applicable regulations, and this program.

When the program administrator grants an exemption under this section, the program administrator documents each exemption together with the required alternate protective measures in the equipment specific energy control procedure. Furthermore, exceptions are documented, and included in postings such as standard operating procedures and warning signs. Affected and authorized-employee training includes these exceptions and any related procedures.

PLC Switch Functioning as Alternate Protection

A PLC switch or system may be used to protect employees who are performing minor tool changes, adjustments, and other minor servicing activities during normal production operations subject to the following:

- The program administrator completes a detailed hazard analysis
- The hazard analysis includes a review of documentation and actual function indicating the PLC system was designed, installed, used, and maintained in accordance with the generally recognized good engineering practices. Acceptable practices include industry best practices, available consensus codes, applicable manufacturers' recommendations, prior operating experience, and reliability data
- PLC switches adequately protect employees from hazardous energy sources during the minor servicing activities

Lock and Tag Specification

Locks used for lockout must meet the following minimum requirements:

- Dedicated locks are required, and lockout locks may not be used for any other purpose
- Lockout locks are standardized by at least one of the following: Color, Shape, and Size
- Locks are substantial enough to prevent removal without the use of excessive force or unusual techniques
- Keys to locks are retained by the authorized-employee only. Duplicate keys are disallowed unless they are placed in a key lockbox or other similar locked location only accessible to the program administrator and only accessed when the authorized-employee key holder is not available due to vacation, illness, or a related serious matter
- Combination locks are disallowed

Tags used for tagout must meet the following minimum requirements:

- Tags are standardized in color, shape, and language
- Tags display a phrase such as, Do Not Start, Do Not Energize, Do Not Operate
- Tags display a location to clearly document the name of the authorized-employee
- Tags are sufficiently durable to withstand environmental conditions and will not deteriorate if exposed to harsh chemicals and wet conditions
- Tags are attached directly to lock shackles or with nylon, non-reusable, locking cable ties having a minimum breaking strength of 50-pounds and tolerating the environment where they are exposed without failure

Training

The organization provides OSHA compliant lockout/tagout training upon initial assignment. Affected-employees receive awareness training while authorized-employees receive authorized-employee training. The organization requires retraining upon the following:

- Change in authorized-employees job assignments
- Change in machines, equipment, or processes presenting a new hazard
- Change in the energy control procedures
- There are inadequacies in employee's knowledge and use of energy control procedures

Document Retention

At a minimum, this organization retains the program records indicated below.

- Equipment specific energy control procedures - Maintain in a perpetual fashion with updates completed as necessary to meet program needs; retain older procedure versions for at least one year after the latest revision is implemented

The program administrator maintains all records related to this program.

ELECTRICAL SAFETY

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ELECTRICAL SAFETY

This program provides awareness-level information for unqualified employees who do not work on electrical systems that operate over 50-volts.

Application and Scope

This program addresses the safety of personnel whose job responsibilities involve working near, but not on electrical systems, and who are unqualified with respect to electrical work.

This organization prohibits employees from working on electrical equipment, electrical systems, electrical circuits, and equipment and have actual or potential exposure to electrical hazards, including shock, and arc flash, and that operate over 50-volts. This organization uses the services of qualified electricians to install electrical equipment, electrical systems, establish temporary power branch circuits, install temporary lighting circuits, and similar tasks.

This program is non-exhaustive and requires specific knowledge of and adherence to applicable safety regulations and codes.

All electrical equipment installations must conform to the national electrical code and OSHA regulations.

This program only addresses occupational safety; it does not address electrical system reliability, power quality, preventative maintenance, and other related items.

Functional Roles and Responsibilities

These categories apply to the actual work the individual does and are independent of their actual job title. The following employees have specific functional responsibilities under this program:

Qualified-Persons

Qualified-persons are trained in the hazards and safe work practices for safely working around electricity. They are familiar with the construction and operation of the equipment and the hazards involved. A person can be qualified in some tasks and equipment, but not others.

Electrical engineers and state licensed electricians are not automatically qualified-persons, they must have the specific knowledge and training required by safety regulations together with knowledge and experience in the systems and situations they work with.

Designated employees received qualified-person electrical safety training to ensure the safe completion of allowable tasks.

A qualified-person is someone who has received training and demonstrates the following skills:

- The installation, maintenance, and operation of electric equipment and installations
- The hazards involved in working around electricity
- The use of safe work practices applicable to this organization's operations
- Understand electrical hazards including electrical shock and arc flash
- Understand how to avoid electrical hazards

- Familiar with the proper use of safe work practices and specialized PPE
- Trained and authorized under this organization's control of hazardous energy program
- Understand the electrical code requirements applicable to the qualified-person tasks
- Designated by this organization as a qualified-person

Only qualified-employees may:

- Work on electric circuits, parts, or equipment
- Check voltages, perform amp draws, and troubleshoot
- Test deenergized electrical parts and systems for zero energy state
- Reset electrical main, sub main, and other electrical breakers
- Install or troubleshoot electrical systems and their components

Unqualified Persons

All other employees that work in the general vicinity of electrical equipment operating at 50-volts or more but do not have specific knowledge in the installation and maintenance of electrical equipment and are unqualified-persons.

Unqualified persons have the following responsibilities under this program:

- Participate in all required awareness training
- Never work on electrical systems or expose themselves to electricity or arc flash hazards
- Observe and do not violate all approach boundaries defined in this program
- Never operate electrical breakers
- Never operate equipment in an unsafe condition
- Report unsafe equipment and safety concerns

Hazards

Electrical hazards include the following:

- Arc flash and arc-blast
- Electrical shock and electrocution
- Falls
- Fires

The safe work practices and other procedures and equipment in this program are designed to prevent injury from these hazards.

Arc-Flashes and Arc-Blasts

An arc flash hazard is a possible source of injury or damage associated with the release of stored energy. An arc flash hazard exists when a person is, or might be, exposed to an incident (thermal) energy of 1.2-cal/cm² or more. This energy level is considered the minimum required level to cause a second-degree burn.

The likelihood of occurrence of an arc flash increases when energized electrical conductors or circuit parts are exposed or when they are within equipment in a guarded or enclosed condition and a person is interacting with the equipment in a way that could cause an electric arc.

An arc-blast occurs when the arc flash is sustained long enough, and it is hot enough to damage and melt conductors and other equipment parts. The copper and other metals become conductive vapors. The blast propels these conductive vapors, molten metal, and parts outward from the source in a violent event that causes severe thermal burns, shrapnel that causes lacerations, and related injuries, concussive forces that cause massive tissue damage, hot vapors and gases that cause airway and lung damage, and impulsive noise that damages hearing. Secondary fires sometimes also occur.

Refer to NFPA 70E for a complete definition.

Shock and Electrocution

Electrical shocks cause surface burning of skin and internal burning of tissue as the electricity passes through the body. The extent of burns depends primarily on the amperage. Electricity interferes with normal heart function up to and including halting normal function. It also affects individual cells – It causes electroporation, a process whereby the cells that experience shock become “leaky” and can’t function correctly.

Hazardous Differences in Electrical Potential

When electricity flows through the ground from a downed power line or a damaged underground powerline, the area around the location where the powerline is touching the ground becomes energized. The voltage decreases rapidly with distance from the electrical source, creating a gradient. Voltage drops that occur between specific points in are called ground potentials. Various factors influence this including the sources voltage, soil type, soil moisture, and other factors.

A step potential occurs as a person walks in the energized area – When the feet are separated, there is a step potential, or voltage gradient, that can result in current flow up one leg and down the other, creating a shock or electrocution hazard. A touch potential can occur in a similar fashion, though it is from hand to hand, shoulder to back, hand to foot, or similar scenarios.

Federal OSHA regulations at 29 CFR 1910.269, Appendix C, contain an authoritative description of this phenomena.

- https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=9871&p_table=standards

Falls

Falls often occur after a shock, when the victim is working off of an elevated surface or a ladder. The surprise of the shock or incapacitation from the shock can cause a fall that results in substantial injury, even if the shock itself is not severe.

Fires

Fires can occur secondary to arc-blasts, from overheating of electrical components, and during arc-events even when an arc-blast does not occur. In some cases, fires can occur that are initially undetected when heat buildup occurs over time.

Accidental Contact with Electrical Lines

If equipment contacts a power line, it will become energized at the same voltage as the power line. Any object in contact with the equipment will also become live. In addition, an electrical field will be created around anything in contact with the power line. If an overhead line falls or is contacted, the following precautions should be taken:

- Keep everyone at least 10-feet away
- Use flagging to protect motorists, spectators, and other individuals from fallen or low wires
- Call the local area electrical department or electric utility immediately
- Place barriers around the area
- Do not attempt to move the wire(s)
- Do not touch anything touching the wire(s)
- Be alert to water or any conductors present
- Crews will have emergency numbers readily available. These numbers will include local area electrical department, utility, police/fire, and medical assistance
- If an individual becomes energized, DO NOT TOUCH the individual or anything in contact with the person. Call for emergency medical assistance and call the local utility immediately. If the individual is no longer in contact with the energized conductors, CPR, rescue breathing, or first-aid should be administered immediately, but only by a trained person. It is safe to touch the victim once contact is broken or the source is known to be deenergized
- Wires contacting vehicles or equipment will cause arcing, smoke, and possibly fire. Occupants should remain in the cab and wait for the local area electrical department or utility. If it becomes necessary to exit the vehicle, leap with both feet as far away from the vehicle as possible, without touching the equipment. Jumping free of the vehicle is the last resort
- If operating the equipment and an overhead wire is contacted, stop the equipment immediately and, if safe to do so, jump free, and clear of the equipment. Maintain your balance, keep your feet together, and either shuffle, or bunny hop away from the vehicle another 10-feet or more. Do not return to the vehicle or allow anyone else for any reason to return to the vehicle until the local utility has removed the power line from the vehicle and has confirmed the vehicle is no longer in contact with the overhead lines

Training

This organization provides qualified-person training that includes:

- NFPA 70 E, OSHA 29 CFR 1910 Subpart S, and this program's requirements
- Electrical hazards
- Shock and arc flash boundaries
- Safe work practices selection and use
- PPE selection and use
- Distinguishing exposed live parts from other parts of electric equipment
- Determining the nominal voltage of exposed live parts
- Prohibitions and limitations
- Other relevant content

Retraining occurs periodically with a frequency sufficient to maintain skills and not less frequently than once every three years.

This organization requires and provides first-aid, CPR, AED training to qualified-persons.

Unqualified-persons must attend awareness-level electrical safety training.

Document Retention

The program administrator is the custodian of all records generated because of this program. Documents associated with electrical safety are retained for a minimum of one year and reviewed annually for continuous improvement to the electrical safety program. Documents that fall under other programs, such as PPE assessments and hazardous energy control procedures, are retained as required by the applicable program.

TEMPORARY ELECTRICAL

This applies to temporary electrical installations, including illumination, portable generators, and related topics. This section is non-exhaustive and requires specific knowledge of and adherence to 29 CFR 1926 Subpart K, NFPA 70E, and the organization's Electrical Safety and Generators, Portable and Vehicle Mounted programs, for further details. All installations must conform to the National Electric Code (NFPA 70) and any locally established amendments.

Application and Scope

This program is designed to minimize the risk of electrical shock and electrocution associated with temporary electrical systems, regardless of location. It is non-exhaustive and requires specific knowledge of and adherence to electrical safety regulations, NFPA 70E, NFPA 70: National Electric Code, and any locally-established amendments.

Temporary Electrical Requirements

Temporary power must be installed and maintained safely and compliantly when providing power for the organization's use or use by other trades. Temporary power systems must:

- Be suitable for the intended installation and use (Conductor gauge, equipment type, voltage rating, capacity rating, hazardous classification, etc.)
- Consider the effects of heating and arcing under use conditions
- Have enough mechanical strength and durability
- Have enough electrical insulation

The following additional requirements apply:

- Feeders must originate in an approved distribution center, such as a panel board, that is rated for the voltages and currents the system is expected to carry
- Branch circuits must originate in an approved power outlet or panel board with labels matching up with disconnects and convenience outlets
- Neither bare conductors nor earth returns may be used for the wiring of any temporary circuit
- Flexible cords and cables must be of an approved type and suitable for the location and intended use. They may only be used for pendants, wiring of fixtures, connection of portable lamps or appliances, elevators, hoists, connection of stationary equipment where frequently interchanged, prevention of transmission of noise or vibration, data processing cables or where needed to permit maintenance or repair
- Flexible cords may not be used as a substitute for fixed wiring, run through holes in walls, ceiling, floors, doorways, windows or similar openings, attached to building surfaces, or concealed behind building walls, ceilings or floors

- Receptacles must be of the grounding type. Unless installed in a complete metallic raceway, each branch circuit must contain a separate equipment grounding conductor, and all receptacles must be electrically connected to the grounding conductor
- Suitable disconnecting switches or plug connects must be installed to permit the disconnection of all ungrounded conductors of each temporary circuit
- Equipment operating at 50 or more volts must be guarded against any and all unintentional contact. This guard must be an approved cabinet or other form of approved enclosure
- Panels, dead-fronts, and other electrical equipment may not have unguarded cutouts

Temporary Electrical Inspections

Use of temporary electrical systems by multiple people from different companies and trades often subjects the temporary systems to disturbance and damage that can create safety hazards. Frequent inspections are required. Inspect all cords and tools before every use, periodically during use, when damage is possible or suspected. If deficiencies are found, remove the equipment or cord from service for disposal or repair by a qualified-person.

Ground Fault Circuit Interrupters

The ground fault circuit interrupter (GFCI) is a fast-acting circuit breaker that senses small imbalances in the circuit caused by current leakage to ground and, in a fraction of a second, shuts off the electricity. The GFCI continually matches the amount of current going to an electrical device against the amount of current returning from the device along the electrical path. Whenever the amount going differs from the amount returning by approximately 5-milliamps, the GFCI interrupts the electric power within as little as 1/40 of a second.

The GFCI protects employees against the most common form of electrical shock hazard – The ground fault. It also provides protection against overheating of wiring and electrical components, damage to wire insulation, and fires.

A GFCI will not protect a person from electrical hazards that do not involve a difference in the send and return voltage. For example, line-to-line contact hazards, such as a person holding two hot wires or a hot and a neutral wire in each hand.

The following circumstances require GFCI use:

- All 120-volt, single phase 15 and 20-ampere receptacle outlets on construction sites, that are temporary and are not part of the permanent wiring of the building or structure
- All temporary wiring circuits, portable grounded power tools, and extension cords, whether power is supplied from a utility or an electrical generator
- Portable double-insulated power tools (A double-insulated power tool presents a shock hazard when: (i) It is immersed in water, (ii) It becomes damaged and the internal double insulation is bridged, and (iii) Defects develop in the supply cord of the tool)

Pigtail (portable) GFCIs are acceptable when a circuit is not GFCI protected.

As a best practice, use a pigtail GFCI when it is unclear if a circuit is GFCI protected. An additional GFCI does not create hazards or problems, and it will ensure adequate protection.

Circuit breakers protect equipment - Never rely on circuit breakers to protect people. Use a GFCI.

Temporary Cords

Temporary cords must meet the following minimum requirements:

- Have a continuous ground
- Have undamaged insulation throughout their length
- Free of damage and electrical tape
- Must be three-wire type
- Must be designed for hard or extra-hard usage, including cords used with temporary lights (the NEC lists various types of flexible cords designed for hard or extra-hard usage including hard service cords (types S, ST, SO, STO), and junior hard service cords (types SJ, SJO, SJT, SJTO)

Routing

Route flexible cords and cables appropriately and protect them from accidental damage. Always observe the following:

- Route temporary cords and cables so that they are out of the way of equipment and employees and so they do not block or clutter the area in front of temporary electrical panel boards
- Do not route electrical cords where they can be run over by equipment or pinched in doorways or otherwise damaged
- If a cord must be routed through a doorway or other pinch point, protect it from damage
- Avoid sharp corners, sharp edges, projections and wear points
- When hanging temporary cords and cables overhead, use nonconductive materials only
- Use strain relief at cord connections
- Remove temporary wiring and related equipment as soon as possible after it is no longer needed

Repairs

Temporary cords and electrical equipment are repairable only by qualified-persons and only when the repair returns the cord to its original mechanical and dielectric strength. Electrical tape is not allowed, nor is any other covering that hides insulation integrity and prevents inspection.

Unless a qualified person is present at the jobsite and agrees to repair cords, replace temporary cords with new cords that have molded plugs permanently affixed to the cord rather than attempt repair.

Temporary Lighting

The installation requirements for temporary lighting include:

- Cord and plugs used for illumination must be of proper gauge, with continuous ground, and enough insulation in good repair
- Must have shatter-proof bulbs or protective covers

- Install temporary illumination on separate circuits from temporary outlets to prevent sudden loss of light due to unrelated nuisance GFCI trips when lighting shares a circuit with other electrical loads
- Support overhead temporary lighting only by non-conductive means
- Support overhead temporary lighting by its cord only when so designed
- GFCI protect lighting circuits when water is present and there is a risk of electrical shock (GFCI protection is not required otherwise)
- Use intrinsically safe lighting when used in classified areas or rooms
- Flexible cords used with temporary and portable lights must be usage rated hard or extra-hard
- Inspect cords used with lighting as with all other temporary cords

Refer to ANSI A11.1-1965 for additional details.

GENERATORS FOR TEMPORARY POWER

Generators can cause electrical shock just as with other electrical systems. This section addresses the use of portable generators used at jobsites.

Application and Scope

This program covers stand-alone electrical generators used to supply temporary power to tools, equipment, and temporary lighting. It also covers vehicle-mounted generators, and generators that temporarily supply electricity to job-trailers and other structures. This program does not address permanent generator installations.

Portable Generator Requirements

The following requirements apply to the use of stand-alone and vehicle-mounted portable generators:

- Maintain and use generators in accordance with manufacturer's instructions
- Keep generators dry and do not use electrical equipment that was submerged in water unless thoroughly dried out and inspected for safety
- Setup generators with several feet around all sides to allow adequate ventilation
- Do not use generators in enclosed areas where combustion gases, including carbon monoxide, can concentrate, and poison nearby personnel
- Before refueling, shut down the generator, and allow it to cool
- Store only a limited amount of fuel, only in safe locations, only in type II safety cans, and never use plastic fuel containers
- Generators are loud - Hearing protection is required when noise levels exceed 90-dBA
- 100% GFCI use is required for anything drawing power from a portable generator
- Always plug portable tools and appliances directly into the generator or use heavy duty, grounded (3-pronged) extension cords
- Do not use underrated cords— Replace them with appropriately rated cords that use heavier gauge wires
- Never use electrical tools or appliances with frayed cords, missing grounding prongs, or damaged, or cracked housings
- Use double insulated tools where possible

Regularly inspect all portable generators for damage and defects. This includes convenience outlets, checking for proper bonding, and confirming a continuous path to the driven ground rod, when used. Use of damaged or defective generators is prohibited.

Generator Grounding and Bonding

Grounding is the intentional connection of a grounding conductor to a copper rod driven into the earth, often called a driven ground rod. Grounding provides a safe path for electricity to travel in a short-circuit (i.e. When electricity can't flow through the neutral because of some problem).

Bonding is the intentional connection between the grounded circuit conductor (neutral), and the grounding means for the generator, which includes the generator's frame.

The integrity of the connection between the generator's frame and the equipment grounding terminals of power receptacles is important to the safe use of the equipment. Confirm that there is a continuous connection with the correct equipment. Resistance should measure near zero and must not be intermittent, which indicates a loose connection.

Portable and Vehicle Mounted Generators

The frame may serve as the ground, in place of a driven ground rod, provided that:

- The generator supplies only equipment mounted on the generator and/or cord and plug-connected equipment through receptacles mounted on the generator, and
- The noncurrent-carrying metal parts of equipment, including the fuel tank, the internal combustion engine, and the generator's housing, are bonded to the generator frame, and
- The equipment grounding conductor terminals of the power receptacles that are a part of and mounted on the generator, are bonded to the generator frame, and
- For vehicle-mounted generators, the generator must be bonded to the vehicle frame

If these conditions do not exist, then a connection to a driven ground rod is required.

Generators Supplying Power to a Temporary Structure

In all other situations, including using the generator as a power source for a job trailer or other structure, ground the generator to a driven ground rod installed in accordance with manufacturer's instructions and electrical codes, and always use an open-transition transfer switch.

Carbon Monoxide Poisoning

Carbon monoxide (CO) is a colorless, odorless, and toxic gas that causes severe illness and death. It is formed during the combustion of all fuels, and it is emitted from generators.

- Never use a generator indoors or in enclosed spaces such as garages, crawl spaces, basements, or in non-permit and permit-required confined spaces
- Verify that there is three to four feet of clear space on all sides of the generator, and above it
- Locate generators away from doors, windows, and vents that may allow exhaust gases to enter structures or vehicles
- Locate generators way from non-permit and permit-required confined space entrances and the air-intakes of ventilation equipment to avoid introducing combustion gases

If you or others show symptoms of CO poisoning—dizziness, headaches, nausea, tiredness— Immediately exit the area, get to fresh air, and then seek medical attention. Do not re-enter the area until it is safe as determined by trained personnel equipped with a properly functioning carbon monoxide gas detector.

POWER LINE SAFETY

This section addresses overhead power line safety hazards and safe work practices.

Application and Scope

This section covers overhead powerline safety for aerial lifts, scissor lifts, scaffold, ladders, and heavy equipment. Heavy equipment includes, but is not limited to:

- Concrete pumping trucks
- Drilling rigs
- Earthmoving equipment
- Pile drivers (hammer, vibratory)
- Other heavy equipment types

This section excludes cranes and powerlines.

Warning

ALWAYS ASSUME THE POWERLINE IS ENERGIZED UNLESS THE UTILITY HAS CONFIRMED IT IS OFF AND IT IS VISIBLY GROUNDED AT THE JOBSITE.

Power Line Hazard Survey and Controls

The organization surveys each job-site for overhead power lines, determines what activities and equipment are at risk of contact, and completes the power line safety form when overhead power lines are present. The initial steps are:

- Contact the utility to identify or verify the nominal voltage rating of the power line
- Identify the work zone
- Evaluate the work and the site layout to determine if any part of the equipment or attachments could come closer than: 20-feet for voltages up to 350-kV; 50-feet for voltages at and above 350-kV but less than 1,000-kV; the utility prescribed clearance distance for lines at or above 1,000-kV

If the equipment or personnel will or could come closer than the distances above, or near them, the organization applies one, or more controls based on the magnitude of the voltage, the activity, the equipment, and the closest possible working distance to the power line and completes the power line safety form.

The required control methods assigned are based on the specific scenario at the job-site under consideration. The scenarios are:

- Equipment must travel below the power line for access and egress
- Equipment operations cannot violate a clearance distance

- Equipment operations could violate a clearance distance
- Work involves heavy equipment, aerial lifts, ladders
- Work Involves Scaffold or Scissor Lifts

Equipment Travel Below Powerlines

When equipment must pass under or near power lines, but not work:

- The equipment's boom, dipper, bucket, mast, and support systems are always lowered and stowed
- The maximum height of the stowed equipment is confirmed and compared to the total available distance between the ground and the power line and the applicable clearance distance
- The driver and other personnel ensure the clearance distance is maintained when traveling below the powerline
- A dedicated spotter is used when the driver/operator's visibility is limited

If the crossing point beneath the power lines is a regular access, egress, or crossing location, the organization will:

- Request that the utility relocate the power line, so no contact is possible
- Request that the utility deenergize the power line and visibly ground it at the job-site
- The organization will demark the crossing point

If the utility is unable to relocate or deenergize the power lines, the following are required:

- Utility installs covers to protect from inadvertent contact and installs spheres to increase visibility
- A safe path of travel is selected, marked, and used
- The applicable clearance distance is always maintained

Table 1: Minimum Clearance Distances for All Equipment Traveling Under Power lines

Voltage	Minimum Clearance Distance
$\leq 7,500\text{-V}$	4
$> 7,500\text{-V}$ and $\leq 50\text{-kV}$	6
$> 50\text{-kV}$ and $\leq 345\text{-kV}$	10
$> 345\text{-kV}$ and $\leq 750\text{-kV}$	16
$> 750\text{-kV}$ and $\leq 1,000\text{-kV}$	20
$> 1,000\text{-kV}$	Established by utility or qualified, registered professional engineer

Equipment Operations Cannot Violate a Clearance Distance

When **heavy equipment, aerial lifts, ladders, and any attachments** cannot physically violate applicable clearance distances in any way, at any time, even due to operator error, because the equipment's placement and physical limitations, including its swing radius and equipment reach, preclude clearance distance violations, controls include:

- Demark the power line
- Utility installs spheres increasing visibility of overhead power lines when possible
- Operator always observes clearance distances

Table 2 – Minimum Clearance Distances for Heavy Equipment, Aerial Lifts, and Ladders*

Voltage (kV)	Minimum Clearance Distance (feet)
≤ 50	10
> 50	10-feet + 0.4-inches for each 1-kV over 50-kV
*Cranes and scissor lifts not included	

Equipment Operations Could Violate a Clearance Distance

When **heavy equipment, aerial lifts, ladders, and any attachments**, could violate applicable safe clearance distances because of equipment position, swing radius, maximum equipment reach, operator error, or for other reasons. Controls include:

- Demark the power line and
- Utility relocates power line, so no contact is possible or
- Utility turns off power and visibly grounds powerline at the job-site

If this is not possible, then:

- Utility installs protective coverings to prevent inadvertent contact,
- A dedicated spotter is assigned,
- Equipment operator maintains indicated clearance distance, and
- Utility may also install spheres to increase visibility as appropriate

A spotter is mandatory when work is conducted 20-feet or closer to an overhead powerline, even if the work is not likely to cause a clearance distance violation.

Scaffold and Scissor Lifts

Scissor lifts must not be used closer than the clearance distances described below.

Scaffolds must not normally be erected, used, dismantled, altered, or moved in any way that causes equipment, conductive material or personnel to come closer to exposed and energized power lines than the applicable safe clearance distance described below.

If work requires the violation of a safe clearance distance at any time, including during scaffold erection, and disassembly, ladder and scissor lift use, and before work commences, the organization personnel must contact the local utility to complete one of the following:

- Utility relocates the power line, so no contact is possible (preferred option)
- Utility turns off power and visibly ground powerline at the job-site
- Utility installs protective coverings to prevent inadvertent contact
- A sign is placed on scaffold on either side of the power line

Table 3 – Minimum Clearance Distances from Power Lines for Scaffold and Scissor Lifts*

Voltage	Minimum Clearance Distance, <u>Insulated</u> Power Lines (feet)	Voltage	Minimum Clearance Distance, <u>Uninsulated</u> Power Lines (feet)
≤ 300-Volts	3 (10-preferred)	≤ 50-kV	10
> 300-Volts and ≤ 50-kV	10		
> 50-kV	10-feet + 0.4-inches for each 1-kV over 50-kV	> 50-kV	10-feet + 0.4-inches for each 1-kV over 50-kV
*Excludes Aerial Lifts, Cranes, Ladders			

Power Line Hazard Control Methods

This subsection defines the application of power line hazard control methods.

Power Line Relocation

When required by regulation or this program, and before work starts, the organization requests that the local utility temporarily or permanently move power lines so they are away from the work and clearance distance violations are impossible. Power line relocation may or may not be possible, depending on the circumstances.

Power Line Deenergization and Visible Grounding

When required by regulation or this program, and before work starts, the organization requests that the local utility:

- Deenergize the power lines
- Visibly ground the power lines at the job-site
- Confirm the power lines are deenergized with the organization

The organization will not allow work to start until confirmation is received from the utility and will make the site safe and notify the utility when all work is complete, so the lines can be reenergized.

Protective Coverings and/or Warning Spheres

When required by regulation or this program, and before work starts, the organization requests that the local utility install the following:

- Protective and insulating coverings on power lines to help protect from arcing and inadvertent contact
- Warning spheres that increase the power line's visibility in areas more likely to be contacted by equipment

Demarking Power Lines with Signs

When required by regulation or this program, and before work starts, the organization demarks power lines with sign(s):

- Where vehicles cross beneath it, in both directions
- Along the plane of the applicable clearance distance when equipment is working nearby and not crossing underneath

The sign(s) must indicate the following:

- "DANGER: Look Up - Power Line Overhead"

The sign's text must be large enough to ensure visibility within the cab of passing and nearby vehicles and ideally contains the actual distance from the ground to the lowest point of powerline sag.

Dedicated Spotters

When required by regulation or this program, the organization assigns dedicated spotters. Dedicated spotters are positioned in a strategic location so they can see the power line, the equipment, and properly gauge the clearance distance. Dedicated spotters are typically placed so they can look along the plane of the clearance distance line parallel to the power line. Dedicated spotters must:

- Always have continuous, reliable, and direct communication with the equipment operator
- Provide timely feedback to the operator to ensure maintenance of clearance distances
- Not have any other responsibilities
- Have one or more visual aids to assist in identifying the minimum clearance distance
- Have power line safety training

To help the spotter and the equipment operator gauge distance correctly, they will set up one or more visual references, such as a line painted on the ground, a line of stanchions, or a set of landmarks.

Equipment operations always stop if the dedicated spotter loses contact with operator or takes a break.

Powerline Contact

Powerline contact is an extremely hazardous situation that could easily result in electrocution. Assume the powerline is live until the utility operator confirms it is deenergized and observe the relevant precautions below.

Downed Power Lines

When downed power lines are encountered, observe the following:

- Do not assume downed lines are fiber optic or communication lines
- Stay at least 20-feet from all downed power lines and low hanging lines
- Never drive over downed power lines

Unintentional Contact with Overhead Power Lines

If equipment contacts a power line, it will become energized at the same voltage as the power line. Any object in contact with the equipment also becomes live. In addition, an electrical field is created around anything in contact with the power line inducing a charge in nearby objects or persons. If an overhead line falls or is contacted, take the following precautions:

- Call the local area electrical department or electric utility immediately
- Keep everyone at least 20-feet away
- Place barriers around the area (if safe)
- Do not attempt to move the wire(s)
- Do not touch anything that is touching the wire(s)
- Be alert to water or conductors present

Live wires that contact vehicles or equipment will cause arcing, smoke, and possibly fire. Occupants should remain in the cab and wait for the local area electrical department or utility.

- If the wires are in contact with equipment or a vehicle and they are not entangled, slowly attempt to back the equipment away, however, do not do so if this could pull the wires down onto the vehicle
- Do not touch anything outside the vehicle while in it
- Do not open the doors or windows
- Waive off anyone that tries to help, telling them to remain at least 20-feet away
- Only as a last resort if it becomes necessary to exit the vehicle due to a fire or similar situation, maintain your balance and leap with both feet touching, and without falling, then shuffle, or bunny hop, always keeping feet together, until at least 10-feet away, and preferably 20-feet
- Do not return to the vehicle or allow anyone else to return to the vehicle until the local utility has removed the power line from the vehicle and has confirmed that the vehicle is no longer in contact with the overhead lines

Individual Becomes Energized

If an individual becomes energized, do not touch the individual or anything in contact with the person.

- Call for emergency medical assistance

- Call the local utility immediately
- Only touch the victim once contact is broken or the source is known to be deenergized
- When safe, a trained person administers CPR, rescue breathing, or first-aid

Forms

This section references the following form:

- Power Line Safety

EMERGENCIES AND EGRESS

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JOBSITE EMERGENCY ACTION PLAN

This section addresses emergency action plan for all construction jobsites. This program does not apply to this organization's facilities.

Application and Scope

This section covers all jobsites, all employees, and all subcontractors with respect to emergency action plans (EAP), regardless of emergency type. This program does not apply to this organization's facilities.

Job-Site Specific Emergency Action Plans

When the organization is the lead contractor and the jobsite includes more than ten individuals, the organization will establish its own job-site-specific plan and will communicate this program to involved parties. This will include primary and secondary muster areas and relevant site information. If the jobsite includes less than eleven individuals, verbal transmission of information is acceptable.

If the host employer has its own emergency action plan, personnel will follow that plan when applicable. In addition, the organization will participate in any emergency planning and training process the host employer requests.

Minimum Emergency Response Actions

Employees will immediately notify their frontline leader and the appropriate authorities when an emergency arises. Typically, this involves calling 911 and reporting the emergency followed by verbal reports by phone and/or face to face to other concerned parties.

In the case of fire or other similar emergency, an air horn or similar device announces an evacuation; anyone may activate the air horn if an emergency occurs; if the jobsite has a functional evacuation alarm, that is also acceptable to use:

- Since it is sometimes difficult to identify jobsites, especially in the initial stages, someone familiar with the jobsite must go out to the entrance area and flag down emergency responders so they can find the location
- When an evacuation is called, employees will evacuate to the designated muster point
- Personnel will congregate in the muster area with other employees from their organization
- The frontline leaders(s) will complete a headcount procedure and will notify fire rescue services of missing employees
- Employees will stand clear of all emergency apparatus and personnel and will not demobilize from the site until released

All personnel must evacuate in the event of a fire or similar emergency - There are no critical operations requiring personnel to remain behind in an evacuation.

In the event of a medical emergency, personnel may render aid appropriate for the situation if trained. However, the organization does not require any employee to provide medical services, nor is any employee required to extinguish any fire.

Training

Personnel must receive training and review the job-site emergency program when first assigned to the location and may also receive supplemental training if the program is changed, responsibilities change, or designated actions change.

Document Retention

At a minimum, this organization retains the program records indicated below.

- Site-specific EAP plan for as long as it is applicable
- Training for the length of employment plus one year

The program administrator maintains all records related to this program.

Forms

The following form is included with this program:

- Site-Specific Emergency Action Program (EAP) - Complete one site-specific form for each facility covered by this program. Update this form as needed to ensure applicability. Distribute this form to all emergency coordinators and emergency response leads who should have this form with them during emergencies together with a clipboard and other helpful items

ENVIRONMENTAL

21 Apr 2022





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COLD STRESS MANAGEMENT

This program helps protect employees from injury from exposure to cold environments. It includes both outdoor and indoor work. This program addresses the severest effects of excessive exposure to cold conditions such as hypothermia, frostbite, and trench foot.

Application and Scope

The requirements in this program apply to all locations, jobs, tasks, and employees where excessive cold exposure occurs due to low air temperature, cool wind, refrigerated indoor environments, dampness, and cold water.

Functional Responsibilities

The following employees have functional responsibilities under this program:

- Program Administrator
- Frontline Leaders

Program Administrator

The program administrator will:

- Ensure all employees are trained on identifying sign and symptoms of cold related illness
- Ensure appropriate resources are available to manage cold stress

Frontline Leaders

Frontline leaders will:

- Evaluate potential employee exposures to cold environments by monitoring the National Weather Service
- Set up and maintain cold stress preventative measures as discusses in this program
- Conduct pre-task safety briefings to remind employees about cold stress, preventative methods they should take, and other relevant information to support the goals of this program
- Initiate corrective actions for employees experiencing cold stress
- Monitor local weather reports to properly prepare the workforce or extremely cold weather or storms

Thermal Stress and Strain

Thermal stress is the net heat load imposed upon the human body by exposure to temperature extremes together with metabolic heat load (the amount of heat the body generates), environmental factors, and clothing factors. Work in extreme temperatures will overwhelm the body's internal temperature-control mechanisms. When the body is unable to heat itself sufficiently cold strain results. Cold stress health conditions range from discomfort to death. Cold strain risk increases during the winter months, in extreme work environments.

Cold Stress Risk Factors

A combination of cold stress factors can work to reduce an employee's core body temperature. The basic factors that contribute to cold stress and that can cause cold stress related illness include:

- Increased air movement
- Moisture/wetness
- Clothing
- Exhaustion
- Hypertension
- Hypothyroidism
- Diabetes
- Poor physical conditioning

Individual susceptibility can vary widely between employees, challenging effective management of cold stress. All complaints of cold stress or related signs and symptoms must be taken seriously and acted upon.

Cold Stress Illness

There are three main illnesses that can result from excessive cold stress. These illnesses include:

- Hypothermia
- Frostbite
- Trench foot

Cold stress results from heat loss by the body. The following mechanisms cause heat loss and must be addressed by preventative measures:

- Conduction. Transfer of heat from the body to a cooler object through direct contact
- Convection. Transfer of heat to cool air due to air movement across the surface of the body
- Radiation. Heat radiates outward from the body when it is warmer than the external environment
- Evaporation. Heat leaves the body as water evaporates from the surface of the skin

- Respiration. Inspired air is raised to body temperature prior to being exhaled

Hypothermia

Hypothermia occurs when the body loses heat faster than it can produce it causing a net decrease in core body temperature. Hypothermia results in reduced mental capacity, poor decision making, and possible death. Early signs include shivering, fatigue, loss of coordination, confusion, and pain in the extremities. Late symptoms include no shivering, blue skin, dilated pupils, slowed pulse and breathing, and loss of consciousness. Hypothermia can occur at temperatures well above freezing due to prolonged exposure to cold air or immersion in cold water.

Mild hypothermia usually occurs when the core body temperature is between 98-90°F. Symptoms include shivering, lack of coordination, slurred speech, memory loss, and pale cold skin. The victim must be moved to a warm area and provided a warm beverage. Closely monitor the victim to ensure recovery.

Moderate hypothermia usually occurs when the core body temperature is between 90-86°F. At this stage shivering stops, and the victim will be unable to walk and have diminished mental capacity (confusion, irrationality). Signs of moderate hypothermia must be treated as a medical emergency. Call 911, use all available methods to warm the victim.

Severe hypothermia usually occurs when the core body temperature is below 86°F. Symptoms include severe muscle stiffness, loss of consciousness, cold skin, and possible death. Signs of severe hypothermia must be treated as a medical emergency. Call 911, do not attempt to re-warm. If no pulse, trained workers may begin CPR.

The temperatures described above are approximate. Symptoms may start at different temperatures dependent on individual differences and other onsite circumstances.

Frostbite

Frostbite occurs when the skin freezes which typically occurs at temperatures below 30°F. Wind chill is a significant factor that may contribute to frostbite at higher temperatures. Frostbite typically occurs in the extremities such as fingers and toes and on the face such as the nose and ears. Frostbitten tissue will be cold, tingling, stinging, aching, and/or numb. Skin color changes from bright red, to purple, to white. In severe cases the skin may blister. Frostbite must be treated as a medical emergency. Call 911, protect frostbitten tissue from the elements, and attempt to warm affected tissues with any available methods. Immersion in a warm (not hot) water bath may be used to warm the tissue.

Trench Foot

Trench foot occurs when feet have been immersed in cold water for extended periods of time and can occur at temperatures as high as 60°F if the feet are constantly wet. Symptoms are like frostbite: Tingling, itching, cramping, swelling, or burning sensations. Warm feet by any available means such as gently wrapping in dry cloth or immersing in warm water (not hot). Avoid walking on feet or touching symptomatic tissue to limit damage.

Cold Stress Controls

Preventing cold strain requires the implementation of multiple overlapping engineering and administrative controls dependent on the onsite conditions and requirements of the location.

Engineering Controls

When evaluating and targeting cold stress factors, consider the following engineering-control categories and options:

- Conduction. Reduce the physical transfer of heat from the body by insulating cold objects and covering the body from physical contact with cold objects
- Convection. Cover the body with appropriate PPE to limit the transfer of heat to moving cold air. Reduce the air speed across the skin
- Radiation. Insulate the body with appropriate PPE to capture radiant heat and limit exposure periods as to not overwhelm the body's ability to replenish heat lost to the environment
- Evaporation. It is imperative that workers who become immersed in water or whose clothing become wet, are immediately moved to a warm environment, and provided with a change in clothing. Sudden exposure to cold water creates the largest risk for hypothermia
- Respiration. Warm air where workers spend considerable time whenever feasible

Modify work whenever possible to reduce the necessary level of physical demand. Use task automation, mechanical aids, and eliminate unnecessary labor.

For continuous outdoor work during the winter months, heated warming shelters (tents, cabins, etc.) are made available nearby. All workers are encouraged to use these shelters at regular intervals. When entering a heated shelter, the outer layer of clothing must be removed to allow sweat evaporation.

Administrative Controls

When engineering controls do not adequately control cold stress, administrative controls are required to ensure employee protection. Administrative control options include the following:

- Acclimatization
- Clothing and PPE
- Rest and Recovery
- Weather Monitoring

Acclimatization

Acclimatization is the gradual exposure to cold conditions with an increasing exposure over time to build up cold tolerance among employees. Acclimatization to cold stress can take several weeks and varies greatly due to individual differences. Unacclimated employees require special precautions and supervision to ensure adequate protection. During acclimatization employees should adopt a work rest cycle that has extended rest periods, that are periodically adjusted over a two-week period. Re-acclimatization may be necessary when employees have been away from cold conditions for several days.

Clothing and PPE

Proper whole-body protection with clothing and PPE is essential in combating cold conditions and the associated symptoms of cold stress. Adequate insulating dry clothing is provided to all employees who perform work in air temperatures below 40°F. Employee must adhere to the following requirements when dressing for work in cold environments:

- Layer. Wear several loose-fitting layers of clothing to include at least; an inner moisture wicking layer made of wool, silk, or synthetic fibers
- Wear a hat or hood
- Wear over boots, or other insulated waterproof footwear over wool socks
- Remove any clothing that is wet

Rest and Recovery

Rest and recovery periods are designed to allow the employee to warm one's self. This is typically in a warm location protected from the elements. Warm sweet beverages will be provided in heated break areas for those employees who are exposed to excessively cold conditions to aid in effective rest and recovery.

Weather Monitoring

Frontline leaders monitor local weather report regularly when work is conducted outdoors. Additional precautions and supervision are required during extreme cold weather or storms. Winter weather presents multiple hazards which include high risk of cold stress due to strong winds and cold air in addition to slippery roads and surfaces. All these hazards must be controlled to maintain a safe workplace.

Extreme Cold Procedures

The extreme cold procedures are triggered when the temperature at the worksite is at or below 10°F or equivalent chill temperature.

Frontline leaders must observe employee for alertness and signs or symptoms of cold stress and ensure that:

- All workers are engaged in a buddy system
- The work rate is limited to prevent sweating

Emergency Procedures

When a frontline leader, a designated cold stress observer, a buddy, or any other employee observes cold stress illness in an employee, this fact is immediately communicated to the frontline leader and the victim accosted commensurate with the nature and severity of the situation, as follows:

- Hypothermia and frostbite are medical emergencies, call 911, and request immediate medical assistance and transportation to a hospital. While waiting, immediately take steps to warm the victim

- For all other cold stress related illness, warm the victim off and if the symptoms do not subside, transport them to the hospital or medical facility

When employees work remotely, they must have a reliable method of communication that can include a two-way radio or cell phone. Regardless of the communication method used, it must be tested at the start of each shift to ensure the batteries are charged and there is a good, reliable signal. If radio signals and cell signals are poor, other methods of communication are required.

When emergency responders are notified of a request for assistance, the frontline leader or designee will provide the following information and take the following steps:

- Provide the exact street address of the victim's location or GPS coordinates or nearest cross street
- Other identifying information such as building names and numbers
- Send someone to an appropriate location to flag down the emergency responders and direct them to the victim's location

Training

Training is provided to employees before assignment to work that exposes the employee to cold stress and thereafter as conditions require. All workers are trained to ensure a general knowledge of the signs and symptoms of cold stress and the preventative measures required to limit cold stress.

HEAT STRAIN MANAGEMENT

This program provides heat strain prevention and control procedures for indoor and outdoor work.

Application and Scope

The requirements in this program apply to all of this organization's facilities, jobsites, and remote locations. Investigations are encouraged any time there are reports of heat related discomfort, heat strain cases occur, or when professional judgment indicates further inquiries are appropriate.

Controls should be considered anytime a qualified professional determines that the ACGIH TLV action level or the NIOSH RAL for heat strain is exceeded and strongly considered anytime the ACGIH TLV or the NIOSH REL is exceeded.

Functional Responsibilities

The following job titles have specific functional responsibilities under this plan:

- Program administrators
- Frontline leaders

Program Administrators

Program administrator will also:

- Ensure the completion of heat strain prevention forms for each applicable situation and retain these documents
- Provide adequate training to frontline leaders and employees to meet the requirements of this program
- Follow-up with frontline leaders to ensure this program's consistent and appropriate implementation

Frontline Leaders

Frontline leaders will also:

- Setup and maintain thermal strain preventative measures as discussed in this program, including determining how shade is provided when outdoors, how water is provided, how much water is needed, observing pre-established work rest cycles, and related tasks
- Complete the heat strain prevention form for each situation not already covered by a completed form
- Conduct pre-task safety briefings to remind employees about thermal stress, preventative measures they should take, when they should hydrate, and other relevant information to support the goals of this program
- Observe employees during work to identify any that may be experiencing heat strain
- Coach employees and encourage them to follow procedures

- Initiate corrective actions for employees experiencing heat strain
- Initiate emergency response actions when necessary

Thermal Stress and Strain

Thermal stress is the net heat load imposed upon the human body by exposure to temperature extremes together with metabolic heat load (the amount of heat the body generates), environmental factors, and clothing factors. Thermal strain is the physiological reaction to thermal stress.

Work in extreme temperatures, hot, or cold, will overwhelm the body's internal temperature-control mechanisms. When the body is unable to cool or warm itself sufficiently, heat, or cold strain results. Heat and cold strain health conditions range from discomfort to death. Thermal strain risk increases during summer and winter months, in extreme work environments, and when using certain PPE, such as impermeable chemical protective clothing, regardless of season.

Heat Strain Risk Factors

Any combination of heat-stress factors that increase an employee's core body temperature higher than 100.4°F (38°C) increases the risk of heat strain. The more risk factors that are present, and the more extreme each risk factor is, the greater the heat strain risk.

The basic factors that contribute to heat-stress and that can cause heat strain include:

- High temperature and high humidity in the work environment
- Exposure to radiant heat sources including direct sun exposure or exposure to hot objects and equipment
- Inadequate shade
- Limited air movement or low wind speed
- Increased physical exertion
- Inadequate hydration and/or improper electrolyte balance
- Clothing that insulates or that is impervious to water vapor
- No acclimatization or inadequate acclimatization
- Certain medications
- Certain illnesses, especially hypertension
- Pregnancy
- Age (very young or very old more susceptible)
- Previous heat related illness status (employees are more prone when they have experienced previous heat strain illness)

Heat Strain Illnesses

There are five heat strain related illnesses with overlapping signs and symptoms, as follows:

- Heat rash
- Heat cramps
- Heat exhaustion
- Heat syncope
- Heat stroke

Heat Rash

Heat rash occurs when unevaporated sweat remains in contact with skin for an extended time. This often occurs in areas where clothing is tight. In extreme cases, the affected areas of the skin can become inflamed, infected, and cause discomfort that affects sleep and work efficiency. In most cases, returning to a cool environment, washing the affected area gently with soap and water, and changing wet clothes relieves the problem. Less frequently, in extreme cases, medical intervention is necessary to resolve the problem.

Heat Cramps

Heat cramps occur when there is an electrolyte imbalance from excessive sweating and excessive water intake that is not electrolyte balanced. Individuals that tend to sweat more during exertion are more prone to heat cramps. Prevention involves proper hydration and cooling off methods. Cooling off and restoring the electrolyte balance also help resolve cramps that are occurring.

Heat Syncope

Heat syncope is episodic dizziness and/or fainting. It is an orthostatic problem associated with prolonged standing, especially with locked-knees, or rapid standing after working in a sitting or prone position. Insufficient acclimatization and dehydration are contributing factors. Cooling off and restoring the electrolyte balance are key to both preventing and resolving heat syncope.

Heat Exhaustion

Heat exhaustion is a serious condition that requires a prompt response to properly manage since it is easily progressive if untreated. It is caused by excessive water and salt loss from sweating, with insufficient intake of replacement water and salts. Symptoms include pale skin, diaphoresis (profuse sweating), headaches, nausea, thirst, muscle cramps, feeling faint, dizzy, weakness, and fatigue. The victim often has pale, clammy skin. Cooling off and restoring the electrolyte balance are key to both preventing and resolving heat exhaustion. However, additional emergency procedures are required since heat exhaustion is also a precursor to heat stroke and it is not always easy to tell the difference between heat exhaustion and heat stroke. Refer to the emergency procedures subsection of this program for details on managing this problem.

Heat Stroke

Heat stroke is the most severe form of heat strain. It occurs when the body's temperature-regulation systems fail, and the temperature rises to critical levels. It is characterized by a core body temperature of 104°F or greater. Immediate emergency medical attention is required to resolve heat stroke. Symptoms include:

- Hot, dry skin
- Abnormally high body temperature
- Lack of sweating
- Confusion
- Irrational behavior
- Loss of consciousness
- Convulsions

While hot and dry skin is a traditional sign of heat stroke, this is not always the case. The victim may have moist skin if they were using impermeable PPE or similar clothing that prevents or slows evaporation.

Heat Strain Controls

Preventing heat strain requires implementation of multiple overlapping engineering and administrative controls, depending on the specific situation. Frontline leaders must implement the necessary controls based on the risk factors at play, and increase precautions, controls, oversight, and employee coaching as the risk of heat strain rises. When existing controls are inadequate, regardless of the reason, frontline leaders must implement additional controls.

Heat will spontaneously transfer from warmer to cooler and there are four heat-exchange mechanisms that describe heat transfer:

- Convection. Transfer of heat in a fluid by circulation of heated portions of the fluid (for example, Circulation of warm air from forced-air heating unit)
- Conduction. Heat flow between two objects in contact; heat moves from the higher temperature object to the lower temperature object (for example, Sitting on a cold bench)
- Radiation. Transfer of heat through space (for example, Heat from an oven, or furnace)
- Evaporation. When a liquid enters the vapor state, a cooling effect occurs (for example, sweating)

Heat strain risks are controlled by targeting these heat-exchange mechanisms with engineering and administrative controls.

Engineering Controls

When evaluating and targeting heat-stress factors, consider the following engineering-control categories and options:

- Convective heat controls
- Evaporative heat controls
- Modify the work
- Radiant heat controls

Convective Heat Controls

When the dry-bulb air temperature is higher than the average skin temperature (95°F), heat is gained by convection. The rate of heat gain depends on the magnitude of the temperature differential and the air velocity. Convective controls are limited to modifying the work environment temperature and by increasing or decreasing air movement.

Reducing the air temperature by increasing the mix of cooler outside air, or evaporatively cooled air, or refrigerated air is the primary convective heat control method. Ideally, control the temperature in the work environment to below 80°F, when possible.

When the air temperature is lower than 95°F, increase convective heat loss to help cool employees, by increasing air movement across the skin. This is achieved by the following:

- Increase the dilution ventilation air-exchange rate
- Increase local ventilation
- Provide spot-cooling for locations where employees work most often When the air temperature exceeds 95°F, reduce convective heat gain by:
- Further reduce the air temperature by increasing the mix of cooler outside air, or evaporatively cooled air, or refrigerated air and
- Reduce the air speed across the skin

Evaporative Heat Controls

Evaporative heat controls include the following:

- Increase air movement over the worker (dilution ventilation rate increases, local ventilation increases, and spot-cooling)
- Reduce the influx of moisture by eliminating steam leaks and similar water vapor sources
- Reduce water on workplace floors and other surfaces
- Reduce humidity with HVAC systems

Radiant Heat Controls

Radiant heat controls include the following:

- Isolate the sources of radiant heat so employees are not in the same room
- Place radiant-reflecting shielding or heat-absorbing barriers between the heat source and the employee
- Increase the distance to the heat source

- Modify the hot process or operations

Work Modification

Modify the work, when possible, to reduce the necessary level of physical demand. This is often accomplished through automation that performs repetitive or heavy tasks or with mechanical-assist equipment that decreases the employee's exertions.

Administrative Controls

When engineering controls do not adequately control the heat-stress risk, administrative controls are required. Administrative control options include the following:

- Acclimatization
- Clothing and PPE
- Hydration and electrolyte balance
- Planning
- Rest and recovery
- Shade
- Weather monitoring

Acclimatization

Acclimatization is the gradual exposure of a new employee to a high-heat environment with an increasing exposure time each day, increasing the employees heat tolerance to the specific situation. Acclimatization is triggered when the employee works in a hot environment for at least two hours a day for at least five of the last seven days to ten of the last fourteen days. As exposure to the hot environment increases each day, heat tolerance increases.

The basic process involves the following:

- For new employees, begin with two hours and gradually increase the exposure each day with a total period that ranges from seven to fourteen days, and keep daily increases to a maximum of 20% of the usual duration of work day or shift
- For employees who have previous experience with the job, or have worked in a similar environment, and have been gone from work in hot environments for less than three weeks, the acclimatization regimen is no more than 50% of the usual duration of work in the hot environment on day one, 60% on day two, 80% on day three, and 100% on day four

Take note of the following:

- Anticipate reduced efficiency and output during acclimatization periods, especially during the first half of the acclimatization period
- Full acclimatization is relative to the initial level of physical fitness and the total heat-stress experienced by the individual

- The time required for non-physically fit individuals to develop acclimatization is about 50% greater than for the physically fit so plan accordingly
- In some cases, a full fourteen-day acclimatization period is necessary
- Recognize that some employees have a low heat tolerance and may never fully acclimatize to the point where they are comfortable and work efficiently
- When an employee is not exposed to the hot environment for a time, heat tolerance loss occurs. Heat tolerance loss occurs after about a week, and it continues to progress until the employee has lost all heat tolerance with about a 75% loss after three weeks; treat employees as new employees with respect to acclimatization when absent from a job for about three weeks or more and consider them returning employees when the absence is less than three weeks
- Heat acclimatization is to the work environment and will not be acclimatized to a sudden temperature increase like a heat wave

Frontline leaders closely observe new and returning employees for fourteen days after initial assignment to the outdoor work, anytime the temperature is 80°F or more, and at least 10°F higher than the average high daily temperature for the preceding 5-days

Clothing and PPE

Clothing that is more insulating and more impervious to water vapor will reduce evaporation of sweat and increase the heat strain risk. Employees should select and wear clothing that is less insulating and that allows the escape of water vapor. In addition, the following options will help to increase cooling:

- Wetted garments designed to increase evaporative cooling
- Water-cooled or air-cooled PPE
- Cooling vests
- Use reflective clothing or aprons when near radiant heat sources

When employees must wear water vapor impervious clothing such as chemical protective clothing (CPC), the employees must ensure proper hydration before donning the CPC and after doffing the CPC. In addition, employees should strongly consider a cooling break after doffing CPC unless the CPC use is very brief. Rest and recovery periods after CPC use may require a longer length of time.

Planning

This program must be accompanied by specific clarifying information designed to meet the needs of each applicable situation. This information is summarized in the heat strain prevention form. This form identifies the risk factors and establishes a plan specific to a workplace, department, task, job-site, or project. Complete this form for each situation that exposes employees to a hot-work environment. Grouping of like jobs, tasks, and areas is permitted.

Responsibility for ensuring this form is complete for each situation that triggers this program is the program administrator's responsibility though qualified third-parties and knowledgeable frontline leaders can also complete the form. It is the frontline leader's responsibility to follow-up with the program administrator when existing forms are inadequate, when workplace conditions change, and when new equipment, or processes are introduced that create heat strain risks.

Completion of the heat strain prevention form is mandatory when program implementation is regulation-mandated. When this program is optionally implemented, completion of this form is optional, though useful.

Other planning considerations:

- Shorten the duration of each high-heat exposure when possible
- More frequent shorter high-heat exposures are better than fewer long high-heat exposures
- Schedule very hot jobs in cooler parts of the day when possible

Rest and Recovery

Rest and recovery periods are designed to allow the employee to temporarily reduce exertion and cool oneself. This is typically in a shady area when outdoors, and when indoors, a cooler part of the facility such as a break room.

Rest and recovery periods are applied to work environments with temperatures less than 95°F on a discretionary basis, recognizing that humid work environments and strenuous work necessitate establishment of rest and recovery periods at temperatures well below 95°F.

Frontline leaders should encourage mandatory rest and recovery periods anytime the ACGIH TLV action level or the NIOSH RAL are exceeded, as determined by a qualified professional. Frontline leaders should increase rest and recovery periods anytime the ACGIH TLV or the NIOSH REL is exceeded.

Rest and recovery periods are mandatory when the temperature is 95°F or more and must be a minimum of ten-minutes every two hours. The rest and recovery period may be provided concurrently with other required or provided breaks and meal periods. When the shift length is longer than 8-hours, additional rest, and recovery breaks are required of at least ten-minutes every two hours.

General rules for rest and recovery periods:

- Longer and more frequent rest and recovery periods are appropriate when the environment is hotter, the environment is more humid, the work is more strenuous, and when the PPE is more impervious to water vapor
- Rest and recovery periods should be close to the work area
- For outdoor work, rest, and recovery locations must be in the shade
- Travel time between the rest and recovery area and the work area does not count towards the rest and recovery period

Shade

When the air temperature exceeds 80°F, shade is provided, that meets the following criteria:

- Always maintain one or more areas with shade, while employees are present, that are either open to the air or provided with ventilation or cooling
- Provide enough shade to accommodate the number of employees on recovery periods, rest periods, and meal periods so that they can sit in a normal posture fully in the shade without having to be in physical contact with each other

- The shade shall be located as close as practicable to the areas where employees are working. When the temperature is below 80°F and an employee requests shade, the frontline leader must provide it.

Employees are always allowed and encouraged to take a preventative cooldown rest in the shade when they feel the need to protect themselves from overheating. The frontline leader monitors employees and asks them if they are experiencing symptoms of heat illness. Furthermore, the frontline leader encourages employees to remain in the shade and does not order employees back to work until signs or symptoms of heat illness have abated. Employees are allowed a minimum of 5-minutes for recovery, in addition to the time needed to access the shade.

If an employee exhibits signs or reports symptoms of heat illness, the frontline leader will provide appropriate first aid or emergency response.

Water Supply, Hydration, and Electrolyte Balance

Employees must have access to potable drinking water that meets the following criteria:

- It must be fresh, pure, suitably cool, meet water quality and sanitation requirements, and provided free of charge
- Locate it as close as practical to the areas where employees are working
- When drinking water is not plumbed or otherwise continuously supplied, provide the minimum volume of 1-quart, per employee, per hour, for the entire shift. If there are effective and sanitary procedures for water replenishment during the shift, starting the shift with less water is acceptable and the frontline leader must check water levels during the shift with sufficient frequency to ensure an adequate water supply
- The water must not be from a hose or other similar dispensing mechanism not rated for potable water use
- The use of communal drinking cups and dipping is prohibited
- Water containers must be clean and sanitary
- Water intake requirements include the following:
 - Waiting for thirst as a trigger to drink water is inadequate since proper hydration always lags the onset of the thirst trigger. It takes time to catch up. Frontline leaders must encourage employees to drink water frequently to maintain adequate hydration
 - Drinking smaller volumes more frequently is preferred to larger volume less frequently
 - Employees should drink up to 1-quart (4-cups) of water an hour but should not exceed 1.5-quarts (6-cups) an hour
 - When work occurs longer than 2-hours and when excessive sweating occurs, frontline leaders must provide electrolyte drinks to supplement water, but not replace water
 - Electrolyte drinks must have a balanced electrolyte solution (that is calcium, chlorine, magnesium, phosphate, potassium, and sodium) that is not more than 8% by volume electrolytes and carbohydrates, since greater than this percentage tends to decrease absorption
 - Frontline leaders should discourage sodas, coffee, and energy drinks since these dehydrate employees and increase susceptibility to heat strain

The frontline leader is responsible for ensuring the adequate provision of water initially, and during the shift, and must document the details in the heat strain management form.

Weather Monitoring

Frontline leaders should monitor local weather reports for hot weather and heat wave advisories and warnings so they can properly prepare for workplace temperature increases and implement the high-heat procedures described in this program.

High Heat Procedure

This high-heat procedure is triggered when the temperature equals or exceeds 95°F and include the procedures in this section to the extent practicable.

Frontline leaders must observe employees for alertness and signs or symptoms of heat illness using one of the following methods:

- Frontline leader or designee observation of twenty or fewer employees
- Mandatory buddy system
- Regular communication with sole employee such as by radio or cellular phone
- Other effective means of observation Frontline leaders will also:
 - Maintain effective communication by voice, observation, or electronic means so that employees at the work site can contact a supervisor when necessary. An electronic device, such as a cell phone or text messaging device, may be used for this purpose only if reception in the area is reliable
 - Designate one or more employees on each worksite as authorized to call for emergency medical services, and allow other employees to call for emergency services when no designated employee is available
 - Remind employees to drink plenty of water throughout the work shift
 - Complete pre-shift meetings before the commencement of work to review the high-heat procedures, encourage employees to drink plenty of water, and remind employees of their right to take a cooldown rest when necessary

Emergency Procedures

When a frontline leader, a designated high-heat observer, a buddy, or another employee observes heat strain illness in an employee, this fact must be immediately communicated to the frontline leader and the victim must be assisted commensurate with the nature and severity of the situation, as follows:

- For heat stroke or heat exhaustion that could be or could become heat stroke, call 911, and request immediate medical assistance and transportation to a hospital. While waiting, immediately take steps to cool the victim off by moving the victim to shade, misting with water, wetting the clothing, using a fan, and other similar techniques
- For all other heat related illnesses, cool the victim off and if the symptoms do not subside, transport them to the hospital or medical facility

- Employees experiencing symptoms of heat strain must not be left alone and will be observed until symptoms subside or they are transported for medical care

When employees work remotely, they must have a reliable method of communication that can include a two-way radio or cell phone. Regardless of the communication method used, it must be tested at the start of each shift to ensure the batteries are charged and there is a good, reliable signal. If radio signals and cell signals are poor, other methods of communication are required.

When emergency responders are notified of a request for assistance, the frontline leader or designee will provide the following information and take the following steps:

- Provide the exact street address of the victim's location or GPS coordinates or nearest cross street
- Other identifying information such as building names and numbers
- Send someone to an appropriate location to flag down the emergency responders and direct them to the victim's location

Training

Training is provided to employees before assignment to work that exposes the employee to thermal stress and thereafter as conditions require. Frontline leaders received additional training on how to implement the elements in this plan and other topics. Training content is adjusted, depending on the nature of the exposure, either heat or cold, and the personnel receiving the training, either employees, or front-line leaders.

Document Retention

Retain completed forms and related documentation for the life of the task, job, area, or other unit that the form applies.

Forms

The following forms are referred to in this program:

- Heat Strain Prevention

WEATHER

This program addresses weather related issues.

Application and Scope

Adverse weather can impact work, cause incidents, and injuries. This section addresses the organization's approach to managing weather related hazards.

Certain weather events are more likely at certain times of year. Also, consider using a weather warning or radar map application on a smartphone to help monitor and prepare for adverse weather.

Storm Watches and Warnings

A watch indicates that conditions are favorable for adverse weather and it may occur. Increase vigilance when watches are announced, prepare to stop work, but don't necessarily stop work immediately.

Advisories indicate that adverse weather is expected to cause inconvenience but is not serious enough to warrant a warning.

A warning indicates that severe weather is imminent or occurring. Warnings indicate severe weather. Take all appropriate actions for the type of adverse weather as described in this section and as necessary and appropriate.

Floods and Flash Floods

Floods can severely impact operations, causing substantial damage. The severity of the flood and the sensitivity of the equipment and workplace determine the necessary level of response. Often, securement of materials, and equipment is required.

Flash floods are especially hazardous and can occur without warning. If a flash flood is imminent or occurring, immediately stop work, and seek higher ground as quickly as possible.

Avoid contact with flood waters since flood waters can contain harmful microorganisms from wastewater contamination and hazardous materials from chemical storage and other similar facilities.

Hail

Hail often occurs during severe weather patterns such as strong thunderstorms. Hail varies greatly in size, but even small sized hail can cause injury and property damage.

If an employee is working outside while a hail storm occurs, shut down operations, and seek cover. Stay under cover or inside until the hail storm has passed.

After the storm has passed, evaluate the condition of the roof, vehicles, and other property. Avoid any broken or downed branches or power lines. If trees are stripped of their foliage, chances are there is roof damage.

High Wind

Wind can come by surprise, even during sunny weather. The wind speed compared to the sensitivity of the operations is a key consideration. For example, even moderate wind may necessitate shouting down crane operations though it may not slow down road work. If an operation is not safe in high wind, shut it down. Situations that are sensitive to high wind include, but are not limited to the following:

- Crane work
- Any work that involves objects with high wind resistance that can act like a parachute
- Work on rooftops, tank tops, catwalks, and other elevated surfaces
- Work where adequate dust control can't be maintained

Lightning

Lightning can strike 10-miles or more away from the edges of rainfall. Do not rely on counting between lightning and thunder to determine the distance of the storm. If you observe lightning, begin preparations; do not start any new tasks that cannot be quickly stopped. Monitor the weather for developing information from area radar systems. If caught outside in a lightning event, follow these steps to stay safe:

- Avoid isolated areas, tall trees, hilltops, utility poles, cell phone towers, cranes, large mechanical equipment, ladders, scaffolding, or rooftops
- Never lie flat on the ground
- Retreat to smaller area with dense smaller trees, valleys, ditches, but watch for flooding
- Avoid water
- Avoid wiring, plumbing, and fencing

Snow Storms

Employees need to plan for inclement weather conditions including snow storms. When working in cold temperatures, always layer clothing with cotton and wool under an outer layer that is water resistant. With construction work being vigorous at times, sweat can become the enemy. Freezing sweat can increase the chance of cold weather health issues like hypothermia. Consider the following precautions:

- Keep a full tank of fuel in organization vehicles
- Carry sand bags to increase weight on the rear end of organization vehicles
- Carry burlap bags, a shovel, and warning devices such as triangles or flares
- Bring extra water, food, candles, or matches, blankets, and outerwear
- If available, carry a battery powered radio

Tornados

The high wind speed of a tornado can create devastation. When working in tornado prone areas, the following applies:

- Seek shelter in a sturdy building, or a precast designated tornado shelter. Go to the lowest level of the building and under a heavy desk, work bench, or sit against the wall with your head in your hands
- If an underground shelter is not available, move to an interior room or hallway, putting as many walls between the employee and the outside of the building, away from windows
- Get out of vehicles, do not try to out run a tornado
- Lie flat on the ground and cover your head with your hands. Be aware that low lying areas are good for avoiding the brunt of the wind, however debris buildup, or flooding may take place in that area
- Be aware of flying debris, keep your eyes shut, and head covered
- Do not seek shelter under highway overpasses. Wind blows stronger under the overpass due to the wind tunnel effect
- Do not waste time opening windows and doors to equalize the pressure, this is a waste of valuable time. Buildings are more likely to explode after the wind gets inside. There are enough air leaks in buildings to equalize the pressure on their own
- Remember tornados can occur even before a visible funnel cloud is visible. It is only when there is enough debris in the funnel cloud that they become visible to the naked eye

Wildfires

Wildfires can happen throughout the summer season well into the fall. Wildfires often move quickly and can rapidly inundate an area. When working in wildfire prone areas, observe the following:

- Pay attention to local news sources to stay abreast of local fire conditions
- Implement the hot-work program, when working outdoors
- Use N95 filtering facepieces to help minimize smoke inhalation
- In areas with a high wildfire risk, consider purchasing, and training with individual wildfire shelters
- Identify escape routes from the location and the area in general
- In the event of a wildfire, be prepared to immediately evacuate if the order is given and maintain preparedness
- Leave when told and do not return until the all clear is given

FIRE PREVENTION

21 Apr 2022





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JOBSITE FIRE PREVENTION AND PROTECTION

This section provides information on fire prevention and protection at construction jobsites and similar locations. This program does not apply to this organization's facilities.

Application and Scope

This section applies to all jobsites and all personnel.

General Guidelines

To limit the risk of fire, all employees must abide by the following safety precautions:

- Minimize the storage of combustible materials
- Do not store fuel-gas cylinders, liquid fuels, or other flammable materials in buildings
- Ensure that doors, hallways, stairs and other exit routes are kept free of obstructions, including buildings under construction, or remodel
- Dispose of combustible waste in covered, airtight, metal containers in accordance with local, state, and federal regulations
- Use and store flammable materials in well ventilated areas away from ignition sources
- Use only non-flammable cleaning products
- Keep incompatible (that is, chemically reactive) substances away from each other
- Perform hot-work (that is, welding, open flame work or other ignition sources) in controlled and ventilated areas
- Keep equipment in good working order (that is, inspect electrical wiring and appliances regularly, and keep motors, and machine tools free of dust and grease)
- Ensure that temporary heating units are in good repair, properly used, and safeguarded
- Report all gas leaks immediately
- Repair and cleanup flammable liquid leaks immediately
- Keep work areas free of dust, lint, sawdust, scraps, and similar material
- Ensure that required hot-work permits are obtained
- Turn off electrical equipment when not in use
- Do not block fire hydrants

Fire Extinguishers and Incipient Stage Fire Fighting

Employees are not required to fight fires. However, trained employees can extinguish incipient stage fires using portable fire extinguishers.

Present flammable and combustible material type and the storage environment where the materials are used determine the type, size, and placement of portable fire extinguishers. The placement and extinguishing agent requirements apply to the following material classes within a facility or a construction site.

There are four classes of fire extinguishers. These are listed below together with their respective requirements for availability in fixed facilities.

- Class A – Ordinary Combustibles. Portable fire extinguishers must be located within 75-feet of class A combustibles. At least one 2 A fire extinguisher must be provided in the following locations: (i) On each floor of the job-site, (ii) Adjacent to each stairway at each floor, (iii) For each 3,000-feet of floor area or a fraction thereof
- Class B – Flammable and Combustible Liquids. Portable fire extinguishers must be located within 50-feet of class B combustibles
- Class C – Electrical. There is no specific distance rating for placement of class C fire extinguishers, but portable fire extinguishers must be located within 30 to 75-feet from electrical equipment that processes or are otherwise exposed to class A and class B combustibles
- Class D – Combustible Metals. Portable fire extinguishers must be located within 50-feet from class D fire hazard areas

All portable fire extinguishers must be freely accessible always and placed in a conspicuous location.

Employees will inspect fire extinguishers at least monthly to ensure they are immediately ready for use. At least annually, a professional maintenance organization will inspect all fire extinguishers and repair, recharge, or update as appropriate.

When combustible materials start to accumulate, a water supply that is adequate to operate firefighting equipment must be made available in addition to portable fire extinguishers.

Vehicles and heavy equipment must have a class A, B, and C extinguisher available for use by the operator.

Training

Employees are trained in the use of fire extinguishers upon initial assignment and annually thereafter.

TEMPORARY AND PORTABLE HEATING EQUIPMENT

This applies to all temporary and portable heaters used at job-sites and other temporary locations.

Requirements for Portable Heaters

Depending on the heater type, units can lead to burns, fires, explosion, carbon monoxide poisoning, the creation of oxygen deficient atmospheres, and electrical hazards. This section is designed to address these hazards.

- Notify all personnel when temporary heaters are used
- Always read the owner's manual before use; any manufacturer-mandated use-restrictions and requirements take precedent and must be followed
- Verify that heaters are in good condition and that they operate properly; do not use any heater that is improperly functioning
- Maintain the manufacturer-recommended clearance from combustible materials
- Do not place a heater directly on a plywood or combustible floor of any type; use a 4x4-foot square of fire-resistant drywall or cement board
- Always use heaters in a well-ventilated area to prevent carbon monoxide build-up unless the unit is designed for indoor use and does not emit carbon dioxide
- Never move or reposition a heater that is operating or hot. Shut off the heater and allow it to cool prior
 - to moving to prevent burns
- Since job site conditions change constantly, routinely and frequently inspect units, hoses, cords, tip-over prevention, and police-up any nearby combustible materials
 - that may have been moved near a heater
- Locate portable fire extinguishers in the area where the heater is located
- Do not leave an operating heater unattended overnight
- Never refuel a hot portable heater when the fuel port is attached to the device. Always allow it to cool
 - before refueling
- Store fuel outdoors, at least 20-feet from all entry/egress points, and 35-feet from all heat-producing devices
- If propane tanks are used as fuel, keep propane tanks upright, on a firm, level surface that is at least 6-feet from the heater and secure against accidental tip-over
- Protect hoses from physical damage and exposure to extreme heat

- Route hoses safely and never through non-secured doorways or in other ways where the hose can be damaged; always block doors and windows from closing
- Disconnect the heater fuel source prior to making any repairs on it
- Use heaters with tip-over safety shut offs and other safety features

For electric units:

- Verify the circuit has the proper amperage rating for the heater
- Use a GFCI-protected circuit or a pigtail GFCI with electric heater
- When nuisance trips occur, investigate the cause first before initiating a circuit-breaker reset
- Ensure all electric cords are in good repair

GENERAL SAFETY

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BARRICADES, SIGNS, AND TAGS

This section addresses the use of barricades, signs, and tags used for OSH purposes. Refer to the hazard communication program for information on chemical labels, the fall protection program for information on warning and control lines, the electrical safety program for information on barricades related to shock and arc-flash protection, and when applicable, refer to substance-specific programs.

General Guideline

OSH-related barricades, signs, and tags are used to increase safety. They:

- Alert readers to the indicated hazard
- Provide information on how to avoid the indicated hazard
- Designate no-go and unsafe areas or areas where caution is required
- Identify safety equipment
- Provide general safety information

OSH-related barricades, signs, and tags must follow this section and any other applicable programs.

In general, signs should have the following:

- An applicable signal word (i.e. danger, warning, caution)
- The hazard (i.e. shock hazard, fall hazard, etc.)
- The consequences of the hazard
- How to avoid the hazard (i.e. keep out, keep hands out, etc.)
- Graphical symbols that reinforce the message without the use of words

In some circumstances, specific legal requirements may necessitate deviations from this standard when the specific regulation has requirements unique to that regulation.



Barricades

Barricades notify personnel of specific hazards, warn personnel to stay clear, or prevent access by unauthorized personnel. Barricades include barricade tape, physical barricades, and other similar equipment. Barricade tape should ideally contain the signal symbol with the signal words danger or caution, together with a specific requirement such as keep out.

When used, barricade tape, physical barricades, and markings on physical barricades will conform to the following:

- Barricades are used to indicate hazards and are promptly removed when the hazard no longer exists
- Barricades and tape must be substantial enough to withstand the weather and the intended use without coming apart or falling
- Barricades must be maintained
- Use only one color and signal word; do not mix and match colors or signal words
- The person or organization who installs the barricade tape is responsible for maintaining the integrity of the barricade tape and for maintaining the barricaded area in terms of housekeeping and orderliness

Install the barricade:

- Before the hazardous work commences
- Fully surround the hazardous area
- When using tape or similar, install so that it is approximately 39-inches high with a sag not lower than 34-inches

The person or organization who installs the barricade is responsible for removing the barricade when the hazard no longer exists.

If a person or organization changes the nature and scope of the hazard in a previously barricaded area, that person, or organization assumes responsibility for that hazard and the barricaded area unless specific, mutually agreed-upon arrangements are made to the contrary.

Traffic Safety Barricades

Barricades used for traffic safety must meet the requirements in the Manual on Uniform Traffic Control Devices (MUTCD). Refer to that document for further details.

Other Programs Requiring Barricades

Some regulations require the use of specific barricade types, with specific colors, markings, strength requirements, and other features. Examples include:

- Warning and control lines in certain fall protection applications
- Barricades for arc-flash and shock boundaries in electrical safety applications
- Posting crystalline silica exposure areas
- Other similar functional applications

For these and other specific applications, refer to the applicable program for further details.

Signs

Signs are used to denote specific hazards and to provide time to act and avoid the hazard. Place signs in proximity to the hazard and ensure they are visible. When signs designate a specific area, apply them at all entrances to that location. Cover up or remove signs when the hazard no longer exists. Signs are required for specific work tasks as defined within the applicable program.

Exit Signs

Lighted exit signs are required in facilities that are operational, over each designated exit. Exit signs are also required in buildings under construction or remodel, when it is not immediately obvious where the exit is located.

Traffic Safety Signs

Signs used for traffic safety must meet the requirements in the MUTCD and applicable state amendments. Refer to that document and the applicable amendments for further details.

Signs for Substance-Specific Programs

Substance-specific programs, including but not limited to asbestos, crystalline silica, and lead have specific sign requirements. When applicable, refer to these programs for additional information.

Tags

Use tags to temporarily identify hazards (such as defective tools, damaged electrical cords). Also use tags to indicate the equipment's status (For example, red-tag, green-tag system for scaffold, or the use of tags for locking and tagging equipment, etc.). Tags must contain a signal word and a major message that is understandable to all employees, preferably with a graphic symbol that reinforces the message. Tags must be affixed as close as possible to the hazard and removed when the hazard is no longer present.



Language and Colors for Barricade Labels, Signs, and Tags

Barricade markings, signs, and tags use several signal words and colors:

- Danger/Red
- Warning/Orange

- Caution/Yellow
- Green
- Blue

Danger/Red

This indicates the hazard is immediate. If the hazard is not avoided, death, or serious injury is likely. This signal word and color combination is used on barricades, signs, and tags. Examples include, but are not limited to the following:

- Barricade – Arc-flash boundary or limited approach shock boundary. “Danger – Electrical Hazard, Do Not Enter”
- Sign - Rotating heavy equipment. “Danger – Rotating Equipment, Crush/Caught-Between Hazard, Keep Out”
- Sign - Impact and fall zones. “Warning – Falling Objects, Keep Out!”
- Sign – Crystalline Silica, General Industry. “Danger – Respirable Crystalline Silica. May Cause Cancer. Causes Damage to Lungs. Wear Respiratory Protection in this Area. Authorized Personnel Only”
- Sign – Crystalline Silica, Construction Site. “Danger - Respirable Crystalline Silica Inhalation Hazard, Keep Out”
- Tag - Locked and tagged equipment. “Danger – Do Not Operate, Do Not Energize”

Untrained and unauthorized personnel must either stop and/or do not enter.

When it is a sign or barricade designating a location, authorized personnel may enter if they are hazard aware, appropriately trained based on the situation, are wearing the correct personal PPE, observing the appropriate safe-work practices, and entry is performed only when it is safe. When personnel question if they are “authorized,” the answer is likely no, keep out.

When it is a tag, employees must follow the procedures and safe-work practices associated with the tag. For example, if equipment is locked and tagged, only the authorized-employee who applied it may remove the lock and tag, and only if safe to do so.

Regardless, no employee may step on, sit on, or work off any hole cover unless that cover is designed for such use in accordance with the hole cover requirements in the fall-protection program.

Warning/Orange

This indicates a potential hazard. If the hazard is not avoided, death, or serious injury may occur. This signal word and color combination is typically associated with equipment hazards, though some employers use it for other purposes. Examples include, but are not limited to the following:

- Sign – Point of operation hazard. “Warning – Amputation Hazard, Keep Hands Away”
- Sign – Arch and Shock Flash Hazard. “Warning – Observe Safe-Work Distances, Use Correct PPE”

Caution/Yellow

This indicates a potential hazard. If hazard is not avoided, minor, or moderate injury may occur. Personnel should exercise caution when entering area. Examples include, but are not limited to the following:

- Excavation obscured by vegetation or objects. "Caution – Open Excavation, Stay Clear of Edge"
- Hot equipment surfaces. "Caution – Hot Surfaces, Avoid Contact"

Safety Information/Green

This color indicates emergency egress routes, the presence of safety equipment, the presence of first-aid stations, and other similar uses.

Notice/Blue

This color indicates information about an item or area that may or may not be safety related.



Unauthorized Removal of Barricades and Signs

Barricades and signs are hazard controls - Only personnel that placed barricades and signs should remove them. If another trade removes a sign for specific and allowable reasons, even inadvertently, the individuals and organization removing them must reset them appropriately. However, restrictions apply. Refer to the Hazard Control section for this document for additional information on the unauthorized or inappropriate removal of controls.

FUEL STORAGE AND HANDLING

This section covers the storage and handling of fuels with emphasis on temporary storage.

Application and Scope

This section applies to the storage of fuel in tanks and non-bulk containers and to the handling of fuel.

Non-Bulk Fuel Container and Storage Requirements

Portable, non-bulk fuel-containers must meet the following minimum requirements.

- Metal type I or type II safety can (type II preferred)
- Equipped with self-closing, leak proof lid
- Maximum size is 5-gallons
- Must be labeled with their contents

Portable, non-bulk fuel-container storage must meet the following minimum requirements.

- Never stored near aisleways, passageways, doorways, exits, exit discharges, under stairs, or near stair landings
- Other than for fuel containers in immediate use, fuel-container storage is outdoors
- Portable fuel-containers should be aggregated and must be stored in safe outdoor locations, however, storage must not exceed 25-gallons unless they are in approved flammable storage cabinets

When fuel containers must be stored inside, the following requirements apply.

- No more than 60-gallons are stored in a rated, marked flammable storage cabinet and no more than three storage cabinets will be located in any single storage area
- Unless a room meets fire, resistive ratings required in 29 CFR 1926.152(b)(4), applicable state regulations in state-plan states, and the local fire code, portable flammable storage containers not in immediate use are stored outside

Bulk Fuel Tanks and Storage Requirements

This section addresses the temporary storage of fuels. It includes bulk tanks and small portable containers. It applies to all jobsites and all personnel.

Tank Design

- Designed for the storage of the fuel they contain

- Must have secondary containment equivalent to at least 100% of the total volume or must be double walled
- Contain a maximum volume consistent with the local fire code
- Must have an approved dispensing hose and dispensing device that automatically closes with no latch open device
- Must be clearly marked with all the following: Tank's contents, "Flammable – No Open Flames, No Smoking within 50-Feet," and "Keep 50-Feet from Buildings"

Tank Placement

- Must be located no closer than 50-feet to any building
- Must have a 5-foot clearance around it in all directions
- Must be placed in a way that avoids damage from vehicles and equipment or protected from collision
- Place tank so it is accessible to fire department personnel; a 12-foot access way is required within 200-feet of the tank
- Must be placed so that drainage will not impact waterways
- A portable fire extinguisher with a minimum classification of 2A-20-B:C is required no closer than 25-feet and no further than 75-feet from the tank

Gaseous Fuels

The following requirements apply to gaseous fuels.

- LPG cylinders are never stored inside
- LPG cylinders are stored upright and chained or in approved storage cabinets, protected from the elements
- LPG cylinders are stored in locations away from traffic areas
- Storage locations have at least one approved portable fire extinguisher having a rating greater than 20-B:C

Fuel Handling

General fuel-handling requirements include the following:

- Turn off all engines, motors, and remove all other ignition sources before refueling
- Allow equipment to cool off before refueling
- Cleanup spilled fuel immediately using appropriate spill cleanup materials, contaminated dirt must be cleaned up
- Bond containers when transferring fuel from one container to another (Bonding is not required during transfers to equipment or a tool for end use)

Reporting Fuel and Oil Spills

Any spill that pollutes or has the potential to pollute waters of the state (including surface water, ground water, and ditches or storm sewers leading to surface waters), are reported to the Water Quality Control Division at the Colorado Department of Public Health and Environment as soon as the release is discovered. Contacting the Department's 24-hour emergency spill reporting line will satisfy this reporting requirement.

- Colorado Dept. of Public Health and Environment 24-hour spill reporting line: 1-877-518-5608

If the release causes a sheen on the surface of navigable waters, or an emulsion to be deposited beneath the water surface or on the adjacent shoreline, it is also reported to the National Response Center under the Clean Water Act.

- National Response Center (NRC) 1-800-424-8802

Local authorities are also notified in both circumstances.

Hydraulic oils and lubricating oils are not specifically listed under Section 304 of the Emergency Planning and Community Right to Know Act (EPCRA). However, local response authorities are notified if there is an emergency and/or if emergency assistance is needed.

HOUSEKEEPING

This program addresses basic housekeeping requirements applicable to all job-sites.

General Requirements

Good housekeeping habits can prevent fires and injuries, allow emergency crews to respond faster, maintain means of egress, and improve efficiency. All organization employees are responsible for assisting in proper housekeeping including, but not limited to, the following:

- Shop and facility floors and egress routes must be kept clear
- Jobsites must be kept clean and orderly
- Daily housekeeping is required for all jobsites and equipment
- All doors, aisles, and passageways are kept clear and in good repair, with no obstruction across, or in aisles, and doors
- Form and scrap lumber with protruding nails, and all other debris, are kept clear from work areas, passageways, and stairs
- To facilitate cleaning, floors, work areas, and passageways are kept free from protruding nails, splinters, holes, and loose boards
- Recyclables, waste, trash, oily, and used rags, and other refuse are aggregated in storage containers by type
- Combustible scrap and debris are removed at regular intervals
- Containers used for garbage and other oily, flammable, or hazardous wastes are equipped with covers and conspicuously labeled
- Garbage, waste materials, and recyclables are disposed of at frequent and regular intervals
- Dust minimization cleaning techniques are used such as use of sweeping compound, high efficiency particulate air (HEPA) vacuums and avoiding using compressed air to clean surfaces

When managers notice housekeeping issues, they will take note of it in the periodic job-site inspection form and address the issue immediately.

ILLUMINATION REQUIREMENTS

This addresses the minimum illumination requirements for construction work.

Illumination Requirements

The organization requires adequate illumination to enable the safe performance of tasks. Illumination may be natural or artificial provided it is enough for the task and not less than the illumination requirements in the following table.

Minimum Illumination (Foot Candles)	Area of Operation
5	General construction area lighting
3	General construction areas, concrete placement, excavation, and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas
5	Indoors: warehouses, corridors, hallways, and exit ways
5	Tunnels, shafts, and general underground work areas. Exception: Minimum of 10-foot candles is required at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of Mines approved cap lights will be acceptable for use in the tunnel heading
10	General construction plant and shops (for example, batch plants, screening plants, mechanical, and electrical equipment rooms, carpenter shops, rigging lofts, and active store rooms, mess halls, and indoor toilets, and workrooms)
30	First-aid stations, infirmaries, and offices
All other areas: American National Standard A11.1-1965, R1970, Practice for Industrial Lighting When used, artificial lighting must be intrinsically safe when used in classified rooms and areas.	

STOP WORK AUTHORITY

This stop-work authority (SWA) program expects employees to immediately halt any task or operation that jeopardizes safety, health, and/or the environment and implement corrective actions before work restarts.

Application and Scope

This program applies to all locations, all situations, all employees, temporary employees, and subcontractors. This program covers the following event-types:

- Imminent harm situations including but not limited to injury, acute chemical exposure, environmental contamination, and similar events
- Other unabated OSH hazards
- Near-misses/near hits

This program does not specifically address the necessary reporting requirements beyond the first report and the optional use of a stop work form. Refer to the Incident, Injury, and Illness Reports, and Investigations program for details on completing and submitting formal written reports for insurance, liability, or other purposes.

Obligation to Stop Unsafe Work

Each employee has an individual responsibility and obligation to stop work when a situation occurs that involves an actual or perceived unsafe condition, behavior, act, error, omission, or lack of understanding that could result in personnel injury, environmental contamination, or physical damage to property. Any person can challenge another person in good faith with respect to safety and health matters, regardless of job-title, role, seniority, trade, or technical specialty. Personnel that legitimately and in good faith exercise their SWA are exempt from disciplinary action regardless of the outcome of the stop work intervention investigation.

When multiple observers simultaneously identify the need to exercise their SWA, and they are aware of each other's observations, it is possible that the observing employees may feel less inclined to act in the belief that there are several people present and someone else will take care of it. Unfortunately, this creates a substantial risk that the hazard will go unreported and unabated.

Consequently, it is management's expectation that the observing employees will immediately discuss the situation with other observers and at least one observing employee must act decisively to intervene. However, if multiple stop work interventions are issued to one or more frontline leaders, this is an acceptable outcome and is never discouraged. Furthermore, the failure to report an imminent harm situation may result in disciplinary action.

Stop Work Process

A stop work intervention includes the following steps:

- Stop the work
- Notify affected parties

- Investigate and evaluate the situation
- Implement corrective actions
- Resume work

Stop the Work

Employees will stop work under this program's authority any time an actual or possible hazardous condition or behavior occurs that could result in injury, environmental contamination, equipment damage, or property damage. The level of response is determined by the event type, as shown below.

Imminent Harm Possible

If imminent harm is possible, employees must take independent action, completing actions necessary to stabilize the scene and prevent harm or further harm. However, mitigative steps may not be possible due to the risks posed to the observing employee and any responding employees and in that case, the employee will take what reasonable actions possible such as barricading the area, posting guards to keep others away, and similar defensive actions that do not pose a risk. Employees must not place themselves at risk.

In imminent harm situations, the employee will notify the frontline leader as soon as practical and upon arrival on scene, the frontline leader and the employee will jointly take any remaining defensive actions to necessary to create a safe scene and stabilize the situation.

Imminent Harm Not Possible

If imminent harm is not possible, coordinate intervention through the frontline leader. Notify the frontline leader of the situation and take joint responsibility for addressing the situation proactively. Once the frontline leader is notified and arrives on scene, the frontline leader and the employee will notify all affected personnel verbally of the stop work intervention and complete any additional stabilization steps that includes, but are not limited to stop associated work activities, remove persons from the area, secure power, stabilize the situation, and make the area as safe as possible without creating additional hazards or placing oneself at risk.

Ambiguous Situations

If the situation is ambiguous or the observer is unsure of the risk, the conservative approach is needed, and the observer will issue an immediate stop work.

Near-Hit/Near Miss Situations

When a near-hit/near miss event occurs, the observer should coordinate a stop work through the frontline leader so that all affected persons can take a moment to review the situation, identify corrective actions for similar situations in the future, and learn from the situation. In these situations, completion of the optional stop work form is encouraged to document the situation and ensure corrective actions are propagated into the future for the affected location and other locations and personnel. Near hits/near-misses will be discussed at the next safety meeting.

Investigate and Evaluate

The frontline leader and affected personnel will investigate the situation to find the root causes and contributing causes. Once this is complete, the affected persons will discuss the situation – This discussion must lead to one of the following outcomes:

- The situation is safe, and the work may continue without any further intervention
- The situation is unsafe and requires corrective action that can be carried out without other personnel or equipment
- The situation is unsafe and requires corrective actions beyond the available personnel's capabilities or technical knowledge, or materials and/or equipment are needed that are not immediately available

The necessary and proper corrective actions will be discussed at this time. If the situation cannot be resolved immediately, work will be suspended until proper resolution is achieved. The frontline leader makes the final determination on stop work validity or adequacy of the resolution actions. In case of a conflict, the frontline leader will escalate the situation to the next level of management.

Implement Corrective Actions and Resume Work

Corrective actions will be completed in a prompt fashion consistent with the level of hazard and the need to restart work. Only those employees directly involved in corrective action implementation may remain in the vicinity of an imminent-harm hazard, and only when safe for them to do so.

Work may not restart until a reinspection occurs that shows the situation is safe. Under no circumstance will work restart until the situation is proven safe and the frontline leader authorizes a restart.

No Adverse Action or Retribution

This organization and its managers, frontline leaders, and employees will not blame, take punitive actions, or take retribution against any employee who acts in good faith to exercise his or her stop work authority, even if the investigation reveals the situation is safe without completing corrective actions. In fact, employees who exercise good-faith stop work interventions are recognized for their contributions to safety, encouraged, and rewarded.

Training

This organization trains employees and frontline leaders on this program and how to implement it before assignment to a workplace. Retraining is completed as necessary to ensure competency and no less often than once every three years.

Written Reports and Forms

A stop work form is provided with this program to optionally document stop work interventions that require detailed or time-consuming effort. The initiator documents all stop work interventions at least verbally, and optionally uses this form, providing it to their immediate manager the program administrator.

The program administrator will review the situation and when appropriate to do so, distribute the report to all other frontline leaders so that each one may discuss the situation with their teams at the next safety meeting, to learn from the situation. The program administrator will also discuss the situation at the next health and safety team meeting, if one is used, and/or with managers and executives, to determine if changes are required to safe work practices or other procedures, to determine if new safe work practices are required, or to determine if changes to the OSH manual are necessary. The program administrator will ensure the completion of any follow-on tasks but may delegate responsibility for completing them to other qualified individuals.

If the situation requires other written reports, for example, an insurance report, a first report of injury, or similar, the frontline leader will find the correct form, the necessary information, and will complete and submit the required form. This may also include verbal notifications. Refer to the Incident, Injury, and Illness Reports and Investigations for further details.

TOOLS

This program covers hand and power tool use.

Application and Scope

This program is designed to help employees select the appropriate tool for the job, use the tool correctly, and avoid injury. This program includes the use of hand, hydraulic, liquid fuel, portable abrasive, power, pneumatic and powder actuated and woodworking tools. It applies to all personnel and jobsites.

General Tool Safety Requirements

General tool use requirements include the following:

- Maintain tools in accordance with manufacturer's instructions and specifications
- Inspect tools before each use; do not use damaged or defective tools
- Select tools and equipment appropriate for the work and the work area
- Use tools only for their designed use
- Use tools in accordance with manufacturer's instructions and limitations
- Select and consistently wear appropriate apparel and PPE for the task, the tool and the associated hazards

The following subsections cover additional information unique to specific tool types including:

- Hand tools
- Hydraulic tools
- Liquid fueled tools
- Portable abrasive tools
- Power tools
- Pneumatic Tools
- Powder actuated tools
- Woodworking tools and equipment

Hand Tools

Hand tools are powered manually and include hammers, screwdrivers, pliers and other similar tools.

Remove and repair all hand tools that have mushroomed heads, split or defective handles, worn parts or other defects that impair their strength or render them unsafe. Consider the following additional guidelines when maintaining and storing hand tools.

- Keep cutting tools sharp and cover sharp edges to protect the tool and to prevent injuries from unintended contact
- Replace cracked, splintered or broken handles on files, hammers, screwdrivers, sledges and other similar tools
- Ensure that the handles of tools like hammers and axes fit tightly into the head of the tool
- Replace worn jaws on wrenches, pipe tools and pliers
- Redress burred or mushroomed heads of striking tools
- When on work surfaces and in storage, orient sharp tools such as saws, chisels and knives away from aisles and orient handles so they do not extend over the edge of the work surface
- Do not store tools on elevated surfaces where they could fall and strike someone below
- Clean, degrease and dry tools before storage

Consider the following operational guidelines for safe hand tool operation.

- Keep the work environment clean and tidy to avoid clutter which may cause accidents
- Pull on a wrench or pliers; Never push unless you hold the tool with your palm open
- Do not apply excessive force or pressure on tools
- Do not cut towards yourself when using cutting tools
- When using utility knives and box cutters, preferentially select self-retracting blade styles and knives with avoid non-retracting blades or blades that must be manually retracted
- Do not hold stock in the palm of your hand when using a cutting tool or a screwdriver; Place it on a workbench or in a vice
- Select appropriate gloves for hand tool use; avoid bulky gloves or gloves with inadequate grip
- Do not drop or throw tools; Hand them directly to others handle first
- Do not carry tools in a way that interferes with using both hands on a ladder, while climbing on a structure, or during hazardous work; If working on a ladder or scaffold, raise and lower tools using a bucket and hand line
- Do not carry a sharp tool in your pocket
- For electrical work, use insulated tools only. See Electrical Safety for Maintenance Personnel, page 137 and Electrical Safety for Electricians, page 146 for additional details
- When working in hazardous/classified locations and near flammable liquids and gases in unclassified locations, spark proof tools may be required

Hydraulic Tools

Hydraulic tools rely on several physics principles to operate. They require the use of hydraulic fluid. Hydraulic power tool fuel must be approved fire resistant and must retain its operating characteristics at extreme temperatures of exposure. The exception to fire resistant fluid involves hydraulic fluids used for the insulated sections of derrick trucks, aerial lifts and hydraulic tools that are used on or around energized electrical lines; This hydraulic fluid must be of the insulating type. In addition, always observe and never exceed the manufacturer's recommended safe operating pressure for hoses, valves, pipes, filters and other fittings.

Jacks

All jacks—including lever and ratchet jacks, screw jacks and hydraulic jacks—must have a stop indicator, and the stop limit must not be exceeded. Also, the manufacturer's load limit must be permanently marked in a prominent place on the jack, and the load limit must not be exceeded.

A jack should never be used to support a lifted load. Once the load has been lifted, it must immediately be blocked up. Put a block under the base of the jack when the foundation is not firm and place a block between the jack cap and load if the cap might slip.

To setup a jack, make certain of the following:

- The base of the jack rests on a firm, level surface
- The jack is correctly centered
- The jack head bears against a level surface
- The lift force is applied evenly

Proper maintenance of jacks is essential for safety. All jacks must be lubricated regularly. In addition, each jack must be inspected according to the following schedule.

Table 1 – Proper Jack Maintenance

Hydraulic Use Description	Inspection Frequency
Continuous or intermittent use at one site	Minimum every 6-months
Sent out of the shop for special work	Inspected when sent out and returned
Abnormal loads or shock	Inspected before use and immediately after use

Liquid Fueled Tools

Fuel powered tools usually operate with gasoline. The most serious hazard associated with the use of fuel powered tools comes from vapors that can burn or explode and when combusted and emit hazardous exhaust fumes that contain carbon dioxide, among other constituents. Good ventilation is essential.

Only store liquid fuels in approved containers with the following characteristics:

- 5-gallons or less
- Flash arresting screen

- Metal containers only
- Self-closing, leak proof lid
- Articulating pour spout with spout cover
- Clearly label the fuel can with its contents and ensure its legibility over time
- Type II containers are preferred but Type I containers are acceptable

Do not store more than 25-gallons in safety cans. Keep fuel storage containers away from combustible materials and sources of flame.

Handle liquid fuels to prevent spills at least 35-feet away from sparks and open flames and always in locations with good ventilation. Before refueling, turn off the tool and allow it to cool. Use a funnel as necessary to prevent spilling.

Portable Abrasive and Cutting Tools

This section covers portable grinding wheels and rotating tools with wire wheels and cutoff wheels. These tools are used for abrasive grinding, cutting, polishing and wire buffing; hazards include flying fragments, the wheels can break off creating a hazard and they can generate sparks that serve as an ignition source.

Conduct a Pre-Use Inspection and Verify the Tool's Condition

Inspect the tool before each use, verifying the following items:

- The spindle is threaded so the nut tightens during use
- The presence of a visible arrow showing spindle's rotation direction
- That all the threads of the mounting nut are engaged
- The machine operates at or below the wheel's max rated speed
- The machine's operating speed is readily visible to the operator
- The power cord is undamaged and the insulation is intact throughout its length
- The tool is double insulated or has a grounding conductor

During the pre-use inspection, examine the guards verifying the following at a minimum:

- The wheel guard is present
- The guard is original to the machine or was obtained from the OEM
- The guard covers at least 180° of the wheel's periphery, the spindle end, the nut and flange projections
- Type 01/41 wheels are guarded by side members on both sides
- The guard can contain a broken wheel
- During use the guard is always positioned to protect the operator

During the pre-use inspection, examine flanges verifying the following at a minimum:

- Flanges are at least 1/4 (cutoff) or 1/3 (grinding) of the wheel OD
- Adaptor flanges are used with Type 27/42 wheels larger than 5-inches
- Flanges are recessed
- Flanges are uniform in diameter
- Flanges are rigid and do not distort when tightened
- Bearing surfaces are flat, smooth and uniform one flange to another

Mounting Wheels

Before an abrasive wheel is mounted, inspect it closely for damage. Testing ensures that the abrasive wheel is free from cracks or defects. To test, wheels should be tapped gently with a light, non-metallic instrument. If the wheels sound cracked or dead, they must not be used because they could fly apart in operation. A stable and undamaged wheel, when tapped, will give a clear metallic tone or ring. When mounting wheels, pay attention to the following:

- Inspects each wheel carefully prior to mounting
- Disconnect the power source before mounting
- Verify Wheels fit freely on the machine's spindle
- Ensure all mating surfaces are flat and free of foreign particles
- Use enough but not excessive torque during mounting to avoid distortion or damage
- Verify the mounted wheel does not loosen during cutting/grinding

Operational Rules

To prevent an abrasive wheel from cracking, it must fit freely on the spindle. The spindle nut must be tightened enough to hold the wheel in place without distorting the flange. Always follow the manufacturer's recommendations and the following:

- Determine whether a hot-work permit is required and if it is, complete the permit and manage all combustible hazards in accordance with the permit and the hot-work and fire watch program
- Implement dust control measures appropriate for the work and the location
- Wear appropriate PPE; at a minimum, safety glasses, face shield and gloves

An abrasive wheel may disintegrate or explode during startup. Allow the tool to come up to operating speed prior to grinding or cutting. Never stand in the plane of rotation of the wheel as it accelerates to full operating speed.

- Run wheels for 60 seconds in an enclosure before use grinding
- Side grind only done with wheels designed for that purpose
- Never clamp a hand held grinder in a vise

- Verify the spindle speed of the machine will not exceed the maximum operating speed marked on the wheel

Wheel Handling and Storage

Proper handling and storage are essential to prevent wheel damage. Observe the following:

- Handle wheels with caution to prevent bumping or dropping
- Store in suitable racks, boxes, bins or drawers
- Do not expose wheels to water or solvents
- Avoid exposure to temperature or humidity extremes
- Always use wheels within their recommended shelf life

Power Tools

The company inspects power tools regularly to ensure all electrical connections are suitable for the type of tool and the working environment.

All employees will observe the following precautions while using power tools:

- Never carry a tool by the cord or hose
- Never yank the cord or the hose to disconnect it
- Keep cords and hoses away from heat, oil and sharp edges
- Disconnect tools when not in use, before servicing, before cleaning and when changing accessories
- Keep all people not involved with the work at a safe distance from the work area
- Secure work pieces with clamps or a vise, freeing both hands to operate the tool
- Avoid accidental startup; Do not hold fingers on the switch button while carrying a plugged in tool
- Maintain tools with care; keep them sharp and clean for best performance
- Follow instructions in the user's manual for lubricating and changing accessories
- Be sure to keep good footing and maintain good balance during operation
- Wear proper apparel for the task and the tool to avoid getting caught in moving parts
- Never leave tools unattended on scaffolds, ladders or overhead levels
- Remove all damaged portable electric tools from use and tag them: "Do Not Use"

All electric tools will:

- Have a three-wire cord with a ground or have double insulation
- Be plugged into a ground receptacle

- Be powered by a low voltage isolation transformer

A constant pressure switch or control that shuts off the power when pressure is released is required for:

- All drills, tappers, fastener drivers, grinders more than 2-inches in diameter
- All disc sanders greater than 2-inches in diameter
- All belt sanders, reciprocating saws, saber saws, scroll saws and jigsaws with shanks greater than 0.25-inches

Pneumatic Tools

Pneumatic Tools are powered by compressed air and include chippers, drills, hammers, impact wrenches and sanders. Observe the following precautions when using pneumatic tools:

- Be aware of tool attachments and fasteners. Tool attachments or fasteners can easily strike a worker
- Ensure pneumatic tools are fastened securely to the air hose to prevent them from becoming disconnected. Use a whip check, a short wire or positive locking device attaching the air hose to the tool
- If an air hose is more than 1/2-inch (12.7 millimeters) in diameter, a safety excess flow valve must be installed at the source of the air supply to reduce pressure in case of hose failure
- When using pneumatic tools, a safety clip or retainer must be installed to prevent attachments such as chisels on a chipping hammer from being ejected during tool operation
- Pneumatic tools that shoot nails, rivets, staples, or similar fasteners and operate at pressures more than 100-pounds per square inch (6,890 kPa), must be equipped with a special device to keep fasteners from being ejected, unless the muzzle is pressed against the work surface
- Airless spray guns that atomize paints and fluids at pressures of 1,000-pounds or more per square inch (6,890 kPa) must be equipped with automatic or visible manual safety devices that will prevent pulling the trigger until the safety device is manually released
- Eye protection is required; head and face protection are recommended for employees working with pneumatic tools
- Screens must also be setup to protect nearby workers from being struck by flying fragments around chippers, riveting guns, staplers or air drills
- Compressed air guns should never be pointed towards anyone. Workers should never dead-end them against themselves or anyone else. A chip guard must be used when compressed air is used for cleaning
- Use of heavy jackhammers can cause fatigue and strains. Heavy rubber grips reduce these effects by providing a secure handhold. Workers operating a jackhammer must wear safety glasses and safety shoes that protect them against injury if the jackhammer slips or falls. A face shield also should be used
- Use hearing protection when working with pneumatic tools

Powder Actuated Tools

The company will store all powder actuated tools in a lockable container labeled "POWDER ACTUATED TOOLS" on an outside label. An inside label reads "Warning – Powder actuated tool to be used only by a qualified operator and to be kept under lock and key when not in use."

Each tool must always have the following in the container:

- Operator's instructions and service manual
- Power load and fastener chart
- Tool inspection and service record
- Service tools and accessories

Eye or face protection must be worn by operators and assistants when tool is in use. Only load tools just prior to intended firing time, if the work is interrupted after loading then unload the tool immediately. Always use tools in accordance with manufacturer's recommendations.

Never point a tool at anyone. Hold the tool in place for 30 seconds on misfire, dispose of properly after.

Employees are not allowed to use powder actuated tools:

- In an explosive or flammable atmosphere
- On hard or brittle material
- On easily penetrated or thin materials of questionable resistance unless backed
- Within a ½-inch of the edge of steel
- Within 3-inches of the edge of masonry
- On thin concrete
- On spalled areas
- On existing holes

The company inspects all powder actuated tools before use. Any damaged or broken tools are removed from service immediately and tagged defective until repaired in accordance with manufacturer's instructions.

Warnings signs say "Powder Actuated Tools in Use" must be conspicuously displayed within 50-feet of powder actuated tool operation.

Training

Employees that use powder actuated tools receive training on their proper use and carry a valid operator's card while using the tool. Employees receive training on other tools periodically. Training includes proper use, proper maintenance, correct tool selection, operation in accordance with manufacturer's instructions, and necessary PPE.

WASTE MANAGEMENT

The organization is committed to the proper management of waste and the application of waste reduction methods that help control its environmental impact. This section outlines this organizations recycling, hazardous waste, universal waste, used oil, and used filter policies and procedures that promote waste reduction and proper management.

Scope and Application

This program applies to wastes generated during work at construction sites, including:

- Ordinary non-hazardous waste generated through the course and scope of standard and normal work
- Incidental amounts of universal waste
- Incidental amounts of hazardous waste
- Used oil

This program applies to all personnel, including subcontractors.

General Waste Management Guideline

This organization will avail itself of controlling employer supplied solid waste, recycling, and reuse collection points and containers, when required or permitted by the controlling employer. Otherwise, this organization will establish its own collection points and containers consistent with its needs, and those of its subcontractors, as applicable, with notice to the controlling employer if it expects to generate and store hazardous waste.

Stormwater Management and Storage

To the extent applicable, this organization follows appropriate stormwater regulations and best practices regarding waste management storage that includes the following:

- Minimize storage volumes by regular removal from the location for proper recycling, reuse, and disposal
- Store in appropriate and always closed containers
- Store wastes in ways that prevent releases into the environment and that prevent stormwater contamination using secondary containment, storage under cover, and similar approaches

This organization always follows applicable stormwater management plans and requirements applicable to the jobsite and its work.

Recycling Guidelines

The organization applies waste reduction concepts whenever possible, including, but not limited to the following.

- Source reduction. The optimization of the design to avoid waste, the use of pre-existing buildings when possible, the use of construction methods that minimize waste and other techniques to minimize waste and reduce energy consumption
- Salvage and reuse. The careful demolition and removal of items for potential reuse at the jobsite or at another jobsite
- Recycling. The careful segregation of debris for recycling with a qualified vendor
- Buying recycled materials for reuse

Universal Waste Management

Universal waste is hazardous waste produced in relatively large quantities by a variety of sources such that governments have established simpler management rules. Universal waste is defined by Federal regulations and applicable state regulations. Federal regulations include the following 5 universal wastes:

- Aerosol Cans
- Batteries
- Lamps
- Mercury-Containing Equipment
- Pesticides

State regulations often include additional items.

The organization is a small quantity generator of universal waste, producing and aggregating less than 5,000-kg (11,000-pounds) of universal waste at any time, and storing universal waste for less than 1-year.

Accumulated universal waste is aggregated by type and securely stored so that it will not spill nor contaminate stormwater, surface waters, or soil. It is properly labeled with an accumulation start date and the container's contents.

Universal waste is disposed by delivering it to an approved universal waste handler, recycling, or disposal facility. It is never discarded in the trash.

Hazardous Waste Management

In general, a hazardous waste is a waste with properties that make it dangerous to handle or that can harm human health or the environment. Hazardous waste includes wastes defined by 40 CFR 239-281 and applicable state regulations, including the following

- F, K, P, and U listed hazardous waste
- Characteristic (corrosive, ignitable, reactive, toxic) hazardous waste
- Waste radioactive material mixed (radioactive and non-radioactive) hazardous waste

The organization is a Conditionally Exempt Small Quantity Generator (CESQG) as defined by 40 CFR 239-281 and a Very Small or Conditionally Exempt Small Quantity Generator as defined by applicable state regulations.

Very Small Quantity Generator (VSQG) of hazardous waste. It does not generate more than 100-kg (about 220-pounds or 27-gallons) of hazardous waste and no more than 1-kg (about 2.2-pounds) of acutely hazardous waste in any calendar month. It does not accumulate more than 1,000-kg (about 2,200-pounds) of non-acutely hazardous waste onsite at any one time.

Accumulated hazardous waste is aggregated by type and securely stored so that it will not spill nor contaminate stormwater, surface waters, or soil. It is properly labeled with an accumulation start date and the container's contents using a compliant hazardous waste label.

The organization typically disposes of it through the local business hazardous waste program at the county level, as permitted by applicable law, or an approved and licensed Treatment, Storage and Disposal (TSD) organization, as appropriate for the circumstances.

Hazardous Waste Storage

This organization safely stores hazardous waste prior to disposal, recycling, or reuse. This organization aggregates and stores, in amounts not greater than allowable limits:

- Ignitable and flammable waste, such as used solvents and waste virgin solvents in metal type II safety cans
- Corrosive, reactive, and toxic waste in chemically compatible containers with secondary containment

Employees maintain a contemporaneous log of hazardous wastes stored, their amounts, and associated safety data sheets.

This organization will properly label all hazardous waste with RCRA-compliant hazardous labels that include the date the waste was generated, and this organization's name, and contact information.

Other applicable rules and best practices:

- Keep containers closed unless adding or transferring hazardous waste
- Use good handling, grounding, and bonding techniques when transferring flammable liquids
- Do not store or handle containers in ways that could damage or rupture them
- Store containers in locations that preclude the possibility of damage or upset from vehicles or heavy equipment
- Maintain storage containers in good condition
- Never mix waste streams unless expressly allowed to do so
- Complete an inspection of the containers and the storage area no less than frequently than weekly, documenting each inspection

Hazardous Waste Reuse and Recycling

In limited circumstances, for some hazardous waste types, recycling, and reuse is possible. This is on a case-by-case basis, and this organization will consult with qualified professionals and appropriately licensed organizations as needed if it intends to deliver hazardous waste to a recycler or for reuse. This includes gasoline and solvents used by licensed and permitted fuels blending programs or other allowable reuses.

Used Oil Management

Used oil means any oil refined from crude oil or any synthetic oil made from coal, shale, or polymer material that is used and, because of such use, is contaminated by physical or chemical impurities. Used oil includes:

- Engine oil
- Transmission fluid
- Compressor oil
- Metalworking oils
- Hydraulic oil
- Refrigeration oil
- Oils used as a buoyant
- Electrical insulating oil

Used oil does not include:

- Vegetable oil or animal oil, even when used as a lubricant
- Virgin (unused) oil
- Bottom clean out waste from virgin oil storage tanks
- Petroleum products like antifreeze or kerosene
- Petroleum distillates used as solvents

The organization requires application of the following rules related to the generation, collection, storage, and disposal of used oil:

- Store in good, non-leaking containers
- Store so that containers cannot be knocked over
- Store to avoid environmental contamination (under cover, closed when not being filled or drained)
- Keep an oil-selective spill-kit on site sized appropriately
- Label storage containers with the words “Used Oil” and never “Waste Oil”
- Do not accumulate used oil longer than 1-year
- Dispose of use oil through a qualified and licensed organization

Thoroughly drain all small used oil containers until no free liquid is present. These empty containers are then recycled through normal channels and procedures.

Used oil with 1,000-ppm or more of total halogenated solvents is hazardous waste. Never mix solvents with used oil.

Used Oil-Filter Management

Used oil filters and other materials containing or otherwise contaminated with used oil when the used oil is properly drained or removed to the extent possible such that no free-flowing oil remains are regulated as solid waste unless the contaminated material from the filter is itself a hazardous waste. The organization handles used oil filters as follows.

- Once removed from the engine, they are punctured in the dome portion to break the vacuum
- They are placed on a drain rack for at least 12-hours with draining used oil collected and placed in labeled used oil containers
- If any oil drips out of the filter when picked up, it is not properly drained and left on the drain rack for an additional time
- Non-terne plated filters from passenger vehicles and light to medium duty trucks are accumulated in containers marked used oil filters and are disposed of through normal scrap metal recycling channels and procedures
- Terne plated filters containing lead are accumulated and stored in a container labeled "terne plated used oil filters" when scrap metal recycled or, they are stored in a container labeled "hazardous waste" when they are disposed of as hazardous waste

Other Used Filters

Used fuel filters, transmission oil filters and specialty filters may exhibit the toxicity characteristic for benzene and/or heavy metals. Whether or not the filter exhibits any hazardous waste characteristics is largely dependent on the construction of the filter. Some filters are made entirely of metal and some filters consist of a metal casing with fibrous filter material inside.

In the case of filters made entirely of metal, the residual amount of fluid clinging to the metal parts is not likely to cause the filter to fail the toxicity characteristic for benzene or other fuel constituents. Other filters that are made entirely of metal and that are properly drained of fuel or oil can be recycled as scrap metal.

Other filters that contain fibrous filter material are carefully evaluated since the fibrous materials retain residual amounts of fluid even after draining. Depending on the type of fuel they contained, some fuel filters can fail the toxicity test for benzene or other volatiles. Similarly, some specialty filters can fail the toxicity test for heavy metals. Fibrous filters that exhibit a toxicity characteristic are disposed of as hazardous waste or recycled. When recycled, the used filters are managed as a hazardous waste from the point of generation through the point the filter enters the recycling process. Containers are labeled as "Other Used Filters – Hazardous Waste."

The organization confirms the status of all other filters by consulting with manufacturers and, in some circumstances, requesting assistance from hazardous waste management firms.

WORKING OVER OR NEAR WATER

This program addresses work over and near water.

Procedures

Employees working over or near water when there is a drowning hazard must wear Coast Guard approved life jackets or buoyant work vests. Employees may substitute the use of PFAS with 100% tie off, in place of life preserver or vest. PFAS use can include fall arrest or work restraint configurations provided that the system in use does not allow submersion in the water. Verify fall arrest clearance distances and the maximum working length of work restriction systems.

Employees will inspect vests or life preservers for defects that affect strength or buoyancy, prior to each use, and will remove defective units from service.

Ring buoys with at least 90-feet of line will be provided and readily available for emergency rescue operations when there is a risk of drowning. The separation distance between ring buoys will not exceed 200-feet.

At least one lifesaving skiff must be immediately available at locations where employees are working over or adjacent to water when the water is deep enough to facilitate the skiff's use.

The organization coordinates rescue programs and rescue equipment availability with the job-site owner whenever possible.

HAZARDOUS SUBSTANCES

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HAZARD COMMUNICATION

This program sets forth specific requirements for hazard communication program implementation including safety data sheet (SDS) management, hazard communication, hazardous material labeling, and related items.

Application and Scope

All requirements in this program apply to all organization locations, all departments, and all employees that store and/or use hazardous chemicals. This program includes quality control laboratories that are adjuncts of production operations and perform repetitive procedures for assuring product safety, consistency, and quality.

This program excludes analytical laboratories that:

- Use multiple chemical procedures or chemicals
- The procedures involved are not part of a production process
- The procedures do not simulate a production process
- The chemical manipulations are carried out on a laboratory scale (that is, they do not produce commercial quantities, a product, or material)

Locations operating an analytical laboratory meeting this definition are subject to laboratory safety regulations and the laboratory safety program.

The following substances are excluded from hazard communication regulations and this program:

- Hazardous wastes regulated by the EPA
- Tobacco products
- Natural wood or chemically untreated wood products for retail sale
- Manufactured items handled/processed in a way not resulting in employee exposure through inhalation, ingestion or skin absorption (such as items for immediate use or retail sale)
- Food, drugs, and cosmetics consumed or used by the employees on the job-site
- Retail trade establishments, except for processing, and repair work areas
- Pesticide use regulated by the California Department of Food and Agriculture
- Consumer products, unless quantities used or exposures are greater than ordinary home consumer quantities or exposures

Nothing in this program is designed to limit or constrain the selection and application of appropriate hazard controls and appropriate safe work practices.

Functional Responsibilities

The following employees have specific responsibilities under this program:

- Program Administrator

- Frontline Leaders
- Employees

Program Administrator

The program administrator has the following responsibilities:

- Perform periodic reviews and updates of this document to ensure legal compliance, appropriate hazard control, and applicability
- Maintain the 30-year chemical list
- Provide appropriate workplace labels for portable containers and to replace illegible labels
- Maintain a system for updating SDS on a contemporaneous basis
- Conduct periodic assessments to verify system integrity and SDS availability
- Work with frontline leaders as needed

The program administrator may designate a qualified person to fulfill their responsibilities under this program.

Frontline Leaders

Supervisors, foreman and leads (frontline leaders) have the following responsibilities under this program:

- Uniformly and consistently enforce all requirements in this program including, but not limited to: (i) Ensure availability and continuing access to applicable SDS for each direct report, (ii) Ensure all chemical containers are labeled, (iii) Ensure employees handle, store, dispense, mix, and use chemicals if properly trained, (iv) Obtain missing SDS or report them to the program administrator
- Follow-up on safety incidents to include proper emergency treatment of injured employees

Purchasing / Procurement Agent

Assigned purchasing and procurement personnel have the following responsibilities:

- Request the delivery of an SDS when purchasing new hazardous chemicals
- Request updated SDS for existing hazardous chemicals
- Submit SDS to the program administrator or designated SDS administrator

Assigned purchasing and procurement personnel may not delegate their responsibilities under this program.

Hazardous Chemical List

This organization maintains a list of all hazardous chemicals used and stored. This list uses the product name from the applicable SDS to avoid confusion. New chemicals are added to this list as they are brought onsite with additions made as soon as reasonably possible. The program administrator maintains this list in a perpetual fashion. The chemical list is a part of this program and it is maintained by the administrator.

Safety Data Sheets

A current SDS is required for each hazardous chemical an employee uses or is otherwise exposed to at work. The administrator may maintain SDS in any fashion allowing continuous access to the SDS, and electronic or paper systems are both acceptable, provided that:

- The access point for the SDS must be in the immediate work area of the affected employees
- When the administrator establishes an electronic system for employee access to SDS, a computer or other device with direct access to SDS is required in the work area
- The target employee access time is approximately five-minutes from the initial attempt
- When using paper-based systems, administrators should store electronic versions of all SDS in an electronic archive to allow easy reprinting and to ensure document retention

Administrators may supply only those SDS affecting employees within a department or functional area.

The SDS storage and access methods are discussed in new hire and hazard communication training sessions

SDS Exceptions

SDS are not required for household and office products when the products are used in the workplace in the same manner and quantities that a consumer would use them. However, employees who are required to work with household and office products with a duration and frequency of exposure greater than what a normal consumer would experience have a right to know about the properties of those hazardous chemicals and SDS are required.

New Chemicals and SDS Update Procedure

Before a chemical is brought on site, and never later than when a chemical is first brought onsite, the purchaser must secure an SDS and provide it to the administrator. The administrator will save a copy and/or an electronic version and make the SDS available to the affected employees using the standardized SDS system in place and will update the 30-year chemical list.

If an SDS is not received before or with the initial shipment, or the first shipment after an update has been made, the person receiving the chemical must obtain an SDS by contacting the vendor or manufacturer and have them immediately send the correct SDS or by downloading the SDS from the vendor or manufacturer's website and providing this SDS to the administrator.

In addition, the administrator will conduct periodic assessments of chemicals and SDS to verify that SDS are available for all chemicals and they are the most current versions. The frequency of periodic assessments may vary but should not exceed once every year.

SDS Archiving

When a chemical is no longer used, and will never be reordered, and is no longer present in the workplace, the program administrator may retain the SDS with other in-use chemicals or archive the SDS in a location and manner that allows easy access and retrieval. Regardless of the method used, SDS are retained for the length of employment plus 30-years.

Chemical Container Labels

Chemical labels are required on all chemical containers including the following:

- Incoming chemical containers
- Secondary containers
- Storage tanks
- Portable containers

If an employee transfers a chemical into a portable container and uses the chemical in the portable container immediately, labels are not required. However, employees must label portable chemical containers if the container is not in their direct control and in immediate use. If an employee departs for a break or goes home and leaves the container, the container must be labeled.

Retention of DOT Markings on Incoming Chemical Containers

Employees must not deface or remove chemical labels and DOT markings, placards, and labels on incoming chemical containers regardless of container type, until the container is empty and free of any potential hazards including chemical residue or vapors.

Allowable Labeling Systems

This organization uses manufacturer provided labels for all hazardous chemicals and incoming chemicals need not be labeled when the manufacturer's label is intact and legible. If a label is defaced or otherwise damaged or illegible, a replacement label from the manufacturer is used. If one cannot be obtained, the company uses alternative workplace labels. Alternate workplace labels contain the product name, words, pictures, symbols, or a combination providing at least general information regarding the chemical hazards and address physical and health hazards.

Provided they are used consistently, acceptable labeling systems include the following:

- Manufacturer provided labels
- Globally Harmonized System (GHS) labels
- Hazardous Materials Identification System (HMIS) labels
- Employee generated alternate workplace labels that have the appropriate information

The administrator ensures replacement labels are available to frontline leaders who in turn have access to and distribute replacement labels to employees.

Additional hazardous chemical labeling systems encountered include NFPA 704 and US Department of Transportation (DOT) placards. NFPA 704 labels and placards are typically required for the exterior of chemical storage areas and on bulk chemical storage tanks in accordance with local fire codes. The DOT requires proper placarding of hazardous chemicals during transportation under 49 CFR, Part 172, and often, manufacturers include DOT placard markings on individual containers. While NFPA 704 and DOT placards are acceptable labels and may be left on containers, they must not be the sole means of hazardous chemical identification. One of the allowable labeling systems described earlier in this section is required.

Hazards of Non-Routine Tasks

Non-routine tasks can present significant hazards to employees. Relevant documentation including periodic topic specific training, on the job training, process knowledge, process descriptions, drawings, job hazard analyses, and related documents will be used to help identify and control the hazards of non-routine tasks. The risk-management tools used will reflect the level of hazard.

Regardless, affected employees are informed of the hazards and the appropriate hazard controls before work starts. Frontline leaders are required to provide this information during meetings, team huddles, safety briefings, or arrange for a qualified person to facilitate training.

If an employee encounters an unforeseen hazard, they must stop work and report the problem, and not restart the task until the safety issue is addressed and the situation is safe.

Pipe Labels

Pipe labels used at this organization will conform to ANSI/ASME A13.1 with respect to color and size, and the names of materials that appear on pipe labels are standardized. When there are multiple names for a hazardous chemical and confusion could arise as to what a name means, this organization maintains a pipe label guide, or an effective substitute, that contains the specific names listed on each label to avoid confusion, together with corresponding product identification information including the manufacturer's name that appears on product labels and corresponding SDS.

When the contents of a pipe vary, the most common contents will appear on the label, however, the normal contents and the occasional contents are listed in the facility pipe label guide.

The size of labels and the text is considered with respect to distance they must be viewed from, the pipe's size, and other factors. Label placement considers the viewers angle.

Typical label placement on pipes includes:

- When pipes enter and leave tanks and equipment
- On both sides of wall, floor, and roof penetrations
- On each side of direction changes unless one side provides enough visibility
- Adjacent to all valves and flanges
- Every 50-feet on long runs where identification of individual pipes is simple and in congested areas where confusion is possible, every 25-feet

Refer to ANSI/ASME A13.1 for additional details.

When anhydrous ammonia systems are used, pipe labeling on those systems will conform to IIAR Bulletin 114 that expands upon ANSI/ASME A13.1

Unlabeled Pipes

If an employee encounters an existing pipe with unidentified contents and must work on the pipe, all work on, or around the pipe must stop until the employee successfully identifies the pipe's contents. The employee must trace the pipe to its source, reference available drawings, consult other information, and confirm the contents. Frontline leaders must confirm the identification and approve work before it recommences.

Multi-Employer Hazard Communication

This section addresses the following circumstances:

- Personnel from another employer are exposed to chemicals used at this organization's location by this organization's employees or others
- This organization's employees are exposed to chemicals used by another employer at this organization's location or another

If personnel from another employer are exposed to chemicals used at this organization's location by this organization's employees, the frontline leader and the administrator verify these personnel:

- Are given access to the applicable SDS and understand how to access the SDS
- Have received hazard communication training consistent with the hazard communication regulation and this program
- Have and know how to use PPE appropriate for the work and the hazards

If a contractor intends to bring a new chemical to this organization's location, the contractor must supply a current SDS to the administrator before bringing the chemical to the location. The administrator will ensure the new SDS is included in the company SDS system. Additionally, if the organization's employees will be exposed to the new chemical, the administrator, and the frontline leader will provide training consistent with this program if the chemical introduces new hazards, requires different controls, or different PPE.

If the organization's employees are exposed to chemicals in the workplace while working at another company or job-site, the program administrator and frontline leader verify the organization's employees have access to the SDS of the other company as appropriate, and the completion of location specific hazard communication training consistent with the hazard communication regulation and this program.

If the organization's employees bring chemicals to a job-site, the program administrator and frontline leader verify the organization's employees have access to the SDS and provide these SDS to other employers at a multi-employer location.

Chemical Compatibility

Employees involved with the selection and purchase of hazardous chemicals for use within the facility must consider the following:

- The physical hazards, chemical reactions, and occupational health effects that will occur when chemicals are mixed together as the result of an unintentional chemical release and during the intentional release of chemicals, including to drains and the sanitary sewer, with appropriate planning to avoid these scenarios and development of relevant emergency response plans and training to guide employees if emergencies occur
- Chemical compatibility and incompatibility with pipes, process vessels, equipment, gaskets, and other materials that may come into contact with the chemicals, and the selection of materials appropriate for contact with the hazardous material with respect to the materials concentration
- Appropriate storage methods to ensure that incompatible chemicals are not stored together

Unintentional Chemical Exposure

The following general guidelines deal with unintentional contact with chemicals. In addition to these guidelines, follow any precautions indicated on labels and SDS.

- **Inhalation.** Seek fresh air immediately. If symptoms persist, seek medical attention
- **Eye Contact.** Promptly flush eyes with water for a minimum of 15-minutes and seek prompt medical attention. When available, switch to using sterile eye saline solution for eye rinsing
- **Ingestion.** Follow the precautions on labels and SDS and seek medical attention immediately
- **Skin Contact.** Promptly flush the affected area with water for at least 15-minutes, removing contaminated clothing. If symptoms persist after washing, seek medical attention. Do not allow contaminated clothing to remain in contact with skin and dispose of contaminated clothing

If you are in doubt, contact the organization's workers' compensation medical provider or go to the emergency room.

Always report chemical exposures to your frontline leader.

Training

Employees receive hazard communication training upon initial assignment and periodically thereafter, as hazards in the workplace change. Hazard communication training is compliant with the hazard communication standard, this document, and includes at a minimum:

- The requirements of the hazard communication regulation
- Any operations in the work area where hazardous chemicals are present
- The location and availability of the written hazard communication program
- The location and availability of SDS and the methods used to access the SDS
- Methods and observations may be used to detect the presence or release of a hazardous chemical in the work area such as gas detector use, visual, and audible warning devices, visual appearance, or odor of hazardous chemicals when being released
- The hazards of chemicals used in the work area or that cause exposure

- The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used
- The details of the hazard communication program including: (I) An explanation of the labels received on shipped containers and the workplace labeling system used by their employer and (ii) Safety data sheet, including the order of information and how employees can obtain and use the appropriate hazard information

Employees working exclusively in the office are not required to attend hazard communication training.

Document Retention

At a minimum, this organization retains the program records indicated below.

- Alternative workplace label documentation, as applicable
- A list of all hazardous chemicals retained for the duration of employment plus 30-years
- Safety data sheets for each hazardous chemical retained for the duration of employment plus 30-years
- Training records for the length of employment plus one year

The program administrator maintains all records related to this program.

Addendum

This program includes the following addendums that are merged into and made a part of this program:

- Chemical Inventory List

ASBESTOS AWARENESS

This section provides information on asbestos, its hazards and where it may be found. This organization does not work with or remove asbestos. When the presence of asbestos is suspected or known, the organization will stop work and report the situation. The organization works with appropriately knowledgeable and licensed subcontractors or otherwise refers out asbestos-remediation and related tasks.

What is Asbestos?

Asbestos is a fibrous mineral that was extensively used in years past because of its many excellent qualities that include:

- It absorbs sound
- It is resistant to heat and fire
- It is an electrical insulator
- It has a high tensile strength
- It is resistant to chemical degradation
- It is very fibrous and easy to incorporate into different materials in a variety of ways including weaving it into cloth or mats, mixing it with cement, plaster, insulation, floor tiles, adhesives, and many other materials

There are five different types of asbestos:

- Chrysotile (White Asbestos)
- Amosite (Brown Asbestos)
- Crocidolite (Blue Asbestos)
- Anthophyllite
- Tremolite and Actinolite

The most common of these is white asbestos, followed by brown and blue. Anthophyllite and tremolite-actinolite usually occur as contaminants in other asbestos types and certain mined products.

Where is Asbestos Found?

Because of its excellent properties, asbestos is found in a wide variety of construction materials used throughout the years.

- Adhesives and mastics
- Automotive brake linings and clutch pads
- Concrete water supply lines
- Drywall

- Fire retardant for structural steel
- Flooring materials, especially vinyl tiles
- Gaskets
- Heat resistant fabrics
- Thermal system insulation (TSI)
- Roofing materials
- Surfacing materials such as plaster, putty, and caulk
- Many other products

The US EPA first banned asbestos in several products in 1973 and in most products in 1989, though the 1989 ban was overturned in court, in 1991.

Though its current use is substantially limited, chrysotile, the only asbestos currently used, is found in some fiber-cement board products from non-US sources, including China and India, and these countries continue to use asbestos extensively.

Under Federal OSHA regulations, the term asbestos-containing material, or ACM, means any material that contains more than one percent asbestos.

When asbestos is labelled friable, it means that the material is easily crumbled or broken apart. Disturbing friable asbestos allows it to become entrained, or suspended, in air, creating an inhalation hazard.

What are the Hazards of Asbestos?

Asbestos is directly linked to the following health hazards:

- Asbestosis (a significant cause of Pneumoconiosis, an occupational lung disease)
- Lung cancer
- Mesothelioma (cancer of the lung-lining and/or abdominal lining)
- Laryngeal cancer
- Ovarian cancer
- Testes Cancer
- Pleural plaques
- Pleural thickening
- Pleural effusion

Small exposures over longer periods or larger exposures over shorter periods often causes asbestos-related disease.

What Should I Do If I Encounter Asbestos?

Disturbing asbestos containing materials and insulations will often create an airborne exposure. If you encounter asbestos, or you think you may have found asbestos, immediately stop work and report the situation. Work with asbestos containing materials and insulations is prohibited and must be referred to a qualified abatement company.

What Regulations Apply?

Federal OSHA regulations apply to virtually all asbestos work. In addition, each state has its own set of asbestos regulations that govern work with asbestos, requiring licensing and other requirements.

Training

When the presence of asbestos is known or suspected, the organization provides awareness level training to employees that could encounter it. This training helps them understand how to recognize the presence of the material and what steps to take when encountered.

BLOODBORNE PATHOGENS EXPOSURE CONTROL

This program addresses the minimum requirements for employees occupationally exposed to bloodborne pathogens during trauma and similar medical emergencies at this organization.

Application and Scope

This program applies to all employees assigned to clean blood and other potentially infectious material (OPIM) after medical or trauma incidents or other event that introduces blood and OPIM into the working environment.

Functional Responsibilities

Roles with functional responsibilities under this program include:

- Program Administrator
- Employees
- Exposed Employees

Program Administrator

The program administrator has the following responsibilities:

- Implement this program and review annually
- Ensure proper management of regulated waste
- Generate and update the exposure control determination
- Ensure appropriate personal protective equipment (PPE) is readily available
- Retain all documents required by this program including vaccination declination forms, post exposure records, sharps injury log, training rosters, and other relevant documents
- Identify new or revised employee positions with occupational exposure
- Identify and evaluate new or modified tasks or procedures affecting exposure
- Evaluate relevant and appropriate changes in technology that eliminate or reduce exposure to bloodborne pathogens
- Evaluate relevant and appropriate commercially available and effective safety medical devices designed to eliminate or minimize exposure

Employees

Employees have the following responsibilities:

- Avoid all areas contaminated with blood and OPIM, and stay clear until clean and sanitary

Exposed Employees

Exposed employees tasked with cleaning blood and OPIM have the following responsibilities under this plan:

- Attend initial and annual bloodborne pathogens training
- Obtain hepatitis B vaccination series or declines this vaccination as indicated in this program
- Clean blood and OPIM and sanitizes affected surfaces
- Work safely around equipment and complete, if trained, or request lockout/tagouts from maintenance when needed
- Observe universal precautions
- Follow safe work practices
- Properly use the correct PPE
- Observe good personal hygiene
- Dispose of blood and OPIM contaminated waste properly
- Notify the program administrator of any personal exposures to blood and OPIM, including sharps incidents

Employee Exposure Determination

Under normal conditions, employees do not have exposure to blood and OPIM. However, a medical or trauma emergency involving blood or OPIM could contaminate equipment and the facilities.

To the greatest extent possible, designated employees are discouraged from cleaning up blood and OPIM in favor of contracting with a qualified contractor. Only in limited circumstances, designated employees may need to clean and sanitize affected portions of facilities and equipment. These designated employees are exposed to blood and OPIM only during these cleaning and sanitation tasks.

Affected Job Titles

Exposure by job title is as follows:

- No job titles have exposure to blood and OPIM on a consistent or regular basis
- Any employee tasked with cleaning up blood and OPIM, regardless of job title, has occasional exposure only during an emergency when blood and OPIM is present in the workplace. The actual job titles exposed to blood and OPIM vary based on who volunteers and is subsequently designated to perform this responsibility
- Employees that have incidental exposure to blood and OPIM because they may work near an incident or on contaminated equipment include all job titles at all locations and in the field. Employees with incidental contact must not clean up blood and OPIM

Refer to the Bloodborne Pathogens Exposure Determination that is a part of this program, for further details.

Methods of Compliance

The organization uses the following methods of compliance to prevent bloodborne pathogen and OPIM exposure.

Engineering and Work Practice Controls

Engineering and work practice controls must be used to eliminate or minimize employee exposure. These controls will be examined and maintained or replaced on a regular schedule to ensure their effectiveness. All procedures involving blood or OPIM are performed in such a manner as to minimize splashing, spraying, spattering, and generation of droplets of these substances.

Universal Precautions

Exposed employees always observe universal precautions when handling or cleaning blood or OPIM. In a situation where it is difficult determining bodily fluids, all fluids are considered, and treated as infectious.

Personal Protective Equipment

The organization provides all employees with appropriate PPE, proper containers and handwashing facilities, or antiseptic towelettes, at no cost to the employee. PPE includes appropriate gloves, masks and face shields, and impenetrable aprons. PPE is located at designated bloodborne pathogens (BBP) stations. Employees practice good donning and doffing techniques to avoid inadvertent exposure to blood and OPIM.

Housekeeping and Good Technique

Work areas are maintained in a clean and sanitary condition. Employees decontaminate equipment and working surfaces with an appropriate disinfectant. All procedures involving blood or OPIM are performed in a way minimizing splashing, spraying, spattering, and generation of droplets.

Employees put waste products into plastic bags, ties the bags, and marks them as medical waste with required biohazard labels. The bags are disposed as regulated waste. All regulated waste, including contaminated sharps, are placed in closable rigid containers, constructed to contain all contents and prevent leakage, appropriately labeled, and color-coded.

Personal Sanitation

Employees must wash their hands immediately after cleaning blood or OPIM and after removing gloves, using good handwashing techniques.

Eating, drinking, smoking, applying cosmetics, or lip balm, and handling contact lenses are prohibited when cleaning blood and OPIM.

Labels

Warning labels are affixed to containers of regulated waste, refrigerators and freezers containing blood or OPIM, and other containers used to store, transport or ship blood, or OPIM, except when red bags or red containers are used, or when bags or containers are placed in a labeled secondary container.

Labels required by this section must have the biohazard symbol and the work biohazard printed on them. The labels must be fluorescent orange or orange-red or predominantly so with contrasting-color print.

Labels are affixed as close as feasible to the container by string, wire, adhesive, or other method that prevents their loss or unintentional removal.

Labels required for contaminated equipment must also state which portions of the equipment remain contaminated.

Regulated waste that has been decontaminated should not be labeled or color-coded.

Regulated Waste

Regulated Waste means:

- Liquid or semi-liquid blood or OPIM contaminated items that would release blood or OPIM in a liquid or semi-liquid state if compressed
- Items that are caked with dried blood or OPIMs and can release these materials during handling
- Contaminated sharps
- Pathological and microbiological wastes containing blood or OPIMs

Contaminated sharps must be discarded immediately or as soon as feasible in containers that are:

- Closable
- Puncture resistant
- Leakproof on the sides and bottom
- Labeled or color-coded in accordance with this program and applicable regulations
- Easily accessible to personnel and located as close as is feasible to the immediate area where sharps are used or can be reasonably anticipated to be found
- Replaced routinely and not be allowed to overfill
- Maintained upright throughout use

When moving containers of contaminated sharps from the area of use, the containers must be closed immediately prior to removal or replacement to prevent spillage or protrusion of contents and placed in a secondary container if leakage is possible.

Secondary containers must be:

- Closable
- Constructed to contain all contents and prevent leakage during handling, storage, transport, or shipping
- Labeled or color-coded in accordance with the BBP regulation

When reusable containers are used in the workplace, employees must not open, empty, manually clean, or otherwise handle manually handle containers in any way that would expose employees to the risk of percutaneous injury.

Regulated waste disposal is in accordance with federal, tribal, state, and local laws and regulations.

Laundry

When applicable, contaminated laundry is bagged or containerized at the location where it was used, not be sorted or rinsed in the location of use, and minimally handled. Contaminated laundry bags or containers are leakproof, labeled, or color-coded in accordance with the label-requirements of this program unless the receiving laundry facility always observes universal precautions. Anyone handling laundry must wear protective gloves and other appropriate PPE.

Hepatitis B Vaccinations

The organization provides employees with a hepatitis B virus (HBV) vaccination series, at no cost, within 10-working days of initial assignment. If an employee declines the HBV vaccine, the employee must sign the declination form (see available forms) but may choose to receive the vaccination later at no cost. Documentation of vaccination refusal is kept by the organization. See the hepatitis B vaccination form.

Post Exposure Follow-up

When employees report an exposure to blood or OPIM, the organization takes the following steps:

- The employee receives immediate access to a confidential, no cost medical evaluation, and follow-up with a licensed healthcare professional
- The program administrator provides the licensed healthcare professional is provided with a description of the exposed employee's duties as they relate to the exposure incident, documentation, and route of exposure, results of the source employee's testing, if available, and all relevant medical records
- The program administrator documents the route(s) of exposure, exposure circumstances, and, unless prohibited by state law, identifies and documents the source employee
- The program administrator obtains consent to test the source employees' blood for HBV and HIV status, unless the source employee's status is known, documenting consent or refusal, and once consent is obtained, test the source employee's blood to determine HBV and HIV infectivity
- Upon consent of the exposed employee, the program administrator collects and tests the exposed employee's blood for HIV and HBV infectivity
- Provide the exposed employee with a copy of the CFR 1910.1030 regulation together with the results of any testing (source employee and exposed employee), and legal requirements for non-disclosure of the source employees serological status
- Within 15-days, provide the medical opinion to the employee
- When medically indicated, provide post exposure prophylaxis to the exposed employee

Training

The organization provides initial training when employees are assigned and annually thereafter. Training may be standalone, or part of first-aid and CPR training. The training includes the following, at a minimum:

- An accessible copy of the regulatory text of this program and an explanation of its contents
- A general explanation of the epidemiology and symptoms of bloodborne diseases
- An explanation of the modes of transmission of bloodborne pathogens
- An explanation of the employer's exposure control plan and how the employee can obtain a copy of the written plan
- An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and OPIMs
- An explanation of the use and limitations of methods that will prevent or reduce exposure including appropriate engineering controls, work practices, and PPE
- Information on the types, proper use, location, removal, handling, decontamination and disposal of PPE
- An explanation of the basis for selection of PPE
- Information on the hepatitis B vaccine, including information on its efficacy, safety, method of administration, the benefits of being vaccinated, and that the vaccine and vaccination will be offered free of charge
- Information on the appropriate actions to take and persons to contact in an emergency involving blood or OPIMs
- An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available
- Information on the post exposure evaluation and follow-up that the employer is required to provide for the employee following an exposure incident
- An explanation of the signs and labels and/or color coding used in the workplace
- An opportunity for interactive questions and answers with the person conducting the training session

Additional supplemental training is provided when changes that affect exposure occur, though supplemental training is typically limited to addressing new exposures.

Document Retention

The program administrator maintains the records of occupational exposure to blood or OPIM including the following:

- Employee exposure records
- Employee's HBV status

- All results of examinations, medical testing, and follow-up procedures
- Copy of the licensed healthcare professional's written opinion
- Copy of information provided to the healthcare professional

These records are kept confidential and not disclosed or reported without direct consent and kept for the duration of employment plus 30-years.

The organization keeps training rosters for all applicable training sessions. These records are kept for the duration of employment.

If an employee declined the HBV vaccine, a copy of the signed HBV Vaccine Declination Form is retained for the duration of employment or until the employee chooses to receive the vaccine.

The organization maintains a sharps log and periodically reviews the log to aid in the evaluation of problematic devices or procedures requiring additional attention or review. This log is maintained kept in addition to OSHA 300 and 301 logs required by 29 CFR 1904. All sharps related injuries occurring each calendar year are document on the applicable year's log. Sharps logs are retained for 5-years following the end of the year to which it relates. Affected-employee confidentiality is maintained. Relevant injuries are recorded in the sharps injury log within fourteen-working days from the date the incident is reported to the organization.

Forms

The following forms are referenced within this document:

- BBP Exposure Determination Form
- Hepatitis B Vaccination form
- Sharps Injury Log

CHEMICAL PROCUREMENT PROGRAM

This program addresses the procurement and receipt of hazardous materials covered by the hazard communication program.

Application and Scope

The full application of this procedure will help better manage chemical inventories, ensure safety data sheets (SDS) are current, increase safety by ensuring each chemical is evaluated, improve purchasing efficiencies, and save money.

Functional Responsibilities

The purchasing agent has functional responsibilities under this program.

Purchasing Agent Responsibilities

The purchasing agent has the following responsibilities:

- Work with other employees to identify appropriate products that can be consistently ordered and that reduce the overall scope of product brands and formulations
- Ensure the receipt of new SDS for all new chemicals
- Ensure that SDS are properly added to the SDS management system
- Ensure that SDS are periodically updated
- Conduct periodic checks

The purchasing agent may delegate these responsibilities to a qualified person.

Occupational Safety and Health Staff

Designated occupational safety and health staff, including collateral duty safety officers, have the following responsibilities:

- Review new chemical purchase requests from employees
- Evaluate chemical hazards
- Approve, disapprove, or request additional information and planning based on the review, and do not approve unless all key elements are in place
- Assist users and purchasing agents as necessary to maintain this programs' integrity

Designated occupational safety and health staff may designate these responsibilities to qualified personnel.

Employee Responsibilities

Employees and chemical users have the following responsibilities:

- Coordinate chemical purchases as indicated and do not purchase chemicals without explicit authorization
- When new chemicals are necessary, locate specification sheets and SDS, and provide this information to the safety and health coordinator, and the purchasing agent, together with monthly and annual use estimates and the maximum on site storage need, and follow up with requested information as needed

Employees may not delegate their responsibilities under this program.

Procedures

Chemical selection, ordering, and receipt must follow this procedure.

Selection

The safety and health coordinator will evaluate new chemical requests. This evaluation will include the following:

- Physical safety based on the chemical and physical properties
- Occupational health based on toxicity and available occupational exposure limits
- Anticipated and suspected employee exposures and the need to quantify exposures during trial periods and initial use
- Proposed handling methods
- New or supplemental PPE needs
- The need for additional or supplemental HAZCOM and/or chemical handling training
- The need for a substance specific program and medical surveillance program
- Proposed storage methods and locations
- Impact of use on waste streams, hazardous waste generator status, impact environmental permits (air emissions, wastewater discharge including pre-treatment, stormwater, and related)
- Other relevant considerations such as piping system chemical compatibility, safe piping routes, labels and signs, and related infrastructure needs
- Update the 30-year chemical list to include the new chemical
- A work with users, maintenance, and facilities staff to ensure all elements are in place prior to ordering

Ordering

The purchasing agent will:

- Confirm chemical selection with the user(s) and occupational safety and health staff
- Secure an SDS for each new chemical purchased before the chemical is brought on site and deliver electronic copies to whomever maintains SDS files

- Source chemicals as requested from users with an eye towards maintaining the smallest possible chemical inventory in terms of quantities, brands, and formulations
- Initially order the minimum quantity necessary to test the chemical
- Arrange for the safe receipt of initial shipments
- Do not substitute products, brands, grades, or make any other substitutions; purchase only the exact chemical that was approved

Receipt

The employee receiving the chemical for the first time will follow all handling and work practices and will store the chemical only in designated locations.

COMPRESSED GAS CYLINDERS

This section includes safe handling and storage techniques and requirements for compressed gas cylinders, regardless of application.

Compressed Gas Cylinder Use

The requirements for cylinder use include:

- Only the gas supplier mixes gases in the cylinders or refills them
- Employees are prohibited from using compressed gases (air) to clean clothing, themselves, or work surfaces
- Only handled by experienced and properly trained employees
- Never use fuel gas cylinders equipped with shut off valves without reducing the pressure through a suitable regulator
- Never use damaged or defective cylinders; Inspect cylinders, regulators, and manifolds before use
- Employees are expected to tag cylinders out of service and contact the gas supplier if any defects are found
- Keep cylinders, valves, and manifolds clean and free of grease
- Before connecting a regulator to a cylinder valve for welding use, the valve outlet shall be wiped clean with a clean cloth free of oil and lint
- When opening valves, always stand to the side and turn the face away from the valve
- If leaks are found, close the valve, and gland nut. If this doesn't stop the leak, discontinue using that cylinder, and immediately remove it from the work area
- Prior to removing a regulator, the valve will be in the closed position and the gas will be released

Inspections

Ensure inspections of the compressed gas cylinders include the following:

- Up to date with hydrostatic testing requirements every 5-years
- Contents and precautionary labeling clearly marked on the exterior
- No damage to pressure regulators, manifolds, hoses, gauges, and relief valve. Checked for corrosion, pitting, cuts, gouges, digs, bulges, neck defects, and general distortion
- Checked for leaks regularly with leak detecting liquid
- Safety pressure relief valves present
- Cylinders and valves repairs performed only by the supply gas vendor

- Unauthorized painting of cylinders not allowed
- Suitable pressure regulating devices in use when gas is emitted to systems with pressure rated limitations lower than the cylinder pressure

Leaking Cylinders

The proper procedure for a compressed gas cylinder leak:

- Tighten the valve
- If necessary, remove the cylinder to a ventilated area or outside
- As appropriate and if gas is flammable, place a warning sign on the cylinder
- Attach an out of service tag
- Notify the gas supplier and follow their instructions

Transportation

The requirements to properly move compressed gas cylinders are the following:

- Tilt them and roll them on their bottom edges
- Ensure the compressed gas cylinders are not dropped or struck
- Ensure that the valve protector caps are secured in place and the regulators are removed
- Transport the gas cylinders in a vertical position
- Always use cylinder dollies
- Move in a safe manner either with a hand truck or by rolling on bottom edge for short distances
- If the gas cylinders are hoisted, use cradles, sling boards, or properly secured them to pallets
- Never use magnets or choker slings to hoist, nor will the valve cap be used for lifting
- Use a suitable truck, chains, or steadying devices to secure gas cylinders

Storage and Placement

A compressed gas cylinder must be placed in-storage when it will not be used, or it is reasonably foreseeable that it will not be used, within the next 24-hours. Cylinder storage and placement conforms to the following:

- Close and remove all valves, manifolds, and replace the valve cap
- Store upright
- Secure the cylinder with a chain or similar device
- Store in dry cool area (below 125-degrees) that is well-ventilated

- Storage in locations that prevent damage by passing objects, vehicles, falling objects, and other damage. Correct storage precludes access and/or tampering by unauthorized personnel.
- Store away from exit paths, exits, exit discharges, tops of stairs, stair landings, elevators, dock doors, and gangways
- Never place items on top of fuel gas cylinders
- Protect the bottom of the cylinder from rusting; do not place the cylinder in wet or submerged locations
- Store full cylinders separately from empty cylinders, preferably using appropriate tags to note the status of the cylinder as full, in-service, or empty
- Separate oxygen cylinders from fuel gas cylinders a minimum distance of 20-feet or with a noncombustible barrier at least 5-feet in height having a fire-resistance rating of at least one-half hour. Flammable gases are separated from oxidizing gases (acetylene and propane are separated from oxygen tanks a minimum of 20-feet or by a fire-resistant partition when in storage)
- Stored away from electrical connections, gas flames, or other sources of ignition
- Do not place cylinders where they could become part of an electrical circuit
- During welding and related operations keep cylinders far from welding, or cutting activities so sparks, hot slag, or flames cannot reach them. Ensure welding electrodes never strike the cylinder to create an arc
- Never take cylinders (oxygen or fuel gas) into confined spaces

The organization complies with the Compressed Gas Association Pamphlet P-1-1965.

Labeling Requirements

Compressed gas cylinder labels comply with hazard communication labeling requirements and include the following:

- Contents of the compressed gas cylinder
- Manufacturer and supplier information
- Warning statement

Manifolds

Whenever feasible utilize manifolds and hard piping to deliver compressed gasses to permanent fixed use locations.

The following requirements apply:

- All fuel gas and oxygen manifolds must have the name of the substance in 1-inch letters painted or permanently attached

- Both ends of the supply hose leading to the manifold must be constructed so that hoses cannot be interchanged between the fuel gas and oxygen
- Never use adapters to permit the interchange of hoses

CRYSTALLINE SILICA EXPOSURE CONTROL PROGRAM

The purpose of this program is to assess and control respirable crystalline silica exposures to reduce the risk of occupational disease, primarily silicosis, from workplace exposures.

Application and Scope

This plan applies to all employees that work in a job that exposes them to crystalline silica levels at or above the action level (AL) of 25 $\mu\text{g}/\text{m}^3$ on an eight-hour time weighted average (TWA) basis under any foreseeable conditions.

The complete implementation of this exposure control program requires the completion and implementation of the crystalline silica program addendum by an occupational safety and health professional or other similarly qualified-person.

Functional Responsibilities

The competent-person has functional responsibilities under this program.

Competent-Person

The competent-person will:

- Implement the written exposure control plan as outlined in this program and its addendum
- Review and evaluate the effectiveness of this program and its addendum at least annually
- Identify and predict potential crystalline silica hazards in the workplace
- Maintain relevant knowledge of, and skills in the, applicable regulations, associated hazards, and means and methods to control crystalline silica hazards
- Conduct frequent and regular inspections of all jobs, materials, and equipment where crystalline silica exposures may reasonably be present

The competent-person may delegate functional responsibilities to another competent-person whom meets the requirements of this program such as an occupational safety and health professional.

Definitions

The following terms are defined as indicated below:

- *Action level (AL)* means a concentration of airborne respirable crystalline silica of 25 $\mu\text{g}/\text{m}^3$, calculated as an 8-hour TWA
- *Permissible exposure limit (PEL)* means an airborne concentration of respirable crystalline silica in excess of 50 $\mu\text{g}/\text{m}^3$, calculated as an 8-hour TWA for which no employee may be exposed
- *Respirable crystalline silica* means quartz, cristobalite, and/or tridymite contained in airborne particles that are determined to be respirable by a sampling device designed to meet the

characteristics for respirable-particle-size-selective samplers specified in the International Organization for Standardization (ISO) 7708:1995: Air Quality—Particle Size Fraction Definitions for Health-Related Sampling

- *High-efficiency particulate air [HEPA] filter* means a filter that is at least 99.97% efficient in removing mono-dispersed particles of 0.3 micrometers in diameter

Exposure Determination

This organization will assess and control the exposure of employees who are actually or reasonably expected to have exposure to respirable crystalline silica at or above the AL. There are three possible methods for the development and application of exposure assessment and control.

- Table Method – 29 CFR 1910.1153(c)(2)
- Objective/Performance Data from a Third-Party
- Scheduled Monitoring by this Organization

This organization will apply these data sources as applicable to develop and evaluate exposure control methods to reduce the risk of employee exposure to crystalline silica. For most instances, this organization will apply the Table Method.

Table Method

This organization will apply the specified engineering controls, work practices, and required respiratory protection guidance provided in 29 CFR 1926.1153(c)(2) Table 1, which can be found at the end of this program. For activities not listed on Table 1, or when engineering controls, work practices, and respiratory protection requirements provided in Table 1 cannot be fully implemented, this organization will assess the exposure of employees who are exposed or may reasonably be expected to have exposure to respirable crystalline silica at or above the AL in accordance with this program.

Objective/Performance Data from a Third-Party

If specific and objective air-monitoring data is available for the specific tasks under consideration, this organization may choose to review the data to determine its applicability to its own operations. These data can be derived from industry-wide surveys or calculations based on the composition of a substance, demonstrating employee exposure to respirable crystalline silica associated with a product or material or a specific process, task, or activity. However, these data must reflect workplace conditions closely resembling this organization's workplace conditions or must create a higher exposure-potential than the processes, types of material, control methods, work practices, and environmental conditions in this organization's current operations.

Scheduled Monitoring by this Organization

In the absence of objective data, and for tasks not guided by 29 CFR 1926.1153(c)(2) Table 1, this organization will complete its own scheduled monitoring as further indicated within this program.

Exposure Controls

This organization uses engineering and work practice controls to control respirable crystalline silica as indicated in table 1. When tasks are performed that do not appear on table 1 or when table 1 is not fully implemented, this organization will apply the controls established from scheduled or performance monitoring as developed by an OSH professional in conformance with this program and as documented in the program addendum.

Implementation of 29 CFR 1926.1153(c)(2) Table 1

When applicable, the engineering controls, work practice methods, and required respiratory protection specified in Table 1 must be properly and fully implemented. This includes, but is not limited to verifying the following:

- For indoor work, ventilation is effective and minimizes visible dust accumulation
- When wet methods are used, water flow rates are sufficient to minimize visible dust
- Activities that are performed within enclosed cabs or booths are maintained free from settled dust, have door seals that function properly, have gaskets and seals in good working condition, are under positive pressure through the delivery of fresh air that is filtered through a 95% efficient filter in the 0.3-10.0 um range, and has both heating and cooling capabilities

Where an employee performs more than one task on Table 1 during the course of a shift, and the total duration of all tasks combined is more than four hours, the required respiratory protection for each task is the respiratory protection specified for more than four hours per shift. If the total duration of all tasks on Table 1 combined is less than four hours, the required respiratory protection for each task is the respiratory protection specified for less than four hours per shift.

Respirators

Respirators are required under the following circumstances:

- When specified by Table 1
- For tasks not listed in Table 1, or when the engineering controls, work practices, and respiratory protection described in Table 1 are improperly or incompletely implemented
- Where exposures exceed the PEL during periods necessary to install or implement feasible engineering and work practice controls
- Where exposures exceed the PEL during tasks, such as certain maintenance and repair tasks, for which engineering and work practice controls are not feasible
- During tasks for which an employer has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL

Where an employee performs more than one task on Table 1 during the course of a shift, and the total duration of all tasks combined is more than four hours, the required respiratory protection for each task is the respiratory protection specified for more than four hours per shift. If the total duration of all tasks on Table 1 combined is less than four hours, the required respiratory protection for each task is the respiratory protection specified for less than four hours per shift.

This organization maintains a separate respiratory protection plan – Refer to that program for details on the proper use of respirators, respirator-related medical surveillance, and other requirements.

Barricades and Signs

Whenever an employee performs work that will or could generate airborne dust that contains crystalline silica, regardless of the airborne concentration, they will use barricade tape, signs, or a combination to restrict access to the work area. The authorized persons working in the area will not allow unauthorized individuals to enter the area. When other authorized users do enter the area, the employees conducting the work will ensure that new arrivals use the appropriate PPE.



**Inhalation Hazard.
Authorized Persons
Only. Respirator
Required.**



**Peligro de inhalación.
Solo para personas
autorizadas.
Respirador requerido.**



Housekeeping

This organization ensures that all housekeeping activities used to remove settled silica containing dusts from surfaces does not introduce dust to the air. If housekeeping activities ever generates visible dust the activity must be stopped, and the housekeeping technique must be reformulated to ensure that dust is not generated.

This organization uses wet methods and HEPA vacuums to remove settled dust from floors and surfaces. Wet methods include using water to spray onto the dust source to allow for wet mopping, sweeping, and wiping.

When wet methods and HEPA vacuums create risk to life or health, the use of dry sweeping compound is permitted for limited activities under authorization of the program administrator. The use of dry sweeping compound is not as effective as other methods and will only be approved on a limited basis when no other alternative exists and, it is properly done to control airborne dust. In addition, many commercially available dry sweeping compounds contain silica or other hazards that must be evaluated prior to introducing them into the workplace.

This organization disallows the use of compressed air for cleaning floors and surfaces contaminated with silica containing dusts except when used in conjunction with an effective ventilation system which captures the liberated dusts close to the source of the dust.

All bags or other silica containing waste storage are tightly closed preventing the accidental release of silica containing dusts.

Scheduled Monitoring

When scheduled monitoring is required, this organization performs initial 8-hour TWA exposure assessments that consist of one or more personal breathing zone air samples reflecting the exposures of each employee on each shift, for each job classification, and in each work area. Where several employees perform the same task on the same shift and in the same work area, a representative fraction of employees expected to have the highest exposure to respirable crystalline silica are sampled.

There are three monitoring outcomes with specific requirements associated with each. These outcomes include the following.

- Results are below the AL
- Results are at or above the AL but below the permissible exposure limit (PEL)
- Results are at or above the PEL

Each outcome requires specific actions as further indicated below.

Results are Below the AL

When monitoring results are below the AL, the following requirements apply.

- After the initial assessment, this organization will discontinue monitoring for all employees and jobs whose exposures are below the AL
- After any non-initial monitoring, this organization will repeat monitoring within 6-months until two consecutive samples obtained seven or more days apart are below the AL, and at that time, this organization will discontinue monitoring for those employees whose exposures are represented by such monitoring

Results are at or Above the AL but Below the PEL

When results are at or above the AL but below the PEL, the following requirements apply.

- If the initial assessment indicates that employees are exposed to levels of crystalline silica at or above the AL and below the PEL, this organization will complete additional monitoring within six months of the most recent assessment to validate the results and will continue monitoring every six months
- When the most recent non-initial assessment indicates employee exposure below the AL, this organization will repeat monitoring within 6-months until two consecutive samples obtained seven or more days apart are below the action level and at that time, this organization will discontinue monitoring for those employees whose exposures are represented by such monitoring

Results are at or Above the PEL

When results are at or above the PEL, the following requirements apply.

- When the most recent assessment indicates that employees are exposed to levels of crystalline silica at or above the PEL, this organization completes additional monitoring within three

months of the most recent assessment to validate the results and continues monitoring every three months as long as results stay above the PEL

- If subsequent non-initial monitoring results are below the PEL and above the AL, the time until the next sampling period is extended to 6-months
- If subsequent non-initial monitoring results are below the AL, this organization will repeat monitoring within 6-months until two consecutive samples obtained seven or more days apart are below the action level and at that time, this organization will discontinue monitoring for those employees whose exposures are represented by such monitoring

Reassessment of Exposures

This organization completes reassessments of exposures when changes in the workplace may result in new or additional exposures to crystalline silica at or above the AL. Any of the following events may trigger a reassessment:

- Changed work practices, methods, or processes
- Changes to engineering controls
- Equipment modifications
- New equipment additions
- New products or product-formulations
- Other changes that may impact employee exposure

Observation of Monitoring

This organization provides affected employees or their designated representatives the opportunity to observe any monitoring of employee exposure to respirable crystalline silica. This organization also provides the observer any applicable protective clothing or equipment when observation of monitoring requires entry into an area where the use of protective clothing or equipment is required for any workplace hazards. Under no circumstance will observation take place unless the observer is properly protected and observes applicable safe work practices.

Monitoring Documentation

Each assessment includes a formal written report that documents that the appropriate inquiries were made, the methods used, equipment used, results, and conclusions.

Assessment and Laboratory Analysis Quality

Assessment methods, equipment, results, and conclusions conform to generally accepted best practices and applicable regulations. To assure reliable results, this organization will assign a qualified and knowledgeable person to complete assessments and document them using appropriate industrial hygiene practices.

Air sampling and lab analysis will always conform to best practices and one of the following analytical methods: OSHA ID-142, NMAM 7500, NMAM 7602, NMAM 7603, MSHA P-2, or MSHA P-7.

In addition, laboratories that analyze air samples must:

- Be accredited to ANSI/ISO/IEC Standard 17025:2005 with respect to crystalline silica analyses by a body that is compliant with ISO/IEC Standard 17011:2004 for implementation of quality assessment programs
- Use the most current National Institute of Standards and Technology (NIST) or NIST traceable standards for instrument calibration or instrument calibration verification
- Implement an internal quality control (QC) program that evaluates analytical uncertainty and provides employers with estimates of sampling and analytical error
- Characterize the sample material by identifying polymorphs of respirable crystalline silica present, identifies the presence of any interfering compounds that might affect the analysis, and makes any corrections necessary to obtain accurate sample analysis
- Quantitatively analyze for crystalline silica only after confirming that the sample matrix is free of uncorrectable analytical interferences, corrects for analytical interferences
- Each day that samples are analyzed, perform instrument calibration checks with standards that bracket the sample concentrations
- Use five or more calibration standard levels to prepare calibration curves and ensures that standards are distributed through the calibration range in a manner that accurately reflects the underlying calibration curve
- Optimize methods and instruments to obtain a quantitative limit of detection that represents a value no higher than 25-% of the PEL based on sample air volume

Medical Surveillance

This organization provides access to medical surveillance services to each employee who will be exposed to crystalline silica at or above the AL for 30 or more days per year. Unless otherwise prescribed by law, any exposure during the shift or the day counts as one day, even when that exposure is less than a full shift.

This organization provides employees with an initial medical examination within 30-days of initial assignment, unless the employee has received a previous examination dated within the last three years. Periodic medical examinations are also provided at least once every three years or more frequently if recommended by the primary licensed health-care provider (PLHCP).

If the PLHCP's written opinion indicates the need for further examination by a specialist, this organization provides employees with an additional medical examination with a specialist within 30-days of receiving the PLHCP's written opinion.

All examinations whether initial or periodic are provided at no cost to the employee.

Medical examinations consist of:

- A medical and work history with: Past, present, and anticipated exposure to crystalline silica, dust, and other agents affecting the respiratory system
- History of any respiratory system dysfunction
- History of tuberculosis

- Smoking status and history
- A physical examination with an emphasis on the respiratory system
- A chest X-ray
- A pulmonary function test [Forced vital capacity (FVC), Expiratory volume in one second (FEV1), FEV1 / FVC ratio]
- Testing for latent tuberculosis infection (initial only)
- Any other test deemed appropriate by the PLHCP

This organization will provide the following information to the PLHCP:

- A description of the employee's duties (previous, current, and anticipated) that have exposed or will expose the employee to respirable crystalline silica
- The employee's exposure (previous, current, and anticipated) to respirable crystalline silica
- A description of any personal protective equipment (PPE) that is used or will be used by the employee, including the length of time used
- Information from the employee's previous medical examinations
- A copy of the respirable crystalline silica standard

Medical Reports and Opinions

Initial and periodic medical reports must contain the following information, at a minimum:

- A statement indicating the results of the medical examination, including any medical conditions at an increased risk of health impairment from exposure to crystalline silica and any conditions that require further evaluation
- Any recommendations on the employee's respirator use
- Recommended limitations on the employee's exposure to crystalline silica
- A statement of referral to a specialist if the chest X-ray is classified as 1/0 or higher by the B reader or if deemed appropriate by the PLHCP

Reports of additional exams and inquiries by specialists must contain the following information, at a minimum:

- A statement indicating the results of the medical examination, including any medical conditions at an increased risk of health impairment from exposure to crystalline silica and any conditions that require further evaluation
- Any recommendations on the employee's respirator use
- Recommended limitations on the employee's exposure to crystalline silica

This organization obtains a written medical opinion from the PLHCP or the specialist within 30-days of the medical examination. The written opinion must contain:

- The date of the examination

- A statement that the examination meets the requirements of the regulation
- Any recommended limitations on the employee's use of respirators
- When authorized by the employee in writing: (i) Any recommended limitations on the employee's exposure to crystalline silica and (ii) A statement of referral to a specialist if the chest X-ray is classified as 1/0 or higher by the B reader or if deemed appropriate by the PLHCP, for initial and periodic exams, but not specialist exams

Employee Communication

This organization will communicate the following information employee in the indicated time, as further described below.

- Individually notify affected employees in writing of all monitoring results or post the results in a location accessible to all affected employees within five working days after the completion of an exposure assessment. If exposure assessment results indicate that employee exposure is at or above the PEL, this organization will describe the corrective actions being undertaken to reduce employee exposure to or below the PEL within this written notification to the employee
- Provide a copy of all written medical opinions within 30-days of the exam date
- Provide a copy of all written medical reports by specialists within 30-days of the exam date

Training

This organization trains exposed employees in the following topics.

- Relevant exposures
- The health hazards associated with exposure to respirable crystalline silica that includes cancer, lung effects, immune system effects, and kidney effects
- Specific tasks in the workplace that could result in exposure to respirable silica
- Specific measures the employer has implemented to protect employees from exposure to respirable crystalline silica, including engineering controls, work practices, and respirators used
- The purpose and a description of the medical surveillance program
- The contents of the regulation

This organization may combine all training requirements under this section within a stand-alone class or as part of a longer hazard communication session.

This organization will ensure that copies of the regulation and this program are readily available to each employee.

Document Retention

This organization maintains accurate records of the following:

- All exposure measurements taken to assess employee exposure to respirable crystalline silica. At the very least these will include:
 - The date of measurement for each sample taken
 - The task monitored
 - Sampling and analytical methods used
 - Number, duration, and results of samples taken
 - Identity of the laboratory that performed the analysis
 - Type of PPE, such as respirators worn by the employees monitored
 - Name, social security number, and job classification of all employees represented by the monitoring, indicating which employees were monitored
 - All objective data relied upon.
- The crystalline silica-containing material in question
- The source of the objective data
- The testing protocol and results of testing
- A description of the process, task, or activity on which the objective data were based
- Other data relevant to the process, task, activity, material, or exposures
- Of each employee covered by medical surveillance. Including:
 - Name and social security
 - A copy of the PLHCPs' and specialists' written opinions
 - A copy of the information provided to the PLHCPs and specialists

All records related to this program will be provided upon request to employees, former employees or representatives designated by the individual employee and their representatives, to the extent required by regulation or law.

If this organization ceases to do business, it will transfer to the successor employer all records required to be maintained, and the successor employer will retain them for the remainder of the period section.

Forms

The following forms are included:

- Crystalline Silica Program Addendum

Tables

The table below is adapted from 29 CFR 1926.1153(c)(2) Table 1 – Specified Exposure Control Methods When Working with Materials Containing Crystalline Silica.

29 CFR 1926.1153(c)(2) TABLE 1

Equipment or Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤4 hours/shift	>4 hours/shift
(i) Stationary masonry saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None
(ii) Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions:		
	—When used outdoors	None	APF 10
	—When used indoors or in an enclosed area	APF 10	APF 10
(iii) 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 Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None

	Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency		
(iv) Walk behind saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions:		
	—When used outdoors	None	None
	—When used indoors or in an enclosed area	APF 10	APF 10
(v) Drivable saws	For tasks performed outdoors only: Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None
(vi) Rig mounted core saws or drills	Use tool equipped with integrated water delivery system that supplies water to cutting surface Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None

(vii) Handheld and stand mounted drills (including impact and rotary hammer drills)	Use drill equipped with commercially available shroud or cowl with dust collection system Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter cleaning mechanism Use a HEPA filtered vacuum when cleaning holes	None	None
(viii) Dowel drilling rigs for concrete	For tasks performed outdoors only: Use shroud around drill bit with a dust collection system. Dust collector must have a filter with 99% or greater efficiency and a filter cleaning mechanism	APF 10	APF 10
(ix) Vehicle mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with a low flow water spray to wet the dust at the discharge point from the dust collector	None	None
	OR		

	Operate from within an enclosed cab and use water for dust suppression on drill bit	None	None
(x) Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact:		
	—When used outdoors	None	APF 10
	—When used indoors or in an enclosed area	APF 10	APF 10
	OR		
	Use tool equipped with commercially available shroud and dust collection system Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter cleaning mechanism:		
	—When used outdoors	None	APF 10
	—When used indoors or in an enclosed area	APF 10	APF 10
(xi) Handheld grinders for mortar removal (that is, tuckpointing)	Use grinder equipped with commercially available shroud and dust collection system	APF 10	APF 25

	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter cleaning mechanism		
(xii) 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 the grinding surface Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None
	OR		
	Use grinder equipped with commercially available shroud and dust collection system Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		

	Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter cleaning mechanism:		
	—When used outdoors	None	None
	—When used indoors or in an enclosed area	None	APF 10
(xiii) Walk behind milling machines and floor grinders	Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions OR	None	None
	Use machine equipped with dust collection system recommended by the manufacturer Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions When used indoors or in an enclosed area, use a HEPA filtered vacuum to remove loose dust in between passes	None	None

(xiv) Small drivable milling machines (less than half lane)	Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant Operate and maintain machine to minimize dust emissions	None	None
(xv) 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 Operate and maintain machine to minimize dust emissions	None	None
	For cuts of 4-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 Operate and maintain machine to minimize dust emissions OR	None	None
	Use a machine equipped with supplemental water spray designed to suppress dust. Water must be combined with a surfactant	None	None

	Operate and maintain machine to minimize dust emissions		
(xvi) Crushing machines	Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (for example, hoppers, conveyors, sieves/sizing or vibrating components and discharge points) Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote-control station	None	None
(xvii) Heavy equipment and utility vehicles used to abrade or fracture silica containing materials (for example, hoe ramming, rock ripping) or used during demolition activities involving silica containing materials	Operate equipment from within an enclosed cab. When employees outside of the cab are engaged in the task, apply water, and/or dust suppressants as necessary to minimize dust emissions	None	None
	Apply water and/or dust suppressants as necessary to minimize dust emissions OR	None	None

(xviii) Heavy equipment and utility vehicles for tasks such as grading and excavating but not including: Demolishing, abrading, or fracturing silica containing materials	When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab	None	None

GASES, VAPORS, FUMES, DUSTS, AND MIST CONTROL

This section addresses employee chemical exposure to hazardous chemicals, regardless of the route of entry.

Application and Scope

This section is designed to reduce employee exposure to harmful substances. This section applies to all personnel at all jobsites that are exposed to hazardous substances.

The organization evaluates chemical exposures and ensures that exposures are below the applicable OSHA permissible exposure limit (PEL). The organization reserves the right to apply American Conference of Government Industrial Hygienists (ACGIH) threshold limit values (TLVs), or other published occupational exposure limits that are lower than OSHA PELs, in specific circumstances.

To achieve compliance, the organization applies the hierarchy of controls, when feasible, as indicated.

- Eliminate the chemicals use
- Substitute a less hazardous chemical
- Implement engineering controls, such as ventilation
- Implement administrative controls
- Supply personal protective equipment

See substance specific sections for additional details.

LEAD HAZARD AWARENESS

This section addresses lead-hazard awareness considerations.

Application and Scope

This organization does not work with or remove lead products or lead-based paint. However, employees may have incidental contact with lead products and lead-based paint in some limited circumstances.

Procedure

If the presence of lead products or lead-based paint is known, frontline leaders will ensure that all affected employees have appropriate awareness level training. Employees are prohibited from working with lead products or removing lead-based paint.

When an employee suspects the presence of lead products or lead-based paint, the employee must report this to the frontline leader who will take steps to confirm or deny the presence of lead. Employees must stop work until a lead-free determination is made.

Training

This organization provides awareness level training to employees that may encounter these products during work. This training helps them understand how to recognize the presence of the material and the steps to take when encountered.

LIFTING AND HOISTING

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CRANE SAFETY WHEN RENTING CRANES WITH OPERATORS

The section covers crane rentals with crane operators at selected jobsites. The organization subcontracts these activities and requires the crane company to perform all work safely.

Crane Operators

Crane operators must:

- Have nationally recognized, current, operator certification and must prove this before operations begin
- Follow manufacturer's instructions
- Retain a copy of relevant procedures, manuals, and documentation in the cab of the crane
- Follow all required crane safety program elements including inspections
- Mobile crane setup is critical. Observe all appropriate procedures and always verify ground conditions

Work Area Controls

The organization will erect and maintain control lines, warning lines, railings, or similar barriers to mark the boundaries of hazardous areas to protect employees and other personnel who work near a crane from being struck or crushed. If it is infeasible to erect such barriers, then clearly mark the hazard areas by a combination of warning signs and high visible markings identifying the hazard area(s).

If an employee goes to a location in the hazard area, the employee ensures the operator is informed. Where the operator knows an employee went to such a location, the operator must not rotate the superstructure until the operator is informed, in accordance with a pre-arranged system of communication that the employee is in a safe position.

When available, the organization uses hoisting routes minimizing the exposure of employees and the public to hoisted loads. If the operator is not moving a suspended load, no employee is allowed within the fall zone unless they are engaged in hooking, unhooking, or guiding the load; engaged in the initial attachment of the load to a component or structure; or operating a concrete hopper or concrete bucket.

Pre-Lift Planning

A pre-pick planning meeting occurs between the operator and site employees involved with the pick whenever necessary. At a minimum, the topics of the meeting include the following:

- Communication methods and signals
- Crane configuration
- Crane weight ratings
- Critical lift program (if it is a critical lift)

- Ground conditions, stability, and other site factors
- Identification of key personnel
- Relevant site hazards
- Rigging configuration
- Weather
- Weight of the load

Placement, Setup, and Ground Conditions

All cranes will only be assembled or used on firm, drained, and sufficiently graded ground with any necessary supporting material in accordance with the crane manufacturer's directions. The operator is informed where all hazards beneath the operating area are located, such as voids, tanks, and utilities. Mobile cranes will have blocking material that ensures proper load distribution and equipment support.

If the organization is not the controlling entity at the job, the organization informs the controlling entity of any ground problem(s) it is aware of and work with other organizations to determine corrective actions.

During crane setup, the subcontractor will establish boundaries with hazard tape, delineating the swing radius of the crane and the lifting zone.

Individuals Working Around Cranes

Employees that work around cranes receive training consistent with the training requirements in §29 CFR 1926 Subpart CC – “Cranes and Derricks in Construction,” or equivalent regulations for state-plan states, including the hazards of working around cranes, struck by and pinch/crush hazards and site-specific hazards.

RIGGING

This section addresses rigging loads for lifting.

Application and Scope

This procedures in this program are designed to prevent loss of load control during rigging and lifting operations. This program applies regardless of the lifting equipment type. Riggers must rig all lifts safely and within rigging equipment load limits. Riggers are always responsible for the load under the hook.

Functional Responsibilities for Riggers

Riggers determine load weights, select appropriate rigging, attach rigging to the load and the hook, inspect, and maintain rigging equipment and signal the crane operator. Riggers responsibilities include:

- Follow manufacturer's instructions, applicable regulations, and this program
- Know the crane's lift capacity and identify all actual load weights or reasonably estimate load weights
- Work with the crane operator to complete rigging and lift plans
- Select rigging equipment appropriate for the load and the situation
- Inspect and maintain rigging equipment
- Remove unsafe or inadequate rigging from service upon discovery
- Take full responsibility below the hook
- Understand crane hand signals and other methods of communication (for example, radio)
- Maintain operational competency and attend all required training
- When conflicts arise between the operator and the rigger, resolve those conflicts favoring the more conservative and safer approach
- Never use unsafe rigging or engage in an unsafe lift

Safe Operating Procedures

During rigging operations, keep a rigging guide handy to look up important information.

Rigging equipment may not be used for fall protection or confined space entry applications. Fall protection equipment and confined space entry equipment may not be used for rigging loads. Rigging equipment may not be used for towing vehicles.

Riggers will always observe the following:

- Do not use damaged or defective slings or hardware
- Do not shorten slings with knots, bolts, or other makeshift devices

- Do not kink slings
- Do not load slings more than their safe working limit
- Attach slings securely
- Do not place hands or fingers between the sling and its load while the sling is being tightened around the load
- Rig loads to maintain good load control
- Never work under a suspended load
- Keep suspended loads clear of other objects
- Keep employees clear of all loads about to be lifted and suspended loads
- No shock loading
- Do not pull slings from underneath a load when the load is resting on the sling; place loads on cribbing instead

Taglines

Always use tag lines to better control loads:

- Tag lines must be nonconductive
- Do not splice taglines or tie knots in them
- Use larger diameter taglines – They are easier to handle
- Always wear gloves
- Never loop a tagline around hands, arms, or other body part

Rigging Equipment Selection and Use

Riggers only use equipment designed and compliant with applicable ASME regulations and with safe working limits under the specific rigging conditions and techniques in use.

The organization forbids the use of any rigging equipment and wire rope, natural fiber rope, or synthetic fiber rope and hitches in applications that are greater than the manufacturer's rated capacity.

Rigging equipment must have permanently affixed identification markings as prescribed by the manufacturer, indicating the recommended safe working load.

Hooks, rings, oblong links, pear shaped links, welded or mechanical coupling links, or other attachments used with alloy steel chains must have a rated capacity equal to that of the chain. The organization bans the use of job or shop hooks and links, or makeshift fasteners formed from bolts or rods, or other such attachments.

All wire rope will:

- Have covered or blunted protruding ends of strands in splices on slings and bridles
- Never be secured by knots, except on haul back lines on scrapers

- Never have an eye splice with less than three full tucks
- When used in hoisting, lowering, or pulling load, consist of one continuous piece without a knot or splice
- Never have eyes in wire bridles, slings, or bull wires formed by wire rope clips or knots

Slings will never be shortened with knots, bolts, or other makeshift devices nor kinked. Slings used in a basket hitch must have the loads balanced to prevent slippage. Slings will be padded or protected from sharp edges of their loads. No organization employee will put their hands or fingers in between the sling and its load while the sling is being tightened around the load or be allowed under a suspended load. In addition, the organization forbids shock loading and pulling a sling from under a load when the load is resting on the sling.

Tag lines must be used if there is potential of the hoisting material to swing out of control.

All latches will be in place on all hooks to eliminate the hook throat from opening. Safety latches on hooks will not be deactivated or made inoperable except when a qualified rigger has determined that the hoisting or placing of purlins and single joists can be performed more safely by doing so or when equivalent protection is provided in a specific erection program.

Whenever rigging equipment is not used, it is removed from the immediate work area and stored to prevent damage.

Rigging equipment is not permitted for use in conjunction with or as a substitute for PFAS.

Custom Rigging Equipment

All custom design grabs, hooks, clamps, or other lifting accessories will be marked with their safe working loads and tested prior to use to 125% of their rated load.

Rigging Equipment Inspections

The organization requires pre-use equipment inspections by a qualified rigger before each shift to ensure:

- Labels are present and legible
- Manufacturer's markings are present and legible
- Safe working limits are clearly indicated
- The equipment is free of defects and damage

The organization requires comprehensive, annual rigging equipment inspections by a designated employee who is a qualified rigger familiar with the rigging equipment being inspected. Each inspection is documented on an inspection form and retained by the program administrator.

When work and use conditions, severity of wear, and equipment familiarity indicate more frequent comprehensive inspections, the organization will increase the inspection frequency.

Rejected rigging equipment will be immediately removed from service and tagged to prevent inadvertent use. Inhouse repair of rigging equipment is prohibited.

Lift and Rigging Programs

Riggers will follow lift and rigging programs when provided, and will work with crane operators, hoist operators and others to develop lift and rigging programs appropriate for operations at the job-site and for the lifts under consideration when required by this program of the host employer.

Critical lifts always require a lift program or completion of a critical lift form.

Training

The organization requires qualified rigger training at a minimum. The organization accepts any qualified rigger training course from any reputable organization if it includes relevant subject matter applicable to the work performed and covering relevant OSHA regulations, consensus standards, best practices, and a test to demonstrate knowledge.

The organization requires retraining at least once every 3-years or more frequently if behavior or incidents indicate knowledge and skill gaps.

Forms

The following forms are applicable to this section:

- Rigging Inspection Form

SIGNALPERSONS

This program addresses signalperson requirements for all lifting operations.

Application and Scope

This program covers all signalperson work and it applies to all lifting operations, regardless of equipment or method.

The organization provides a signal person for lifts when:

- The point of operation is not in full view of the operator
- The view in the direction of traveling equipment is obstructed
- The operator or person handling the load determines that it is necessary due to site specific safety concerns

Procedures

Signals to the operator will be by hand, voice, audible, or new signals. The signals selected by the organization's site supervisor must be appropriate for the site conditions.

When hand signals are used, the standard method will be used in accordance with OSHA 1926 Subpart CC Appendix A – Standard Hand Signals.

Devices used to transmit voice signals will be tested onsite before beginning operations to ensure that the signal transmission is effective, clear, and reliable. Use one channel for radio signal transmission unless multiple cranes are needed to coordinate, or another situation arises where the operator deems it necessary.

When voice signals are chosen, prior to beginning operations, the operator, and signal person must agree on the chosen voice signals. Each voice signal must contain the following three elements, in order:

- Function (that is, hoist or boom) with direction
- Distance and/or speed
- Function with the stop command

New signals, or signals other than hand voice, or audible, may be used when the organization's operator demonstrates the new signals are at least equally effective as the other signals or the new signals comply with a national consensus regulation.

If the operator becomes aware of a safety problem and needs to communicate with signal person, the operator must safely stop operations. Operations will not resume until the operator and signal person agree that the problem has been resolved. Anyone else on the job-site that becomes aware of a safety concern must alert the operator or signal person by giving the stop or emergency stop signal.

Training

Assigned personnel receive qualified signalperson training before assignment. Training includes power line safety. Refresher training is once every 3-years or at any time refresher training is indicated. Training may be to the qualified or certified level.

MATERIAL HANDLING

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HEAVY EQUIPMENT

This program addresses the general safety requirements of heavy equipment and operator training.

Application and Scope

This program is designed to ensure that heavy equipment is safe to use and that operators are qualified to perform their job responsibilities. This program covers operator qualifications for the operation of heavy and earth moving equipment.

Earthmoving and other heavy equipment includes track hoes, skid steers, dozers, loaders, graders, and other similar equipment. Heavy equipment excludes material handling equipment such as forklifts, telehandlers, scissor lifts, aerial lifts, elevated work platforms, and cranes.

A skid steer or a loader with forklift attachments is categorized as heavy equipment and not a powered industrial truck. This program does not apply to powered industrial trucks.

Safety Features and Operational Requirements

All heavy equipment is equipped with the following:

- Roll over protective structures (ROPS) unless designed for standup operation
- Seat belts are provided on all heavy equipment with ROPS
- All heavy equipment capable of bidirectional movement, such as articulating tractors, skid steers, front end loaders, backhoes and similar equipment, are equipped with a horn which should be used when the machine is moving in either direction. The horn is maintained in operational condition
- All heavy equipment has a service braking system capable of stopping and holding the equipment fully loaded. Brake systems for self-propelled rubber tired off highway equipment meets applicable minimum performance criteria specific in 29 CFR 1926.60
- Periodic brake tests are required
- Heavy equipment capable of reverse motion and with an obstructed view to the rear, are not used unless the equipment has an operational reverse signal alarm distinguishable from the surrounding noise level or an employee signals that it is safe to do so
- All heavy equipment is guarded appropriately to avoid employee injury during operation
- Steering or spinner knobs are attached to the steering wheel unless the steering mechanism is of a type that prevents road reactions from causing the steering wheel to spin and the steering knob will be mounted within the periphery of the wheel
- When hazards exist because of falling objects, protection from falling objects is provided to protect the employee from hazards associated with the specific operating conditions or the area is barricaded, and access is restricted
- No modifications or additions which affect the capacity or safe operation of the equipment are made without the manufacturer's written approval. If such modifications or changes are made,

the capacity, operation, and maintenance instruction plates, tags, or decals will be changed accordingly. The original safety factor of the equipment will not be reduced

- Equipment manuals, load rating charts and other instruction material provided by the manufacturer are kept in the equipment and are legible and accessible to the operator
- Operators use equipment within all capacity limits specified by the manufacturer
- Operators will not remove or defeat any safety features
- Employees will move or cause heavy equipment to be moved upon any access roadway or grade unless the access roadway or grade is constructed and maintained to accommodate the safe movement of the equipment and vehicles involved
- Assisting employees do not work within a 10-foot radius of the heavy equipment, unless the equipment is designed to accommodate such work and does not present a hazard to the other employees. This restriction does not apply when the operator has disengaged machine movement
- Employees will always stand clear of the full swing radius of all equipment
- No employee will walk between equipment and an object within the swing or turn radius of the vehicle
- No employee or bystander will stand or work under a suspended load
- Operators use equipment within all capacity limits specified by the manufacturer
- Operators will remain at appropriate distances from electrical lines and systems

Inspection and Maintenance Requirements

Heavy equipment use conforms to the following inspection and maintenance criteria:

- Heavy equipment is inspected prior to each use, by the operator, using a standardized safety inspection checklist that incorporates all manufacturer's inspection points, all safety features, and any other items appropriate to include
- Pre-use inspections include a visual inspection and a functional test
- If the equipment, its attachments, or other conditions change that present new hazards, the pre-use inspection checklist is revised
- Equipment is removed from service if conditions identified on the pre-use inspection or during operation pose a risk to the operator, other employees, or bystanders
- Comprehensive equipment inspections are required at least annually, and more frequently when called for by the manufacturer
- Periodic preventative maintenance is required whenever the manufacturer's instructions require it
- All equipment is maintained to OEM specifications

- Maintenance and inspection records are retained for the life of the equipment and not less than 5-years

Training

The organization requires each operator receive and maintain proficiency supporting safe and effective use on the equipment type and class they will operate. Operators are authorized to use heavy equipment only when properly trained in accordance with this section. Operator training is provided by one or more authorized trainers with the specific knowledge, operational experience and operational skills to train the operator trainees properly and safely as needed to develop and maintain proficiency.

Initial training can include any or all the following:

- Classroom training that includes load ratings, safe operations, safety features, swing radius, blind spots, pre-use inspections, dealing with power line contact, required PPE, and other relevant content
- Supervised equipment operations under controlled conditions
- Supervised on-the-job training (employees in training may not operate equipment unsupervised)

Periodic retraining occurs when:

- The operator demonstrates a lack of skill or other concern to management or to an authorized trainer
- The operator demonstrates a lack of understanding about safe operation
- The equipment or its attachments are modified, and the modifications change the operational limits, safety features, operational controls, or other key equipment features
- At least once every 3-years

When no specific reason is provided for retraining, the retraining consists of an observation or observations by one or more authorized trainers with a duration to ensure that the operator is qualified to continue equipment operation.

When retraining is required because of a problem, classroom training and supervised training are repeated at the discretion of the authorized trainer, in addition to reobservation.

When an operator is newly hired, and has documented experience operating the same equipment class, the authorized trainer may reduce or eliminate the amount of classroom time and supervised equipment operation time as appropriate.

The organization accepts valid training authorizations from nationally recognized third parties in lieu of inhouse training, provided that such training is current and can be validated with the training organization.

In all cases, regardless of prior training, each employee that operates heavy equipment must demonstrate their skill to a designated trainer through direct observation of equipment operations. An operator is not certified until directly and successfully observed and evaluated by a qualified-person.

Authorized trainers with suitable operational experience and operational skills must undergo training themselves initially and at least once every 5-years to ensure that they understand how to train operators effectively.

The organization maintains all training rosters and observation forms for as long as each operator is employed and at least 5-years after.

Forms

The following forms are required.

- Heavy Equipment Evaluation form for the specific equipment types
- Heavy Equipment Inspection Form for the specific equipment types (checklists supplied by the manufacturer in instruction manuals and standalone documents are acceptable)

POWERED INDUSTRIAL TRUCKS

This program sets forth specific requirements for powered industrial truck use at construction sites.

Application and Scope

All requirements in this program apply to all facilities and job-sites, and all powered industrial trucks (PITs) used at construction sites. This program applies to all employees that operate PITs and/or provide operator training.

The organization recognizes OSHA does not include heavy equipment with forklift attachments in the PIT definition.

Functional Roles and Responsibilities

The following employees have specific functional responsibilities under this program:

PIT Instructors

PIT instructors have the following responsibilities:

- Help administer the PIT program
- Maintain proficiency in each piece of PIT equipment in use
- Maintain working knowledge of applicable regulations
- Maintain proficiency in delivering PIT training including participation in a train-the-trainer class no less than once every 3-years
- Help coordinate PIT training
- Complete PIT training
- Complete PIT evaluations
- Help maintain PIT documentation
- Provide ongoing support to PIT operators

PIT instructors may not delegate their responsibilities under this program.

PIT Operators

PIT operators have the following responsibilities:

- Attend all required training and continually maintain PIT operator certification
- Only operate PIT types covered by the applicable PIT certification
- Complete pre-user inspections every day or shift and report damaged PITs
- Do not operate unsafe PITs

- Safely and professionally operate PITs including the use of all safety features
- Safely recharge and refuel PITs

PIT Operations

Only competent employees, as demonstrated by the successful completion of the training and evaluation, can operate PITs. Operators must be trained on the specific class of PIT they will be operating.

Modifications or additions may affect capacity and safe operation are only allowed to be done by the manufacturer or with the manufacturer's written authorization.

The following rules apply to all employees who operate any type of PIT at the organization:

- Never operate a liquid or propane fueled PIT without adequate ventilation
- To avoid bodily harm trucks cannot drive up to a person standing in front of a wall or fixed object
- No employee can stand or pass under the elevated portion of any truck, loaded, or empty
- No one other than the operator can ride on PITs
- Arms and legs are prohibited from being placed between the uprights of the mast or outside the running lines of the truck
- When the operator is more than 25-feet from the PIT, the load must be fully lowered, and the brakes engaged
- Maintain a safe distance from the edge of ramps or platforms while on an elevated surface
- PITs cannot be used to open or close freight doors
- All trucks, trailers or railcars must have their brakes set and wheel blocks in place while loading or unloading with PITs
- Operators must check the flooring of trucks, trailers, and railroad cars for breaks, weakness, and other hazards before driving the PIT onto them
- Railroad tracks will be crossed diagonally wherever possible
- Avoid running over loose objects
- When traveling, with or without a load, keep the forks as low to the ground as possible
- Turn off engines before fueling
- Stunt driving and horseplay is prohibited

Pre-Use Inspection

The first operator to use a PIT each shift, inspects the PIT using the supplied inspection form or the checklist supplied by the manufacturer. If the PIT passes inspection, it is safe to use. If the PIT fails inspection, repairs are required before use. To ensure other operators do not use an unsafe PIT, use an out of service tag, a repair tag or a sign indicating the need for repairs and give the keys to the program administrator or the qualified mechanic to prevent inadvertent use.

It is acceptable to use the PIT if there is cosmetic damage or a minor problem, and these issues do not affect safe operation of the PIT. Remove the PIT from service if it needs repair, is defective, or in any way unsafe. Damaged, improperly functioning or non-functional systems or components require removal from service including the following:

- Any component the manufacturer indicates as critical
- Bent components
- Brakes and throttle
- Broken welds, missing fasteners, and similar problems
- Controls and gauges (damaged, illegible, or non-functional)
- Evidence of a collision or other mishap
- Excessive or unsafe heating of components
- Flat or underinflated pneumatic tires
- Guards damaged or missing
- Hard tires with larger sections of rubber missing
- Illegible or missing identification or load rating data plates
- Leaking battery acid, leaking hydraulics, fuel leaks
- Lifting mechanism and other hydraulic components
- Safety features (seatbelt, horn, warning lights, backup beeper, mirrors, and other similar safety features)
- Steering system problems
- Other critical systems, components, or damage

When in doubt, remove the PIT from service and consult with a qualified mechanic. Operators will not use an unsafe forklift.

Maintenance

When PITS require maintenance, the following rules apply:

- Take a truck out of service when the PIT needs repair, is defective, or is unsafe
- Only authorized personnel can perform repairs
- Do not operate a truck with a known fuel system leak
- Do not use open flames for checking electrolyte levels in storage batteries or gasoline levels in fuel tanks
- Remove the truck from service If the temperature of any part is more than its normal operating temperature

- All repairs must take place in safe and non-hazardous locations
- All PITs are kept in a clean condition, free of lint, excess oil, and grease
- Noncombustible agents are used for cleaning trucks

Classified and Hazardous Locations

PITs may only operate in classified and hazardous locations when they are rated accordingly. Review 29 CFR 1910.178(c): Table N-1, for details on allowable PIT types and working environments.

Maintenance and Repair

Only qualified mechanics can perform PIT maintenance and repairs. Appropriate qualifications include specific training and experience on PIT repairs of the type under consideration. In-house personnel familiar with forklift repair may perform non-critical repairs, check fluid levels, and other similar tasks. However, at least once every six months, a professional PIT technician must perform an inspection, complete all manufacturer required preventative maintenance, perform any necessary repairs, and ensure the PIT meets manufacturer's specifications.

Only manufacturer approved parts equivalent with those used in the original design are allowed.

After maintenance and repairs have been completed, the mechanic completes a performance test to ensure the PIT is safe to operate.

Mechanics will maintain a repair log or retain service tickets evidencing repair and provide this documentation to the program administrator.

Modifications

Manufacturer supplied forklift attachments designed for use with the make and model of forklift are permitted. However, employees may not modify the forklift or make additions affecting the capacity and safe operation without the manufacturer's prior written approval.

The organization requires written approval from PIT manufacturers and will first seek that approval. If a manufacturer declines to approve modifications, the organization may use a registered professional engineer to review the modifications and approve them if they are sound, provided the engineer is qualified to perform this analysis. If approved, capacity, operation, maintenance instruction plates, tags, or decals must also be changed accordingly to reflect the modifications.

Free Rigging and Lifting

Lifting objects with a forklift as one would with a crane or hoist affects the capacity and safe operation of a PIT. In addition, in-house and unapproved forklift modifications may not meet manufacturer's specifications and they also change the capacity or safe operation of the PIT.

Unless the manufacturer specifically approves such use in writing, the following are prohibited:

- Lifting of objects like a crane or hoist
- Attaching rigging gear to the forks, called free rigging
- Drilling, cutting, or otherwise modifying forks to accept rigging equipment
- Forklift attachments

If the manufacturer's documentation is silent on one or more of the items above, the assumption is it is disallowed unless the organization obtains approval in writing from the manufacturer as described in the Modifications section of this program.

If fork attachment use is allowed, the attachments must meet relevant OSHA regulations and ANSI B56 regulations.

Personnel Work Platforms

Work platforms meant for attachment to a PIT must comply with the minimum design requirements in ANSI/ITSDF B56.1-2016: 7.38 (standard forklifts) or ANSI/ITSDF B56.6-2016:8.24 (rough terrain forklifts) and 1910.178(a)(4), (a)(5) and 29 CFR 1926.451(g)(4). This includes:

- Guardrails on all sides with a self-closing gate or a chain are required
- If guardrails are missing or non-compliant, a personal fall protection system is required
- When personal fall arrest systems are used, they must meet applicable OSHA and ANSI Z359 requirements and do the following: (i) The user must complete a pre-use inspection of all personal fall arrest systems and (ii) A competent-person must inspect all personal fall arrest system components
- Guards are required for moving truck parts representing a hazard to personnel working from the platform
- Ensure the lifting mechanism operates smoothly throughout its entire lift height, both empty and loaded
- Verify all lift limiting devices and latches, if provided, are functional
- Provide overhead protection as indicated to be necessary by the operating conditions

When a work platform is used, the following minimum requirements apply:

- Verify the combined weight of the work platform, load, and personnel do not exceed 50% of the PIT capacity as indicated on the data plate
- Personnel and equipment on the work platform must have adequate room to safely work without crowding do not exceed the available space
- Personnel must always remain on the platform floor (do not use items, such as, railings, planks, and ladders to achieve additional reach or height)
- Attach the work platform securely to the lifting carriage or forks using integrated attachment hardware
- On trucks equipped with rotators, mechanically secure the rotator to prevent movement
- Mark area with cones or other devices to warn of work by elevated personnel
- Ensure the truck has a firm and level footing
- Lift and lower personnel smoothly, with caution, and only at their request
- Ensure the work platform is horizontal, centered, and not tilted forward or rearward when elevated

- Avoid overhead obstructions and electric wires
- Place all travel controls in neutral and set parking brake
- Keep hands and feet clear of controls other than those controls in use
- Only slowly move the truck and/or work platform for minor adjustments horizontally when personnel are on the work platform, and only at their request
- Keep mast vertical. Do not operate on a side slope
- Have a trained operator in position to control the truck, or available to operate controls
- When the operator is not in position, engage the parking brake, and chock the wheels
- Lower the work platform to floor level for personnel to enter and exit. Do not climb on any part of the PIT to enter or exit
- Do not use work platforms when the PIT manufacturer disallows their use
- Do not use rough terrain forklifts, also called telehandlers, to elevate personnel on platforms unless other options have been explored and found infeasible

Training

The organization PIT training program consists of three steps:

- Classroom training
- Supervised PIT operation (practical training)
- Performance evaluation

Trainees may only operate a PIT when under the direct supervision of a previously certified operator who has the knowledge, training, and experience to train operators and evaluate their competence. Trainees may never operate a PIT when such operation endangers the trainee or other employees.

Training topics for new operators include all the topics addressed in 29 CFR 1910.178(l)(3).

To avoid duplicate training, the organization may rely on previous PIT certification training provided there is documentation showing successful completion. If there are training topics not covered but are applicable, additional training is provided. In all cases, a performance evaluation is required. The program administrator and designated PIT trainers have the right to not accept prior training.

The organization evaluates all operators at least once every three years to verify competency. Retraining is required when:

- The operator has been observed to operate the vehicle in an unsafe manner
- The operator has been involved in an accident or near miss incident
- The operator has received an evaluation revealing the operator is not operating the truck safely
- The operator is required to drive a different type of PIT
- A condition in the workplace changes in a manner affecting safe operation of the truck

Employees assigned to training and observation responsibilities must meet the following requirements:

- Have a valid certification for the PIT(s) under consideration
- Have operated a PIT for at least one year
- Have not experienced any at fault mishaps

Document Retention

The program administrator is the custodian of all records generated by this program. The program administrator will retain documentation related to this program as follows:

- PIT maintenance and repair records for the life of the PIT
- Employee training records for the full-term of employment of each employee and one additional year after termination
- If the organization relies on PIT training completed at another employer, copies of these records are required

Forms

This program includes the following forms:

- PIT Pre-Use Inspection
- PIT Performance Evaluation (for use by qualified PIT instructors only)

PERSONAL PROTECTIVE EQUIPMENT

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HEARING CONSERVATION

This program addresses noise exposure and hearing conservation.

Application and Scope

The organization's employees are present at a variety of host employer and construction sites in a range of environments and operating conditions. As a result, the organization understands that its employees may be exposed to loud noise greater than the permissible noise exposures.

This program applies whenever the ambient noise level exceeds permissible noise levels. This program covers all exposed employees that work at all job-sites.

Permissible Noise Exposure

When the ambient noise exceeds the permissible noise exposures listed below, the implementation of this program is required.

Table 1: Permissible Noise Exposures

Duration Per Day (Hours)	Sound Level, dB(A), Slow Response
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25 or less	115

Noise Monitoring

As a best practice, and because of job-site variability in ambient noise levels, the organization completes periodic job-site monitoring to ensure employees are not exposed to ambient noise levels greater the permissible noise exposures in table 1. Records obtained from noise monitoring are evaluated for compliance with this program. Employees with job positions that exceed the noise levels in this section are included in this program.

All records generated because of this program are retained by the program administrator. Records of noise monitoring are shared with affected-employees.

Hearing Protection Requirements

Hearing protectors are provided at no cost to employees whenever ambient noise levels exceed the permissible noise exposures in table 1 or a frontline leader believes exposure exists, hearing protection is required.

The organization ensures the noise attenuation rating (NRR) of hearing protectors is appropriate for the ambient noise level.

Hearing protectors are always available to employees and at no cost.

Training

Employees receive hearing conservation training, including the proper use of hearing protectors. The organization initially provides hearing conservation training to all employees and periodically thereafter.

PERSONAL PROTECTIVE EQUIPMENT

This section applies to the selection and use of PPE.

Application and Scope

This section applies to all personnel working at all locations. The appropriate type and level of PPE is required. The actual PPE used depends on the nature of the work and its hazards, the condition of the work area (for example, ventilation, risk of falls, etc.), user acceptance, applicable safe work practices, applicable job-safety/job-hazard analyses, and job-site specific requirements.

This section is not designed to limit the appropriate use of PPE in any way; employees and subcontractors will use the appropriate PPE for the hazard and will also follow owner and prime contractor PPE requirements. The organization recognizes that specialized PPE established during JHA generation and review may also be required.

Minimum Required PPE for All Jobsites

The minimum required PPE for all jobsites and always includes the following:

- Sturdy work pants
- Shirt with at least 4-inch sleeves
- Safety toe boots
- Safety glasses
- Hard hat
- Hand protection appropriate for the hazards
- High visibility garment (ANSI/ISEA 107-2015 type R, performance class 2)

Minimum PPE Requirements by Body Part

This section establishes the minimum PPE requirements based on body part.

Head Protection

Hardhats are required when overhead hazards are present, when falling objects are possible, and as indicated in PPE and hazard assessments.

Hardhats meet the following requirements.

- ANSI/ISEA Z89.1-20 Type II approved when top of head and side of head protection are both necessary
- ANSI/ISEA Z89.1-20 Type I approved when top of head protection is necessary, and side protection is unnecessary
- ANSI/ISEA Z89.1-20 Class C, G, or E for personnel and applications with no exposure to electrical shock

- ANSI/ISEA Z89.1-20 Class G or E for personnel and applications with exposure to electrical shock, including but not limited to electricians, controls technicians, facilities personnel, and maintenance personnel that must troubleshoot equipment, and/or verify zero-energy state for lockout/tagout
- Climbing style hardhats are indicated when there is a risk of hardhat displacement due to work activities

The following hardhat types are disallowed.

- Recreational climbing
- Bump caps, on a limited basis, and only when overhead hazards are limited to bump protection scenarios and falling object hazards are not present

Employees will:

- Write their name and the date the hardhat is placed in service on the underside of the shell, in a visible location
- Observe hardhat expiration dates, when present, and related manufacturer's instructions
- Inspect hard hats for dents, cracks, discoloration, penetration, exposure to weakening chemicals, brittleness, and other damage to the shell or suspension
- Not modify the hardhat in any way, but may apply stickers, and decals approved by the organization
- Not store anything between the underside of the hardhat and the head
- Reversing the hardhat on the suspension is allowed, provided the manufacturer explicitly states this practice is permitted

Eye and Face Protection

Eye and face protection are required whenever flying objects, chemical splashes, and other similar hazards are present.

Safety eyewear and face shields will meet the following requirements.

- ANSI Z87.1 or ANSI Z87.1+ rated, as applicable
- Have other hazard-appropriate ANSI Z87.1 ratings
- Prescription safety glasses must have permanently welded side shields or be wraparound style
- Have an appropriate eye shade or optical density when used for welding, cutting, and work near or on lasers
- Have sufficient thermal and radiant energy protection when used for arc-flash or thermal protection

Safety goggles will meet the following requirements:

- ANSI Z87.1 approved
- Appropriate for the hazard (for example, indirect goggles for splash protection)

Face shields will meet the following requirements:

- ANSI Z87.1 approved
- When used for welding, they must have the appropriate shade for the welding type

Safety glasses or goggles are always required with face shield use.

Hearing Protection

Hearing protection is required when the permissible exposure level for noise is exceeded and as indicated in PPE and hazard assessments.

Hearing protectors will meet the following requirements:

- Adequate noise attenuation rating
- Non-melting type when heat and arc-flash exposure are possible

Refer to the hearing conservation program for complete details on hearing protector selection, use, and hearing conservation training.

Respiratory Protection

Respiratory protection is required when hazardous dust, mist, gas or vapor concentrations exceed their applicable occupational exposure limit's time weighted average (TWA) or ceiling. While the OSHA permissible exposure limits (PELs) are the legally mandated limits, this organization reserves the right to apply other values that are more protective such as ACGIH TLVs, NIOSH RELs, or AIHA WEELs. Refer to the respiratory protection program for details.

Body and Thigh Protection

OSHA does not specify a consensus code, but PPE assessments must consider protection of the body and thighs. Refer to PPE and hazard assessments for details.

Hand Protection

Gloves are required when hazards necessitate their use, as indicated in PPE and hazard assessments.

Gloves must meet the following requirements:

- Hazard appropriate (cut, abrasion, impact, penetration, chemicals, heat, and vibration)
- Work appropriate to include considerations of grip and dexterity
- Select gloves that are EN 388-2016 and/or ANSI/ISEA 105-2016 rated whenever possible

Hand Placement

Hand placement is an important hand safety consideration.

- Always pay attention to hand placement, especially when working with machinery; keep hands away from points of operation, in running nip points and other hazardous areas of equipment
- Always use equipment with guards in place
- Use the right tool for the job and use it correctly with all guards in place

Never:

- Clean or repair equipment while it is running
- Feed material into equipment with your hands, use a push stick or other device
- Wear gloves, jewelry, or long sleeves around rotating machinery
- Use your hands to sweep up wood chips, metal shavings, glass, or other sharp objects
- Use solvents, gasoline, other chemicals or compressed air to clean your hands
- Operate machinery or power tools under the influence of alcohol or drugs, even some prescription drugs

Foot and Leg Protection

Protective footwear is required whenever there is a danger of foot injury due to falling or rolling objects, or objects that can crush, or otherwise injure the foot or lower leg, and as indicated in PPE and hazard assessments.

Protective footwear must meet the following requirements:

- ANSI Z41 and/or ASTM F2413 approved
- Athletic style safety toe boots are allowed unless the PPE assessment indicates otherwise
- Metatarsal guards are needed when performing activities exposing the top of the foot to impacts such as jack hammering, chip hammering, or similar activity
- Electrostatic dissipative footwear is prohibited for electricians and other job titles with exposure to electricity
- Safety toe boots must provide adequate protection from chemical hazards when so exposed

Minimum PPE Requirements by Exposure

This section clarifies the minimum PPE requirements for specific OSH exposures including:

- Chemical hazards
- Electrical hazards
- Fall prevention and fall arrest
- Flash-fire hazards
- Traffic and heavy equipment hazards
- Welding and hot-work hazards

Chemical Hazards and Chemical Protective Clothing

Chemical protective clothing (CPC) is required when employees must pour, blend, apply, or otherwise handle hazardous chemicals on a day-to-day basis or during emergency response activities. Selected CPC must consider chemical compatibility, manufacturer's permeation data, manufacturer's breakthrough time, exposure mechanisms, work rate, the environment, heat stress, and other relevant factors. Proper CPC selection often requires extensive inquiries, air-sampling and the involvement of OSH professionals. CPC used for emergency response is subject to HAZWOPER regulations.

Level A Requirements

Level A PPE is used when the highest level of respiratory, skin, eye and mucous membrane protection is necessary. Level A ensembles include the following:

- Vapor-tight, fully encapsulating suit
- Self-contained breathing apparatus (SCBA)
- Inner gloves
- Outer, chemical-impervious boots

Level B Requirements

Level B PPE is used when the highest level of respiratory protection and a lower level of skin, eye and mucous membrane protection are necessary. Level B ensembles include the following:

- Non-vapor-tight suit (can be encapsulating or non-encapsulating)
- SCBA or air-line respirator
- Inner and outer gloves
- Outer, chemical-impervious boots

Level C Requirements

Level C PPE is used when a lower level of respiratory protection and a lower level of skin, eye and mucous membrane protection are necessary. Level C ensembles include the following:

- Non-vapor-tight suit with hood (can be rain-suit or coverall style)
- Air-purifying respirator, full-face
- Inner and outer gloves
- Outer, chemical-impervious boot

Level C/D Minimum Requirements

Level C/D is used when respiratory protection is not required and a lower level of skin, eye and mucous membrane protection is necessary. Level C/D ensembles include the following:

- Rain-suit style bib and coat with integrated hood, or coveralls with hood, or full-coverage smocks with sleeves and with a hem low enough to remain below boot tops while in use
- A face shield with safety glasses or goggles

- Inner and outer gloves
- Outer, chemical-impervious boot

Level D

Level D attire is normal work attire that includes basic PPE applicable to the job, location or task. It is not suitable for protection from chemical exposures.

Donning, Decontamination, and Doffing

CPC requires careful attention to donning, decontamination, and doffing procedures. An OSH professional is required to further develop these procedures, when applicable.

Electrical Shock and Arc-Flash Rated PPE

Working on electrical systems requires protection from electrical shock and arc-flash. The selected PPE depends on several factors. Refer to the electrical safety program for details.

Fall Prevention and Fall Arrest

When employees work at heights, fall protection is required. Refer to the fall protection program for details.

Flash Fires and Flame-Resistant Clothing

Flame resistant clothing (FRC) is required any time a flash fire hazard is present. Refer to the FRC program for details.

Traffic, Heavy Equipment, and High Visibility Clothing

High-visibility clothing is required when working near traffic as defined in Manual on Uniform Traffic Control Devices (MUTCD) as amended by each state and when working near heavy equipment. High visibility clothing must meet the following requirements:

- All employees and subcontractors exposed to vehicular traffic, heavy equipment traffic, or that work near railcars, will wear high visibility fluorescent apparel compliant with ANSI/ISEA 107-2015 type R, performance class 2, or better
- Employees may be required to wear high visibility garments in warehouses, high forklift-traffic areas, and construction sites, though garments used for this purpose can carry any ANSI/ISEA 107-2015 rating

Welding and Hot-Work PPE

Welding and related PPE used for hot-work must adequately protect against UV light, heat, sparks, hot slag, fumes, and related hazards. The minimum acceptable level of PPE for welding include the following:

- A welding helmet or shield with the appropriate shade level
- Welding leathers, cape, or similar garment that protects the body, and the arms from hot slag, and UV radiation

- Welding gloves
- Appropriate respiratory protection (welding helmet integrated PAPR or respirator worn under the helmet)
- Leather safety toe boots

Refer to the welding safety program for details.

Availability

The program administrator or designee ensures employees have access to PPE in full compliance with the PPE assessment, replacing inventory as it is exhausted. Frontline leaders keep the program administrator or designee informed of PPE inventory levels.

Payment for PPE

Employees are provided PPE at no cost except for the following:

- Non-specialty safety toe protective footwear, including safety toe shoes or boots, when allowed to be used off location
- Non-specialty prescription safety eyewear, when allowed to be used off location
- Everyday clothing, such as long sleeve shirts, long pants, street shoes, and normal work boots
- Ordinary clothing, skin creams, or other items, used solely for protection from weather, such as winter coats, jackets, gloves, parkas, rubber boots, hats, raincoats, ordinary sunglasses, and sunscreen

Replacement PPE is provided at no cost, except when the employee has intentionally damaged the PPE or continually loses the PPE.

Training

Employees receive PPE training upon initial assignment and periodically thereafter, based on the hazards encountered and the PPE type. Specialized PPE often requires additional training; this training is provided upon assignment of the respective PPE.

RESPIRATORY PROTECTION

This program describes the organizations' minimum requirements for the use of air-purifying respirators.

Application and Scope

This program applies to all employees that use a gas, vapor, or particle-filtering respirators, at all job-sites. This includes:

- Filtering facepieces
- Tight-fitting, air-purifying respirators
- Powered air-purifying respirators (PAPR)

The term air-purifying respirator (APR) includes all the above respirator types.

This program does not address atmospheric-supplying respirators including:

- Self-contained breathing apparatus (SCBA)
- Closed-circuit SCBA (rebreathers)
- Self-contained self-rescuers (SCSR) and emergency escape breathing apparatus (EEBA)

Respirators, training, and programs are all provided at no cost to employees when respirators are required. However, the organization recognizes it is not required to include employees in this program whose only use of respirators involves the voluntary use of filtering face pieces (often called dust masks).

Functional Roles and Responsibilities

The following individuals have responsibilities under this program:

- Program Administrator
- Employees

Program Administrator

The program administrator will:

- Complete periodic exposure assessments
- Select exposure-appropriate respirators and cartridges
- Coordinate medical evaluations
- Coordinate annual fit tests
- Maintain records and written procedures associated with this program
- Evaluate the effectiveness of this program and improve it when necessary

The program administrator may designate one or more individuals to fulfill the tasks described within this program as necessary and appropriate.

Employees

Employees who wear respirators will:

- Use the respirator in accordance with this program and their respiratory protection training
- Effectively inspect, maintain, clean, and store their respirator to prevent damage
- Immediately leave hazardous atmospheres if contamination, failure, breakthrough, or any other circumstance that indicates a respirator malfunction such as the detection of a smell, order, taste, or irritation
- Report physical or medical conditions that will affect their ability to meet the requirements of respiratory protection training and the contents of this program
- Perform a user seal check each time a respirator is used

Respirator Selection

The respiratory hazards of exposed employees, user factors, and workplace factors that affect performance and reliability provide the basis for respirator selection. The organization selects respirators that are appropriate for the inhalation hazards employees encounter and that ensure compliance with all statutory and regulatory requirements.

The program administrator identifies and evaluates respiratory hazards in the workplace; this evaluation includes the following considerations:

- A reasonable estimate of employee exposures to respiratory hazards and an identification of the contaminant's physical and chemical properties
- The extent of the hazard (for example, nuisance level, exceeds PEL, exceeds NIOSH IDLH, intermittent exposure, continuous exposure)
- The job tasks and job factors that affect respirator use and selection
- Workplace factors that affect respirator selection
- Personal work rate
- Ambient temperature and relative humidity
- Length of time in respiratory protection
- Oxygen concentration in the environment
- User fit
- Visibility
- Necessary eye and face protection
- Compatibility with other PPE such as welding face shields
- User acceptance
- Respirator limitations

- Regulatory mandates on respirator use
- Other relevant considerations

The following considerations apply to respirator cartridge selection when protecting workers against gases and vapors.

- Contaminant's physical and chemical properties, especially boiling point, vapor pressure, and vapor density
 - How the hazardous substance is used (for example, spraying, misting, and application with a brush)
 - The hazards of the contaminant (for example, skin absorption, and eye irritant)
 - The warning properties of the contaminant (smell and taste)
 - Occupational exposure limits
 - Assigned protection factor
- The calculated maximum use concentration

APRs are required whenever the concentration of an airborne contaminant is present in the immediate environment at a concentration at or above the PEL for the contaminant in question. If the concentration of airborne contaminants is at or above the lower of the calculated maximum use concentration (MUC) or the NIOSH IDLH concentration, supplied air is required. If a PEL is not available for the contaminant, the applicable ACGIH-TLV, or NIOSH-REL are applied to the situation.

The use of APRs in IDLH environments is expressly prohibited.

The program administrator ensures an OSH professional or an industrial hygienist makes reasonable estimates of the airborne contaminant levels and determine the MUC of the hazardous substances.

The organization selects particulate filters for protection against particulates based on the following requirements and considerations including 42 CFR Part 84.

- The presence or absence of aerosolized oil in the air
- If no oil aerosols are present in the work environment, use a filter of any series (N, P, or R)
- If oil aerosols (for example, lubricants, cutting fluids, glycerin) are present, use an R, or P series filter
- N-series filters cannot be used if oil particles are present
- If oil aerosols are present and the filter is to be used for more than one work shift, use only a P series filter: discard R series filters after each shift
- Select the desired filtration efficiency (95%, 99%, 100%)

The organization allows filtering facepieces (dust mask) use only for nuisance level exposures.

Respirators, training, and programs are all provided at no cost to employees when respirators are required.

Respirator Certification Process

Respirators place a physiological burden on the user because of increased breathing resistance and the weight of the respirator. Additionally, the fit of the respirator to the user is critical. For these reasons, respirator users are required to complete a certification process. Certification involves the successful completion of all the following items:

- Questionnaire. Each user must initially complete the Respirator Medical Evaluation Questionnaire (annual completion of medical questionnaires is optional)
- Medical Evaluation. A Physician or Other Licensed Health Care Professional (PLHCP) will review each employee's questionnaire and provide the appropriate final determination of the employee's ability to safely use a respirator. The PLHCP can either clear the employee for respirator use or require follow-up medical evaluation to provide a final determination of the employee's ability to safely use a respirator (annual medical evaluation is optional unless the user falls under the HAZWOPER regulation, 29 CFR 1910.120, or a substance specific regulation under 29 CFR 1910 that requires periodic medical evaluations)
- Fit Test. The employee must obtain an initial fit test for each respirator type, size, and manufacturer (annual fit tests are also required)
- Training. The employee must initially and successfully complete a respiratory protection training course (annual retraining is required)

The following completed documentation must be on file for each employee.

- Documentation from the PLHCP indicating the employee is medically cleared to use the respiratory protection equipment selected by the employer
- Completed and signed fit test documentation
- A copy of the signed training roster for the training session(s) attended by the employee
- Employee respirator certification form certifying that the employee has completed all necessary steps in the process. Must be signed by the employee and the Health and Safety Coordinator.

Medical Questionnaire Completion and Evaluation

The program administrator will administer the medical questionnaire confidentially during the employee's normal working hours or at a time and place convenient to the employee.

The program administrator will provide the following information to the PLHCP before the PLHCP makes a recommendation concerning an employee's ability to use a respirator.

- A copy of the written respiratory protection program
- The type and weight of the respirator to be used by the employee
- The duration and frequency of respirator use (including use for rescue and escape)
- The expected physical work effort
- Additional protective clothing and equipment to be worn
- Temperature and humidity extremes that may be encountered

- Any supplemental information provided previously to the PLHCP regarding an employee need not be provided for a subsequent medical evaluation if the information and the PLHCP remain the same

The employee may discuss the questionnaire with the PLHCP.

Follow-Up Medical Exams

A follow-up medical examination is required for any employee who gives a positive response to

A follow-up medical examination is required for any employee who gives a positive response to certain questions on the respirator medical questionnaire or the PLHCP otherwise requires the exam.

Additionally, follow-up medical evaluations are required in the future if:

- An employee reports medical signs or symptoms that are related to ability to use a respirator
- A PLHCP, supervisor, or the respirator Program Administrator informs the employer that an employee needs to be reevaluated
- Information from the respiratory protection program, including observations made during fit testing and program evaluation, indicates a need for employee reevaluation or
- A change occurs in workplace conditions (for example, physical work effort, protective clothing, temperature) that may result in a substantial increase in the physiological burden placed on an employee

Follow-up medical examinations:

- Include any medical tests, consultations, or diagnostic procedures that the PLHCP deems necessary to make a final determination
- Confidential and scheduled during the employee's normal working hours or at a time and place convenient to the employee

The employee may discuss the results of any follow-up examinations with the PLHCP.

Fit Tests

It is self-evident that respirators must fit properly to provide protection. If a tight seal is not maintained between the face piece and the employee's face, contaminated air will be drawn into the face piece and inhaled by the employee. Fit testing will ensure that this seal is correct and will prevent inhalation of contaminated air.

Before an employee is required to use any respirator with a negative or positive pressure tight-fitting face piece, a qualitative fit test (QLFT) or a quantitative fit test (QNFT) is required:

- Prior to initial use
- Whenever a different respirator face piece (size, style, model or make) is used
- At least annually thereafter

The employee must be fit tested with the same make, model, style, and size of respirator that will be used.

Additional fit tests are required whenever the employee reports, or the PLHCP, supervisor, or manager observe changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight.

If after passing a QLFT or QNFT, the employee subsequently notifies the Health and Safety Coordinator, supervisor, or PLHCP that the fit of the respirator is unacceptable, the employee will be given a reasonable opportunity to select a different respirator face piece and to be retested.

The fit test will be administered using an accepted QLFT or QNFT protocol.

A QLFT may only be used to fit test negative pressure APRs that must achieve a fit factor of 100 or less, though QNFTs are preferred, even in these situations.

Respirator Use

Employees will follow the procedures described in this section for all respirator use. Manufacturer's requirements and limitations also apply.

Pre-Use and Post-Cleaning Inspection

All respirators need to be inspected before each use and after cleaning. Respirator inspections will include the following:

- A check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the face piece, head straps, valves, connecting tube, and cartridges, canisters, or filters
- A check of elastomeric parts for pliability and signs of deterioration

Seal Protection

No employee will use a tight-fitting face piece if the employee has any of the following:

- Facial hair that comes between the sealing surface of the face piece and the face or that interferes with valve function
- Any condition that interferes with the face to face piece seal or valve function

If an employee wears corrective glasses, goggles, or other PPE, such equipment must be worn in a manner that does not interfere with the seal.

User Seal Check

Tight-fitting respirator users must perform a user seal check to ensure that an adequate seal is achieved each time the respirator is put on. Either the positive and negative pressure checks listed in this section, or the respirator manufacturer's recommended user seal check method will be used. User seal checks are not substitute for qualitative or quantitative fit tests.

- Positive Pressure Check. Close off the exhalation valve and exhale gently into the face piece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the face piece without any evidence of outward leakage of air at the seal. For most respirators, this

method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test

- Negative Pressure Check. Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the face piece collapses slightly and hold the breath for 10-seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the face piece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory

The respirator manufacturer's recommended procedures for performing a user seal check may be used instead of the positive and/or negative pressure check procedures provided that the employer demonstrates that the manufacturer's procedures are equally effective.

Limitations

Tight-fitting APRs, PAPRS, and filtering facepieces only purify and clean the air. They do not supply oxygen and therefore can only be used in environments where oxygen content is greater than 19.5%. If you are in doubt, use an air monitor to verify oxygen levels before entry.

Atmospheres with an oxygen content greater than 23.5% can also present dangers due to the enhanced ability of substances to burn in oxygen enriched atmospheres.

Do not use respirators when an unknown contaminant is present or when the concentration of a known contaminant is present in amounts greater than the IDLH or the MUC level, whichever is lower.

Leave the area immediately for any respiratory related issues that may include but is not limited to the following:

- Respirator malfunction
- Unusual discomfort
- Coughing, sneezing, vomiting, fever, and chills
- Breathing becomes difficult
- Dizziness, nausea, weakness, or other stress or illness occurs
- You taste or smell the contaminant or substance you are working with
- Your face or eyes become irritated
- The need to change filters/cartridges
- When the respirator or cartridges reach service life limits
- Decontamination of the respirator or face

Never alter or modify the respirator in any way.

To the greatest extent possible, establish natural ventilation during all work; this will reduce airborne contaminants. If natural ventilation is inadequate, mechanical ventilation is indicated. If you use mechanical ventilation, avoid creating a higher hazard by blowing dust around and increasing the airborne dust concentration; situate blowers to minimize airborne contaminants.

This organization investigates all perceived respirator malfunctions to determine the cause and develop corrective actions.

Cartridge Selection and Replacement

Cartridges have a definite life span. Do not wait until you can taste or smell a chemical to change-out your cartridges. Use only the respirator cartridges specific for the substances they are designed for in concentrations less than the IDLH concentration.

The following general guidelines apply to particulate filter cartridge and filter pad selection and replacement:

- All filters, cartridges, and canisters used in the workplace are labeled and color coded with the factory applied, NIOSH approval label; do not remove this label
- Replace all filter cartridges, chemical cartridges, filter pads, and loose fitting facepieces as indicated in this document or as otherwise directed by your supervisor; you may complete change outs more frequently if appropriate to do so
- When replacing cartridges, always write the current date and time on the cartridge
- When cartridges get wet, their efficiency is reduced; replace them immediately if this occurs
- When using a chemical cartridge, always use a filter pad with retainer; the default filter pad is an N-95 though your supervisor may request something different
- When changing the cartridges, take the opportunity to thoroughly clean your respirator as outlined in this document
- Before storage, thoroughly clean off your respirator and store used cartridges in a separate bag
- Frontline supervisors will identify the appropriate chemical cartridges based on the jobsite and the tasks
- You must always use the appropriate chemical cartridge and replace cartridges and filters per this program or as modified for the jobsite and task
- The program administrator and knowledgeable frontline leaders reserve the right to adjust this respirator cartridge and filter replacement schedule based on specific jobsite conditions that necessitate a more aggressive schedule
- If you encounter problems with your respiratory protection and/or unidentified hazards, stop work, and report to your supervisor

Ongoing Respirator and Program Effectiveness

The program administrator will routinely evaluate work area conditions, degree of employee exposure or stress, and applicable regulations and consensus codes. When there is a change in work area conditions, degree of employee exposure or stress, changes to applicable regulations and industry standard that may affect respirator effectiveness, the organization will reevaluate this program to ensure its continued effectiveness.

A qualified person will this written program periodically. This includes a review of all program elements and their effectiveness and appropriate updates to address any deficiencies.

Voluntary Use of Air-Purifying Respirators

This organization allows employees to use some respirators on a voluntary basis, including:

- Tight-fitting APRs
- PAPRs
- Filtering facepieces

The voluntary use of SCBA, rebreathers, and SCSRs is prohibited.

Voluntary use is allowed when the contaminant concentration is at, and always remains below, the applicable exposure value (OSHA PEL, MSHA PEL, ACGIH TLV, or NIOSH REL, whichever is lower), the respirator use does not present a safety or health hazard, and the employee:

- Only uses NIOSH-certified respirators and compatible cartridges
- Only uses organization-supplied respirators
- Does not use personal respirators brought from home or another workplace
- Cleans and maintains the respirator in accordance with this program
- Properly stores the respirator
- Removes the respirator from service when necessary
- Follows all manufacturer requirements
- Completes the additional requirements described below, based on the respirator type

Facial hair and other interferences with the sealing surface of the respirator are discouraged.

Tight Fitting APR Voluntary Use Requirements

Voluntary users of all tight-fitting APRs must complete all medical evaluation requirements described within this program and must sign the Voluntary Respirator Use acknowledgment form. Respirator fit tests are voluntary.

PAPR Voluntary Use Requirements

Voluntary users of all PAPRs must complete all medical evaluation requirements described within this program and must read, understand, and sign the Voluntary Respirator Use acknowledgment form. Respirator fit tests for tight fitting PAPRs are voluntary.

Filtering Facepieces Voluntary Use Requirements

Voluntary users of filtering facepieces must read, understand, and sign the Voluntary Respirator Use acknowledgment form. Respirator fit tests and compliance with the other provisions of this program is voluntary.

Respirator Cleaning, Sanitation, and Maintenance

Respirators must be cleaned and disinfected before each use to ensure proper fit, to allow time for an inspection, and to prevent disease transmission when two or more users share one respirator. The following general requirements apply.

- The exterior surfaces of the respirator should be wiped down daily to remove contaminants and prevent exposure to chemical residues that may have splashed or been deposited onto the respirator through normal use
- Respirators should then be washed at the end of each day with water followed by antiseptic wipes. This is particularly important with respirators that are shared by two or more coworkers
- Periodic soaking of the entire respirator in a vendor approved cleaning and disinfecting solution is encouraged to clean the hard to reach areas. Allow the respirator to thoroughly dry prior to use
- Do not get cartridges wet. Wet cartridges do not function properly
- Ensure the respirator is thoroughly cleaned and disinfected in a manner that prevents damage to the respirator and does not cause harm to the user

Cleaning Procedure

These procedures are general in nature. Refer to the manufacturer's cleaning and sanitation recommendations for further information.

- Remove filters, cartridges, or canisters. Disassemble facepieces by removing diaphragms. Discard or repair any defective parts
- Wash components in warm water, maximum 43 °C (110 °F), with a mild detergent, or with a manufacturer recommended cleaner. Use a stiff bristle brush (not wire) to ease removing dirt
- When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for 2-minutes in one of the following solutions:
- Hypochlorite solution (50 ppm of chlorine) made by adding one milliliter of laundry bleach to one liter of water at maximum 43 °C (110 °F)

- Aqueous solution of iodine (50 ppm iodine) made by adding 0.8 milliliters of tincture of iodine (6-8 grams ammonium and/or potassium iodide/100 cc of 45% alcohol) to one liter of water at maximum 43 °C (110 °F)
- Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer
- Rinse components thoroughly in clean, warm, preferably running water, maximum 43 °C (110 °F). Drain
- The importance of thoroughly rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed
- Components should be hand dried with a clean lint free cloth or air dried
- Reassemble face piece, replacing filters, cartridges, and canisters where necessary
- Test the respirator to ensure that all components work properly

Storage

All respirators will be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, contact with damaging chemicals, and to avoid deformation of the face piece and exhalation valve.

Maintenance and Repairs

Before and after each use, inspect the respirator for excessive wearing of parts, contamination, and/or dirt. Damaged, worn, and/or contaminated parts should be immediately replaced.

The five inspection steps are:

- 1.Headbands. Check the headbands for elasticity. Ensure there are no cracks or tears. Check for missing buckles
- 2.Face piece. Check for dirt, cracks, tears, or holes. Inspect the shape of the face piece for distortion that may be caused by improper storage and that could result in a poor fit
- 3.Valves. Check to ensure that inhalation and exhalation valves are correctly in place and that they are free from cracks, tears, distortions, and/or dirt buildup
- 4.Cartridge Holders. Ensure that all gaskets are correctly seated. Check for cracks and thread damage.
- 5.Cartridges/Filters/Pre-Filters. Make sure these parts are clean and dry. Do not try to clean using water or compressed air or nitrogen. Inspect for dents, scratches, bulges, or other damage. Pay attention to areas where the cartridge seals with the respirator.

Altering the respirator as a quick fix due to a problem will put the wearer at risk. Maintenance on respirators should be limited to simple parts replacement with original, factory sealed, NIOSH approved parts. Do not use parts from a different brand of respirator, even if the parts appear to fit.

If the respirator is damaged in any way and a simple replacement of parts will not suffice, it should be replaced.

Fit testing is not required on the new respirator if it is of the same type, brand, model, and size as the original. If it is not the same type, brand, model, and size as the original, fit testing must be done before the new respirator is used.

Employees are encouraged to closely monitor respirators and all other PPE and obtain new or replacement PPE immediately upon notice of damage or excessive wear. Never use damaged or contaminated respirators or another PPE.

Training

The organization requires each employee to complete training considering the respiratory hazards that could occur and those that do occur during both routine and emergency situations before certification. At a minimum, the training will include the following:

- Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator
- What the limitations and capabilities of the respirator are
- How to use the respirator effectively in emergency situations, including situations when the respirator malfunctions
- How to inspect, don, and doff, use, and check the seals of the respirator
- What the procedures are for maintenance and storage of the respirator
- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators
- The general requirements of this section

If a new employee has received training within the last twelve months that addresses the elements specified above, that employee is not required to repeat such training provided that the employee can demonstrate knowledge of those element(s).

Employees are retrained on an annual basis and when any of the following situations occur:

- Changes in the workplace or the type of respirator render previous training obsolete
- Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill
- Any other situation arises when retraining appears necessary to ensure safe respirator use

Document Retention

At a minimum, this organization retains the program records indicated below.

- Respiratory protection selection documentation, as applicable
- Respirator cartridge selection and change-out related information
- Respirator questionnaire review results, medical opinions, and related documentation for the length of employment plus 30-years

- Respirator fit test records until the next fit test is complete
- Training records for the length of employment plus one year

The program administrator is the custodian of all records.

WALKING WORKING SURFACES

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AERIAL LIFTS

This section provides requirements and best management practices for aerial lifts used by all employees at all locations. Reference manufacturer's instructions for the lift make and model for more details.

What is an Aerial Lift?

The term aerial lift includes the following:

- Extensible boom platforms
- Aerial ladders
- Articulating boom platforms
- Vertical towers
- A combination of the above devices

Scissor lifts are not aerial lifts; OSHA considers scissor lifts mobile scaffold.

Pre-Use Requirements

The operator will inspect the lift for defects prior to each day's or shift's operation. Include items unique to each manufacturer and model and discussed in manufacturer's instruction manual. Use the Aerial Lift Pre-Use Inspection Form and/or the manufacturer supplied checklist. If the inspection reveals damage, defects, or incorrect function, do not operate the unit, remove it from service, and report the problem.

Before use, assess site conditions and mitigate hazards, including, but not limited to:

- Debris
- Slopes, ditches, drop offs, holes, and obstructions
- Inadequate ground or floor conditions
- Overhead obstructions
- Overhead power lines
- Presence of unauthorized persons
- Hazardous locations and atmospheres
- Wind and weather conditions
- Other hazardous conditions

Aerial Lift Operations

Operate aerial lifts in accordance with the manufacturer's instructions, limitations, and the following:

- Read and understand the manufacturers' manuals

- Review and understand all labels, warnings, and instructions on the lift
- Practice with the aerial lift until comfortable with the controls and proficient with its operation
- Understand the load rating of the lift and account for the combined weight of the users, tools, and equipment. Never allow the weight on the work platform to exceed the manufacturer's load rating
- Ensure all occupants of the platform wear appropriate personal safety equipment for the conditions where the platform will be operated

WARNING: PERSONAL FALL ARREST SYSTEMS ATTACHED TO A CERTIFIED ANCHOR ARE ALWAYS REQUIRED WHEN OPERATING ANY AERIAL LIFT, INCLUDING WHEN DRIVING AT GROUND LEVEL.

- Isolate the lift or implement traffic control measures to ensure that other equipment or vehicles cannot contact the scissor lift
- Barricade impact zones under lifts to avoid injury to people on the ground from falling objects
- Barricade the area around the lift to warn others of the lift's swing radius and to prevent crushing injuries when working near buildings or equipment
- Select work locations with firm, level surfaces away from hazards that can cause instability such as drop offs, holes, slopes, bumps, ground obstructions, or debris
- Do not drive the lift on slopes that exceed the maximum ratings indicated by the manufacturer
- Use the lift only when weather conditions are good. The maximum allowable wind is 28-mph unless the instruction manual indicates otherwise. If gusty wind conditions are expected, do not use the lift. Do not increase the surface area of the platform or the lift; this will cause destabilization in windy conditions. Do not use the lift during lightning or storms
- Use stabilization systems provided with the equipment as designed and appropriate for conditions
- Ensure that safety systems are maintained and not bypassed
- Do not belt off to an adjacent pole, structure, or equipment while working from an aerial lift
- Stand on the platform or basket floor; do not sit or climb on the edge of the basket or rails and do not use planks, ladders, or other devices for a work positioning
- Field modification of a lift is disallowed unless the manufacturer allows the modification, this is certified in writing and the actual modifications conform
- Follow the manufacturer's instructions for safe movement. This usually rules out moving the lift in an elevated position. Operate the lift in a slower mode when navigating obstacles. Do not position the platform in a way that places the operator between the platform and joists, beams, or other obstructions that could crush the operator. Never drive over grates or covers. Avoid horizontal forces from tasks that cause the platform to sway or become unstable such as pushing or pulling on objects outside the platform.
- Remove the key when not in use to prevent unauthorized use

- Do not use the lift as a ground for welding unless the lift is designed for that use and is equipped with a weld line to platform option and it is connected properly

Exiting an Aerial Lift While Elevated

Employees may use aerial lifts to access a rooftops or other walking and working surfaces provided the manufacturer allows this use and when following these rules:

- Verify the walking and working surface is structurally sound
- Identify and plan for fall protection needs before, during and after the transition between the lift and the walking and working surface; 100% tie off is required
- Preferentially, position the platform so that it is directly above the surface and no higher than 12-inches
- If the lift must be positioned adjacent to the walking and working surface, position it so that it is as close as possible to the surface, and no further than 12-inches
- Egress from the lift and access to the lift is only through the sliding mid rail or gate, not over the rails
- Follow manufacturer's instructions and limitations

Using and Aerial Lift Anchor When Outside the Lift

The operator may exit the aerial lift and use the lift's fall protection anchor when working on a roof or elevated surface, only under the following circumstances:

- The manufacturer expressly allows this use
- 100% tie off is required
- The slope or roof pitch must allow for safe walking and working surface access without falling
- The platform must be positioned close to the user and no further than allowed by the manufacturer
- The person working at heights must not work further from the anchor point than allowed by the manufacturer
- A second operator must remain on the ground, must have line of sight to the person working at heights and must have direct access to the lift's controls

Work Near Overhead Electrical Lines

Aerial lifts are not normally insulated for use near electrically energized circuits such as power lines or exposed bus bars and will not provide protection from contact with or proximity to electrical current. Operators will maintain safe distances between the lift and electrical power lines and apparatus in accordance with the Minimum Safe Approach Distance (MSAD) chart provided by the manufacturer and never less than 10-feet for voltages to ground of 50-kV or below and an additional 4-inches for every 10-kV over 50-kV.

Aerial lifts intended for use around electrically energized circuits must be designed for that use and must meet requirements of ANSI/SIA A92.2-2001, Vehicle Mounted Elevating, and Rotating Aerial Devices. Reference manufacturer owner's manual and machine identification plate for the category of insulating aerial device (if applicable). Only qualified-persons (electrical) may work on electrical systems that operate over 50-volts.

Work in Hazardous or Classified Locations

Lifts are not normally designed for use in classified or hazardous locations. Do not operate a lift in hazardous or classified locations or other areas where potentially flammable or explosive gases or combustible dust may be present unless the lift is specifically designed and rated for that use. Reference manufacturer's manual and the identification plate affixed to the machine to determine whether it is permissible to operate the machine in hazardous locations.

Maintenance

Employees may only use properly maintained lifts. Operators must verify the completion of preventative maintenance when renting lifts. For the lifts it owns, the organization provides periodic inspections and preventative maintenance in accordance with manufacturer's instructions. Inspections, preventative maintenance and repairs are performed by a person qualified to complete these activities only using manufacturer approved parts and techniques.

Safety labels, load ratings, and other markings on the aerial lift are not removed, defaced, or altered. Missing or illegible markings are replaced promptly.

Altering or disabling of safety devices, such as warning beepers, guards or interlocks is prohibited, and modifications will be done only with the permission of the manufacturer.

Training

Operators must complete training appropriate for the types of lifts in operation, including the inspection, application, and operation of lifts, including recognition, and avoidance of hazards. When an operator is directed to operate an unfamiliar lift, the operator receives instructions regarding the location of the manufacturers' manuals, the purpose and function of all controls and the safety devices and operating characteristics specific to the group of aerial lifts prior to operating. Operators are afforded the opportunity to familiarize themselves with proper lift operation. Operators are retrained if management notes any performance deficiencies and periodically otherwise.

Documentation

The organization retains all maintenance and repair records of organization owned equipment in an equipment specific file for the life of the equipment. Pre-use inspections are retained for the life of the job and as otherwise required by this safety program.

Forms

The following forms are required.

- Aerial Lift Pre-Use Inspection Form or Manufacturer-Equivalent Form

FALL PROTECTION

This section describes the specific situations requiring fall protection, the allowable methods to protect from falls for each situation, and a description of the proper application of each method. This program includes information on the proper use, inspection, and care of personal fall arrest systems (PFAS) used in fall arrest, travel restraint, and work positioning.

Application and Scope

This program applies to:

- All personnel who work at heights for any reason or work type, regardless of location
- Jobsites and situations that involve floor holes, stair holes, openings to shafts and pits, and other similar features that meet the definition of a floor hole and where employees could fall into it or drop objects

This program describes a variety of situations that require fall protection. When this program addresses a specific task, function, or equipment (i.e., an application), the listed systems for that application are the only allowable fall protection methods. To learn about how each allowable system works, and the rules associated with each, refer to the associated “systems” subsection.

Functional Responsibilities

This section defines two functional positions:

- Competent-Person (Fall Protection)
- Qualified-Person (Fall Protection)

Competent-Persons

A competent-person is someone capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and is authorized to take prompt corrective measures to eliminate them. Competent-persons are designated by the organization only after meeting specific training requirements and on-the-job experience.

The fall protection competent-person has the following responsibilities:

- Assist in the evaluation of jobsites and the selection of fall protection methods and appropriate site programs
- Assist in the appropriate selection and correct application of fall protection systems
- Periodically visit jobsites and complete hazard assessments, advising personnel on technical matters
- Inform front line supervisors and project managers when fall protection hazards and unsafe conditions are observed, select, and apply corrective actions
- Stop work if an egregious or imminent harm situation exists

- Complete personal fall arrest system inspections
- Complete safety net compliance certifications
- Complete employee training
- Implement alternate fall protection programs
- A safety monitor must be a competent-person with respect to their duties

Qualified-Persons

A qualified-person has a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project.

The fall protection qualified-person has the following responsibilities:

- Supervise the design, installation, and use of horizontal lifelines
- Certify anchors
- Prepare alternate fall protection programs and approve of any changes
- Assist the competent-person as needed

Fall Hazard Definition

A fall hazard exists in construction when an individual is working at heights greater than 6-feet, as measured from the walking and working surface, when adequate protection from a fall is not provided by guardrails, handrails, or other protective methods.

Any surface is a working surface where employees walk and work. This includes floors, roofs, ramps, bridges, runways, formwork, and concrete reinforcing steel. Walking and working surfaces exclude ladders, vehicles, or trailers. Employees may only work on walking and working surfaces that have the requisite strength and structural integrity.

Fall hazards require prompt corrective actions, always. Changing circumstances, work progression, and rotating personnel result in a variety of fall hazards. Occasionally, previously corrected hazards re-emerge. Emerging hazards also require prompt corrective actions, regardless of who created the hazard.

Personnel involved with construction activities that create fall hazards (creating employer), including but not limited to floor holes, stair holes, roof holes, wells, pits, shafts, or similar structures, or that demolish piping and other equipment that results in floor holes, or that create wall openings, have an ongoing obligation to protect from falls using one or more approved methods in this program, and notify the owner or general contractor.

If the creating employer's personnel are unable to correct the fall hazard(s), they will notify the owner and general contractor, who will in turn identify the organization and personnel who will correct it.

During interim periods where hazards are present, and pending the installation of controls, this organization prohibits personnel from working in those areas and situations until controls are set up, and personnel will set up barricades and signs to warn others, as defined in the barricade section of this program.

Fall Protection Exception for Inspections

When qualified personnel complete inspections, investigations, or assessments of workplace conditions prior to the actual start of construction work, or after all construction work is complete, they need not use fall protection if suitable anchor points are not available. However, personnel must tie off when suitable fall protection anchors are available, and during all construction work, regardless of the task.

This exception does not apply to inspections, investigations, or assessments after construction starts and before it finishes. Personnel may not creatively apply this exception to avoid the proper use of fall protection.

Fall Protection for Unspecified Applications

Unless otherwise specifically listed in this program, when exposed to a fall hazard, employees must use one of the following fall protection methods:

- Guardrails
- Safety nets
- Personal fall arrest systems (PFAS)

Application: Aerial Lifts

An aerial lifting device is any vehicle-mounted device, telescoping or articulating, or both, used to position personnel.

The allowable fall protection method is:

- Personal fall arrest system

This includes when the personnel basket is on the ground.

Application: Dangerous Equipment

Dangerous equipment includes tanks, vats, degreasing units, rotating machinery, electrical systems, equipment with protruding parts, and similar equipment that, because of form or function, present a hazard to employees who could fall onto or into such equipment, or fall from equipment to a lower level.

When employees **work less than 6-feet above dangerous equipment**, use at least one of the following:

- Guardrails
- Equipment guards

When employees **work 6-feet or higher above dangerous equipment**, use at least one of the following:

- Guardrails
- PFAS
- Safety Nets

Application: Excavations

Excavation edges do not normally require fall protection unless the excavation edge is obscured by plant growth or other visual barriers. In most cases, the solution is the removal of the objects that block visibility. However, in some cases, fall protection is necessary and the competent-person typically makes this determination.

The allowable fall protection methods are:

- Guardrails
- Fences
- Barricades

Application: Falling Object Protection, General

Protection from falling objects is required when overhead work exposes one or more employees. Hardhats are always required. Implement one or more of the following options:

- Toe boards, screens, or guardrail systems
- Guardrails with mesh or similar
- Install canopies and protect and keep objects far enough from an edge so they will not fall if displaced
- Barricade the impact zone, prohibit personnel from entering the barricaded area and keep objects on the surface above far enough from the edge so they will not fall if inadvertently displaced

Additional precautions:

- Do not store materials and equipment within 6-feet of a roof edge unless without guardrails; this includes using screens and similar controls to prevent stacked material from falling
- Ensure that piled, grouped, or stacked materials are stable and self-supporting
- Keep surfaces clean and free of debris that could trip personnel or that could fall
- Use tool lanyards when working at heights

Application: Formwork and Reinforcing Steel

When employees set up formwork, remove formwork, or install reinforcing steel, including rebar tying, work on rebar assemblies while suspended, and work with poured concrete, both vertically and horizontally, at heights of 6-feet or more above a lower level, at least one of the following fall protection methods is required:

- PFAS
- Safety nets
- Positioning device systems

There are additional requirements for the following situations:

- Climbing on and traversing formwork and reinforcing steel from 6-feet to 24-feet
- Work on formwork and reinforcing steel from 6-feet to 24-feet
- Climbing on, traversing, and working on formwork and reinforcing steel above 24-feet
- Work on metal bracket form scaffold at or above 10-feet

Formwork and Reinforcing Steel Fall Protection

When installing forms, tying rebar mats, and other reinforcing steel assemblies, use an allowable fall protection method when working 6-feet or more from the ground or level below. The only allowable options are personal fall arrest systems, safety nets, or work positioning systems.

When working on rebar mats and other reinforcing steel assemblies:

- Ensure that the reinforcing steel assembly is capable of safely supporting the loads imposed upon it during installation, including any employees suspended from it
- Use tool lanyards and other falling object prevention and protection techniques to protect others from falling objects

Climbing and Traversing Rebar Mats Up to 24-Feet

When climbing and moving from point-to-point on rebar mats and other reinforcing steel assemblies from **6-feet to 24-feet**:

- Employees need not tie off when climbing or moving from point to point
- Practice 100% tie off when suitable anchor points are available

Working on Rebar Mats Up to 24-Feet

When working on rebar mats and other reinforcing steel assemblies from **6-feet to 24-feet**:

- Use fall protection when climbing and traversing stops and work starts at a particular location

Rebar Mats Over 24-Feet

When working from, climbing on, and traversing rebar mats and other reinforcing steel assemblies **over 24-feet**:

- Always use an allowable fall protection method – 100% tie off required

Application: Hoist Areas

Hoist areas are locations on a walking and working surface where equipment or materials are loaded or received using a hoist or similar device. The following fall protection methods are all required:

- Install guardrails around three sides
- Use a removable section of fence, a gate, or a chain to protect the open side of the guardrail when the hoist is not in use

- When employees are exposed to a fall during hoist operations, or that gate, or chain is otherwise removed, use PFAS

Application: Holes

A hole is a gap or void in a floor, roof, or other horizontal walking and working surface (2-inch minimum). Floor holes expose personnel to fall hazards during construction, during installation of fall protection controls, and when different trades and personnel perform work on and around holes.

The allowable fall protection methods for protecting holes are:

- Guardrails with toe boards
- Guardrails with covers
- Compliant cover (Use barricades to improve visibility when appropriate)
- PFAS

The fall protection methods used to protect holes are subject to changing circumstances, incorrect construction of controls, incorrect reinstallation of controls, structural failure, and other problems. In addition, uninvolved personnel are at increased risk when working near holes; they may not understand the nature and scope of the associated fall hazard. For example, uninvolved personnel may inadvertently place tools on, or walk on a floor cover that another party improperly installed, resulting in a fall.

Careful attention is required by all personnel that work at the site to ensure that the fall hazards associated with holes are meticulously designed, installed, properly maintained, and when conditions and work occur, reinstalled correctly.

The employer or crew that creates the hole, or that disturbs compliant covers and other controls, is required to install, or reinstall controls or surface the issue with other trades and the general to determine who will install or reinstall controls. Unprotected holes always require mitigation.

Application: Ladders

Requirements for fall protection while using a ladder include:

- Climbing a fixed ladder where the climb is greater than 24-feet in height
- Climbing a fixed ladder when the climb is less than 24-feet and the top ladder rung is greater than 24-feet above the lower level
- Portable ladder climbing is not considered working at heights; However, when working from a portable ladder when greater than 6-feet from the lower level and 3-points of contact are not possible, use appropriate fall arrest equipment anchored to a suitable anchor

Application: Leading Edges

A leading edge is the unprotected floor edge of a walking and working surface. Examples include decks and roofing where there is additional flooring after and the edge. The fall protection requirements vary, depending on personnel involvement in leading edge construction or work near, but not constructing, the leading edge.

Leading Edge Construction

Allowable fall protection methods for personnel involved with leading edge construction are:

- Guardrails
- Safety Nets
- PFAS
- Alternate fall protection program with written justification on infeasibility of other methods

Working Near a Leading Edge

Working near a leading edge, but not constructing it, requires the application of one or more of the following fall protection methods:

- Guardrails
- Safety Nets
- PFAS

If a guardrail system is chosen to provide the fall protection, and a Controlled Access Zones (CAZ) has been established for leading edge work, the control line may be used in lieu of a guardrail along the edge that parallels the leading edge.

Application: Overhand Bricklaying and Related Work

Overhand bricklaying is the process of laying bricks and masonry units to build a wall that in a manner that the surface of the wall to be jointed is on the opposite side of the wall from the mason, requiring the mason to lean over the wall to complete the work. Related work includes mason tending and electrical installation incorporated into the brick wall during the overhand bricklaying process.

When employees are engaged this work and are exposed to a fall of 6-feet or more, one of the following fall prevention and protections methods is required:

- Guardrails
- Safety nets
- PFAS
- CAZ

If an overhand bricklayer must reach more than 10-inches below the level of the walking and working surface, they must be protected from fall hazards by at least one of the following:

- Guardrails
- Safety nets
- PFAS

Bricklaying performed on scaffold must conform to scaffold requirements.

Falling Object Protection

For overhand bricklaying work, personnel will apply the following requirements:

- No materials or equipment except masonry and mortar can be stored within 4-feet of the working edge
- Excess mortar, broken or scattered masonry units, and all other materials, and debris will be kept clear from the work area by removal at regular intervals

Application: Precast Concrete Erection

When employees are engaged in the erection of precast concrete members such as wall panels, columns, beams, and floor or roof tees and related operations such as grouting and they work at heights of 6-feet or more above a lower level, they must use at least one of the following fall protection methods:

- Guardrails
- PFAS
- Safety nets
- Alternate fall protection programs only with written justification on infeasibility of other methods

Application: Ramps, Runways, and Other Walkways

A ramp is an inclined walking and working surface used to access another level. A runway is an elevated walking and working surface that includes but is not limited to catwalk, a foot walk along shafting, or an elevated walkway between buildings.

Employees will use guardrails placed on unprotected sides when the potential fall is 6-feet or more.

Application: Residential Construction

Residential construction is the building of structures with a home or dwelling using traditional wood frame construction techniques and with framing materials of wood or equivalent cold formed sheet metal stud framing, but not steel, or concrete, wooden floor joists, wooden roof structures and exterior walls of wood or equivalent cold formed sheet metal stud framing or masonry brick or block. Structures that meet this definition, including multifamily buildings, are residential construction for purposes of fall protection compliance. Anything that does not meet this definition is non-residential. 11

Personnel engaged in residential construction, regardless of trade or application, and including roofing, will use at least one of the following fall protection methods:

1 OSHA Instruction STD 03-11-002: Compliance Guide for Residential Construction. Published 16 December 2010. Effective 16 June 2011. Accessed 20 August 2018. URL: <https://www.osha.gov/enforcement/directives/std-03-11-002>

- Guardrails
- PFAS
- Safety nets
- Alternate fall protection plan*

*This organization disallows alternate fall protection plans unless it can document that all other fall protection methods are impossible to safely implement.

Application: Roofing Work on Steep Roofs, Non-Residential

A steep roof has a slope greater than 4/12 (18.43-degrees). The allowable fall protection methods for non-residential roofing work on steep roofs includes at least one of the following:

- Guardrail systems with toe boards
- Safety net systems
- PFAS

Regardless of the method(s) used, employees must have fall protection during all work.

Application: Roofing Work on Flat and Low Slope Roofs, Non-Residential

Low slope roofs have a slope equal to or less than 4/12 (18.43-degrees). Allowable fall protection methods for roofing and reroofing on a low slope non-residential roof, include at least one of the following:

- Guardrails
- PFAS
- Safety nets
- Warning line system and personal fall arrest system
- Warning line system and safety monitoring system
- Warning line system and safety net system
- Warning lines and guardrails
- Safety monitoring system alone, without a warning line, only on roofs 50-feet wide or less

Regardless of the method(s) used, employees must have fall protection during all work.

Determining Flat and Low Slope Roof Widths

This subsection provides additional information on determining roof widths when identifying allowable fall protection methods on non-residential flat and low slope roofs. Determining roof width is critical when personnel intend to use the safety monitor only, with no warning line, on roofs that are 50-feet wide or less.

Rectangular Roofs

Width is simply the lesser of the two primary dimensions, even when a roof slopes toward or away from the roof center.

Irregular Shaped Roofs with Rectangular Sections

Break down irregular shaped roofs into subareas. Use dividing lines of the shortest length to minimize the number of areas less than 50-feet wide, and to limit the size of those roof areas where a safety monitoring system alone applies. Refer to Figures 1 and 2 below for the correct and incorrect method to determine roof width. In these figures, a W indicates the correct width while a W in a circle indicates the incorrect width.

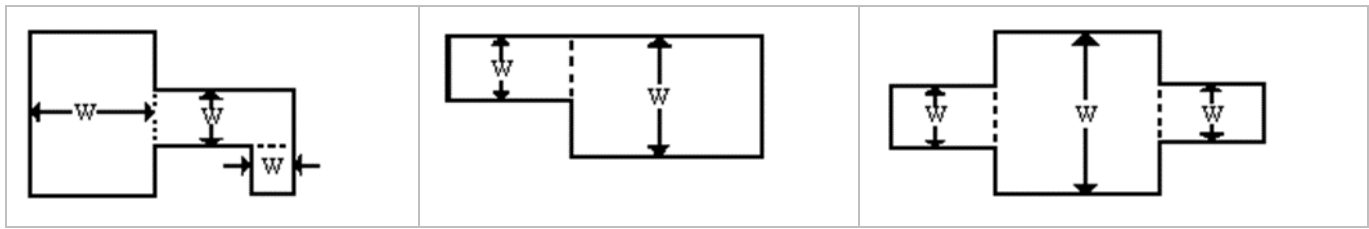


Figure 1: Correct approach to width determination on irregular roofs with rectangular areas. In each example, the roof is divided into logical constituent sections rectangles, and the width of each rectangle is obtained as if the roof section was a rectangular roof

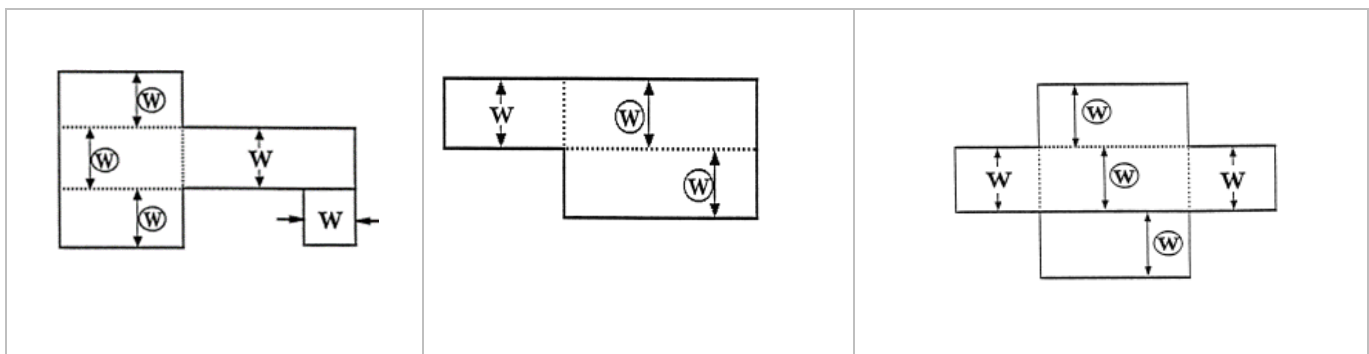


Figure 2: Incorrect approach to width determinations on irregular roofs with rectangular areas

Irregular Shaped Roofs with Non-Rectangular Sections

The width is always the narrowest dimension for all non-rectangular shaped roofs.

Noncontiguous Roofs

A roof is noncontiguous if it has sections with different elevations. Consider roofs comprised of several separate, noncontiguous areas as a series of individual roofs when determining roof width.

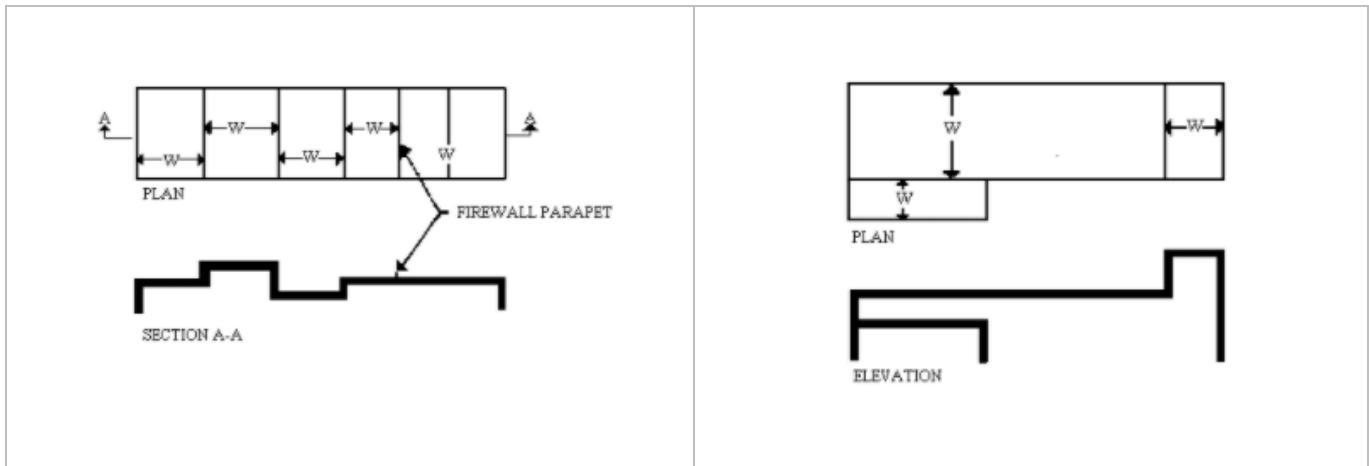


Figure 3: Two examples depicting noncontiguous roofs with varying elevations.

Roofs with Penthouses, Courtyards, and Additional Floors

Some roofs have penthouses, additional floors, courtyard openings, elevation differences, and similar architectural features that create a noncontiguous rooftop.

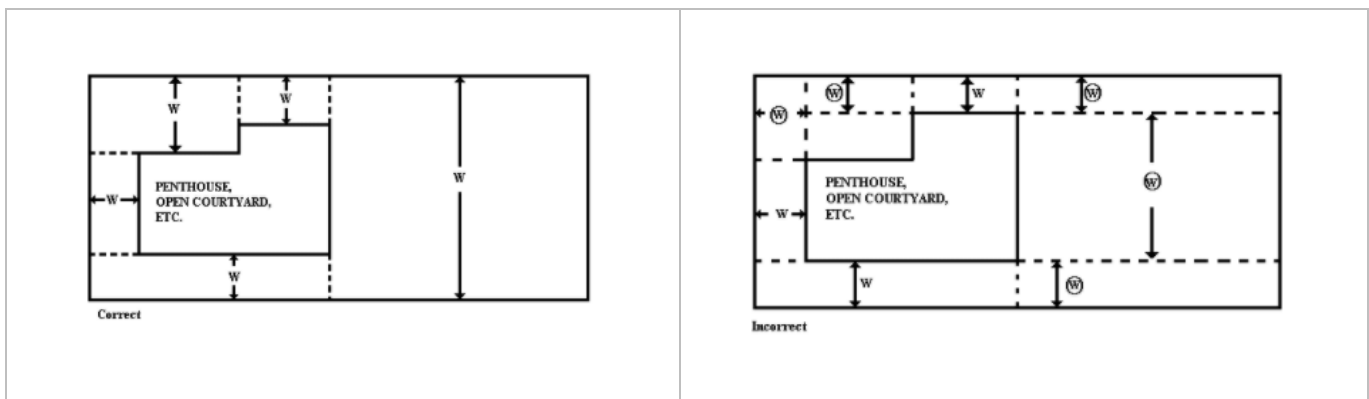


Figure 4: Correct (left) and incorrect (right) width determinations for a roof with a penthouse, courtyard, or similar architectural feature

Application: Rooftop Work, Not Roofing, Non-Residential

Adequate fall protection is required when non-roofing trades work on roofs in non-residential construction situations. Examples of situations where this may occur include, but are not limited to, the installation and retrofitting rooftop-mounted equipment, vents, painting, completing mechanical installations, and similar.

Employees engaged in non-residential, non-roofing work on a flat or low slope roof will use one of the following fall protection methods

- Guardrails
- Safety nets
- PFAS
- Warning lines when one of the other three methods is infeasible, subject to conformance with the requirements in the warning line section of this program

Application: Supported Scaffolds

A supported scaffold is one or more platforms supported by outrigger beams, brackets, poles, legs, uprights, posts, frames, or similar rigid support. Personnel will use an appropriate fall protection method when working during scaffold erection, work from a scaffold, and scaffold dismantling, when more than 10-feet above a lower level. The allowable fall protection method varies based on the scaffold type.

Crawling Boards (Chicken Ladders)

A crawling board is a supported scaffold with a plank and evenly spaced cleats spaced that provide footing, for use on sloped surfaces such as roofs.

The allowable fall protection methods are:

- Guardrails or
- PFAS or
- ¾-inch diameter grabline, or equivalent handhold, securely fastened beside each crawling board.

Fabricated Frame Scaffold

Fabricated frame scaffold is a supported scaffold with platform(s) supported on fabricated end frames with integral posts, horizontal bearers, and intermediate members.

The allowable fall protection methods are:

- Guardrails or
- PFAS

Form and Carpenters Bracket Scaffold

Form and carpenters bracket scaffold are supported scaffold with a platform supported by brackets - Form scaffolds attach to concrete formwork while carpenters' brackets scaffolds attach to the structure.

The allowable fall protection methods are:

- Guardrails or
- PFAS

Ladder Jack Scaffold

A ladder jack is a supported scaffold with a platform resting on brackets attached to ladders.

The allowable fall protection method is:

- PFAS

Mobile Scaffold

A mobile scaffold is a powered or unpowered, portable, caster or wheel-mounted supported scaffold.

The allowable fall protection methods are:

- Guardrails or
- PFAS

Pump Jack Scaffold

A pump jack scaffold is a supported scaffold with vertical support poles and movable support brackets

The allowable fall protection methods are:

- Guardrails or
- PFAS

Specialty Supported Scaffold

Supported scaffold include rarely used specialty scaffold. This includes the following:

- Bricklayers' square scaffolds
- Horse scaffolds
- Outrigger scaffolds
- Plasterers', decorators', and large-area scaffolds
- Roof bracket scaffolds
- Step, platform, and trestle ladder scaffolds
- Window jack scaffolds

This category excludes frame scaffold, tube and coupler scaffold, manufactured scaffold, and any other supported scaffold type not listed in this subsection.

The allowable fall protection methods are:

- Guardrails or
- PFAS

Tube and Coupler Scaffold

A tube and coupler scaffold is a supported or suspended scaffold with platforms supported by tubing, and erected with coupling devices connecting uprights, braces, bearers, and runners.

The allowable fall protection methods are:

- Guardrails or
- PFAS

Safe Tie Off Locations on Supported Scaffold

Safe tie off locations vary based on the scaffold type. Refer to manufacturer's instructions and the scaffold section for full details. However, in general, guardrails are not safe tie off locations.

Fall Protection for Unspecified Scaffold Types

The required fall protection for unlisted scaffold is one of the following:

- Guardrails or
- PFAS

However, due the variety of scaffold types and regulations, always verify the fall protection method against applicable regulations before starting work.

Application: Suspended Scaffold

A suspended scaffold is one or more platforms suspended by ropes or other non-rigid means, anchored to an overhead structure.

Boatswains Chairs

A boatswain's chair is a single-point, adjustable, suspension scaffold with a seat or sling designed to support one employee in a sitting position.

The allowable fall protection method is:

- PFAS

Catenary Scaffold

A catenary scaffold is a platform supported by two horizontal and parallel ropes attached to structural members of a building, or other structure.

The allowable fall protection method is:

- PFAS

Float (Ship) Scaffold

A float (ship) scaffold is suspension scaffold with a braced platform resting on two parallel bearers and hung from overhead supports by ropes of fixed length.

The allowable fall protection method is:

- PFAS

Needle Beam Scaffold

A needle beam scaffold is a platform suspended from needle beams. Needle beams are attached to the structural members on one end and the other end is suspended.

The allowable fall protection method is:

- PFAS

Self-Contained Adjustable Scaffold

A self-contained adjustable scaffold is a combination supported and suspension scaffold with an adjustable platform(s) mounted on an independent support frame(s) not a part of the object being worked on and equipped with a system to raise and lower the platform(s). Examples are rolling roof rigs, rolling outrigger systems, and some masons' adjustable supported scaffolds.

The allowable fall protection method is:

- Guardrails and
- PFAS

Two-Point Suspension (Swing Stage) Scaffold

A two-point suspension scaffold is a suspension scaffold with a platform supported by hangers (stirrups) suspended by two ropes attached to overhead supports and equipped with a system to raise and lower the platform.

The allowable fall protection methods are:

- Guardrails and
- PFAS

Safe Tie Off Locations on Suspended Scaffold

Safe tie off locations vary based on the scaffold type. Refer to manufacturer's instructions and the scaffold section for full details. However, in general, guardrails are not safe tie off locations.

Fall Protection for Unspecified Scaffold Types

The required fall protection for unlisted scaffold is one of the following:

- Guardrails or
- PFAS

However, due the variety of scaffold types and regulations, always verify the fall protection method against applicable regulations before starting work.

Application: Scissor Lifts

Scissor lifts are self-propelled powered platforms mounted on folding arms. Federal OSHA recognizes scissor lifts as scaffold and fall protection is not required when the rails are undamaged, and the gate is closed. However, as a best practice, have fall arrest equipment available for work restriction and, in limited circumstances, when reaching beyond the rails, or performing other work that may expose the employee to a fall hazard.

Scissor lift rails may or may not meet the load rating for certified fall protection anchors and scissor lifts may or may not have certified anchorage locations – Refer to the manufacturer's instructions for details.

Application: Skylights

Employees that work around skylights must follow an appropriate fall protection method unless the skylight can support, without failure, at least twice the weight of employees, equipment and materials that may be imposed on the cover at any one time as determined by the competent-person and never less than 200-pounds applied perpendicularly at any one area. In addition, verification of the weight bearing capacity and safety factor of the skylight must be confirmed by the manufacturer either through consultation of product specifications and manuals or through communication with a manufacturer's representative with appropriate product knowledge.

If the safety factor is not supplied, the assumption is that the actual weight bearing capacity of the skylight is 50 percent of the figure supplied. In addition, skylights must be in good repair. Any skylight deemed to not meet the load bearing requirements of this is in poor repair or damaged.²²

The allowable fall protection methods when skylights do not meet these requirements include the following:

- Compliant cover
- Compliant guardrail
- PFAS
- Work restriction system

When used, skylight screens and guards must meet the following requirements:

- Must support at least 200-pounds applied perpendicularly at any one area on the screen
- Must not deflect enough, with a 200-pound force applied, to break the glass

When an employee is exposed to a fall due to the presence of a floor hole that occurs after the removal of an existing skylight and before a new one is installed, a PFAS is required, and must continue to be used until the new skylight is secured in place and structurally sound.

² OSHA Interpretation Letter Dated 20 December 2017 from Michael A. Matthews https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=25927. Accessed 29 July 2017.

Application: Steel Erection

Steel erection is the construction, alteration or repair of steel buildings, bridges, and other structures, including the installation of metal decking and all planking used during the process of erection. When applicable, refer to the fall protection requirements in the steel erection subsection for details.

Application: Unprotected Sides and Edges

An unprotected side or edge is any side or edge of a walking and working surface except at entrances to points of access, where there is no wall or guardrail system at least 39-inches high. This includes floors, roofs, ramps, and runways.

The allowable fall protection methods for unprotected side and edge protection are:

- Guardrails
- PFAS
- Safety Nets

Application: Wall Openings

An opening is any gap or void 30-inches or greater high and 18-inches or greater wide, in a wall, or partition, that is 6-feet, or more from the lower level that employees can fall through.

The allowable fall protection methods for wall openings are:

- Guardrails
- PFAS
- Safety nets

Application: Well Pits, Shafts, and Similar Excavations

Well pits and shafts are excavations and structures in the ground that are narrow and deep that present a fall hazard with subsequent entrapment or engulfment. These locations and structures expose personnel to fall hazards during construction, during installation of fall protection controls, and when different trades and personnel perform work on and around these locations.

Well pits, shafts, and similar excavations require one or more fall protection methods:

- Guardrails
- Fences
- Barricades
- Covers

The fall protection methods used to protect these locations are subject to changing circumstances, incorrect construction of controls, incorrect reinstallation of controls, structural failure, and other problems. In addition, uninvolved personnel are at increased risk when working near these areas since they are uninvolved and may not understand the nature and scope of the associated fall hazard. For example, uninvolved personnel may inadvertently place tools on, or walk on a floor cover that was improperly installed, resulting in a fall. Careful attention is required by all personnel that work at the site to ensure that the fall hazards associated with well pits, shafts, and similar excavations are meticulously designed, properly installed, properly maintained, and when conditions and work occur, reinstalled correctly.

System: Alternate Fall Protection Programs

Personnel may use an alternate fall protection plan in three situations only.

- Leading edge construction
- Precast concrete erection
- Residential construction

The organization or its subcontractors must demonstrate that conventional fall protection equipment use is impossible, or it creates a greater hazard, in writing.

This organization disallows alternate fall protection programs without first completing research into alternatives. Infeasibility due to cost or time is inadequate.

A qualified-person will prepare a site-specific alternate fall protection plan for the leading edge work, precast concrete work, or residential construction work. The program will include the following, at a minimum:

- The specific reasons why the use of conventional fall protection systems (guardrail systems, PFAS, or safety nets systems) are impossible, or why their use would create a greater hazard
- The specific measures and procedures personnel will observe to reduce or eliminate the fall hazard (For example, the program should discuss the extent to which scaffolds, ladders, or vehicle-mounted work platforms can be used to provide a safer working surface and thereby reduce the hazard of falling)
- Each location where conventional fall protection methods cannot be used; These locations must be classified as a CAZ, following all CAZ requirements
- Where no other alternative measure has been implemented, the employer will implement a safety monitoring system in conformance to this program
- The fall protection program includes a statement which provides the name or other method of identification for each employee who is designated to work in the CAZ. No other employees may enter the CAZ

A competent-person will supervise program implementation.

The employer will maintain a copy of the fall protection program, with all approved changes, at the jobsite and the assigned qualified-person will:

- Maintain the program and keep it up to date

- Approve changes to the fall protection program

If an employee falls, or some other related, serious incident occurs, a near miss for example, the employer will investigate the circumstances of the fall or other incident to determine whether the fall protection program needs to be changed (for example, new practices, procedures, or training) and will implement those changes to prevent similar types of falls or incident.

System: Canopies

When used, canopies used for falling object protection must be strong enough to prevent collapse and to prevent penetration by falling objects.

System: Controlled Access Zones (CAZ)

Use CAZs only when completing overhand bricklaying work or as part of an alternate fall protection program during:

- Leading edge construction
- Precast concrete erection
- Residential construction, only when part of an alternate fall protection plan

CAZs must meet the following requirements:

- For leading edge construction applications, erect the control line between 6-feet and 25-feet from the unprotected edge for applications other than precast concrete
- For precast concrete applications, erect the control line between 6-feet and 60-feet or half the length of the member, whichever is less, from the leading edge
- The control line must be connected on each side to a guardrail system or wall
- The control line must extend parallel to and along the entire length of the unprotected or leading edge

When using a CAZ for overhand bricklaying applications:

- Erect the control line between 10-feet and 15-feet from the working edge
- Ensure that all employees are encompassed using additional control line at the ends as needed
- Enlarge as needed before guardrails are in place to encompass access points, material handling, and storage areas
- If guardrails are in the way of overhand bricklaying operations, the sections that interfere, or will interfere for no more than a day's work may be temporarily removed
- Only allowing overhand bricklayers and those doing related work into the CAZ

In general, limit the area encompassed by the CAZ and adjust as work progresses to minimize exposure to fall hazards.

Control line used to delineate a CAZ must meet the following criteria:

- Made of ropes, wires, tapes, or equivalent materials, and supporting stanchions
- Marked at 6-foot maximum intervals with high visibility material
- Rig and support so that the lowest point will be no lower than 39-inches from the walking/working surface and the height no more than 45-inches
- Have a minimum breaking strength of 200-pounds

System: Controlled Decking Zones (CDZ)

CDZs are allowed as a fall protection method for decking operations in steel erection, where metal decking is initially being installed, and forms the leading edge of a work area over 15-feet and up to 30-feet above a lower level.

Leading edge workers in a CDZ will:

- Have protection from fall hazards above 2-stories or 30-feet, whichever is less
- Have completed CDZ training

Employees who are not engaged in leading edge work and trained in the hazards involved will not enter the CDZ

The CDZ will:

- Be no more than 90-feet wide and 90-feet deep from any leading edge
- Not exceed 3,000 square-feet of unsecured decking
- Have designated and clearly marked boundaries with control lines or the equivalent
- Have safety deck attachments placed from the leading edge back to the control line
- Have at least two safety deck attachments for each metal decking panel

Personnel will not make final deck attachments nor install shear connectors from within the CDZ.

System: Hole Covers

When used, covers must meet the following requirements:

- Covers must support at least twice the weight of the employees, equipment, and materials, as determined by the competent-person
- Secure covers with cleats or by other means that prevent cover displacement
- Mark covers with either the word "HOLE" or "COVER" and "NO STEP"
- Verify that covers retain their integrity and are properly replaced when moved

Before cover installation, and during construction and installation, personnel must use proper fall protection methods to prevent falls and dropped objects.

This organization and all subcontracted organizations involved with designing covers, installing covers, reinstalling covers, and who's employees work or may work in areas where covers are present, have an ongoing obligation to inform their employees of the hazards associated with covers, the appropriate means of protection, the appropriate methods of installing and reinstalling covers and other controls, and making holes safe to work around.

System: Guardrails, Screens, and Toe Boards

Guardrails are passive fall prevention systems. Under normal circumstances, properly constructed, and installed guardrails prevent falls without any interactions by the employee. The minimum guardrail use requirements are:

- Erect guardrails on all unprotected sides and edges
- When used at a hoist area, place a chain, gate, or removable sections across the access point when not hoisting
- When used around holes for passage of materials, no more than two sides can be removable
- Protect access openings in guardrails with a gate or offset so that a person cannot walk directly into the hole or off the edge

A compliant guardrail consists of the following elements:

- The top edge height of top rails or guardrail members is between 39 and 45-inches above the walking and working surface, except when conditions warrant (for example, when employees are using stilts, the top edge height of the top rail must be increased by an amount equal the stilt height)
- The top rails and mid-rails size are at least 0.25-inch nominal diameter or thickness to prevent cuts and lacerations
- If wire rope is used for top rails, flag with high visibility material at intervals not more than 6-feet
- Mid-rails, screens, mesh, intermediate vertical members, or equivalent intermediate structures are required when there is no wall or other structure at least 21-inches high
- Mid-rails must be midway between the top edge of the guardrail system and the walking / working level
- When used, screens and mesh must extend from the top rail to the walking / working surface and along the entire opening between rail supports
- Intermediate vertical members between the main posts must be at intervals of 19-inches or less
- Install structural members (such as additional mid-rails or architectural panels) to leave no openings wider than 19-inches
- Guardrail systems must be capable of withstanding at least 200-pounds of force applied within 2-inches of the top edge, in any direction, and at any point along the edge, and without causing

the top edge of the guardrail to deflect downward to a height less than 39-inches above the walking / working surface

- Mid-rails, screens, mesh, and other intermediate vertical members must be capable of withstanding at least 150-pounds of force applied in any direction at any point along the mid-rail or other member
- Guardrail systems must not have rough or jagged surfaces that would cause punctures, lacerations, or snagged clothing
- Top rails and mid-rails must not cause a projection hazard by overhanging the terminal posts
- The selection of mid-rail type and construction depends on the overall stability of the guardrail and the desired protection from falling objects. If the guardrail requires additional supports, intermediate vertical members are added for additional structural stability
- When toe boards are used for falling object protection, they must withstand at least 50-pounds of force applied in any downward and outward direction, they must be at least 3.5-inches tall, and they must be installed with a 1/4-inch or less of clearance between the waling / workings surface
- Use screens if objects or material extend above the toe board
- If guardrails are used as falling object protection, they must have small enough holes to prevent falling objects

Personnel may substitute parapets that meet the guardrail requirements as the entire guardrail or a mid-rail, as applicable.

When using a guardrail, personnel will use a personal fall arrest system when working between the guardrail and the unprotected edge.

- If the work involves roofers performing non-residential roofing work, a safety monitor is permitted when working between the guardrail and the unprotected edge, though PFAS is preferred
- If the work involves overhand bricklaying, a CAZ is permitted when working between the guardrail and the unprotected edge, though PFAS is preferred

System: Nets

When used, safety nets must meet the minimum requirements in this section and manufacturer's instructions. Install safety nets:

- As close as practical under the walking and working surface but in no more than 30-feet below
- With enough clearance under them to prevent contact with the surface or structures below when subjected to an impact force equal to the drop-test specified in this subsection

Safety nets must extend outward from the outermost projection of the work surface as indicated in the table below.

Vertical distance from working level to horizontal plane of net	Minimum required horizontal distance of outer edge of net from the edge of the working surface

Up to and including 5-feet	8-feet
From 5-feet up to and including 10-feet	10-feet
More than 10-feet	13-feet

Drop Tests

Except as indicated below, safety nets and safety net installations must be drop-tested:

- After initial installation and before use
- Whenever relocated
- After major repair
- At 6-month intervals if left in one place

The drop-test will consist of a 400-pound bag of sand, 28-inches to 32-inches in diameter, dropped into the net from the highest walking and working surface causing exposure, but not from less than 42-inches above that level.

When this organization can demonstrate it is unreasonable to perform the drop-test a designated competent-person will certify that the net and net installation follows the provisions of this section and the applicable regulations by preparing a certification record prior to the net being used as a fall protection system. The certification record must include:

- An identification of the net and net installation for which the certification record is being prepared
- The date that it was determined that the identified net and net installation complied
- The signature of the person making the determination and certification

The most recent certification record for each net and net installation shall be available at the jobsite for inspection.

Inspection, Repair, and Maintenance

Safety nets require at least a weekly inspection, looking for wear, damage, and other deterioration. Safety nets must also be inspected after any occurrence which could affect the integrity of the safety net system. Defective components and nets must be immediately removed from service.

Materials, scrap pieces, equipment, and tools which have fallen into the safety net must be removed as soon as possible from the net and at least before the next work shift.

Materials and Construction

Safety nets and their installations must be capable of absorbing an impact force equal to that produced by the drop-test specified in this subsection.

The maximum size of each safety net mesh opening will not exceed 36-square inches nor be longer than 6-inches on any side, and the opening, measured center-to-center of mesh ropes or webbing, shall not be longer than 6-inches. All mesh crossings shall be secured to prevent enlargement of the mesh opening.

Each safety net, or section of it, must have a border rope for webbing with a minimum breaking strength of 5,000 pounds.

Connections between safety net panels must be as strong as integral net components and spaced not more than 6-inches apart.

System: Personal Fall Arrest

PFAS include four main components. These four components comprise the ABCDs of fall protection:

- **Anchor Point.** This is the location where you attach your lanyard or self-retracting lifeline
- **Body Harness.** The body harness has straps that fit around your chest, buttocks, and thighs. Body harnesses must be worn properly. It should be inspected before every use
- **Connector.** Connectors include the lanyard, self-retracting lifelines, D rings, carabineers, and other devices that are used to connect the body harness to the anchor point. These are crucial components of PFAS and must be used correctly. They should be inspected before every use. Additionally, lanyards must be attached to anchor points in such a manner that energy absorbing components will properly deploy in the event of a fall; incorrectly attaching a lanyard could mean severe injury or even death
- **Descent.** An employee descending from a personal fall arrest system that has been deployed. It includes self-rescue and assisted rescue

Fall protection used by the organization employees must conform to all requirements in:

- OSHA §29 CFR 1926 Subpart M
- Applicable state regulations
- Applicable ANSI/ASSP codes including Z359: Fall Protection Code
- Applicable ASTM test methods and regulations in OSHA §29 CFR 1926 Subpart M and ANSI/ASSP Z359

The minimum static strength and load rating requirements of PFAS includes the following:

- **Certified Anchors:** 5,000-pounds per attached employee
- **Improvised Anchors:** 3,600-pounds per attached employee
- **Personal Fall Arrest Equipment:** 5,000-pounds
- **Maximum Arresting Force:** 1,800-pounds
- **Maximum Deceleration Distance:** 3.5-feet

Improperly used equipment can cause serious bodily injury even if it does prevent you from hitting the ground. It is imperative that you wear and use all equipment correctly. The following guidelines apply:

- Observe all manufacturers' instructions for the proper use and limitations of PFAS and related equipment, including anchor point restrictions, and employee weight restrictions
- Inspect the personal fall arrest system prior to each use
- Ensure adequate fall clearance distance between the working surface (foot level) and the floor or lower level and any objects in the fall path. If the clearance distance is not enough, you will strike the floor before fall arrest components deploy. Reference the manufacturer's instructions for calculating free fall distance and verifying every application
- The body harness D-ring attachment point should be placed in the center of the employee's back, between their shoulder blades
- Rigged so an employee cannot free fall more than 6-feet nor meet a lower level
- Ensure there are no twists in your harness and that it is sized and adjusted correctly
- Never tie off to scaffolding, guardrails, process piping, or any other structure not capable of withstanding 5000-pounds
- Ensure lanyards are not twisted or incorrectly attached to connection points and are free of knots
- Do not work alone. In case of an emergency, at least one other person must be within visual or hearing distance when using personal fall arrest equipment
- To guarantee cross connectivity, prevent loss of integrity, and ensure that the manufacturer stands behind their product should a fall occur, all fall arrest equipment used in any given situation should ideally be manufactured by the same organization whenever possible
- Do not use PFAS and related equipment for any purpose except personal fall arrest or work restriction
- Do not use PFAS and related equipment at home or in other activities outside of work
- Always use provided PFAS. This organization prohibits recreational fall arrest equipment since rock climbing gear and similar recreational equipment do not meet the same standards of protection as industrial fall arrest equipment
- Do not use faulty or damaged equipment. Promptly remove damaged or malfunctioning PFAS from service. Tag the equipment and return it to the program administrator
- Immediately retire fall arrest equipment involved in a fall. Do not reuse any fall protection equipment after a fall. This includes anchorage connectors, connectors, harness, and any other devices in use at the time of the fall; anchors require inspection by a qualified-person
- Do not use body belts for fall protection
- Lanyards' snap hooks and full body harness D rings must be compatible with each other to avoid unintentional disengagement
- The snap hook gate will be capable of withstanding a minimum side load of 350-pounds applied to a point midway between the nose and the gate hinge without breaking or creating permanent deformation greater than 0.125-inches

Total Fall Clearance and Free Fall Calculations

Before starting work, calculate the free fall distance to ensure that the PFAS will properly deploy during a fall.

Clearance Distance

$$= \text{Free Fall Distance} + \text{Deceleration Distance} + \text{D Ring Shift} + \text{Back D Ring Height} + \text{Safety Factor}$$

Where:

- Free Fall Distance, the distance a connected person falls before the PFAS engages, for a shock absorbing lanyard is:
- Free Fall Distance, D-ring below anchor = Lanyard length – distance between anchor and D-ring (preferred whenever possible)
- Free Fall Distance, D-ring level with anchor = Lanyard length
- Free Fall Distance, D-ring above anchor = Lanyard length + distance between anchor and D-ring (special lanyards required since free fall distance is greater than the maximum allowed 6-feet)
- The free fall distance for a self-retracting lifeline is within 2-feet; always consult the manufacturer's instructions to confirm this
- Deceleration Distance = 3.5-feet (The distance the lanyard stretches to absorb the shock)
- D-Ring Shift = 1-foot (The distance the D-ring slides up)
- Back D-Ring Height = 5-feet (The height between the soles of the feet to the dorsal D-ring; assumed 5-feet for a 6-foot-tall person)
- Safety Factor = 2-feet

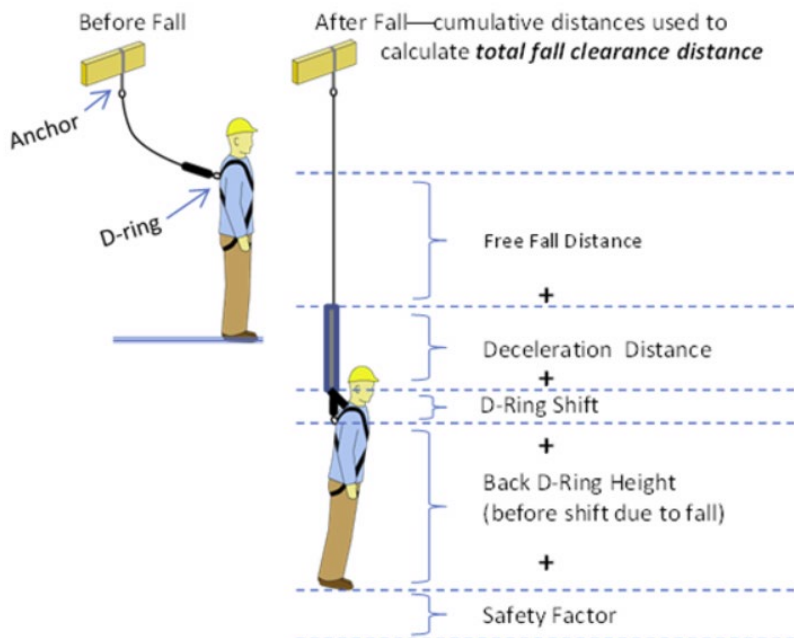


Figure 5: Calculating total fall clearance when anchored above the D-ring

Swing Fall

A swing fall is a fall that causes the victim to swing through an arc once or several times in a pendulum effect. This is an extremely dangerous condition that can cause severe injury if the victim swings into obstructions. This hazard is primarily associated with self-retracting lifeline (SRLs) and vertical lifelines. To reduce the chance of swing falls, observe the following rules:

- Maintain the angle between an imaginary vertical line between the anchor point and the ground, perpendicular to the ground, and the lanyard, or lifeline, to the smallest amount, and always less than 15-degrees; ideally, position the anchor point so that it is directly overhead
- Stay within the area underneath the anchor point as indicated in the drawing at right and always maintain awareness of your anchor point location relative to your position
- Reference the manufacturer's instructions for swing fall prevention guidance

Work Restriction / Travel Restraint Systems

Work restriction systems, also called travel restraint systems, prevent falls because they restrict movement; the lanyard is short enough to restrict the user from reaching and stepping off the work surface. This is an acceptable method of controlling a fall hazard when it eliminates the possibility of a fall from all directions and angles using conventional fall protection equipment.

OSHA does not specify the minimum anchor strength for work restriction and travel restraint. However, the ANSI values are:

- Improvised: 1,000-pounds
- Certified: Two times the foreseeable force

The maximum allowable working surface slope for work restriction is 18.4-degrees (4:12 pitch, 33 percent-slope).

Positioning Device Systems

Work positioning systems support and position the user to enable work with both hands on elevated vertical surfaces only. Work positioning systems must comply with the following:

- Rigged in such a way that the employee cannot free fall more than 2-feet
- Connectors and D rings must comply with PFAS requirements
- Snap hooks and D rings must be compatible with the member they are connected to prevent unintentional disengagement. Only double locking D rings are allowed

The minimum anchor strength is:

- Improvised: The greater of twice the foreseeable force or 3,000-pounds
- Certified: Two times the foreseeable force

When climbing rebar mats

Equipment Storage and Care

Proper storage and care of PFAS is crucial to correct function. Follow these general rules on storage and care and any additional rules provided by the manufacturer.

- Store PFAS and related equipment in a clean and dry location free of chemical contamination and temperature extremes. Do not leave PFAS on the floor or the bottom of toolboxes
- High heat, acids, bases, and corrosives in general may damage fall protection equipment to such an extent that the damage is obvious. However, these chemicals may also damage fall protection equipment in ways that are not obvious but that seriously affect the integrity and safety of the equipment. Even water may cause problems such as corrosion that could cause loss of integrity
- As a rule, do not allow chemicals to contact any part of your fall protection equipment. If chemicals are splashed on any portion of your equipment, STOP using it immediately. Thoroughly rinse and dry the equipment with water, allow it to hang dry and give it to the program administrator for inspection and possible replacement
- Welding creates high heat and molten metal that pops and sparks. If the type of welding that you are performing produces sparks and molten metal that flies off or drips from the weld site, exercise extreme caution. The molten metal and sparks may damage your fall protection equipment creating a serious hazard. Use Kevlar harness and lanyards to increase the level of safety when welding at heights
- Do not use damaged fall protection equipment. Place a repair tag on the equipment, note the problem, and damaged location, sign, and date the tag, and turn in the damaged equipment to the program administrator
- Periodically wash your PFAS using warm water and mild soap or as otherwise directed by manufacturer's instructions. Never use a dryer with PFAS. Ensure all PFAS is thoroughly dry before storage.

Equipment Inspections

Fall protection equipment requires both pre-use and annual inspections in accordance with manufacturer's instructions and this subsection.

Before each use, inspect all fall protection equipment. The inspection should include the following items, at a minimum:

- Verify that all equipment has not been impact loaded
- Identify worn or damaged parts, rub marks, abrasions, cuts, chemical damage, thermal damage, weak spots, and corrosion
- Ensure that all fasteners are present and tight
- Ensure all tags are present and legible
- Check SRLs to ensure they operate correctly and inspect the full length of the line
- Follow additional inspection procedures required or recommended by the manufacturer

A competent-person, other than the user, must inspect fall PFAS annually. Annual inspections must conform to manufacturer's requirements, ANSI regulations, and best practices. Document annual inspections and retain all documentation until the next annual inspection on manufacturer supplied forms or the form accompanying this program.

Post-Fall Equipment Procedures

Immediately and permanently remove from service any equipment involved with a fall, regardless of cause. In addition, if evidence of impact loading is found during any inspection without knowledge of a prior fall, remove the equipment from service and investigate the situation. In all cases, impact loaded equipment is not allowed back in service with the limited exception of certain self-retracting lifelines that have been returned to the manufacturer and recertified for use by the manufacturer, in writing.

Requirements for Damaged and Defective Equipment

If an inspection reveals any defect or damage, immediately remove the equipment from service. Place a repair tag on the piece of equipment in question, make a brief note of the problem and the location of the damage on the equipment, sign, and date the tag, and turn in the damaged equipment to the frontline leader.

Rescue

Self-rescue is the best option. If self-rescue is not possible, assisted rescue is the next option. If assisted rescue is not possible, a pick-off by authorized rescuers is required. Target rescue time is 9-minutes; maximum rescue time is 20-minutes unless harnesses are equipped with trauma straps or other appurtenances designed to increase safe hang time.

Prior to initiating a rescue, always call 911 and request a rescue in case the worker is unable to self-rescue, or you are unable to complete an assisted rescue. Once rescuers are on the way, initiate one of the following rescue operations based on the rescuers training level.

Option 1 - Self-Rescue for Conscious and Capable Worker

- The worker climbs to the level above, with the help of a ladder positioned by someone nearby when available and descends to the lower level using approved means (for example stairs and ladders)
- The worker immediately removes all fall protection equipment from service by tagging it and reporting the incident to the foreman or superintendent as appropriate for the jobsite

Option 2 - Mechanically Aided Rescue (Aerial Lift, Scissor Lift, Bucket Truck) for an Unconscious or Incapable Worker

- Position an aerial lift or scissor lift under the victim
- Raise the lift so the worker is completely on the floor of the lift and the workers' arrest system is unloaded
- Disconnect the worker from the arrest system and lowers the worker to the ground in the lift
- Administer first-aid as necessary
- Call for medical assistance as necessary

- Remove all fall protection equipment from service by tagging it and reports the incident to the foreman or superintendent as appropriate for the jobsite

Option 3 - Mechanically Aided Rescue (Haul/Rope System) for an Unconscious or Incapable Worker

- Rescuer attaches the anchor end of the rescue device to an approved anchor point
- Rescuer Lowers the load end to the suspended worker and attaches to the suspended worker's dorsal or chest D-ring as appropriate for the rescue equipment
- Rescuer lowers the worker to the floor or ground level
- The worker immediately removes all fall protection equipment from service by tagging it and reporting the incident to the foreman or superintendent as appropriate for the jobsite
- WARNING: THIS RESCUE TYPE REQUIRES SPECIALIZED TRAINING

System: Safety Monitors

When used, the organization will designate a competent-person to monitor the safety of other employees during work on the roof. The safety monitor must be competent to recognize and address fall hazards and have the authority to stop work. Safety monitor responsibilities include the following:

- Stay on the same walking and working surface as the work
- Stay within visual sighting distance of monitored personnel
- Stay close enough to communicate orally with employees
- Must not have other responsibilities that divert the monitor's attention
- Warn personnel when they are unaware of a fall hazard or act unsafe
- Only allow personnel directly engaged in the work within the warning line area

All personnel must promptly comply with safety monitors warnings. The use or storage of mechanical equipment on flat and low slope roofs is disallowed when safety monitor systems are active.

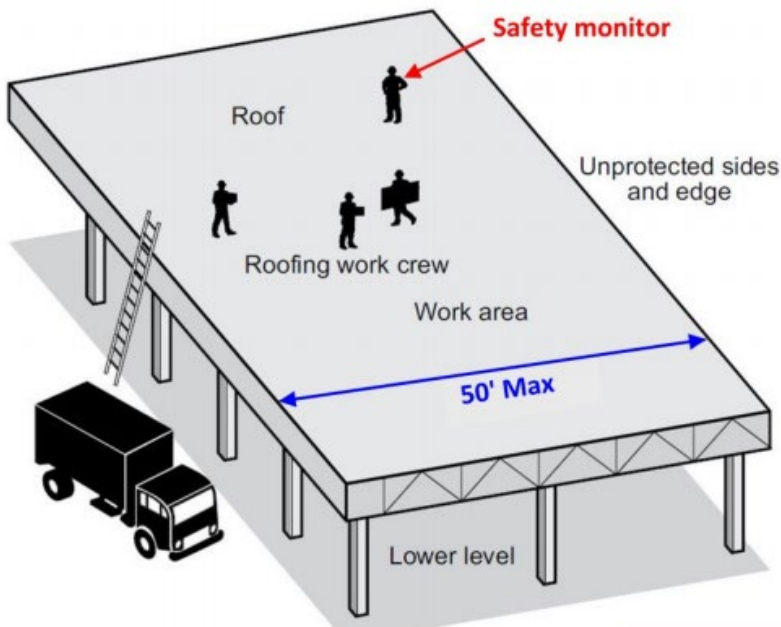


Figure 6: Safety monitor without a warning line is allowed only on non-residential, flat and low slope roofs 50-feet or less in width as determined by the rules in the warning line subsection

System: Warning Lines

A warning line system is a series of lines specifically placed to warn employees of nearby fall hazards. Warning lines can be used in the following situations:

- Flat and low slope roofs during non-residential roofing work with a 6-foot setback
- Flat and low slope roofs during all other work with a 15-foot setback
- As part of an alternate site-specific fall protection plan for residential construction, leading edge construction, and precast concrete erection

Non-Residential Roofing Work

During non-residential roofing operations, warning line use must meet the following:

- When mechanical equipment not used, the warning line system will be erected no less than 6-feet from the roof edge
- When mechanical equipment is used, the warning line system will be erected no less than 6-feet from the roof edge which is parallel to the direction of the mechanical equipment operation, but no less than 10-feet from the roof edge perpendicular to the direction of the mechanical equipment
- Employees are not allowed between the roof edge and warning line unless the worker is performing roofing activities in that area
- Refer to the safety monitor subsection

Non-Residential, Non-Roofing, Rooftop Work

Non-residential, non-roofing trades may use a warning line system subject to the following:

- The warning line setback from the edge is 15-feet
- When working between the warning line and the edge, PFAS is required unless the worker is a roofer
- The warning line must meet the minimum requirements in this section

General Warning Line Requirements for All Situations

Warning lines, when used, must meet the following minimum criteria:

- Warning lines consist of ropes, wires, or chains, and supporting stanchions
- Support lines to prevent keep the lowest point at least 34-inches from the walking/working surface, but not higher than 39-inches
- Lines will be capable of resisting, without tipping over, a force of at least 16-pounds applied horizontally against the stanchion, 30-inches above the walking/working surface, and perpendicular to the warning line
- The line must 500-pound tensile strength, and support loads applied to the stanchions
- Attach line to stanchions so that slack will not be taken up between other sections
- Construct a path with two parallel warning lines for points of access, materials handling, storage, and hoisting areas. When a path to a point of access is not in use, use a section of warning line or similar barricade across where the path intersects the warning line
- Offset paths to prevent employees from walking directly into the work area
- Store and use mechanical equipment on roofs where employees are protected by a warning line system, guardrail, or personal fall arrest system

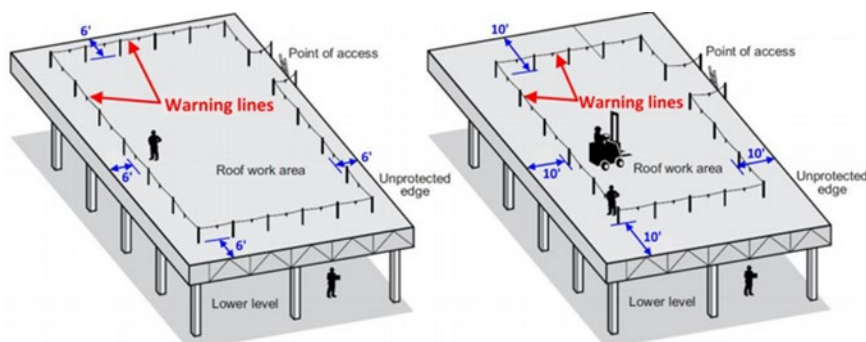


Figure 7: Warning line use without mobile equipment (left), and with mobile equipment (right)

Site-Specific Fall Protection Plans

The organization may develop site-specific fall protection plans based on host employer requirements, prime contractor requirements, or demonstrated need due to complicated situations or excessive fall hazards. In addition, site-specific fall protection plans are always required when developing and implementing an alternate fall protection program at a specific location.

A competent-person must complete site-specific programs and will familiarize all affected parties with the program. The site-specific program must be available on-site to all affected personnel, always.

Document Retention

The program administrator will maintain the following records:

- Jobsite-specific fall protection records for the life of the job plus at least 1-year
- Inspection records for the life of the inspected equipment
- Training records for the length of employment

Training

The organization provides the following fall protection training:

- Authorized user training for employees that work at heights upon initial assignment and periodically thereafter. Fall protection training contains topics relevant to the organization's work at height exposures including the recognition and elimination of fall hazards and the proper use of PFAS and work restriction equipment with recertification every year
- Competent-person inspector training for employees that perform annual inspections with recertification per latest version of the ANSI fall protection code not to exceed at least once every 3-years
- Competent-person fall protection training for assigned competent-persons with recertification per latest version of the ANSI fall protection code not to exceed at least once every 3-years

Forms

The following forms are required.

- Fall Protection Equipment Inspection Forms
- Site-Specific Fall Hazard Plan (when applicable)

LADDERS AND LADDER LIFTS, PORTABLE

This section addresses the use of portable ladders.

Application and Scope

This program applies to all personnel and all jobsites. It includes portable ladders, job-built ladders, and ladder lifts.

Climb for Safety

Apply the CLIMB acronym when using ladders.

- C: Choose the right appropriate ladder type and duty rating for the job
- L: Look and inspect – Identify unsafe ladders and remove them from service
- I: Insure a safe, stable setup
- M: Move carefully - Use three points of contact always
- B: Be a safety expert, not a statistic

Choose the Right Ladder

Select the appropriate ladder for the job at hand.

- Select the right ladder length for the job
- Select the ladder with the appropriate load rating and do not exceed it
- Use portable ladders with an ANSI duty rating of type II, I, IA or IAA or a CSA rating of grade 2, 1, 1A or 1AA

Table 1: Portable Ladder Requirements

Duty Rating	Rated Use	CSA Rating	ANSI Rating
200-pounds	Light Duty Household	Grade 3	Type III
225-pounds	Medium Duty Commercial	Grade 2	Type II
250-pounds	Heavy Duty Industrial	Grade 1	Type I
300-pounds	Extra Heavy Duty Industrial	Grade 1A	Type IA
375-pounds	Super Heavy Duty	Grade 1AA	Type IAA

Look for Damaged or Missing Parts – Inspect the Ladder

Inspect the ladder before every use. Ladders must have:

- Undamaged feet, friction pads, rails, rungs and other components
- Clean and grease free rungs and rails
- Intact and legible labels
- No excessive paint (obscures defects)

Reference manufacturer's instructions for additional inspection considerations.

Use of the ladder inspection form accompanying this program is optional but encouraged.

Remove unsafe ladders from service immediately.

Ensure Safe and Stable Setup

General setup considerations:

- Look for overhead power lines before handling and setting a ladder; Avoid using a metal ladder near power lines or exposed energized electrical equipment and always maintain safe working distances
- Set the ladder on stable surfaces; avoid mud and slippery locations; use mud sills and aftermarket ladder stabilization devices when appropriate, and always with care
- Setup ladders on level surfaces; do not use extension ladders in sloped surfaces
- Avoid setup in front of doors and other high traffic areas; if unavoidable, barricade areas around the ladder to prevent upset, lock doors and take other similar precautions
- Setup and use ladders as they are designed; do not use a step ladder in a folded configuration to access an upper level
- Follow all manufacturer's instructions for proper ladder setup and the proper use of aftermarket stabilization devices
- Do not tie or fasten ladders together to provide longer sections unless they are specifically designed for such use
- Do not modify ladders or attempt repairs unless expressly allowed by the manufacturer and repairs are made using original parts installed to original specifications
- Setup specialty ladders in accordance with manufacturer's instructions and only use as designed

Extension and straight ladder setup procedure:

- Set the ladder so that the horizontal distance from the wall to the feet of the ladder is 25% ($\frac{1}{4}$) of the vertical height
- When accessing an upper level, extend the top of the ladder 3-feet (3-rungs), but not more than 4-feet (4-rungs) above the surface of the upper level
- Verify both rails are in contact with the vertical surface

- Secure the top of the ladder to prevent inadvertent displacement and consider securing the bottom of the ladder to prevent kick out; use any appropriate securement method
- When extending a ladder, verify that the rung locks are properly engaged, that the overlap of the fly section and the base section meet manufacturer's requirements and that the rope does not present a trip hazard
- Consider using appropriate aftermarket ladder safety devices for ladder stabilization and securement
- Consider using manufacturer provided ladder rail grab extensions for safe access to upper levels
- Choose friction pads for concrete, asphalt and other similar surfaces and choose spiked feet for grass and soil

Step ladder setup procedure:

- Verify the ladder is in the fully extended position
- Do not setup for access to an upper level
- Consider using appropriate aftermarket ladder safety devices for ladder stabilization and securement

Move Carefully - Climbing Procedures

When ascending and descending a ladder, follow these procedures.

- Remove grease, mud, snow and other foreign substances from shoe soles, rungs and rails before climbing
- Face the ladder and maintain three points of contact when ascending and descending; both hands and one foot or both feet and one hand must always be in contact with the ladder
- Use a rope and a bucket to raise and lower tools and equipment; never carry tools and equipment in your hands when climbing a ladder
- When performing work from a portable ladder and three points of contact are not possible, use PFAS when the height is 6-feet or greater from a lower level and always use an appropriate anchor
- When working from a ladder, keep your body between the rails always; reposition the ladder as needed and do not over reach
- Do not climb from one ladder to another
- Do not use the top step of a ladder unless so designed

Avoiding Kick Out

An extension or straight ladder can kick out at the bottom under certain circumstances, resulting in a fall. The friction between the feet and the surface is in the safe zone when the ladder is setup correctly and the duty rating is appropriate. However, if the ladder is setup at too low an angle from the horizontal, the friction pads are missing, damaged or coated with a slippery substance, a kick out force is generated and the ladder falls. Kick out occurs due to several reasons:

- Ladder is setup at too low an angle from horizontal
- Ladder foot friction pads are worn, missing, oily, or wet
- Underfoot surface examples are slippery, icy, wet, oily, loose
- User climbed beyond the ladder upper support point

Job Built Ladders

All job built ladders must meet the following requirements:

- Must be safely support the intended load
- Cleats must be made from clear, straight grained lumber and with uniform vertical spacing of 12-inches
- Cleats must be nailed at each end with three 10d nails or the equivalent
- Cleats must be blocked or notched into the side tails
- The width of single cleat ladders must be 15 to 20-inches
- Rails must be made from select Douglas Fir without knots
- Rail splicing is permitted only when there is no loss of strength to the rail
- Single cleat ladders must not exceed 30-feet in length
- Double cleat ladders must not exceed 24-feet in length

Ladder Lifts

Ladder lifts are devices that use a powered pulley system to raise materials onto rooftops and other structures. Ladder lift use must conform to the following:

- Ladder lift use must conform to manufacturer's instructions and limitations including the load rating
- Ladder lifts must be used with lifting attachments appropriate for the material being lifted
- Ladder lifts in use must have an emergency stop braking system to prevent carriage drop
- During set up, follow power line clearance distances
- Make sure to set the unit on level footing and secure the top of the ladder to prevent displacement

- Ladder lifts must be inspected before setup and per shift thereafter
- Ladder lifts are for materials only; employees may not use ladder lifts
- Employees must not work under ladder lifts
- Employees must barricade the areas immediately under and around the ladder lift to protect employees from falling objects

Training

All company employees are provided training in proper use of ladders, recognition of hazards related to ladders and how to minimize these hazards.

Forms

The following forms are required.

- Ladder Inspection Form

SCAFFOLD

This program contains safety information and requirements for fabricated scaffold, supported, and mobile scaffold used in construction and general industry.

Application and Scope

This program addresses the use of scaffold by all employees at all locations. It covers the following scaffold types:

- Fabricated frame scaffold (supported scaffold)
- Tube and coupler scaffold (supported scaffold)
- Mobile scaffold, also called Baker, Perry, or narrow frame scaffold

This section does not address suspended scaffold or scaffold types that are not listed above.

Shore and lean-to scaffolds are prohibited.

Regardless of type, erecting, dismantling and work from scaffold commonly creates the following hazards:

- Falls to lower level
- Scaffold collapse or partial collapse from instability or overload conditions
- Struck by falling objects
- Shock or electrocution from contact with powerlines

This section provides specific guidance on avoiding these hazards.

Functional Responsibilities

The following personnel have responsibilities for scaffold safety:

- Competent-Persons
- Erectors and Dismantlers
- Registered Professional Engineers

Competent-Persons

Competent-persons have the following responsibilities:

- Inspect scaffolds and scaffold components for visible defects before each work shift and after any occurrence that could affect the structural integrity, and authorize prompt corrective actions
- Inspect manila, plastic, or other synthetic rope used for top rails or mid-rails
- Determine if a scaffold will be structurally sound when intermixing components from different manufacturers

- Determine if galvanic action has affected the capacity when using components of dissimilar metals
- Selects and direct employees who erect, dismantle, move, or alter scaffolds
- Determine if it is safe for employees to work on or from a scaffold during storms or high winds and to ensure that a personal fall arrest system or wind screens protect these employees
- Determine the feasibility and safety of providing fall protection and access
- Train anyone involved that erects, disassembles, moves, operates, repairs, maintains, or inspects scaffold
- Properly select and apply scaffold status and use tags

Erectors and Dismantlers

Erectors and dismantlers have the following responsibilities:

- Erect scaffold in accordance with regulations and manufacturer's instructions
- Erect scaffold under the guidance of a competent-person
- Inspect scaffold components prior to assembly to ensure that components used are of similar material and in good repair
- Use fall protection with 100 percent tie-off while erecting and dismantling scaffolds
- Erect scaffold free from recognizable and preventable hazards
- Attend initial training and periodic refresher training on erection, dismantling, and fall protection

Registered Professional Engineers

A registered professional engineer is required to design:

- Scaffolds that are to be moved when employees are on them
- Tube and coupler scaffolds over 125-feet in height
- Fabricated frame scaffolds over 125-feet in height
- Brackets on fabricated frame scaffolds used to support cantilevered loads
- Outrigger scaffolds and scaffold components

Requirements for All Supported Scaffold

Several requirements apply to all supported scaffold, regardless of type, as further defined in this subsection.

Capacity and Rating

The minimum requirements for scaffold capacity and rating include the following:

- Each scaffold and component must support without failure its own weight and at least four times the maximum intended load applied or transmitted to it
- Scaffolds and components must not be loaded more than their maximum intended loads or rated capacities, whichever is less
- Load carrying timber members should be a minimum of 1,500 lbf/in² construction grade lumber

Stability

The minimum requirements for stability include the following:

- Supported scaffolds must be set on base plates, mud sills, or other adequate firm foundation
- Footings must support the loaded scaffold without settling or displacement
- Unstable objects may not be used to support scaffolds or platform units
- Frontend loaders and similar pieces of equipment will not be used to support scaffold platforms unless they have been specifically designed by the manufacturer
- Forklifts will not be used to support scaffold platforms unless the entire platform is attached to the fork and the forklift is not moved horizontally while the platform is occupied

Restraining Supported Scaffolds

Supported scaffolds with a height to base width ratio of more than 4:1 must be restrained by guying, tying, bracing, or an equivalent means; use the manufacturers' recommendation or the following placements:

- Install at the closest horizontal member to the 4:1 height and repeat vertically with the top restraint no further than the 4:1 height from the top
- Vertically: Every 20-feet (6.1 m) or less for scaffolds less than 3-feet (0.91 m) wide; Every 26-feet (7.9 m) or less for scaffolds more than 3-feet (0.91 m) wide
- Horizontally: At each end, at intervals not to exceed 30-feet (9.1 m) from one end

Scaffold Components

- Scaffold components manufactured by different manufacturers must not be intermixed, unless they fit together without being forced and the scaffold's structural integrity is maintained
- Scaffold components manufactured by different manufacturers are not allowed to be modified to make them fit together, unless a competent-person determines that the resulting scaffold is structurally sound
- Scaffold components made of dissimilar metals must not be used together unless a competent-person has determined that galvanic action will not reduce the strength of any component below safety regulations

Platforms and Planks

Platforms are the work areas of the scaffold, unless they are used as walkways. The minimum requirements for platforms include the following:

- For most activities, the working distance between the scaffold platform and the structure being worked on must be no more than a 14-inches. For lathing and plastering, a gap of 18-inches is permitted
- Scaffold platforms and walkways must be at least 18-inches wide, unless they are used in areas that are so narrow that they must be less than 18-inches wide. In such cases, the platforms must be as wide as feasible, and fall protection must be provided
- Each platform must be fully planked or decked between the front uprights and the guardrail supports
- Platforms used solely as walkways, or during erection, or dismantling, require only the planking that the competent-person determines is necessary to provide safe working conditions
- To prevent slippage, platforms must be cleated, or otherwise restrained at each end or overlap their support at least 6-inches
- Unless it is designed and installed to support employees and materials without tipping, or has guardrails that block employee access, each end of a platform may not extend over its support more than 12-inches (for platforms 10-feet or shorter in length) or more than 18-inches (for platforms more than 10-feet long)
- On scaffolds where platforms are abutted to create a long platform, each abutted end must rest on a separate support surface (this does not preclude the use of shared support members, such as T sections, hook-on platforms that rest on common supports)
- When platforms must overlap because a scaffold changes direction, such as turning a corner, platforms that rest on a bearer at an angle other than a right angle will be laid first, and platforms that rest at right angles over the same bearer will be laid second, on top of the first platform
- The platform must not deflect more than 1/60 of the span when loaded
- Each platform must be planked with the space between the platform and uprights less than 1-inch wide
- When side brackets or odd shaped structures result, the space must not exceed 9.5-inches in a wider opening between the platform and the uprights
- Scaffold planking must be able to support, without failure, its own weight, and at least four times the intended load
- Wooden planking must not be covered with opaque finishes, except that platform edges may be marked for identification. Platforms may be coated periodically with wood preservatives, fire retardants, and slip resistant finishes, provided they do not obscure the top or bottom wood surfaces

Access

Access includes minimum requirements, access types, stair towers...

Minimum Requirements

The minimum requirements for access include the following:

- A means of safe access is required when scaffold platforms are more than 2-feet (0.6 m) above or below a point of access
- Direct access is acceptable when the scaffold is not more than 14-inches (36 cm) horizontally and not more than 24-inches (61 cm) vertically from the other surfaces
- Do not use cross braces as a means of access
- Employees must have a safe means of access provided for erecting and dismantling supported scaffolding

Access Types

Ladders, such as portable, hook-on, attachable, and stairway:

- Portable, hook-on, and attachable ladders must be positioned so as not to tip the scaffold
- Hook-on and attachable ladders must be specifically designed for use with the type of scaffold on which they are used
- Hook-on and attachable ladder rungs must be positioned so that their bottom rung is not more than 24-inches above the scaffold supporting level, have uniform spacing between rungs of a maximum 16¾-inches, have minimum rung length of 11½-inches and have rest platforms provided at a maximum of 35-foot vertical intervals
- Stairway type ladders must be positioned so that their bottom step is not more than 24-inches above the scaffold supporting level, have rest platforms at maximum vertical intervals of 12-feet, have a minimum step width of 16-inches, except for mobile scaffold stairway type ladders, which will have a minimum step width of 11½-inches and have slip resistant treads on all steps and landings
- Steps and rungs of ladders and stairway type ladders must line up vertically with each other between rest platforms

Stair towers must have:

- A stair rail consisting of a top rail and a mid-rail on each side of the stairway
- A top rail of each stair rail system capable of serving as a handrail, unless a separate handrail is provided
- Handhold on handrails, and top rails serving as handrails, for employees grasping them to avoid falling
- Stair rails and handrails surfaced to prevent punctures or lacerations to employees, and to prevent snagging of clothing

- Ends of stair rails and handrails constructed so that they do not constitute a projection hazard
- A space of at least 3-inches between handrails, or stair rails used as handrails, and other objects
- No less than 28-inches and no more than 37-inches from the upper surface of the stair rail to the forward edge of the tread, in line with the face of the riser
- A landing platform at least 18-inches wide by 18-inches long at each level
- A scaffold stairway width of at least 18-inches between stair rails
- Slip resistant surfaces on treads and landings
- Stairways installed between 40-degrees and 60-degrees from the horizontal
- Guardrails meeting safety regulations on the open sides and ends of each landing
- Uniform riser height, within $\frac{1}{4}$ -inch, for each flight of stairs. Greater variations in riser height are allowed for the top and bottom steps of the entire system (not for each flight of stairs)
- Uniform tread depth, within $\frac{1}{4}$ -inch, for each flight of stairs

Integral prefabricated frames must:

- Be specifically designed and constructed for use as ladder rungs
- Not be used as work platforms when rungs are less than 11.5-inches in length, unless each affected-employee uses appropriate fall protection
- Have rungs which are uniformly spaced and a length of at least 8-inches, with a maximum space between rungs of 16.75-inches
- Have rest platforms provided at a maximum of 35-foot vertical intervals

Ramps and walkways

- Ramps and walkways 6-feet or more above lower levels must have guardrails that comply with the Fall Protection regulation
- No ramp or walkway will incline more than 1:3 (1 vertical to horizontal, or 20 percent above the horizontal)
- If a ramp or walkway has a slope of more than 1:8, it must have cleats securely fastened to the planks not more than 14-inches apart, to provide footing

Erectors and Dismantlers

Erectors and dismantlers need access in accordance with the following:

- Hook-on or attachable ladders will be installed as soon as scaffold erection has progressed to the point that permits safe installation and use
- When erecting and dismantling tubular, welded frame scaffolds, end frames may be used as climbing devices for access, provided that horizontal members are parallel, level, and not more than 22 vertical inches apart and they are erected in a manner that creates a usable ladder and provides good hand hold and foot space

- Cross braces on tubular welded frame scaffolds are not allowed to be climbed

Fall Protection

Fall protection is required when employees work from scaffold that is more than 10-feet above a lower level. Allowable fall protection includes guardrails, PFAS, or travel restraint systems.

Guardrails on scaffold must conform to the following:

- Guardrail systems must be installed along all open sides and ends of platforms, and must be in place before the scaffold is released for use by employees other than erection/dismantling crews
- Walkways located within a scaffold must have guardrail systems installed within 9.5-inches of and along at least one side of the walkway
- Each top rail or equivalent member of a guardrail system must be able to withstand a force of at least 200-pounds applied in any downward or horizontal direction, at any point along its top edge
- The top edge height of top rails on supported scaffolds must be between 36-inches and 45-inches
- When conditions warrant, the height of the top edge may exceed the 45-inch height, provided the guardrail system meets all other criteria. Note: The minimum top edge height on scaffolds manufactured or placed in service after January 1, 2000 is 38-inches
- Guardrails (for example, mid-rails, screens, mesh, intermediate vertical members, solid panels), must be able to withstand a force of at least 150-pounds applied in any downward or horizontal direction, at any point along the mid-rail or other member
- When mid-rails are used, they must be installed at a height approximately midway between the top edge of the guardrail system and the platform surface
- When screens and mesh are used, they must extend from the top edge of the guardrail system to the scaffold platform, and along the entire opening between the supports
- When intermediate members (such as balusters or additional rails) are used, they must be no more than 19-inches apart
- Guardrails must be surfaced to prevent punctures or lacerations to employees and to prevent snagging of clothing, which may cause employees to lose their balance
- Ends of rails may not extend beyond their terminal posts, unless they do not constitute a projection hazard to employees
- In lieu of guardrails, cross bracing may serve as a top rail or mid-rail, providing the crossing point is between 20 and 30-inches above the work platform for a mid-rail, or between 38, and 48-inches above the work platform for a top rail

When used, PFAS must meet the following requirements:

- PFAS must meet all requirements in the fall protection section
- PFAS systems may include vertical or horizontal lifelines

- When vertical lifelines are used, they must be fastened to a fixed safe point of anchorage, independent of the scaffold, and be protected from sharp edges and abrasion. Safe points of anchorage include building structural members, but not standpipes, vents, electrical conduit which may give way under the force of a fall
- When horizontal lifelines are used, they are to be secured to two or more structural members of the scaffold
- A competent-person must determine the feasibility and safety of providing fall protection for employees erecting or dismantling supported scaffolds

Stilts may be used on a large area scaffold. When a guardrail system is used, the guardrail height must be increased in height equal to the height of the stilts. The manufacturer must approve any alterations to the stilts

Note: A large area scaffold consists of a pole, tube, and coupler systems, or a fabricated frame scaffold erected over substantially the entire work area.

Falling Object Protection

Falling object protection is required. Employees must wear hard hats and must establish falling object protection as described in the fall protection section, and in accordance with the following:

- Barricade the area below the scaffold so employees are not permitted to enter
- Install toe boards along the edge of platforms
- Where tools, materials, or equipment are piled to a height higher than the top edge of the toe board, they should be prevented from falling by paneling or screening extending from the toe board to the top of the guardrail
- Use a guardrail system with openings small enough to contain the objects
- Use a canopy structure, debris net, or catch platform strong enough to withstand the impact of the potential falling objects will be erected over the employees

When used, toe boards must be:

- Able to withstand a force of at least 50-pounds applied in any downward or horizontal direction, at any point along the toe board
- At least 3.5-inches high from the top edge to the level of the walking/working surface
- Securely fastened in place at the outermost edge of the platform, and not have more than ¼-inch clearance above the walking/working surface
- Solid, or with openings not over 1-inch

Inspections

Inspections are required for all scaffold types, regardless of when they were erected, who erected them, and the type. This includes mobile scaffold.

A competent-person will inspect scaffolds and scaffold components for visible defects before each shift and after each occurrence that could affect a scaffold's integrity. Any part of a scaffold that has been damaged or weakened so that it no longer meets OSHA strength requirements must either be repaired, replaced, braced, or removed from service. Minor repairs are permitted but major repairs often must involve trained erectors and replacement parts.

Employees are prohibited from working on scaffolds covered with snow, ice, or other slippery materials – except to remove these substances.

The competent-person uses a tagging system to indicate the scaffold's status.

Scaffold Tags

Status tags ensure that the status of scaffold is clearly communicated to users and other personnel. Scaffold tag use conforms to ANSI A10.8.

General requirements include:

- Scaffold tags are attached at all access points
- Scaffold tags are updated as conditions change
- Employees and other personnel are obligated to always adhere to scaffold tags

Scaffold status tags must be consistent in color and language, meeting the following minimum requirements:

- Red Tag – Danger – Scaffold is incomplete, do not use
- Yellow Tag – Caution – Scaffold does not meet regulations, fall protection is required
- Green Tag – Attention – Scaffold built to regulations, safe to use

Red Scaffold Tags

Red scaffold tags indicate that the scaffold failed an inspection and is unsafe. Employees are prohibited from using a red-tagged scaffold.

Yellow Scaffold Tags

Yellow scaffold tags indicate the scaffold is stable but does not fully meet requirements and fall protection is required. Generally, these yellow tags indicate the scaffold is under construction or is being dismantled and access is only by trained erectors/dismantlers.

Green Scaffold Tags

Green scaffold tags indicate that the scaffold is built to regulations, stable, and safe to use without a personal fall arrest system. Employees may use green-tagged scaffold provided they have scaffold user-level training.

Other Tags Sometimes Used

The following scaffold use tags are sometimes optionally deployed:

- Pre-Shift/Pre-Use Inspection (typically white or green). An inspection tag or form is often used to document the daily inspection; when a green tag is applied and an inspection tag is not present, the competent-person will have filed the inspection form
- Special Precautions (typically yellow): When used, this tag denotes special precautions that may be required; employees may use the scaffold provided they follow the indicated special precautions

Erection and Dismantling

Erection and dismantling both require competent-person supervision, erectors/dismantlers must be trained appropriate for the scaffold type. Personal fall protection use is required during erection and dismantling work. Safe work practices include proper erection and dismantling order to ensure stability, 100 percent tie-off for all dismantlers, and other applicable work practices. In addition, the scaffold must be constructed so that it is erected, stabilized, planked, is level and plumb, and fully compliant with all other requirements of applicable regulations and manufacturer's requirements.

Form and Carpenters' Bracket Scaffold

Attach each bracket, except those for wooden bracket-form scaffolds, by one or more of the following:

- Nails
- A metal stud attachment device
- Welding
- Hooking over a secured structural supporting member, with the form wales either: Bolted to the form or secured by snap ties or tie bolts extending through the form, or for carpenters' bracket scaffolds only, by a bolt extending through to the opposite side of the structure's wall, securely anchored
- Wooden bracket-form scaffolds must be an integral part of the form panel
- Folding-type metal brackets, when extended for use, must be either bolted or secured with a locking-type pin

Frame Scaffold Requirements

Frame scaffold consists of one or more platforms supported by vertical premanufactured frame members. This subsection covers the use of frame scaffold. In addition to the requirements for all scaffolds discussed previously, the following additional considerations apply:

Bracing

Scaffold must remain square and stable. Proper bracing is an important stability factor. Bracing must meet the following minimum requirements:

- Frames and panels must be connected by cross, horizontal, or diagonal braces, alone, or in combination, which secure vertical members together laterally

- As frames are stacked, cross braces must be of such length as will automatically keep the scaffold plumb, level, and square
- All brace connections must be secured to prevent dislodging

Pinning

Pin frame scaffold as indicated below.

- Frames and panels must be joined together vertically by coupling or stacking pins or equivalent means
- Frames and panels must be locked together to prevent uplift, where uplift can occur. (Uplift is the separation of a frame from the frame below it)

Mobile Scaffold Requirements

Mobile scaffolds are supported scaffolds set on wheels or casters that are easily moved between locations with little effort. In addition to the requirements for all supported scaffolds discussed previously, the following additional considerations apply:

When moving the scaffold:

- Verify stability and move the scaffold carefully to prevent tipping
- Apply manual force as close to the base as possible, but not higher than 5-feet
- Do not use powered systems unless the system and the scaffold are designed appropriately

Never move the scaffold when someone is on it, unless the following conditions exist:

- Height to base width ratio of the scaffold during movement is 2:1 or less, unless the scaffold is designed and constructed to meet or exceed nationally recognized stability test requirements such as ANSI/SIA A92.5 and 92.6
- Surface is within 3-degrees of level and free of pits, holes, and obstructions
- Outrigger frames, when equipped, are installed on both sides of the scaffold
- No employee is on any part of the scaffold that extends beyond the wheels, casters, or other supports
- When power systems are used, the propelling force is applied directly to the wheels and does not produce a speed more than 1-foot per second
- Notify the rider before movement

After positioning and before mounting:

- Lock the casters or wheels
- Verify that caster stems, wheel stems, adjustment screws are pinned/secured
- Verify the scaffold is plumb, level, and stable

Tube and Coupler Scaffold Requirements

Tube and coupler scaffold are designed using purpose-built tubes and couplers. Tube and coupler scaffold are extremely strong and versatile, though their versatility also means they are hard to correctly erect. This subsection covers the use of tube and coupler scaffold. In addition to the requirements for all scaffold discussed above, the following additional considerations apply:

- When platforms are being moved to the next level, the existing platform must be left undisturbed until the new bearers have been set in place and braced before receiving the new platform
- Couplers must be made of a structural metal, such as drop forged steel, malleable iron, or structural grade aluminum; The use of couplers made from gray cast iron is prohibited

Bracing

Bracing must meet the following minimum requirements.

- Transverse bracing by forming an "X" across the width of the scaffold must be installed at the scaffold ends, and at least at every third set of posts horizontally measured from only one end and every fourth runner vertically
- Bracing must extend upward diagonally to opposite sides of the scaffold, such as from the inner posts or runners to the next outer posts or runners, or vice versa
- Building ties must be installed at the bearer levels between the transverse bracing and must meet the legal requirements. Scaffold legs must be placed on a foundation that is adequate to support four times the intended load of the scaffold
- On straight run scaffolds, longitudinal bracing across the inner and outer rows of posts must be installed diagonally in both directions and extend upward from the base of the end posts to the top of the scaffold at approximately a 45-degree angle
- On scaffolds whose length is greater than their height, longitudinal bracing must be repeated beginning at least at every fifth post
- On scaffolds whose length is less than their height, longitudinal bracing must be installed from the base of the end posts upward to the opposite end posts, and then in alternating directions until reaching the top of the scaffold
- Bracing must be installed as close as possible to the intersection of the bearer and post or runner and post
- Where conditions do not permit the attachment of bracing to posts, bracing must be attached to the runners as close to the post as possible

Bearers

A bearer is a horizontal transverse scaffold member, often supported by ledgers, or runners, upon which the scaffold platform rests and which joins scaffold uprights, posts, poles, and similar members. Bearers must be installed so they meet the following requirements.

- Bearers must be installed transversely between posts

- When bearers are coupled to posts, the inboard coupler must bear directly on the runner coupler and be as close to the posts as possible
- Bearers must extend beyond the posts and runners, and provide full contact with the coupler
- The bottom bearers must be located as close to the base as possible

Runners

Runners, ledgers, or ribbon are the lengthwise horizontal spacing or bracing members that support the bearers. The following minimum requirements apply to runners.

- Install runners along the length of the scaffold, located at level heights on the inside and outside posts
- On outside posts, tube, and coupler guardrails, and mid-rails may be used in lieu of outside runners
- Runners on straight runs must be interlocked to form continuous lengths and coupled to each post
- The bottom runners must be located as close to the base as possible

Training

The organization provides the following scaffold related training.

Authorized User

Training is required for authorized users, the individuals that use the scaffold. Topics include the hazards associated with each scaffold type and the procedures necessary to control those hazards. Minimum required topics include:

- The nature of any electrical hazards, fall hazards, and falling object hazards in the work area
- The correct procedures for dealing with electrical hazards and for erecting, maintaining, and disassembling the fall protection systems and falling object protection systems being used
- The proper use of the scaffold, and the proper handling of materials on the scaffold
- The maximum intended load and the load carrying capacities of the scaffolds used
- Other pertinent requirements and concepts

Erector and Dismantler

Erector/dismantler training is required for people erecting, disassembling, moving, operating, repairing, maintaining, or inspecting scaffolds. Topics include correct procedures to perform these activities. The minimum required topics include:

- The nature of scaffold hazards
- The correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffold in question

- The design criteria, maximum intended load carrying capacity, and intended use of the scaffold
- Any other pertinent requirements and concepts

Competent-Person

Competent-person training on elected topics designed to help increase the knowledge of assigned competent-persons. It is required no less frequently than once every three years. Competent-person training must include authorized-person training, erection/dismantling training, and in relevant competent-person topics including regulatory concepts, tagging system application, and use, scaffold inspections, PFAS criteria, selection and use, and other related topics.

Periodic Retraining

Periodic retraining is required as follows:

- When the organization has reason to believe that an employee lacks the skill or understanding needed for safe work involving the erection, use, or dismantling of scaffolds
- When changes at jobsites present a hazard about which an employee has not been previously trained
- When changes in the types of scaffolds, fall protection, falling object protection, or other equipment present a hazard about which an employee has not been previously trained
- Where inadequacies in an affected-employee's work involving scaffolds indicate the employee has not retained the requisite proficiency
- No less frequently than once every three years

Forms

This section includes the following forms:

- Supported Scaffold Inspection

WELDING, OTHER HOT-WORK

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HOT-WORK AND FIRE-WATCH

This program establishes the minimum requirements for completing welding cutting, brazing, grinding, and other hot-work. Hot-work includes any work that involves welding, cutting, brazing, soldering, grinding, generation of sparks, or other work that produces an actual or potential ignition source.

Application and Scope

This program applies to all employees involved with hot-work at all job-sites. This organization employees must follow all aspects of this program at a minimum and may deviate only when host employer requirements are more stringent.

Hot-work Permits

A hot-work permit is required for all hot-work conducted within this organization. The following precautions are required when conducting hot-work.

- Confined spaces, lockout/tagout and electrical hazards
- All hot-work equipment must be in satisfactory operating condition and repair
- All necessary lockout/tagouts are complete and satisfactory (if needed)
- Confined space permits are complete and satisfactory (if needed)
- Confined spaces, storage tanks, and other vessels are clean, purged, isolated, and tested
- Precautions have been made to protect welders from possible shock while working on wet surfaces
- Flammables and combustibles management
- Initial air monitoring of the atmosphere in any confined spaces and the general area indicate that flammable vapors and gases are 10% or less of the lower explosive limit (if any are present)
- All movable combustibles are at least 35-feet from the hot-work
- All portable chemical containers such as drums and totes are at least 35-feet from the hot-work
- The hot-work area is free from combustible dust for 35-feet in all directions
- Non-flammable guards have been placed between walls, partitions, ceilings, and the roof within 35-feet of the hot-work area that are of combustible construction
- Sparks and slag control
- Non-flammable guards have been placed between immoveable combustibles within 35-feet of the hot-work
- Precautions have been taken to prevent ignition sources from entering holes, cracks, or other openings in floors and walls that might ignite combustibles in adjoining areas or levels below

- Duct work and conveyors that have the potential to carry sparks to distant flammables and combustibles have been protected, shut down, and locked out
- Protection for the authorized-employee and nearby employees against heat, sparks, and slag will be in place
- Combustible flooring will be kept wetted or covered with damp sand or will be protected by fire resistant shields
- Where sparks and slag can penetrate cracks and other openings, these will be protected
- Overhead hot-work
- Remove all flammable and combustible material below the location so the area is fire safe and barricade the area immediately below the work
- No individual will work immediately below hot-work
- The level below the hot-work area will meet the same conditions as the area above it whenever sparks and slag may fall to the level below
- Fire suppression
- Appropriate methods for extinguishing fires are operational and available within the immediate work area; the minimum standard is at least one 4A:80B:C (10-pound) fire extinguisher
- Fixed fire suppression systems are operational and unimpaired, when present
- Measures are in place to prevent the accidental activation of automated fire protection systems (smoke and heat detectors), when present
- Assign a fire-watch when any one of the following conditions exist:
 - Flammables or combustibles are closer than 35-feet to the hot-work; this includes building construction and contents
 - Flammables are present that are more than 35-feet away but are easily ignited by sparks or slag
 - Wall or floor openings within a 35-foot radius are present that may expose flammable or combustible material in adjacent areas to sparks and slag, including concealed spaces in walls or floors
 - Combustible materials adjacent to the opposite side of metal partitions, walls, ceilings, or the roof are present; these materials may ignite by heat conduction or radiation
 - If work is performed near walls, ceilings, or other barriers that interrupts the line of sight of the designated fire-watch employee, multiple fire watches employees are required so all areas within the 35-foot radius are under direct observation

Hot-work Prohibited Areas

Some areas are hot-work prohibited areas. These are locations with an extreme fire hazard because of immovable combustibles or flammables. Do not perform hot-work in areas or situations with the following conditions:

- A hot-work permit has not been issued by a trained hot-work supervisor
- Fire suppression systems are impaired
- The area contains flammable liquids, vapors and gases at or above 10% of the LEL or combustible dust
- The area contains exposed, readily ignitable materials, such as grain, methane, or cellulose based products
- Surfaces are noncombustible but contain combustible cores
- Combustible covers are non-removable
- Inability to keep combustible floors wet, covered with damp sand, or protected with fire resistant barriers
- Hot-work is contemplated on pipe, bar, tubing, or other metals in contact with combustible walls, partitions, ceilings, or roof, and the work is close enough to cause ignition by heat conduction or radiation
- The location is designated by the host employer as hot-work prohibited

Fire-Watch Responsibilities

At least one fire watcher is required, when called for by the procedure. If the work area can't be directly observed by a single fire watcher, additional personnel are required. The responsibilities of a fire watcher include but are not limited to the following:

- Physically capable of operating fire extinguishing equipment and trained to do so
- Always have one 4A:80B:C (10-pound) fire extinguisher in their immediate vicinity
- Assigned no other duties while hot-work is in progress
- Maintain a clear view of and have immediate access to all areas included in the fire-watch
- Have authorization to stop work if necessary and restore safe conditions within the hot-work area
- Remain in the hot-work area for a minimum of 30-minutes after all hot-work is complete, or longer if required to determine that there is no further fire hazard
- Complete hot-work and fire-watch training
- Have a method of communication to summon emergency services

In the event of a fire, the fire watcher will:

- Alert employees of the fire
- Attempt to extinguish incipient stage fires in the hot-work area that are within the capability of available equipment and within the fire-watch's training qualifications
- If unable to extinguish a fire in the hot-work area, activate alarm

- Alert employees of any fire beyond incipient stage and activate alarm

Training

Employees and subcontractors that perform hot-work or that perform fire watcher work must attend an initial OSHA and NFPA 51B-compliant hot-work training class and repeat this training periodically. This training is required before assignment.

Forms

The following forms are required.

- Hot-Work Permit – Employee's may use the host employer's hot-work permit provided it has the same content as this organization's permit.

WELDING, CUTTING, AND BRAZING

This program describes how this organization ensures worker protection for workers who perform welding, cutting, and brazing.

Application and Scope

This section applies to all welding, cutting, brazing, and related activities, regardless of location and addresses the following:

- Equipment condition and setup
- Protection of employees involved with hot-work include exposure to coatings and decomposition byproducts when heated and during removal, electric shock, falls, fumes, gases, noise, and ultraviolet light
- Protection of adjacent personnel
- Fire prevention and protection
- Welding in confined spaces
- Welding in wet conditions, over water, or near water
- Ventilation

Equipment Condition and Setup

Equipment condition and setup must conform to the following:

- All equipment will be set up and operated in accordance with manufacturers' recommendations and instructions
- Locate welding equipment, machines, cable, and other apparatus so it does not present a hazard to personal. Power leads, cords and hoses are routed to prevent trip and fall hazards and so they are not subject to damage. Secure heavy, wheel-mounted portable equipment to prevent inadvertent movement
- Conduct a pre-use inspection; When found to be incapable of reliable safe operation, the equipment will be repaired by qualified personnel prior to its next use or removed from service

Hoses

Hose use must conform to the following:

- Hoses are color-coded so they are easily distinguishable from each other; Green hoses are for oxygen, red hoses are for fuel gas, and black hoses are for inert shield gas
- Hoses and connections are cleaned and maintained free of greases, oils, and flammable substances; Oil or grease in the presence of oxygen will ignite readily and burn violently
- When not in use, header hose connections are capped

- When parallel lengths of oxygen and fuel gas hose are taped together for convenience, and to prevent tangling, no more than 4-inches in each 12-inch section will be covered with tape; This keeps two-thirds of the length available for inspection, and it prevents gas-entrapment from a leak
- Use hose couplers that require rotary action to attach and detach; do not use straight pull couplers
- When boxes or containers are used to store gas hoses, verify they are ventilated
- Inspect hoses before each use; when damaged, tag them, and remove them from service immediately

Torches

Torch use must conform to the following:

- Inspect torches at the beginning of each shift
- If the torch tips become clogged, clean them immediately with suitable cleaning wires, drills, or other devices specifically designed for such use
- Defective torches will not be used and must be placed out of service upon discovery

Employee Protection

When there is a possibility of hazardous exposure, helmets, and hand shields shall protect the face, forehead, neck, and ears to a vertical line from back of the ears, from direct radiant energy from the arc, and from direct weld splatter.

For welding or cutting activities, take the following precautions to ensure safety:

- Take fall protection and prevention measures
- Place welding equipment away from passageways, ladders, or stairways to reduce tripping hazards
- Wear personal protective equipment

The welder and helper must use the following personal protection:

- Eye protection
- Helmets – Welding style with appropriate shade
- Protective clothing
- Respirators
- Hearing protection in accordance with this organizations hearing conservation program

The organization provides eye protection appropriate for the exposed hazards. When welding, cutting, or brazing, the following apply:

- Ventilated goggles will be used for brazing operations

- Use welding hoods when welding or cutting
- Lenses are to be tempered, free from lines, air bubbles, waves, or other flaws
- Lenses will be smooth and parallel on the front and rear surface. If the wearer has defective vision, the lenses can be ground providing proper optical correction
- Lenses will bear permanent distinctive marking to indicate the shade number

Table 1 – Filter Lens Shade Requirements for Welding, Cutting, and Brazing

Welding Operation	Shade
Shielded metal arc welding – 1/16, 3/32, 1/8, 5/32-inch electrodes	10
Shielded metal arc welding – 3/16, 7/32, 1/4-inch electrodes	12
Shielded metal arc welding – 5/16, 3/8-inch electrodes	14
Gas shielded arc welding (nonferrous) - 1/16, 3/32, 1/8, 5/32-inch electrodes	11
Gas shielded arc welding (ferrous) - 1/16, 3/32, 1/8, 5/32-inch electrodes	12
Atomic hydrogen welding	10-14
Carbon arc welding	14
Soldering	2
Torch brazing	3 or 4
Light cutting, up to 1-inch*	3 or 4
Medium cutting, 1-inch to 6-inches*	4 or 5
Heavy cutting, 6-inches and over*	5 or 6
Gas welding (light) up to 1/8-inch*	4 or 5
Gas welding (medium) 1/8-inch to ½-inch*	5 or 6
Gas welding (heavy) 1/2-inch and over*	6 or 8
Notes: In gas welding or oxygen cutting, where the torch produces a high yellow light, use a filter, or lens that absorbs the yellow or sodium line	

- Filter lenses must meet the test for transmission of radiant energy described by consensus standards. Protection from arc welding rays will be considered
- When work activities allow, the welder should be enclosed in an individual booth painted with a finish of low reflectivity such as zinc oxide (an important factor for absorbing ultraviolet radiations) and a black lamp. Alternatively, welders are enclosed with noncombustible screens similarly painted with low reflectivity. The booth and screens provide circulation of air at flow

level. Any workers adjacent to the welding areas will be protected from rays by utilizing noncombustible screens or shielding. Adjacent workers may also be required to wear appropriate eye protection to protect from harmful rays

Helmet use conforms to the following:

- Use welding helmets during arc welding or arc cutting operations, excluding submerged arc welding
- Helpers and attendants will be provided protective equipment as appropriate
- Helmets and hand shields will be made of material that insulates from heat and electricity
- Helmets will be constructed of material that does not easily corrode or discolor the skin
- Helmets will not be flammable and will be capable of withstanding sterilization
- Arranged to protect the face, neck, and ears from radiant energy
- Helmets will be equipped with filter plates and cover plates for easy removal

Welders, helpers, and attendants will be provided appropriate protective clothing for the hazards. At a minimum the clothing includes the following:

- A skull cap with bill
- Leather gloves
- Cotton shirt (untucked and with sleeves unrolled and buttoned)
- Pants
- Safety boots with no exposed steel toe

Employees follow additional requirements from owner, clients, and consensus standards.

When controls such as ventilation fail to reduce air contaminants to allowable levels or when the implementation of such controls are not feasible, respiratory protective equipment shall be used to protect personal from hazardous concentrations of airborne contaminants. Refer to the respiratory protection section of this program for additional details.

Protection of Nearby Persons

Workers or other persons adjacent to the welding areas shall be protected from radiant energy, sparks, spatter with any appropriate combination of noncombustible or flame-resistant screens, shields and fire-blankets or must wear eye and face protection, and protective clothing.

Coatings Removal

Prior to welding, remove coatings for 4 to 5-inches in all directions around welds. During coating removal, take appropriate precautions, use appropriate PPE based on the coating removal process, and its associated hazards.

Fire Prevention and Protection

When welding, cutting, brazing, or performing other hot-work, fire protection measures are required, including, but not limited to the following:

- A fire extinguisher must be immediately available to the employee performing the work with a minimum rating of 4 A:80B:C (10-lbs), fully functional, and inspected annually
- Follow all requirements described in the Hot-Work and Fire-Watch program

Metals of Toxic Significance

Use exhaust hoods, booths or respirators in confined spaces or indoors where welding and cutting operations involve metals or metals coated with zinc, beryllium, cadmium, iron, or lead. When welding or cutting activities occur outside where these metals are found, use NIOSH under 42 CFR part 84 approved respirators. In all cases, workers in the immediate vicinity must be protected by local exhaust ventilation or airline respirators.

Completed atmospheric testing by the organization determines the exposure of toxic fumes and gases over a TWA while workers are performing various job activities usually associated with welding, cutting, or brazing. Results from these tests are available to employees within 15-days.

If atmospheric testing is done over the most adverse conditions and shows employee exposure is within the acceptable concentrations specified by 29 CFR 1910.1000, then local exhaust ventilation, or airline respirators are not needed. A best practice provides appropriate respiratory protection for voluntary uses.

Employees follow manufacturer's guidelines regarding cleaning as it pertains to toxicity or flammability. Degreasing and other cleaning operations involving chlorinated hydrocarbons are located to avoid vapors reaching the atmosphere surrounding the welding activities. Always keep trichlorethylene and perchloroethylene out of the atmosphere penetrated by the ultraviolet radiation of gas shielded welding operations.

Prior to welding or cutting on galvanized metals with a zinc coating, employees must grind a 5-inch radius in all directions around the area to be welded, as well as the opposite side of the metal plate.

NOTICE: Grinding also releases toxic metal particles into the air. Always wear proper respiratory PPE when conducting these activities.

Table 2 – Metals of Toxic Significance Requirements

Metal Name	Action Level	PEL
Beryllium	2.0 µg/m ³	0.2 µg/m ³
Cadmium	2.5 µg/m ³	5 µg/m ³
Chromium (VI)	2.5 µg/m ³	5 µg/m ³
Lead	30 µg/m ³	50 µg/m ³
Zinc	N/A	10 µg/m ³
Iron	N/A	10 µg/m ³

Pipeline Testing

Pressure testing is covered in the PHMSA, API Std. 2201-1963. The organization follows operator qualifications required by the DOT and API for regulated pipeline job scopes. During pressure testing, the employees, and public are protected against injury by blowing out closures or other pressure restraining devices, as well as protected from expulsion of loose dirt trapped in the pipe.

Any welded construction activities of transmission pipelines will be done in accordance with the regulation for Weld Pipelines and Related Facilities, API Std. 1104-1968. In addition, welding of branches to pipelines carrying flammable substances will be performed in accordance with Welding or Hot Tapping on Equipment Containing Flammables, API Std. PSD 2201-1963.

X-ray inspections and radioactive isotope inspections will be carried out in conformance with the American National Standard Safety Standard for Non-Medical X-ray and Sealed Gamma Ray Sources, ANSI Z54.1-1963.

Ventilation for Welding, Cutting, and Hot-Work

Adequate ventilation is required. This can include natural ventilation when outside, the use of fume extractors and smoke eaters, the use of blowers and fans to introduce fresh air, or a combination of the above methods.

Welding in Confined Spaces

Ensure the following when welding in confined spaces:

- Follow all confined space entry procedures
- When welding activities occur in confined spaces, cylinders are never allowed inside the confined space
- When arc welding is suspended for any length of time, remove the electrodes from the holders and locate the holders so accidental contact cannot occur and disconnect the welding machine from the power source
- When using a torch, eliminate the possibility of gas escaping through leaks or improperly closed valves by closing the torch valves, positively shutting off the gas supply, and remove the torch, and hose if the cutting activities are suspended for any length of time
- Use local exhaust and general dilution ventilation to control fume, vapor, and gas buildup

INTEGRATED WATER SERVICES, INC.

SITE SPECIFIC SAFETY PLAN

721 Bulverde Rd Suite 104, Bulverde, TX 78163

PROJECT NAME

Pojoaque Basin Regional Water System Job, Aamodt Litigation Settlement Project

PROJECT ADDRESS

4 Bundy Road, San Idefonso Pueblo, NM 87506

EFFECTIVE DATE

April 22, 2022



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INTRODUCTION

This document is this organization's site-specific safety plan (SSSP) for the jobsite and client identified on the cover page, and as further defined within.

PURPOSE AND SCOPE

This SSSP's purpose is to:

- Promote OSH hazard awareness and safe-work practices
- Hold individuals responsible for the safe execution of activities under their control
- Support the development of a proactive jobsite safety-culture
- Highlight critical OSH matters
- Comply with general contractor and host safety and health requirements

This SSSP covers all work completed by this organization, at this jobsite, including self-performed work by employees and subcontractors. It highlights several project and jobsite specific occupational safety and health (OSH) needs. It is not all-inclusive, and it is subservient to this organization's occupational safety and health programs.

Nothing in this program is designed to limit the development and implementation of safe work practices.

FUNCTIONAL RESPONSIBILITIES

The following individuals have responsibilities under this SSSP:

- SSSP Administrator
- Project Manager
- Frontline Leaders
- Competent-Persons
- Non-Supervisory Employees
- Subcontractors and their Employees

Site Specific Safety Plan Administrator

The SSSP administrator will:

- Provide this SSSP to the general contractor or host employer as requested
- Ensure that this SSSP is available to jobsite personnel when work is conducted
- Update this SSSP, if needed

The SSSP administrator may delegate responsibilities to other qualified-persons as necessary to manage job-site OSH matters, and to ensure the ongoing effectiveness of this SSSP, however, the SSSP Administrator maintains overall responsibility for this document regardless, of such delegation.

Project Manager

The project manager will:

- Hold all personnel accountable for properly managing OSH matters
- Coordinate with subcontractors to ensure their employees have an appropriate level of training, knowledge, and skill to meet the stated purpose of this program
- Arrange the work schedule to allow enough time for safety briefings, safety meetings, safety trainings, and related communication efforts
- Coordinate with the host-employer, the general contractor, subcontractors, and other employers as-needed to ensure the safe execution of work
- Work with the program administrator and frontline leaders to ensure the full implementation of this SSSP
- Assign functional responsibilities under this plan to ensure continuity

The project manager may not delegate these responsibilities.

Frontline Leader

The term “frontline leader” applies to any employee with direct supervisory responsibilities at this jobsite. It includes leads, foreman, forewomen, supervisors, and superintendents. For small jobsites, the project manager may also function as a frontline leader. Refer to the assigned personnel section for details.

Frontline leaders will:

- Actively manage day-to-day jobsite OSH matters
- Work with assigned qualified OSH professionals as needed
- Work with the program administrator and others to ensure the full implementation of this SSSP
- Hold all personnel accountable for appropriately managing OSH matters
- Allow enough time for safety briefings, safety meetings, and related communication efforts, and lead these meetings
- When topical OSH training is required, allow time for, and arrange for these sessions
- Coordinate with the host-employer, the general contractor, and other employers as-needed to ensure the safe execution of work
- Stop work and correct hazards as necessary
- Follow up on corrective actions decisively and in a timely fashion
- Redress negative and unsafe behaviors and reward positive and safe behaviors in real-time

The frontline leaders may not delegate these responsibilities.

Competent-Persons

Assigned competent-persons will fulfill the specific functions required of them as defined in the applicable safety and health regulation, this organization’s OSH programs, and this SSSP. Assigned competent-persons may not delegate their responsibilities. Refer to the applicable safety and health program to identify topical competent-person responsibilities.

Employees

Employees will:

- Work safe
- Stop work when unsafe situations develop, regardless of who is involved, report these situations to the Frontline leader, and correct the hazards, or request assistance from the Frontline leader and competent-persons
- Report all incidents and injuries promptly
- Attend all requires safety briefings, safety meetings, and training sessions

Employees may not delegate these responsibilities.

Subcontractors

Subcontractors, subcontractor's frontline leaders, and their employees will:

- Meet or exceed the requirements in this SSSP
- Meet or exceed applicable Federal OSHA regulations under 29 CFR 1926
- Coordinate activities with other subcontractors, this organization, and the general contractor
- Do not bring hazardous materials to the jobsite without first providing safety data sheets to and requesting permission from the frontline leader
- Submit written programs, forms, and reports as requested by the program administrator, project manager, and frontline leader
- Immediately report all jobsite incidents to this organization's frontline leader verbally, conduct an appropriate investigation, and provide follow-up written reports as soon as reasonable

Subcontractors may not delegate these responsibilities.

Assigned Occupational Safety and Health Professionals

OSH professionals have the following responsibilities:

- Attend safety coordination meetings as requested and as available
- Perform periodic jobsite hazard assessments
- Assist identifying corrective actions
- Provide technical and regulatory assistance with respect to OSH matters
- Assist with OSHA inspections, develop abatement plans, and related items
- Provide as requested and as-available occupational safety and health consultation, training, and related services to support the project

APPENDICES

Several appendices are at the end of this SSSP. They contain the following information:

- Appendix 1: Emergencies / Site Specific Emergency Action Plan
- Appendix 2: Training Records
- Appendix 3: Forms
- Appendix 4: Excavation Work Plan (EWP)
- Appendix 5: New Mexico One Call Handbook and Best Practices

SITE SPECIFIC SAFETY PROGRAM - SECTION A

PROJECT INFORMATION

April 22, 2022

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MATERIALS, STORAGE, AND LAYDOWN 4

GENERAL INFORMATION

ABOUT THE CONTRACTOR

This section contains information about the contractor who will perform the work.

LEGAL NAME

Integrated Water Services, Inc.

STREET ADDRESS

721 Bulverde Rd Suite 104, Bulverde, TX 78163

WEBSITE

<https://integratedwaterservices.com/>

ABOUT THE PROJECT

PROJECT NAME

Pojoaque Basin Regional Water System Job, Aamodt Litigation Settlement Project

PROJECT ADDRESS

4 Bundy Road, San Idefonso Pueblo, NM 87506

HOST EMPLOYER

U.S. Bureau of Reclamation (Funding Agency)

GENERAL CONTRACTOR (CONTROLLING EMPLOYER)

CDM Smith

GENERAL CONTRACTOR PROJECT MANAGER

Jacqueline Welborn (Construction Manager); 713-423-7354; welbornj@cdmsmith.com

GENERAL CONTRACTOR SUPERINTENDENT

Thomas Kline; KlineTE@cdmsmith.com

GENERAL CONTRACTOR ASST. SUPERINTENDENT

Damon Repine (Safety Manager); 406-293-1374; RepineDL@cdmsmith.com

SCOPE OF WORK

(1) Install approximately 800-feet of 20-inch C900 pipe, approximately 800-feet of 10-inch C900 pipe. Refer to excavation work plan for further details. (2) Install equipment and piping in two collector wells and in a building. Refer to confined space entry plan for further details.

PERSONNEL AND SUBCONTRACTORS

ASSIGNED PERSONNEL

The following personnel are involved in this project.

Job	Name	Email and Phone
Foreman	David Rosales	drosales@integratedwaterservices.com
Superintendent	Shane Sanders	ssanders@integratedwaterservices.com; 575-649-7718
Project Manager	Todd Brunetti	tbrunetti@integratedwaterservices.com; 559-451-6692
Safety Director	Terry Brem	tbrem@integratedwaterservices.com; 970-819-8462

The personnel listed above are subject to periodic replacement and job rotation as work progresses and jobsite needs change.

ASSIGNED SUBCONTRACTORS

☐ No subcontractors are involved in this project as of the date of this document.

☒ The following organizations are subcontracted and will work at this jobsite:

Subcontractor Name	Role	Primary Contact, Email, Phone
TBD	Flagger crew	TBD

Subcontractors are required to follow this SSSP, this organization's safety and health program, and their own plan, as applicable.

MATERIALS, STORAGE, AND LAYDOWN

EQUIPMENT

☐ No specialized equipment is used by this organization beyond plug and cord connected power tools, temporary electrical cords, temporary power distributors, and hand tools.

☒ This is a list of equipment employees will use, or are likely to use, at this jobsite. Equipment is on this list because it requires staging or parking space, and/or because it presents one or more equipment hazards such as: Creation of an impact zone from falling objects, overhead hazards, equipment hazards, produces heat, sparks, and/or slag, uses a fuel, or creates other hazards that require specific hazard controls. This list is subject to change based on site conditions, work progression, emerging needs, and other factors.

Hand tools

Plug and cord connected power tools

Quicky concrete saw (gas powered)

Plate compactors, walk behind with remote control

Heavy equipment including backhoe, excavator, loader, dump truck, vacuum trailer, (refer to Excavation Work Plan for details)

Portable generator with integral GFCI

Confined space entry equipment

MATERIALS

☐ This organization does not anticipate delivery of materials beyond basic supplies transportable in this organization's own vehicles.

☒ This organization anticipates material delivery. Materials and deliveries include the following:

Pipe and fittings for trenches and related

Valves and fittings for building

STORAGE

☐ This organization does not require storage space at this jobsite.

☒ This organization requires storage space at this jobsite, as follows:

Use laydown area provided by the GC located just west of intake building

Spoils pile located ¼-mile into jobsite; designated spoil pile is only location

LAYDOWN AND ASSEMBLY

☐ This organization does not require laydown or assembly space.

☒ This organization requires laydown and/or assembly space as follows:

Laydown area is parallel to the trench as work progresses

JOB TRAILER

This organization (☒ will have ☐ will not have) a job trailer (☐ with ☒ without) a portable generator.

SECTION B – SITE SPECIFIC SAFETY PLAN

OCCUPATIONAL SAFETY AND HEALTH REQUIREMENTS

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SITE SPECIFIC SAFETY PLAN

GENERAL SAFETY AND HEALTH REQUIREMENTS

ALCOHOL AND DRUGS

This organization expects personnel to arrive at the jobsite free from the effects of alcohol and drugs, and ready to work.

ALCOHOL AND DRUGS PROHIBITED AT JOBSITES

Inebriation or impairment from drug and alcohol use threatens personnel's safety and health. This organization prohibits:

- Use of alcohol
- Use of illegal drugs
- Use of legal drugs when such use causes impairment
- Possession, distribution, or sale of illegal drugs

Violations of this policy are subject to disciplinary action up to and including permanent removal from the jobsite and other disciplinary action consistent with this organization's policies.

ATTIRE AND PERSONAL PROTECTIVE EQUIPMENT

This section addresses general jobsite attire and personal protective equipment (PPE) required at the jobsite.

MINIMUM JOB-SITE PPE

Personnel must use the following minimum PPE at this jobsite:

- Long pants
- Shirt with at least a 4-inch sleeve
- High visibility garment (ANSI/ISEA 107-2015 type R, performance class 2)
- Safety toe footwear
- Safety glasses
- Hardhat
- Other PPE appropriate for the hazard(s)

Use PPE in accordance with the following:

- Always follow manufacturer's requirements and limitations
- Clean, sanitize, and store safely to avoid damage and contamination
- Use PPE as designed and do not alter it
- Inspect PPE before use
- Only use PPE in good repair

PPE SUMMARY BY HAZARD

If you can't eliminate hazards through engineering controls, use PPE specific for hazards. Always inspect PPE before use and on a periodic basis. Common hazards listed by body part include the following:

Body Part	Hazards(s)	Applicable PPE
Head	Bumping into objects, impact hazards, falling objects	Use the appropriate hard hat based on the specific hazards: Type I or II, Class G hard hats are required for non-electricians, while electricians must wear Type I or II, class E hard hats. Use ANSI rated climbing style hardhats when involved with any activity where the hardhat could fall off, create a falling object hazard, and leave the head unprotected in the process
Eyes and face	Impact, Chemical, UV radiation, laser	Only use ANSI Z87.1 approved eye protection. When grinding, use a face shield with glasses. During welding activities, select the correct eye shade for the welding type. For chemical splashing, use a face shield with safety glasses or indirect vent goggles. When using a face shield to protect from arc blast, verify it is rated for that use
Ears / Hearing	Impact tools, nail guns, machinery, and equipment, other loud noise sources	When noise levels are above 90 dB, or when it becomes difficult to speak and be heard in a natural/normal volume, employees will wear hearing protectors with the proper noise reduction rating, to reduce noise to an acceptable level
Lungs	Nuisance level dust	Always use work and cleaning methods that do not loft dust into the air. Use proper filtering facepiece (dust mask) if desired (non-mandatory)
Lungs	Crystalline silica	Follow the crystalline silica exposure control plan and use the proper respirator defined by the table, or as established by your industrial hygienist. Use only NIOSH approved respirators. Respirator use requires medical evaluation, fit testing, and training. Always use work and cleaning methods that do not loft dust into the air

Hands	Pinch-points, cut, or lacerations, electrical, impact, chemical, vibration	Use gloves when working with all hand tools, except for rotating equipment such as lathes, or exposed gears, or flywheels. Use gloves with any equipment that vibrates. Glove choice is based on the hazard and options include protection from (abrasion, laceration, injury to the back of the hand, chemical contact, vibration, heat, and cold). Contact your supervisor, superintendent, or safety personnel to ensure proper glove selection
Hands	Electrical shock	Use electrically rated gloves with leathers when exposed to energized electrical parts. Refer to the electrical safety program for details as applicable. Only qualified employees may trouble shoot energized equipment or work on energized equipment
Torso	Visibility	Use high visibility vests; some jobsites allow high visibility shirts, but this is typically not an option when working near traffic since shirts may not have sufficient reflective material; refer to the high viz PPE section of your safety and health manual for details
Legs	Contusions and lacerations from jack hammers and in some cases, chip hammers	Jack hammer use requires shin and knee guards
Legs	Sparks and flying debris from grinding, laceration from chainsaw use, similar	Use chaps right for the hazard (cut resistant, flame resistant, etc.)
Feet	Dropped objects, slip, trip, and fall	Only ANSI Z41.1 and ASTM F2413-17 shoes are allowed on-site. When electrical hazards exist, EH shoes will be required
Whole Body	Flash Fire	Use NFPA 2112 rated flame-resistant clothing
Whole Body	Arc Flash, Arc Blast	USE NFPA 70E rated flame-resistant clothing with the appropriate calorie rating. Refer to the electrical safety program for details.

Whole Body	Chemical splash, mist	Compatible chemical protective clothing (CPC) is required up to and including aprons, coveralls or rain suits, gloves, face and eye protection, and for volatile chemicals, respiratory protection. Contact safety personnel for anything beyond incidental chemical handling

BARRICADES, SIGNS, AND TAGS

This section addresses the use of barricades, signs, and tags used for OSH purposes. Refer to the hazard communication program for information on chemical labels, the fall protection program for information on warning and control lines, the electrical safety program for information on barricades related to shock and arc-flash protection, and when applicable, refer to substance-specific programs.

GENERAL GUIDELINE

OSH-related barricades, signs, and tags:

- Alert readers to the indicated hazard
- Supply information on how to avoid the indicated hazard
- Designate no-go and unsafe areas, or areas requiring caution or authorized personnel
- Identify necessary safety equipment
- Offer general safety information

This organization expects employees to respect and follow barricades, signs, and tags, always.

Never use barricades and signs in place of a guardrail or gate when the guardrail or gate prevents falling or falling objects.



BARRICADES

Barricades notify personnel of specific hazards, warn personnel to stay clear, or prevent access by unauthorized personnel. Barricades include barricade tape, physical barricades, and other similar equipment. Barricade tape should ideally contain the signal symbol with the signal words danger or caution, together with a specific requirement such as keep out.

When used, barricade tape, physical barricades, and markings on physical barricades will conform to the following:

- Barricades are used to indicate hazards and are promptly removed when the hazard no longer exists
- Barricades and tape must be substantial enough to withstand the weather and the intended use without coming apart or falling
- Barricades must be maintained
- Use only one color and signal word; do not mix and match colors or signal words
- The person or organization who installs the barricade tape is responsible for maintaining the integrity of the barricade tape and for maintaining the barricaded area in terms of housekeeping and orderliness

Install the barricade:

- Before the hazardous work commences
- Fully surround the hazardous area
- When using tape or similar, install so that it is 39-inches high with a sag not lower than 34-inches

The person or organization who installs the barricade handles removing the barricade when the hazard no longer exists.

If a person or organization changes the nature and scope of the hazard in a previously barricaded area, that person, or organization assumes responsibility for that hazard and the barricaded area unless specific, mutually agreed-upon arrangements are made to the contrary.

Traffic Safety Barricades

Barricades used for traffic safety must meet the requirements in the Manual on Uniform Traffic Control Devices (MUTCD). Refer to that document for further details.

Other Programs Requiring Barricades

Some regulations require the use of specific barricade types, with specific colors, markings, strength requirements, and other features. Examples include:

- Warning and control lines in certain fall protection applications
- Barricades for arc-flash and shock boundaries in electrical safety applications
- Posting crystalline silica exposure areas
- Other similar functional applications

For these and other specific applications, refer to the applicable program for further details.

SIGNS

Signs are used to denote specific hazards and to provide time to act and avoid the hazard. Place signs in proximity to the hazard and ensure they are visible. When signs designate a specific area, apply them at all entrances to that location. Cover up or remove signs when the hazard no longer exists. Signs are required for specific work tasks as defined within the applicable program.

In general, signs should have the following:

- An applicable signal word (i.e., danger, warning, caution)
- The hazard (i.e., shock hazard, fall hazard, etc.)
- The consequences of the hazard
- How to avoid the hazard (i.e., keep out, keep hands out, etc.)
- Graphical symbols that reinforce the message without the use of words

In some circumstances, specific legal requirements may cause deviations from this standard when the specific regulation has requirements unique to that regulation.

Exit Signs

Lighted exit signs are needed in facilities that are operational, over each designated exit. Exit signs are also needed in buildings under construction or remodel, when it is not immediately obvious where the exit is located.

Traffic Safety Signs

Signs used for traffic safety must meet the requirements in the MUTCD and applicable state amendments. Refer to that document and the applicable amendments for further details.

Signs for Substance-Specific Programs

Substance-specific programs, including but not limited to asbestos, crystalline silica, and lead have specific sign requirements. When applicable, refer to these programs for other information.

TAGS

Use tags to temporarily identify hazards (such as defective tools, damaged electrical cords). Also use tags to indicate the equipment's status (For example, red-tag, green-tag system for scaffold, or the use of tags for locking and tagging equipment, etc.). Tags must have a signal word and a major message that is understandable to all employees, preferably with a graphic symbol that reinforces the message. Tags must be affixed as close as possible to the hazard and removed when the hazard is no longer present.



LANGUAGE AND COLORS FOR BARRICADE LABELS, SIGNS, AND TAGS

Barricade markings, signs, and tags use several signal words and colors:

- Danger/Red
- Warning/Orange
- Caution/Yellow
- Green
- Blue

Danger/Red

This indicates the hazard is immediate. If the hazard is not avoided, death, or severe injury is likely. This signal word and color combination is used on barricades, signs, and tags. Examples include, but are not limited to the following:

- Barricade – Arc-flash boundary or limited approach shock boundary. “Danger – Electrical Hazard, Do Not Enter”
- Sign - Rotating heavy equipment. “Danger – Rotating Equipment, Crush/Caught-Between Hazard, Keep Out”
- Sign - Impact and fall zones. “Warning – Falling Objects, Keep Out!”
- Sign – Crystalline Silica, General Industry. “Danger – Respirable Crystalline Silica. May Cause Cancer. Causes Damage to Lungs. Wear Respiratory Protection in this Area. Authorized Personnel Only”
- Sign – Crystalline Silica, Construction Site. “Danger - Respirable Crystalline Silica Inhalation Hazard, Keep Out”
- Tag - Locked and tagged equipment. “Danger – Do Not Operate, Do Not Energize”

Untrained and unauthorized personnel must either stop and/or do not enter.

When it is a sign or barricade designating a location, authored personnel may enter if they are hazard aware, appropriately trained based on the situation, are wearing the correct personal PPE, observing the

appropriate safe-work practices, and entry is performed only when it is safe. When personnel question if they are “authorized,” the answer is no, keep out.

When it is a tag, employees must follow the procedures and safe-work practices associated with the tag. For example, if equipment is locked and tagged, only the authorized-employee who applied it may remove the lock and tag, and only if safe to do so.

Regardless, no employee may step on, sit on, or work off any hole cover unless that cover is designed for such use in accordance with the hole cover requirements in the fall-protection program.

Warning/Orange

This indicates a potential hazard. If the hazard is not avoided, death, or severe injury may occur. This signal word and color combination is typically associated with equipment hazards, though some employers use it for other purposes. Examples include, but are not limited to the following:

- Sign – Point of operation hazard. “Warning – Amputation Hazard, Keep Hands Away”
- Sign – Arch and Shock Flash Hazard. “Warning – Observe Safe-Work Distances, Use Correct PPE”

Caution/Yellow

This indicates a potential hazard. If hazard is not avoided, minor, or moderate injury may occur. Personnel should exercise caution when entering area. Examples include, but are not limited to the following:

- Excavation obscured by vegetation or objects. “Caution – Open Excavation, Stay Clear of Edge”
- Hot equipment surfaces. “Caution – Hot Surfaces, Avoid Contact”

Safety Information/Green

This color indicates emergency egress routes, the presence of safety equipment, the presence of first-aid stations, and other similar uses.

Notice/Blue

This color indicates information about an item or area that may or may not be safety related.



UNAUTHORIZED REMOVAL OF BARRICADES AND SIGNS

Barricades and signs are hazard controls - Only personnel that placed barricades and signs should remove them. If another trade removes a sign for specific and allowable reasons, even inadvertently, the individuals and organization removing them must reset them appropriately. However, restrictions apply. Refer to the Hazard Control section for this document for additional information on the unauthorized or inappropriate removal of controls.

EMERGENCY MANAGEMENT

This section addresses emergency response, first-aid kits, medical response procedures, evacuation, and head count procedures. Refer to the site specific EAP for additional details.

SITE-SPECIFIC EAP

This document is accompanied by a site specific EAP found in the appendices. This form will be maintained at the jobsite and updated as necessary to ensure its applicability. The frontline leader will make this plan available to all personnel upon initial assignment, and in an easily accessible manner.

FIRE EXTINGUISHER AVAILABILITY AND USE

Portable fire extinguishers are provided at the jobsite for use by properly trained employees. The number of fire extinguishers and their location is subject to the following:

- The organization supplies a minimum of two fire extinguishers for use at the jobsite with additional extinguishers provided as-needed based on hot-work

- Each extinguisher in service will be fully charged, regularly inspected, fully operational, and ready for immediate use
- Inadequate, damaged, or missing fire extinguishers will be replaced upon discovery
- The minimum size and rating of portable fire extinguishers is 20-pound (6A:80B:C)

In the event of fire, any employee may use extinguishers to attempt to extinguish the fire before evacuating provided they are trained, the egress route is clear, and the rules, and procedures for safe use of portable fire extinguishers are observed.

Portable fire extinguishers are only used to facilitate escape and for fires in the incipient stage. Never use portable fire extinguishers if untrained, on structural fires, or for fires involving flammable compressed gases or hazardous materials.

FIRST-AID KITS

First-aid supplies must be weatherproof, unlocked, and easily accessible. The minimum contents of the first-aid kits conform to ANSI/ISEA Z308.1-2015 class B first-aid kit requirements in a type IV (waterproof) case, or enclosure.

The kit must contain PPE for protection against bloodborne pathogens during blood or bodily fluid clean-up. Optionally, a supplemental kit containing PPE protection is available.

Inspect first-aid kit at least weekly and replenish them as needed to maintain a sufficient level of supplies.

MEDICAL RESPONSE PROCEDURES

All injuries and illnesses occurring at work must be reported to frontline leader as soon as possible after the incident, except for first-aid only incidents. First-aid only incidents must be reported by the start of the next business day after the incident.

If a medical event or trauma occurs at the jobsite, specific procedures apply.

- Life or Limb Threatening. Examples include loss of consciousness, severe burns, loss of an eye, amputation, severe, and uncontrolled bleeding, suspected stroke, suspected heart attack, and similar conditions
- Non-Life or Limb Threatening. Examples include minor to moderate lacerations, mild bleeding, contusions, small thermal burns, and similar situations where medical assistance is required but an ambulance is not needed
- First-Aid Only. Minor incidents not requiring medical treatment

Life- or Limb-Threatening

Life- or limb-threatening trauma, or medical emergency require the following procedure:

- Call 911, unless advised differently at this jobsite and request medical assistance
- Have one employee proceed to the entry way to meet the fire department and the ambulance
- Render aid as appropriate only to the first responders' level of training
- Do not attempt transport in a personal or organization vehicle

Non-Life- or Limb-Threatening

Non-life- or limb-threatening trauma or medical incidents require the following procedure:

- Render aid as appropriate only to the first responders' level of training
- Arrange transportation of the injured or ill party to the nearest emergency room for evaluation and treatment
- Transportation in an organization vehicle is permitted if the injured party is conscious, alert, any bleeding is under control, and the victim is safely transportable

First-Aid Only

For first-aid only incidents, the injured party helps themselves to any necessary first-aid items as necessary for the situation.

Designated Medical Facilities

Designated medical facilities include primary and secondary options as defined in the site-specific EAP.

EVACUATION PROCEDURES

A verbal order to evacuate, audible fire alarm, sustained air horn blast, or other communication method require the complete evacuation from the jobsite to the designated muster area.

Personnel

When ordered, personnel will:

- Leave belongings behind
- Evacuate with group or individually to the muster area, or other designated location
- Remain at muster area or designated location unless told to move
- Follow instructions

Frontline Leaders

Frontline leaders will:

- Lead occupants to designated evacuation point, sweeping the work area during departure; Upon arrival at the muster area, occupants may be directed to an exterior safe refuge area or a secondary muster area
- Account for direct reports and report missing personnel to first responders
- Report injuries or problems to first responders
- Maintain contact with other on-site trades and organizations to coordinate efforts
- Monitor the situation closely and adjust responses appropriately
- Keep personnel informed contemporaneously
- Signal an all clear when the danger has passed with instructions on returning to work

Designated Muster Areas

Designated muster areas include primary and secondary options as defined in the site-specific EAP form.

Headcount Procedures

In the event of a complete or partial evacuation, or after events that scatter occupants, a headcount is required to ensure personnel are accounted for.

When employees reach muster areas, they will organize by crew and organization. The frontline leader will conduct a headcount, identify missing persons, and reports this information to first responders. Employees must remain together, on-site, in the designated muster area, until released.

This organization will maintain a current list of on-site employees to facilitate rapid identification of missing persons.

An all-clear order indicates danger has passed and personnel may return to work or depart the jobsite. Depending on the circumstances, a debrief could be necessary.

FIREARMS AND WEAPONS

Firearms and weapons carried at jobsites present a security and safety risk. This organization disallows firearms and weapons at jobsites, including concealed carry license holders, as further described below.

FIREARMS AND WEAPONS ARE PROHIBITED

This organization prohibits Weapons of any type at jobsites. The carrying of a Weapon of any kind while at a jobsite or inside a private vehicle parked on-owned or leased property, or a client's property, is prohibited, is a violation of this policy, and will subject the employee to discipline, up to and including termination. This policy applies even if the person in question possesses a validly issued concealed weapons permit. This policy applies to all personnel.

For purposes of this policy, the term “Weapon” has the same meaning given to it by C.R.S. 18-1-901(3)(e), more specifically described as “(I) A Firearm, whether loaded or unloaded; or (II) A knife, bludgeon, or any other weapon, device, instrument, material, or substance, whether animate or inanimate, that, in the manner it is used or intended to be used, is capable of producing death or serious bodily injury.”

For purposes of this policy, the term “Firearm” has the same meaning given to it by C.R.S. 18-1-901(3)(h), more specifically described as “any handgun, automatic, revolver, pistol, rifle, shotgun, or other instrument or device capable or intended to be capable of discharging bullets, cartridges, or other explosive charges.”

In the event this organization believes an employee poses a risk of danger to themselves or others, this organization reserves the right to make further inquiry as to whether the employee has a Weapon at the jobsite.

In the event this organization learns that an employee has a Firearm or other Weapon in his or her vehicle, this organization has the right to question the Team Member to determine that the above conditions are satisfied. If the employee is not in compliance with the law and this policy, the employee is subject to disciplinary action, up to, and including termination of employment, and other legal remedies appropriate for the circumstances, including a referral to law enforcement.

Please note that neither the law, nor this policy, allows persons to possess firearms in vehicles owned by another individual.

HAZARD ASSESSMENTS, CONTROLS, AND CORRECTIVE ACTIONS

This organization requires that competent person conduct frequent and regular jobsite, materials, and equipment hazard assessments, and it requires prompt, compliant, and effective controls, and corrective action implementation.

HAZARD ASSESSMENTS

This organization requires informal hazard assessments, formal hazard assessments, and job-hazard analyses (JHA) so it can proactively identify and correct hazards.

Informal, Employee, On-the-Job Assessments, and Observations

This organization authorizes and empowers personnel that observe hazards, unsafe situations, or behaviors, to immediately address the issue and inform their frontline leader. In some cases, the hazard, or unsafe behavior is correctable at once, through job knowledge, simple fixes, and prompt communication. In other situations, the hazard or unsafe behavior is part of a bigger problem, requires an engineered solution, requires specialized personnel, or is not easily correctable for other reasons. Observing personnel will surface hazards with their frontline leaders. The frontline leader receiving the report will promptly address the hazard.

Formal Hazard Assessments

Frontline leaders perform periodic hazard assessments, to proactively identify hazards and target them for abatement, before they cause harm. The duration and frequency of hazard assessments is determined by the hazards inherent to the work, the work's complexity, its scope, past incident history, and other relevant factors. The minimum frequency for active jobsites is weekly.

To assist in the identification, evaluation, and control of hazards, and appropriate application of the technical aspects of the programs in this document, this organization uses the services of occupational safety and health professionals knowledgeable and skilled in these tasks, and in the associated safety and health regulations and consensus codes, to periodically inspect the workplace and to help this organization maintain an appropriate level of inspection quality.

Job Hazard Analysis

For each major task, the assigned frontline leader will complete a JHA consistent with industry best practices. The JHA will identify foreseeable hazards personnel will encounter with enough detail to allow readers to understand the hazards and the assigned hazard controls. The JHA is shared with personnel before the work it covers begins. When the general contractor or host employer requests daily JHAs, this organization will comply.

CONTROLS AND CORRECTIVE ACTIONS

Hazards uncovered in JHA's and other similar proactive assessment methods require controls implementation before the task begins. The implemented controls must be effective and legally compliant.

This organization encourages and empowers personnel to correct hazards upon discovery, consistent with applicable regulations and best practices, together with the technical aspects and the limitations of selected control methods. This is especially true for severe hazards.

However, corrective actions are sometimes complex, require more evaluation, need specialized equipment, need specialized materials, or require additional or specialized personnel that are not present at the time of discovery. In these cases, the timeline for corrective action is directly dependent on the hazard's severity.

Hazards that are life threatening, limb threatening, have serious injury potential, that will or could create a fire or explosion, that will or could cause a chemical release, that will or could affect structural stability, or have other similar serious consequences, require immediate cessation of work upon recognition, with corrective action implementation and verification before restarting work.

Hazards that are less severe require correction as quickly as soon as reasonably possible, and no later than the end of the shift they are found, or the following shift's start, when identified at the end of the prior shift. Examples in this category include, but are not limited to, hazards that present minor injury or no injury potential, that have minor damage potential, or similar circumstances. Technical regulatory violations with no direct relationship to health and safety also require mitigation.

UNDER NO CIRCUMSTANCES WILL ANY EMPLOYEE OR SUBCONTRACTOR ALLOW A LIFE THREATENING, LIMB THREATENING, OR SEVERE IMMINENT HARM HAZARD TO PERSIST.

IF IT IS NOT POSSIBLE TO IMMEDIATELY AND PERMANENTLY CORRECT THE HAZARD, PERSONNEL MUST DEPLOY TEMPORARY AND APPROPRIATE SAFEGUARDS TO PROTECT EXPOSED EMPLOYEES UNTIL A PERMANENT CORRECTIVE ACTION IS COMPLETED AND, ANY TEMPORARY SAFEGUARD MUST MEET BOTH OSH REGULATORY REQUIREMENTS, THIS SSSP, AND THIS ORGANIZATION'S OSH PROGRAMS. PERSONNEL WILL COORDINATE WITH FRONTLINE LEADERS, WHO WILL IN TURN COMMUNICATE AND COORDINATE WITH THE GENERAL CONTRACTOR, HOST EMPLOYER, AND OTHER EXPOSED PARTIES, AS NECESSARY AND APPROPRIATE.

PERSONNEL ARE EXPRESSLY PROHIBITED FROM USING TIME AS A CORRECTIVE ACTION. FOR EXAMPLE: LEAVING A FLOOR HOLE IMPROPERLY GUARDED BECAUSE UPCOMING WORK OVER THE NEXT TWO DAYS INVOLVES INSTALLING EQUIPMENT OVER THE HOLE. WHILE THIS ADDRESSES THE HAZARD, THE HOLE IS UNPROTECTED FOR A TIME. THE HOLE MUST BE GUARDED PROPERLY, ALWAYS.

PERSONNEL ARE EXPRESSLY PROHIBITED FROM USING COMMUNICATION AS A CORRECTIVE ACTION. WHILE IT IS IMPORTANT TO COMMUNICATE THE PRESENCE OF HAZARDS, COMMUNICATION ALONE IS NOT AN EFFECTIVE CONTROL METHOD. THE PROPER SELECTION AND IMPLEMENTATION OF EFFECTIVE CONTROLS TOGETHER WITH GOOD COMMUNICATION IS THE CORRECT APPROACH.

Changing Circumstances and Reemerging Hazards

Corrective action effectiveness is often subject to changing circumstances, incorrect controls construction, incorrect installation, incorrect reinstallation, and other problems. Sometimes, previously corrected hazards reemerge. Furthermore, uninvolved personnel are at increased risk when working near hazards they do not understand or are not aware of. Personnel must pay careful attention to ensure that each hazard control is properly designed, properly installed, properly maintained, and when conditions and work occur that affects the control, it is correctly reinstalled.

If any personnel remove, change, or adjust a hazard control, the employee, and the employee's organization, will reinstall the hazard control, or cause its reinstallation by a qualified party. Reinstallation will return the hazard control to an effective and legally compliant status. If this is not possible, the organization will inform the general contractor or host employer, as applicable, and will establish temporary and effective alternate safeguards to control the hazard during a limited interim period. The frontline leader for the organization that disturbed the controls will communicate these situations to the general contractor or host employer as applicable, and any affected trades.

Example – If a structural hole cover is removed and must be reinstalled, but there is insufficient lumber and insufficient know-how to reinstall the cover properly until the next day, the personnel and organization that disturbed the hole cover must then install temporary standard guardrails around the hole or disallow personnel from entering the room or floor where the hole exists by locking doors, posting signs, and other methods that completely preclude personnel access, coordinating these activities with the general

contractor or host employer. Because the hole presents a hazard to other trades, the general contractor could take over responsibility of properly guarding the hole.

THE ORGANIZATION WHO'S EMPLOYEES DISTURB THE HAZARD CONTROL HAVE AN ONGOING OBLIGATION TO EFFECTIVELY RE-ESTABLISH THAT CONTROL AND COMMUNICATE TO OTHERS AS INDICATED ABOVE. THE DISTURBING ORGANIZATION IS NOT RELIEVED OF ITS RESPONSIBILITIES UNDER THIS SECTION UNTIL AND UNLESS A HIGHER TIER CONTRACTOR INDICATES IT WILL TAKE RESPONSIBILITY FOR RE-ESTABLISHMENT OF THE HAZARD CONTROL AND THEY RESPOND TO THE JOBSITE TO INITIATE CONTROLS.

Records

The assigned frontline leader will maintain a contemporaneous record of all completed hazard assessments, redacted incident reports and investigations, and corrective action documentation, for the full length of the project.

HOUSEKEEPING

This section addresses the importance of housekeeping at this jobsite. It includes cleaning frequency and methods of disposal.

HAZARDS AND CONTROLS

Good housekeeping habits can prevent fire, injuries, and allow emergency crews faster access. Employees will:

- Perform daily housekeeping
- Maintain a clean and orderly worksite
- Maintain a clear means of egress to all exits, keep all exits and exit discharges clear of debris
- Remove scraps, debris, trash
- When cleaning, avoid creating excessive dust. Use vacuums, sweeping compounds, and avoid methods that create dust. When cleaning up areas after work is completed that involves exposure to crystalline silica dust, the only safe cleaning method is with a HEPA-rated vacuum

Area	Items to Clean	Cleaning Methods. Other Comments
Ailes, Passageways, doors	Obstructions that impede egress in passageways, egress routes, exits, exit discharges	Remove obstructions, and debris promptly. Stack and store materials in designated material staging areas. Confirm all exits are clear of debris and functional.

		Frequency: As needed, not less than daily
Floors and grounds	Scrap lumber, protruding nails, protruding bolts, rebar, and other debris	Sweep debris, pick up the scrap lumber, and place them in designated receptacles. Remove protruding nails, splinters, and loose boards. Use non-dust creating methods, cap all rebar that presents an impalement hazard, cut off all protruding bolts from walking and working surfaces Frequency: As needed, not less than daily
Trash bins	General waste	Empty trash bins frequently. Do not allow waste to go over the top of the bin Frequency: As needed, not less than daily
Recycle bins	Recyclables	Employees are encouraged to recycle materials when possible. Frequency: As needed
Trash bins for oily waste	Combustible, oily substances, and used rags	Only use designated, labeled. metal bins with self-closing lids for oily waste. Frequency: As needed, not less than daily
Electrical waste	Scrap wire, wire cuttings, conduit tubing	Remove daily by sweeping and picking up larger pieces. Place electrical waste in designated bins for disposal or recycling, mark damaged electrical cords or destroy to avoid reuse Frequency: As needed, not less than daily

INCIDENT REPORTS AND INVESTIGATIONS

This section addresses the reporting of unanticipated incidents. Each covered incident requires prompt reporting, investigation, and deployment of appropriate corrective actions.

REPORT AND INVESTIGATION PROCEDURE

Personnel must report all the following:

- Workplace injuries
- Suspected or actual occupational health exposures
- Violence or threats of violence
- Incidents involving property damage
- Incidents without injury or property damage leading to injury or property damage (near misses, also called near hits)

Employees of this organization make verbal reports to their frontline leader as soon as possible after the incident. A follow-up written report is required by the start of the following business day.

This organization will report selected incidents to the general contractor or the host employer, as applicable. These include incidents that involve actual injuries, property damage, violent threats, and workplace violence. Copies of written reports and investigations are supplied as they are available.

A qualified person investigates and documents each incident to find the root causes, contributing causes, and identify corrective actions. The investigator will make this report available once it is prepared.

When corrective actions are necessary, involved parties will promptly address them. Refer to the Hazard Assessment and Corrective Actions section of this document for additional details.

OSHA requires direct reporting of the following situations:

- Report within 24-hours: Hospitalization, amputation, or loss of an eye
- Report within 8-hours: Workplace fatality

Consistent with legal requirements, subcontractors are expected to promptly notify OSHA of the occurrence of any injury that requires a direct OSHA report, with prior notification to this organization. Similarly, if one of this organization's employees receive an injury that is directly reportable to OSHA, it will first notify the general contractor or the host employer.

This document includes the following forms:

- First Report of Injury
- General Incident Report Form (for all other incidents)
- Incident Investigation Form

STOP WORK

This section addresses the basic steps to take to issue and manage a stop work scenario. Personnel will coordinate with other trades and other employers as necessary in the event a stop work is issued between those trades or employers.

STOP WORK PROCEDURE

This organization expects employees to immediately halt any task or operation jeopardizing safety, health, or the environment. Examples of situations possibly requiring stop work include:

- Imminent harm
- Serious equipment malfunction
- Unsafe conditions
- Near hits/misses
- Alarms and emergencies
- When an incident occurs
- Anytime anyone believes people, equipment, or the environment are at risk

If the situation does not involve imminent harm, coordinate the stop work through the frontline leader. If the frontline leader is not available or there is an immediate risk to health or the environment, then stop work immediately and take the following steps.

- Remove person(s) from the situation or area as needed
- Stabilize the situation and make the area as safe as possible
- Affected personnel will discuss and gain agreement on the stop work issue and corrective actions
- If affected personnel agree the situation is safe, they will continue with the work; however, if affected personnel determine the stop work issue is valid, the group will correct the hazard
- If the situation is not immediately resolvable, the group will suspend the work until proper resolution is achieved

The frontline leader makeS the final determination on stop work validity or adequacy of the resolution actions, documenting differing opinions.

Stop work interventions are followed-up by a frontline leader to address the root cause, assess if the situation was resolved in a timely manner, and opportunities for improvement.

When conflicts arise during stop work scenarios, the next level of management uninvolved with the work will resolve the discrepancy.

Employees or contractors legitimately using their stop work authority are exempt from disciplinary action.

TRAINING

This section briefly addresses safety and health training applicable to jobsites.

SAFETY AND HEALTH TRAINING REQUIREMENTS

Employees are trained in accordance with the hazards encountered and the applicable regulatory requirements, before assignment to the jobsite. This organization expects subcontractors to confirm to this requirement.

When OSHA requires it, assigned personnel must meet applicable competent-person, qualified-person and certification experience and requirements.

All personnel who work onsite will receive a site orientation prior to working. The frontline leader or a qualified designee will administer the orientation.

Pre-task safety briefings occur at the start of each major phase of work and as needed otherwise. the frontline leader will discuss the hazards and required controls for safely completing the work. Safety briefings are documented.

Toolbox talks are held at least once each week, reviewing contemporaneous safety issues.

The jobsite is not the time or place to provide comprehensive occupational health and safety training. This organization expects subcontractors to ensure their employees are properly trained before arrival at the jobsite. However, in limited circumstances, when specific needs arise, this organization may coordinate specific occupational health and safety training sessions to facilitate the safe completion of work and/or to meet regulatory requirements. Attending subcontractors may incur back charges if the training is an OSHA requirement that directly applies to their work and should have been completed prior to mobilization.

First-Aid, CPR, and AED Training

First-aid, CPR, and AED certifications are encouraged for all personnel, but required for:

- Personnel working on electrical systems over 50-volts, including qualified-persons (electrical) and authorized employees who check for zero energy state during lockout/tagout procedures or troubleshoot electrical systems
- At least two individuals reporting to each subcontractor who are consistently present at the jobsite

SITE SPECIFIC SAFETY PLAN

TOPICAL SAFETY AND HEALTH REQUIREMENTS

CONTROL OF HAZARDOUS ENERGY

This section applies to the control of hazardous energy when employees work on equipment, machines, and prime movers, collectively called equipment, and are exposed to the unexpected energization or startup of the equipment or the release of stored energy. This section also applies to work on new and existing electrical systems, when performed. Refer to the Control of Hazardous Energy and the Electrical Safety programs for further details.

SCOPE AND APPLICATION CLARIFICATION

The Federal OSHA control of hazardous energy regulation, found at 29 CFR 1910.147, does not apply directly to construction activities, though several construction industry OSH regulations require the implementation of hazardous energy control principles, and these principles always apply to electrical safety. Accordingly, to provide safe jobsites, the organization requires the application of lockout-tagout procedures when employees are exposed to hazardous energy during the installation and commissioning of new equipment, during tie-ins, and at other times even when construction regulations do not specifically stipulate this fact.

This section also addresses:

- Equipment components, part assemblies, motors and related items that were removed from the equipment and require benchtop energizing and testing to verify correct function or repairs
- Employees engaged in electrical work when the only energy type is electricity and an electrically safe working condition (ESWC) is required
- Isolation of permit-required confined spaces from hazardous energy

A limited lockout-tagout exemption exists for troubleshooting equipment and equipment components when the only energy source is electricity, and the employee performing the task is a qualified-person with respect to that task, as defined in the electrical safety program; refer to that program for additional details.

WARNING

PERFORMING EQUIPMENT SERVICE, EQUIPMENT MAINTENANCE, LINE BREAKING, WORKING ON ELECTRICAL SYSTEMS AND CIRCUITS, AND PERFORMING OTHER SIMILAR TASKS THAT EXPOSE AN EMPLOYEE TO HAZARDOUS ENERGY, WITHOUT AN ADEQUATE LOCKOUT-TAGOUT, AND THE IMPROPER REMOVAL OF ANOTHER AUTHORIZED-EMPLOYEE'S LOCKS AND TAGS, ENDANGERS LIVES, AND WILL RESULT IN DISCIPLINARY ACTION, UP TO AND INCLUDING EMPLOYMENT TERMINATION.

HAZARDS AND CONTROLS

This section addresses employee exposure to hazardous energy, stored energy, and the unexpected startup of equipment and machines.

Hazard(s)	Source(s)	Control(s)
Exposure to hazardous energy, stored energy, or unexpected equipment startup	Equipment and machines, various energy types, and sources, see below for additional explanatory material	When employees must repair, modify, complete preventative maintenance, complete tie-ins to existing systems or perform other work that exposes them to hazardous energy, the equipment must be deenergized, isolated from hazardous energy sources, locked, and tagged in accordance with the Control of Hazardous Energy program When existing systems are in use, employees must coordinate with the client-owner's authorized-employees, placing locks, and tags over the owner-client's, but never first Refer to as-built drawings, process descriptions, operator knowledge and related information to help identify hazardous energy sources in existing systems Each person applying locks and tags is an authorized-employee and must have authorized-employee training
Exposure to electrical shock	Energized electrical circuits and systems	Lockout-tagout applies to electrical circuits, always observe shock boundaries defined in NFPA 70E, use appropriate insulating equipment, and PPE including appropriately rated, gloves, and leathers, select, and use other appropriate safe-work practices, select, and use an appropriate VOM, never work hot except when troubleshooting and always using prescribed requirements
Exposure to arc-flash/blast	Resetting certain circuit breakers, troubleshooting certain live circuits, other tasks defined in the electrical	Observe applicable arc-flash boundaries, use flame-resistant and arc-rated PPE with the appropriate protection level defined in NFPA 70E, select and use other

safety program, and
NFPA 70Eappropriate safe work practices, select
and use an appropriate VOM

HAZARDOUS ENERGY

Hazardous energy is energy that can cause injury due to its sudden release. Often, hazardous energy is stored within a system and subject to release, often without warning. There are many hazardous energy categories and examples. The most common are listed below.

Mechanical energy, also called kinetic energy, or the energy of motion, is the movement of equipment components or materials. Examples of mechanical energy include:

- Mechanical movement within a machine
- Suspended machine components
- Suspended materials
- Springs that are under tension or compression

Mechanical energy can be relieved or blocked to prevent unanticipated release.

Systems with fluids under pressure, either gaseous or liquid, include:

- Pressure vessels
- Gas tanks
- Hydraulic systems
- Pneumatic systems
- Steam in boilers, steam generators, and associated pipes
- Hazardous chemicals stored within pressurized pipes or tanks

Vertically oriented pipes will produce pressure when opened at the bottom, due to the weight of gravity pushing down on the column of fluid (called hydrostatic pressure). Some chemicals react under specific circumstances and cause the build-up of pressure as they liberate chemical vapors.

Investigate these situations carefully, relieve pressure in a safe and controlled manner and establish lockout-conditions that prevent pressure build-up.

Investigate unlabeled pipes first to determine the contents and whether they contain pressure.

Electricity creates the potential for:

- Shock
- Electrocution
- Arc-flashes and arc-blasts that cause injury from heat, shrapnel, hazardous gases, and noise

Only qualified-persons may work on electrical systems. Refer to the electrical safety program for details.

Static electricity is often a concern because it can discharge and ignite combustible dust and flammable vapors. Dry air increases the potential for static electricity, as does the movement of flowable materials, including liquids, across plastic, and other synthetic surfaces and within plastic parts and pipes. Static energy must be dissipated through grounding and bonding.

Electrical storage devices include batteries and capacitors. Before work begins, batteries must be disconnected from the system while capacitors must be safely discharged.

Thermal energy can occur at high or low temperatures. Some of the sources of thermal energy include:

- Heated and boiling water
- Steam
- Heated machine components
- Cryogenic systems and fluids

Non-ionizing radiation includes:

- Bright lights
- Lasers
- Microwaves

These systems must be turned off, locked, and tagged, before work begins.

Ionizing radiation includes alpha, beta, gamma, and neutron radiation from radioactive sources and with respect to gamma rays and z-rays, radiation machines. Specialized training is required when working with these systems.

CRYSTALLINE SILICA (TASK ON TABLE ONLY)

This section addresses crystalline silica hazards associated with various construction activities when the task is on table 29 CFR 1926.1153(c)(2). This section does not address tasks not found in this table. Refer to this organization's Crystalline Silica Exposure Control Plan for full details.

EXPOSURE CONTROLS

This organization uses engineering and work practice controls to control respirable crystalline silica as indicated in table 1. When tasks are performed that do not appear on table 1 or when table 1 is not fully implemented, this organization will apply the controls established from scheduled or performance monitoring as developed by an OSH professional in conformance with this program and as documented in the program addendum.

Implementation of 29 CFR 1926.1153(c)(2) Table 1

When applicable, the engineering controls, work practice methods, and required respiratory protection specified in Table 1 must be properly and fully implemented. This includes, but is not limited to verifying the following:

- For indoor work, ventilation is effective and minimizes visible dust accumulation
- When wet methods are used, water flow rates are sufficient to minimize visible dust
- Activities that are performed within enclosed cabs or booths are maintained free from settled dust, have door seals that function properly, have gaskets and seals in good working condition, are under positive pressure through the delivery of fresh air that is filtered through a 95% efficient filter in the 0.3-10.0 um range, and has both heating and cooling capabilities

Where an employee performs more than one task on Table 1 during the course of a shift, and the total duration of all tasks combined is more than four hours, the required respiratory protection for each task is the respiratory protection specified for more than four hours per shift. If the total duration of all tasks on Table 1 combined is less than four hours, the required respiratory protection for each task is the respiratory protection specified for less than four hours per shift.

Respirators

Respirators are required under the following circumstances:

- When specified by Table 1
- For tasks not listed in Table 1, or when the engineering controls, work practices, and respiratory protection described in Table 1 are improperly or incompletely implemented
- Where exposures exceed the PEL during periods necessary to install or implement feasible engineering and work practice controls
- Where exposures exceed the PEL during tasks, such as certain maintenance and repair tasks, for which engineering and work practice controls are not feasible
- During tasks for which an employer has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL

Where an employee performs more than one task on Table 1 during the course of a shift, and the total duration of all tasks combined is more than four hours, the required respiratory protection for each task is the respiratory protection specified for more than four hours per shift. If the total duration of all tasks on Table 1 combined is less than four hours, the required respiratory protection for each task is the respiratory protection specified for less than four hours per shift.

This organization maintains a separate respiratory protection plan – Refer to that program for details on the proper use of respirators, respirator-related medical surveillance, and other requirements.

Barricades and Signs

Whenever an employee performs work that will or could generate airborne dust that contains crystalline silica, regardless of the airborne concentration, they will use barricade tape, signs, or a combination to restrict access to the work area. The authorized persons working in the area will not allow unauthorized individuals to enter the area. When other authorized users do enter the area, the employees conducting the work will ensure that new arrivals use the appropriate PPE.



**Inhalation Hazard.
Authorized Persons
Only. Respirator
Required.**



**Peligro de inhalación.
Solo para personas
autorizadas.
Respirador requerido.**



Housekeeping

This organization ensures that all housekeeping activities used to remove settled silica containing dusts from surfaces does not introduce dust to the air. If housekeeping activities ever generates visible dust the activity must be stopped, and the housekeeping technique must be reformulated to ensure that dust is not generated.

This organization uses wet methods and HEPA vacuums to remove settled dust from floors and surfaces. Wet methods include using water to spray onto the dust source to allow for wet mopping, sweeping, and wiping.

When wet methods and HEPA vacuums create risk to life or health, the use of dry sweeping compound is permitted for limited activities under authorization of the program administrator. The use of dry sweeping compound is not as effective as other methods and will only be approved on a limited basis when no other alternative exists and, it is properly done to control airborne dust. In addition, many commercially available dry sweeping compounds contain silica or other hazards that must be evaluated prior to introducing them into the workplace.

This organization disallows the use of compressed air for cleaning floors and surfaces contaminated with silica containing dusts except when used in conjunction with an effective ventilation system which captures the liberated dusts close to the source of the dust.

All bags or other silica containing waste storage are tightly closed preventing the accidental release of silica containing dusts.

TABLES

The table below is adapted from 29 CFR 1926.1153(c)(2) Table 1 – Specified Exposure Control Methods When Working with Materials Containing Crystalline Silica.

29 CFR 1926.1153(c)(2) TABLE 1			
Equipment or Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤4 hours/shift	>4 hours/shift
(i) Stationary masonry saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None
(ii) Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions:		
	—When used outdoors	None	APF 10
	—When used indoors or in an enclosed area	APF 10	APF 10
(iii) 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 Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None

29 CFR 1926.1153(c)(2) TABLE 1			
Equipment or Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤4 hours/shift	>4 hours/shift
	Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency		
(iv) Walk behind saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions:		
	—When used outdoors	None	None
	—When used indoors or in an enclosed area	APF 10	APF 10
(v) Drivable saws	For tasks performed outdoors only: Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None
(vi) Rig mounted core saws or drills	Use tool equipped with integrated water delivery system that supplies water to cutting surface Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None
(vii) Handheld and stand mounted drills	Use drill equipped with commercially available	None	None

29 CFR 1926.1153(c)(2) TABLE 1			
Equipment or Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤4 hours/shift	>4 hours/shift
(including impact and rotary hammer drills)	shroud or cowl with dust collection system Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter cleaning mechanism Use a HEPA filtered vacuum when cleaning holes		
(viii) Dowel drilling rigs for concrete	For tasks performed outdoors only: Use shroud around drill bit with a dust collection system. Dust collector must have a filter with 99% or greater efficiency and a filter cleaning mechanism	APF 10	APF 10
(ix) Vehicle mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with a low flow water spray to wet the dust at the discharge point from the dust collector	None	None
	OR		
	Operate from within an enclosed cab and use water for dust suppression on drill bit	None	None
(x) Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous		

29 CFR 1926.1153(c)(2) TABLE 1			
Equipment or Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤4 hours/shift	>4 hours/shift
	stream or spray of water at the point of impact:		
	—When used outdoors	None	APF 10
	—When used indoors or in an enclosed area	APF 10	APF 10
	OR		
	Use tool equipped with commercially available shroud and dust collection system Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter cleaning mechanism:		
	—When used outdoors	None	APF 10
	—When used indoors or in an enclosed area	APF 10	APF 10
(xi) Handheld grinders for mortar removal (that is, tuckpointing)	Use grinder equipped with commercially available shroud and dust collection system Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater	APF 10	APF 25

29 CFR 1926.1153(c)(2) TABLE 1			
Equipment or Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤4 hours/shift	>4 hours/shift
	efficiency and a cyclonic pre-separator or filter cleaning mechanism		
(xii) 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 the grinding surface Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None
	OR		
	Use grinder equipped with commercially available shroud and dust collection system Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter cleaning mechanism:		
	—When used outdoors	None	None
	—When used indoors or in an enclosed area	None	APF 10
(xiii) Walk behind milling machines and floor grinders	Use machine equipped with integrated water delivery system that	None	None

29 CFR 1926.1153(c)(2) TABLE 1			
Equipment or Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤4 hours/shift	>4 hours/shift
	continuously feeds water to the cutting surface Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions OR		
	Use machine equipped with dust collection system recommended by the manufacturer Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions When used indoors or in an enclosed area, use a HEPA filtered vacuum to remove loose dust in between passes	None	None
(xiv) Small drivable milling machines (less than half lane)	Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant Operate and maintain machine to minimize dust emissions	None	None
(xv) 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 Operate and maintain machine to minimize dust emissions	None	None

29 CFR 1926.1153(c)(2) TABLE 1

Equipment or Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤4 hours/shift	>4 hours/shift
	For cuts of 4-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 Operate and maintain machine to minimize dust emissions OR	None	None
	Use a machine equipped with supplemental water spray designed to suppress dust. Water must be combined with a surfactant Operate and maintain machine to minimize dust emissions	None	None
(xvi) Crushing machines	Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (for example, hoppers, conveyors, sieves/sizing or vibrating components and discharge points) Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote-control station	None	None

29 CFR 1926.1153(c)(2) TABLE 1			
Equipment or Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤4 hours/shift	>4 hours/shift
(xvii) Heavy equipment and utility vehicles used to abrade or fracture silica containing materials (for example, hoe ramming, rock ripping) or used during demolition activities involving silica containing materials	Operate equipment from within an enclosed cab. When employees outside of the cab are engaged in the task, apply water, and/or dust suppressants as necessary to minimize dust emissions	None	None
(xviii) Heavy equipment and utility vehicles for tasks such as grading and excavating but not including:	Apply water and/or dust suppressants as necessary to minimize dust emissions OR	None	None
Demolishing, abrading, or fracturing silica containing materials	When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab	None	None

FALLS AND FALLING-OBJECT PROTECTION

This section addresses hazards related to work at heights and falling-object protection for non-residential job-sites. This section does not apply to residential construction. Falls from ladders and falls from scaffold are covered in their respective sections of this document, when applicable. Refer to the fall protection, ladder safety, and scaffold programs for further details, as applicable.

HAZARDS AND CONTROLS

Any work that is more than six-feet from the ground or level below where the employee is exposed to a fall, is considered working at heights, and fall protection is required, as indicated.

When there is work at heights and there is the possibility of falling objects striking someone below, falling-object protection is required, as indicated.

Working from aerial lifts and scissor lifts is preferred, when the situation is appropriate and when an aerial lift or scissor lift is available.

Common fall hazards and controls include the following:

Hazard(s)	Source(s)	Control(s)
Fall on same level	Wet, icy, snowy, or otherwise slippery surfaces, i.e. Floors, walkways, ground surfaces, unspecified, Objects in path, loss of traction	Wear work-shoes with appropriate slip-resistance for the anticipated surfaces, remove, or dry accumulated water on walking and working surfaces, remove snow, and ice on from walking and working surfaces, address inherently slippery surfaces by spreading sand or other suitable method that increases traction, regularly clean walking, and working surfaces of debris and slippery materials, remove protruding nails, bolts, rebar, and other trip hazards from walking and working surfaces
Fall from vertical surface	Falls from all vertical surfaces during work on rebar mats, concrete forms, and similar vertical surfaces, except ladders	Use one of, or a combination of: (1) PFAS, work-positioning system, safety nets Select and use appropriate work-positioning connectors and anchorage-connectors, select appropriate anchorage locations
Fall down stairs or steps	Includes stairs to roof-access points, catwalk stairs	Install stairs or steps in accordance with OSHA requirements, employees may not use stairs when metal stair-trays are unfilled, employees must use the handrail when ascending and descending steps
Fall from floor, dock, or ground level, fall through floor	Includes all listed horizontal surfaces, includes falls through floor holes, stair holes, wall openings, and unprotected sides and edges	Fall protection for unprotected edges, including wall openings, requires one of the following: (1) Guardrails, (2) PFAS, or (3) safety nets Fall protection for floor holes and stair holes requires one of the following: (1) Guardrails, (2) Compliant floor covers or (3) PFAS When skylights are present and work is on the same level as the skylight, the skylights must be guarded with a standard guardrail around them, be designed to

		prevent falls through them or PFAS is required When work is near dock doors or similar walking and working surfaces, dock doors must be closed
Fall from piled or stacked material	All material types	Employees and subcontractors may not climb or work off of piled materials, piled materials must be stored and arranged in a safe manner not subject to falling over or falling to a level below\
Fall from roof (low-slope)	All flat or low-slope roofs, defined as a roof with a slope less than, or equal to, 4 in 12 (vertical to horizontal)	Fall protection is required and must include one of the following options: (1) Guardrail systems, (2) safety net systems, (3) PFAS, or (4) warning line system with a 15-foot set-back when in full compliance with all provisions of the fall-protection program When using PFAS, suitable anchor points and anchorage connections are required. Consultation with the owner-client and/or the general contractor may be required to identify suitable anchor locations
Fall from roof (steep)	Includes all roofs with a slope greater than 4 in 12 (vertical to horizontal)	Fall protection is required and must include one of the following options: (1) Guardrail systems, (2) safety net systems, (3) PFAS When using PFAS, suitable anchor points and anchorage connections are required. Consultation with the owner-client and/or the general contractor may be required to identify suitable anchor locations
Fall through roof	Includes falls through roof holes, stair holes, and related	Fall protection must include one of the following: (1) Guardrails, (2) Compliant floor covers or (3) PFAS When skylights are present and work is on the same level as the skylight, the skylights must be guarded with a standard guardrail around them, be designed to

		prevent falls through them or PFAS is required
Fall from building girders or other structural steel	All structural members	Fall protection is required and must include one of the following options: (1) Guardrail systems, (2) safety net systems, (3) PFAS
Jump to lower level unspecified	Intentional jumping from one level to another	Jumping from an elevation of more than one step is prohibited
Struck by falling object(s)	Includes any falling objects (tools, materials, debris)	Falling-object protection must include the following: (1) Erect toeboards, screens, or guardrail systems or (2) Erect a canopy structure and keep potential fall objects far enough from the edge of the higher level so that those objects would not go over the edge if they were accidentally displaced or (3) Barricade the area to which objects could fall, prohibit employees from entering the barricaded area, and keep objects that may fall far enough away from the edge of a higher level so that those objects would not go over the edge if they were accidentally displaced Employees must not drop items or debris off of a roof edge or through a hole unless this work is coordinated through the GC and: (1) Using a chute designed and installed for this purpose with a barricaded fall-zone or (2) A barricaded fall zone that is marked with conspicuous signs in all directions, a high-visibility, completely enclosed barricade that is at least 42-inches high and at least six-feet from the fall-zone

SITE-SPECIFIC FALL-PROTECTION PROGRAM

When work involves more than incidental work at heights, this plan will include a supplemental, site-specific fall-protection plan. When applicable, refer to the site-specific fall-protection plan for additional details.

LADDERS

This section addresses hazards related to work from ladders. Falls from scaffold and fall protection are covered in their respective sections of this document, when applicable. Refer to the ladder program for further details.

HAZARDS AND CONTROLS

This section addresses falls from ladders, as indicated.

Hazard(s)	Source(s)	Control(s)
Fall from ladder, ladder displacement, ladder failure	All portable ladder types	Complete pre-use inspections, retire unsafe ladders, use the appropriate ladder for each application, set ladders up properly, do not set up ladders in front of doors, exits, or openings where people, or vehicles pass through without first blocking and barricading, refer to the ladder-safety checklist and ladder safety program for full details
Falling objects	All portable ladder types	Barricade fall zone before starting work

LADDER SAFETY PROCEDURES

Practice CLIMB1:

- C: Choose the right appropriate ladder type and duty rating for the job
- L: Look and inspect – Identify unsafe ladders and remove them from service
- I: Insure a safe, stable setup
- M: Move carefully - Use three points of contact always
- B: Be a safety expert, not a statistic

General setup considerations:

- Look for overhead power lines before handling and setting a ladder; Avoid using a metal ladder near power lines or exposed energized electrical equipment and always maintain safe working distances
- Set the ladder on stable surfaces; avoid mud and slippery locations; use mud sills and aftermarket ladder stabilization devices when appropriate, and always with care

¹ CLIMB acronym by Louisville Ladder. <https://louisvilleladder.com/climb-academy>. Accessed 13 July 2018.

- Set up ladders on level surfaces; do not use extension ladders in sloped surfaces
- Avoid setup in front of doors and other high traffic areas; if unavoidable, barricade areas around the ladder to prevent upset, lock doors, and take other similar precautions
- Set up and use ladders as they are designed; do not use a step ladder in a folded configuration to access an upper level
- Follow all manufacturer's instructions for proper ladder setup and the proper use of aftermarket stabilization devices
- Do not tie or fasten ladders together to provide longer sections unless they are specifically designed for such use
- Do not modify ladders or attempt repairs unless expressly allowed by the manufacturer and repairs are made using original parts installed to original specifications
- Set up specialty ladders in accordance with manufacturer's instructions and only use as designed

Extension and straight ladder setup procedure:

- Set the ladder so that the horizontal distance from the wall to the feet of the ladder is 25% ($\frac{1}{4}$) of the vertical height
- When accessing an upper level, extend the top of the ladder 3-feet (3-rungs), but not more than 4-feet (4-rungs) above the surface of the upper level
- Verify both rails are in contact with the vertical surface
- Secure the top of the ladder to prevent inadvertent displacement and consider securing the bottom of the ladder to prevent kick out; use any appropriate securement method
- When extending a ladder, verify that the rung locks are properly engaged, that the overlap of the fly section and the base section meet manufacturer's requirements and that the rope does not present a trip hazard
- Consider using appropriate aftermarket ladder safety devices for ladder stabilization and securement
- Consider using manufacturer provided ladder rail grab extensions for safe access to upper levels
- Choose friction pads for concrete, asphalt, and other similar surfaces and choose spiked feet for grass and soil

Step ladder setup procedure:

- Verify the ladder is in the fully extended position
- Do not setup for access to an upper level
- Consider using appropriate aftermarket ladder-safety devices for ladder stabilization and securement

When ascending and descending a ladder, follow these procedures.

- Remove grease, mud, snow, and other foreign substances from shoe soles, rungs, and rails before climbing
- Face the ladder and maintain three points of contact when ascending and descending; both hands and one foot or both feet and one hand must always be in contact with the ladder
- Use a rope and a bucket to raise and lower tools and equipment; never carry tools and equipment in your hands when climbing a ladder
- When performing work from a portable ladder and three points of contact are not possible, use PFAS when the height is 6-feet or greater from a lower level and always use an appropriate anchor
- When working from a ladder, keep your body between the rails always; reposition the ladder as needed and do not over reach
- Do not climb from one ladder to another
- Do not use the top step of a ladder unless so designed

PERMIT REQUIRED CONFINED SPACE ENTRY

This section applies to the identification and classification of confined spaces, the posting of permit-required confined spaces, and entry into permit required confined spaces. It also covers declassification and alternate entry.

INTRODUCTION

This section provides basic information on the identification, evaluation, and entry into permit required confined spaces. It applies when permit-required confined spaces are constructed, installed, and entered by this organization, or when this organization enters a permit-space constructed by others.

When suspected or actual permit-spaces are present at the jobsite, this organization will verify that the creating employer (including this organization when employees will enter this space), or the general contractor, requires that a competent-person properly classify and posts these spaces.

When this organization's employees work near unlabeled permit-spaces but will not enter them, it requires that a competent-person properly classify and posts these spaces and inform employees, to preclude entry.

In situations where the host employer or general contractor does not recognize the status of a confined space as permit-required, but this organization does, this organization's policies will follow this section, and this organization's permit-required confined space entry program applies. A host employer or a general contractor's opinion does not override this organization's competent-person classification results when the host employer or general contractor indicates a space classified as permit-required by this organization is a non-permit space.

FUNCTIONAL ROLES AND RESPONSIBILITIES

Employees tasked with the functional roles described in this section have specific responsibilities. These program-specific functional roles include the following:

- Program Administrator
- Entrants
- Attendants
- Entry Supervisors
- Competent-Persons

All participants involved with confined space entry operations complete all required training. Reference the training section of this document for details.

Program Administrator

The program administrator is responsible for ensuring the completion of annual permit reviews.

Entrants

Entrants prepare the permit space for safe entry and enter the space to perform work. Entrant responsibilities include all the following:

- Prepare the permit or assist in its preparation
- Attend the pre-entry briefing
- Understand the nature and extent of the hazards in the space
- Select and use appropriate engineering controls
- Select and use appropriate PPE
- Select and use appropriate entry equipment
- Help isolate the space and complete all lockout/tagout requirements
- Each entrant must have their own lock placed on each isolation point or a group lockout/tagout is required. Entrants must retain their own keys
- Verify safe entry conditions before the initial entry
- Rescind any permit for noncompliance with permit requirements, safety regulations, or this program

Entrants must immediately evacuate if:

- An alarm is activated
- Communication is lost
- Unknown exposures are encountered
- Ordered to do so by the attendant or the entry supervisor

Attendant

Attendants help prepare the space for entry and they ensure the safety of entrants. Attendant responsibilities include all the following:

- Prepare the permit or assist in its preparation
- Attend the pre-entry briefing
- Understand the nature and extent of the hazards in the space
- Understand the symptoms of entrant overexposure to atmospheric contaminants, including behavioral changes
- Establish and maintain ventilation
- Assist the entrant to select and use appropriate engineering controls, PPE, entry equipment, and to complete the lockout-tagout/isolation
- Verify safe entry conditions before the initial entry and observe the space for safety during the entire entry operation
- Ensure continuing and effective operation of ventilation equipment
- Control access to the space
- Maintain an accurate headcount of entrants in the space
- If an unauthorized entrant enters the space, immediately call an evacuation, terminate all entry operations, and notify the entry supervisor
- Maintain communication with entrants
- Perform atmospheric monitoring during entry operations and document contaminant levels on the permit unless another person is assigned this task
- Require the entrant to evacuate the space if unsafe conditions develop, including, but not limited to a hazardous atmosphere
- Must have and test a reliable communication method to allow contact with the entry supervisors and emergency services
- Summon emergency services (if needed) and assist rescue efforts from outside the space
- Never leave the immediate vicinity of the space without first evacuating the entrant
- Rescind any permit for noncompliance with permit requirements, safety regulations, or this program

An attendant may observe more than one permit space at a time if:

- The attendant has direct line of site with each entry point
- The attendant can maintain contact with all entrants reliably
- The attendant can easily and quickly travel between the entry points (that is, they are all on the same level, they are all in the same room, ladders are not necessary for attendant access)
- The entry supervisor believes the level of safety is acceptable and agrees with the program
- An emergency occurs, the attendant immediately calls an evacuation of all confined spaces under observation to enable the attendant to focus on the problem, including activation of emergency response activities. Entry operations in all confined spaces halt until the entry supervisor indicates it is safe to resume operations
- Entry supervisors may disallow multiple permit space monitoring at their discretion

Entry Supervisor

Entry supervisors oversee all entry operations, verify preparations, and take responsibility for the safety of everyone involved. Entry supervisor responsibilities include all the following:

- Remain on site during entry operations
- Understand the nature and extent of the hazards in the space
- Approve or disapprove the permit
- Approve or disapprove of entry operations involving one attendant monitoring multiple spaces
- Conduct the pre-entry briefing
- Advise the entrant, as requested or needed, in the following areas: Select and use appropriate engineering controls, appropriate PPE, appropriate entry equipment, and isolate the space and complete all lockout/tagout requirements
- Verify safe entry conditions before the initial entry
- Ensure personnel are evacuated when necessary and never enter the space
- Ensure a rescue program is in place and all necessary communications have occurred prior to entry
- Ensure permits are complete and removed when work is finished
- Ensure all necessary equipment is returned to its proper location
- Conduct the post-entry briefing
- Rescind any permit for noncompliance with permit requirements, safety regulations, or this program
- Ensure cancelled confined space entry permits get returned to the program administrator in a timely fashion

There are additional entry supervisor responsibilities triggered when one or more of the entrants to the permit space work for another employer. These additional responsibilities include the following:

- Provide information on existing permit spaces, the associated hazards, and hazard controls
- Ensure all non-company entrants apply their own locks and tags to each lockout/tagout point or the group lockout/tagout box
- Conduct pre-entry briefings with non-company entrants
- Conduct post-entry briefings with non-company entrants
- Complete any other multiemployer coordination activities discussed in this program

These additional responsibilities do not apply when the confined space is new, the permit space is not yet tied into existing systems and company employees are not working on or in the space. Reference the multiemployer communication section of this document for additional details.

Competent-Person

Competent-persons have specific knowledge, specific responsibilities, and they are specifically assigned by the company. Competent-persons provide both program support and technical assistance. Competent-persons (for confined spaces), when assigned, have the following responsibilities:

- Identify confined spaces and permit required confined spaces
- Classify spaces as either non-permit or permit required confined spaces
- Reclassify spaces as necessary and appropriate
- Aid in the evaluation of permit space hazards
- Approve or disapprove of temporary declassification of permit spaces to non-permit spaces
- Approve or disapprove of alternate entries
- Provide technical assistance when called upon

The program administrator may designate one or more competent-persons to perform responsibilities under this program, including qualified outside parties.

Multiemployer Roles and Responsibilities

Mandatory, functional roles exist when more than one employer works in a permit space; this occurs when a contractor installs a new permit space, or modifies an existing space, at a host employers facility or jobsite, or as a subcontractor to a general contractor. Good communication and coordination are required.

In situations where there are temporary agency employees and independent contractors, each effectively acting as employees working for a common employer, and the situation does not involve a host-employer to contractor relationship, or a host-employer to general contractor to subcontractor relationship, these multiemployer coordination requirements do not apply since there is only one organization involved with confined space entry.

When applicable, the multiemployer roles are established based on the following employer categories:

- Host employer
- Controlling contractor
- Entry employer

Host Employer

The host employer is the employer owning or managing the property where the permit space work is taking place. This is typically the company. However, a general contractor can serve as the host employer if agreed. In no case will there be more than one host employer.

Controlling Contractor

The controlling contractor is the employer with overall responsibility for the work. If the controlling contractor also owns or manages the property, then it is both a controlling contractor and a host employer. The company is a controlling contractor when it manages its own construction work in lieu of a contractor. This is on a case-by-case basis. To determine whether the company is a controlling contractor, discuss this with the assigned competent-person or the program administrator prior to the projects start date.

Entry Employer

The entry employer is any employer who decides an employee it directs will enter a permit space or it is any employer whose employees work in the immediate vicinity of a confined space and may enter the space to complete work. Multiple entry employers are possible. If the company's employees enter a space when multiemployer worksite roles and responsibilities apply, the company is an entry employer. Entry employers jointly, when more than one, and individually ensure entry operations are safe, compliant with applicable OSHA regulations and this program.

Multiemployer Coordination

Multiemployer coordination is required when any person, other than a company employee or an independent contractor effectively working as an employee needs to enter a confined space. If there is no controlling contractor present at the worksite, the requirements for, and role of, the controlling contractor in this section must be fulfilled by the host employer or other employer who arranges to have employees of another employer perform work involving permit space entry.

Pre-Entry Coordination Requirements

Before entry operations begin, the host employer provides the following information, if available, to the controlling contractor:

- The location of each known permit space
- The hazards or potential hazards in each space or the reason it is a permit space
- Any precautions the host employer or any previous controlling contractor or entry employer implemented for the protection of employees in the permit space

Before entry operations begin, the controlling contractor must obtain the host employer's information about the permit space hazards and previous entry operations and provide the following information to each entity entering a permit space and any other entity at the worksite whose activities could foreseeably result in a hazard in the permit space:

- The information received from the host employer
- Any additional and relevant information the controlling contractor has about the permit spaces including locations, hazards, and precautions
- The precautions the host employer, controlling contractor, or other entry employers implemented for the protection of employees in the permit spaces

Before entry operations begin, each entry employer must:

- Obtain all the controlling contractor's information regarding permit space hazards and entry operations
- Inform the controlling contractor of the permit space program the entry employer will follow, including any hazards likely to be confronted or created in each permit space

The controlling contractor and entry employer(s) coordinates entry operations when more than one entity performs permit space entry at the same time. Furthermore, permit space entry is performed while any activities could foreseeably result in a hazard in the permit space.

Post-Entry Coordination Requirements

After entry operations:

- The controlling contractor must debrief each entity entering a permit space regarding the permit space program followed and any hazards confronted or created in the permit space(s) during entry operations
- The entry employer must inform the controlling contractor in a timely manner of the permit space program followed and of any hazards confronted or created in the permit space(s) during entry operations
- The controlling contractor must apprise the host employer of the information exchanged with the entry entities pursuant to this subparagraph

Contractor Rescue Procedures

The company expects contractors to coordinate rescue operations with the same agency the company uses to perform rescue work for its own entry operations unless the contractor has its own rescue program, rescue personnel, and equipment. It is the responsibility of the contractor to coordinate rescue operation preparation when the space is new, and the company has no experience with the space or its hazards.

CLASSIFICATION AND RECLASSIFICATION

A competent-person must identify all permit required confined spaces (permit spaces) and evaluate the hazards of each permit space. If there are changes in the use or configuration of a non-permit required confined space (non-permit space) increasing the hazards to entrants, reclassification as a permit space is required. If a permit space changes and no longer meets the definition of a permit space, a competent-person may declassify the permit space to a non-permit space.

Classification and reclassification always require documentation and evaluation by a competent-person using the classification form accompanying this program, or another from in substantial conformance when approved by the program administrator. The program administrator must retain all classification documentation for the life of the project, in the case of jobsites, and for the life of the space, for general industry situations.

IDENTIFICATION AND UNAUTHORIZED ENTRY PREVENTION

All permit required confined spaces require signs on or near the entry point to prevent unauthorized access and entry. At a minimum, the sign must contain the words "Danger Permit Required Confined Space. Do Not Enter" and must use the ANSI danger symbol and the red danger banner.

A permit space must never be labelled only as a "confined space" unless the sign also contains additional language such as "no unauthorized entry" and "keep out," to differentiate it is a permit space. Signs using a mixture of pictograms and words specifically informing employees to stay out are preferred.

Signs must be consistent throughout the facility or workplace. The use of bilingual signs is encouraged. To facilitate easy identification, permit spaces may have one or more identification numbers associated with it, though this is not required.

If an unlabeled space has the characteristics of a permit required confined space or it is unclear, assume it is a permit space unless proven otherwise, in consultation with a competent-person. Report unlabeled permit required confined spaces to the program administrator upon discovery.

A controlling contractor constructing, installing, or modifying a permit space must properly classify and demark it, if it is not already completed by the exposed employers.

TEMPORARY DECLASSIFICATION PROCEDURE

On a limited basis, a competent-person may declassify a permit space as a non-permit space if the permit space:

- Poses no actual or potential atmospheric hazards and
- All hazards within the space are eliminated without entry into the space.

The permit space may be reclassified as a non-permit confined space for as long as the non-atmospheric hazards remain eliminated. The control of atmospheric hazards through forced air ventilation does not constitute elimination of the atmospheric hazards.

If it is necessary to enter the permit space to eliminate hazards to achieve a temporary declassification, the entry must follow full permit space entry requirements found throughout this document. If testing and inspection during entry demonstrate the hazards within the permit space have been eliminated, the permit space may be declassified as a non-permit confined space for as long as the hazards remain eliminated.

If hazards arise within a permit space previously declassified to a non-permit space, entrants must immediately evacuate the space. The competent-person must reevaluate the space and determine whether it must be reclassified as a permit space in accordance with other applicable provisions of this section.

The competent-person certifies all hazards in a permit space have been eliminated. A certification contains the date, space location, and certification person's signature. The certification is available to each employee entering the space.

ALTERNATE ENTRY PROCEDURE

On a limited basis, a competent-person may evaluate a permit space and, if conditions permit, may allow entrants to complete operations using alternate entry procedures. Alternate entry procedures are permitted when a competent-person determines:

- The only hazard posed by the permit space is a potential or actual hazardous atmosphere
- Continuous forced air ventilation alone is enough to maintain a safe for entry permit space

- The employer develops supporting atmospheric monitoring and inspection data, making this data available to each employee entering the space
- If initial entry into the permit space is necessary to obtain data, the entry must be performed in full compliance with the permit space entry requirements found throughout this program

The alternate entry procedure involves the following:

- Eliminate any conditions making it unsafe to remove an entrance cover before the cover is removed
- Once entrance covers are removed, guard the opening promptly with a railing, temporary cover or other temporary barrier to prevent an accidental fall through the opening and to protect each employee working in the space from foreign objects entering the space
- Before an employee enters the space, test the internal atmosphere with a calibrated direct reading instrument, for atmospheric contaminants in the order listed: (1) Oxygen content, (2) Flammable gases and vapors, (3) Potential toxic air contaminants
- A hazardous atmosphere is not allowed when any employee is inside the space

Test the atmosphere within the space continuously to ensure the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere and provide monitoring results to all employees who enters the space. If a hazardous atmosphere is detected during entry:

- Each employee must evacuate
- Evaluate the situation to determine how the hazardous atmosphere developed
- Implemented corrective actions to protect employees from the hazardous atmosphere before any subsequent entry takes place

Continuous forced air ventilation is required, as follows:

- Employees do not enter the space until the forced air ventilation has eliminated any hazardous atmosphere
- Direct the forced air ventilation to ventilate the immediate area where an employee is or will be present within the space and continue ventilation until all employees have left the space
- Ensure the air supply for the forced air ventilation is from a clean source so it does not increase the hazards in the space
- If at any point ventilation is lost, the entry must terminate

Written certification is required and demonstrates the space is safe for entry and the pre-entry measures required by this section have been taken. Certification is before entry and available to each employee entering the space or available to the employee's authorized representative.

TEMPORARY ELECTRICAL

This applies to temporary electrical installations, including illumination, portable generators, and related topics. This section is non-exhaustive and requires specific knowledge of and adherence to 29 CFR 1926 Subpart K, NFPA 70E, and the organization's Electrical Safety and Generators, Portable and Vehicle Mounted programs, for further details. All installations must conform to the National Electric Code (NFPA 70) and any locally established amendments.

TEMPORARY ELECTRICAL REQUIREMENTS

Temporary power must be installed and maintained safely and compliantly when providing power for the organization's use or use by other trades. Temporary power systems must:

- Be suitable for the intended installation and use (Conductor gauge, equipment type, voltage rating, capacity rating, hazardous classification, etc.)
- Consider the effects of heating and arcing under use conditions
- Have enough mechanical strength and durability
- Have enough electrical insulation

The following additional requirements apply:

- Feeders must originate in an approved distribution center, such as a panel board, that is rated for the voltages and currents the system is expected to carry
- Branch circuits must originate in an approved power outlet or panel board with labels matching up with disconnects and convenience outlets
- Neither bare conductors nor earth returns may be used for the wiring of any temporary circuit
- Flexible cords and cables must be of an approved type and suitable for the location and intended use. They may only be used for pendants, wiring of fixtures, connection of portable lamps or appliances, elevators, hoists, connection of stationary equipment where frequently interchanged, prevention of transmission of noise or vibration, data processing cables or where needed to permit maintenance or repair
- Flexible cords may not be used as a substitute for fixed wiring, run through holes in walls, ceiling, floors, doorways, windows or similar openings, attached to building surfaces, or concealed behind building walls, ceilings or floors
- Receptacles must be of the grounding type. Unless installed in a complete metallic raceway, each branch circuit must contain a separate equipment grounding conductor, and all receptacles must be electrically connected to the grounding conductor
- Suitable disconnecting switches or plug connects must be installed to permit the disconnection of all ungrounded conductors of each temporary circuit

- Equipment operating at 50 or more volts must be guarded against any and all unintentional contact. This guard must be an approved cabinet or other form of approved enclosure
- Panels, dead-fronts, and other electrical equipment may not have unguarded cutouts

Temporary Electrical Inspections

Use of temporary electrical systems by multiple people from different companies and trades often subjects the temporary systems to disturbance and damage that can create safety hazards. Frequent inspections are required. Inspect all cords and tools before every use, periodically during use, when damage is possible or suspected. If deficiencies are found, remove the equipment or cord from service for disposal or repair by a qualified-person.

Ground Fault Circuit Interrupters

The ground fault circuit interrupter (GFCI) is a fast-acting circuit breaker that senses small imbalances in the circuit caused by current leakage to ground and, in a fraction of a second, shuts off the electricity. The GFCI continually matches the amount of current going to an electrical device against the amount of current returning from the device along the electrical path. Whenever the amount going differs from the amount returning by approximately 5-milliamps, the GFCI interrupts the electric power within as little as 1/40 of a second.

The GFCI protects employees against the most common form of electrical shock hazard – The ground fault. It also provides protection against overheating of wiring and electrical components, damage to wire insulation, and fires.

A GFCI will not protect a person from electrical hazards that do not involve a difference in the send and return voltage. For example, line-to-line contact hazards, such as a person holding two hot wires or a hot and a neutral wire in each hand.

The following circumstances require GFCI use:

- All 120-volt, single phase 15 and 20-ampere receptacle outlets on construction sites, that are temporary and are not part of the permanent wiring of the building or structure
- All temporary wiring circuits, portable grounded power tools, and extension cords, whether power is supplied from a utility or an electrical generator
- Portable double-insulated power tools (A double-insulated power tool presents a shock hazard when: (i) It is immersed in water, (ii) It becomes damaged and the internal double insulation is bridged, and (iii) Defects develop in the supply cord of the tool)

Pigtail (portable) GFCIs are acceptable when a circuit is not GFCI protected.

As a best practice, use a pigtail GFCI when it is unclear if a circuit is GFCI protected. An additional GFCI does not create hazards or problems, and it will ensure adequate protection.

Circuit breakers protect equipment - Never rely on circuit breakers to protect people. Use a GFCI.

Temporary Cords

Temporary cords must meet the following minimum requirements:

- Have a continuous ground
- Have undamaged insulation throughout their length
- Free of damage and electrical tape
- Must be three-wire type
- Must be designed for hard or extra-hard usage, including cords used with temporary lights (the NEC lists various types of flexible cords designed for hard or extra-hard usage including hard service cords (types S, ST, SO, STO), and junior hard service cords (types SJ, SJO, SJT, SJTO)

Routing

Route flexible cords and cables appropriately and protect them from accidental damage. Always observe the following:

- Route temporary cords and cables so that they are out of the way of equipment and employees and so they do not block or clutter the area in front of temporary electrical panel boards
- Do not route electrical cords where they can be run over by equipment or pinched in doorways or otherwise damaged
- If a cord must be routed through a doorway or other pinch point, protect it from damage
- Avoid sharp corners, sharp edges, projections and wear points
- When hanging temporary cords and cables overhead, use nonconductive materials only
- Use strain relief at cord connections
- Remove temporary wiring and related equipment as soon as possible after it is no longer needed

Repairs

Temporary cords and electrical equipment are repairable only by qualified-persons and only when the repair returns the cord to its original mechanical and dielectric strength. Electrical tape is not allowed, nor is any other covering that hides insulation integrity and prevents inspection.

Unless a qualified person is present at the jobsite and agrees to repair cords, replace temporary cords with new cords that have molded plugs permanently affixed to the cord rather than attempt repair.

Temporary Lighting

The installation requirements for temporary lighting include:

- Cord and plugs used for illumination must be of proper gauge, with continuous ground, and enough insulation in good repair
- Must have shatter-proof bulbs or protective covers

- Install temporary illumination on separate circuits from temporary outlets to prevent sudden loss of light due to unrelated nuisance GFCI trips when lighting shares a circuit with other electrical loads
- Support overhead temporary lighting only by non-conductive means
- Support overhead temporary lighting by its cord only when so designed
- GFCI protect lighting circuits when water is present and there is a risk of electrical shock (GFCI protection is not required otherwise)
- Use intrinsically safe lighting when used in classified areas or rooms
- Flexible cords used with temporary and portable lights must be usage rated hard or extra-hard
- Inspect cords used with lighting as with all other temporary cords

Refer to ANSI A11.1-1965 for additional details.

PORTABLE GENERATOR REQUIREMENTS

The following requirements apply to the use of stand-alone and vehicle-mounted portable generators:

- Maintain and use generators in accordance with manufacturer's instructions
- Keep generators dry and do not use electrical equipment that was submerged in water unless thoroughly dried out and inspected for safety
- Setup generators with several feet around all sides to allow adequate ventilation
- Do not use generators in enclosed areas where combustion gases, including carbon monoxide, can concentrate, and poison nearby personnel
- Before refueling, shut down the generator, and allow it to cool
- Store only a limited amount of fuel, only in safe locations, only in type II safety cans, and never use plastic fuel containers
- Generators are loud - Hearing protection is required when noise levels exceed 90-dBA
- 100% GFCI use is required for anything drawing power from a portable generator
- Always plug portable tools and appliances directly into the generator or use heavy duty, grounded (3-pronged) extension cords
- Do not use underrated cords— Replace them with appropriately rated cords that use heavier gauge wires
- Never use electrical tools or appliances with frayed cords, missing grounding prongs, or damaged, or cracked housings
- Use double insulated tools where possible

Regularly inspect all portable generators for damage and defects. This includes convenience outlets, checking for proper bonding, and confirming a continuous path to the driven ground rod, when used. Use of damaged or defective generators is prohibited.

Generator Grounding and Bonding

Grounding is the intentional connection of a grounding conductor to a copper rod driven into the earth, often called a driven ground rod. Grounding provides a safe path for electricity to travel in a short-circuit (i.e. When electricity can't flow through the neutral because of some problem).

Bonding is the intentional connection between the grounded circuit conductor (neutral), and the grounding means for the generator, which includes the generator's frame.

The integrity of the connection between the generator's frame and the equipment grounding terminals of power receptacles is important to the safe use of the equipment. Confirm that there is a continuous connection with the correct equipment. Resistance should measure near zero and must not be intermittent, which indicates a loose connection.

Portable and Vehicle Mounted Generators

The frame may serve as the ground, in place of a driven ground rod, provided that:

- The generator supplies only equipment mounted on the generator and/or cord and plug-connected equipment through receptacles mounted on the generator, and
- The noncurrent-carrying metal parts of equipment, including the fuel tank, the internal combustion engine, and the generator's housing, are bonded to the generator frame, and
- The equipment grounding conductor terminals of the power receptacles that are a part of and mounted on the generator, are bonded to the generator frame, and
- For vehicle-mounted generators, the generator must be bonded to the vehicle frame

If these conditions do not exist, then a connection to a driven ground rod is required.

Generators Supplying Power to a Temporary Structure

In all other situations, including using the generator as a power source for a job trailer or other structure, ground the generator to a driven ground rod installed in accordance with manufacturer's instructions and electrical codes, and always use an open-transition transfer switch.

Carbon Monoxide Poisoning

Carbon monoxide (CO) is a colorless, odorless, and toxic gas that causes severe illness and death. It is formed during the combustion of all fuels, and it is emitted from generators.

- Never use a generator indoors or in enclosed spaces such as garages, crawl spaces, basements, or in non-permit and permit-required confined spaces
- Verify that there is three to four feet of clear space on all sides of the generator, and above it
- Locate generators away from doors, windows, and vents that may allow exhaust gases to enter structures or vehicles
- Locate generators way from non-permit and permit-required confined space entrances and the air-intakes of ventilation equipment to avoid introducing combustion gases

If you or others show symptoms of CO poisoning—dizziness, headaches, nausea, tiredness— Immediately exit the area, get to fresh air, and then seek medical attention. Do not re-enter the area until it is safe as determined by trained personnel equipped with a properly functioning carbon monoxide gas detector.

TOOLS

This section addresses power and hand tool hazards and controls.

GENERAL TOOL SAFETY

When using hand and power tools, employees must:

- Select the proper tool for each job
- Understand the hazards associated with the tool and the intended work
- Properly inspect the tool before each use
- Remove defective tools from service immediately upon discovery
- Use the tool properly
- Maintain the tool properly
- Use PPE appropriate for the tool and the work
- Use GFCI with cord and plug connected power tools

WASTE MANAGEMENT

This program addresses waste disposal methods for jobsite created waste accumulated prior to and during construction activities. This includes ordinary waste, universal waste, and hazardous waste for very small quantity generators. This organization encourages reducing use, reusing when possible, and recycling, whenever these options are available.

TYPES OF WASTE GENERATED

This organization generates waste and recyclables consistent with its operations. It does not anticipate excessive waste nor larger items that require special handling.

GENERAL WASTE MANAGEMENT GUIDELINE

This organization will avail itself of controlling employer supplied solid waste, recycling, and reuse collection points and containers, when required or permitted by the controlling employer. Otherwise, this organization will establish its own collection points and containers consistent with its needs, and those of its subcontractors, as applicable, with notice to the controlling employer if it expects to generate and store hazardous waste.

SSSP APPENDIX 1: EMERGENCIES

This appendix contains this jobsites' emergency action plan (EAP).

PERSONNEL REVIEW REQUIRED

Each person working at this jobsite must review this site-specific EAP upon assignment and whenever it is updated.

POSTING REQUIREMENT

Post this job site specific EAP in a conspicuous place so it is available to all personnel.

SITE SPECIFIC SAFETY PROGRAM - APPENDIX 1

EMERGENCY ACTION PLAN

APRIL 22, 2022

Appendix 1 Contents

Jobsite Information 2

Possible Emergencies 3

Communication Methods 4

Muster Areas and Safe Refuges 4

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Utilities Contact Information 8

Contractor’s Emergency Contacts..... 9

Local Emergency Services Contact Information..... 9

Emergency Medical Services 9

Workplace Injury and Illness Reports..... 11

Additional Information..... 11

JOBSITE INFORMATION

LAST REVISED ON

22 April 2022

JOBSITE NAME

Pojoaque Basin Regional Water System Job, Aamodt Litigation Settlement Project

JOBSITE ADDRESS

4 Bundy Road, San Idefonso Pueblo, NM 87506

JOBSITE COORDINATES

35.874592926647885, -106.1340627753306

WORK AREA ACCESS

Via Bundy Road

ADDITIONAL INFORMATION

This EAP is subject to updates as necessary.

Contact your foreman or the jobsite superintendent with questions.

For follow up assistance with workers compensation issues, contact the safety director.

POSSIBLE EMERGENCIES

The following emergencies are possible at this location.

☒ Confined Space Rescue	☐ Hurricane
☐ Chemical Release – Gas or Vapor	☐ Lightning
☐ Chemical Release – Liquid	☐ Medical / Mass Casualty
☐ Dangerous Wildlife	☒ Medical / Trauma
☐ Earthquake / Seismic Activity	☒ Rain and Hail
☒ Excavation Cave In	☐ Security Threat / Workplace Violence
☐ Facility or Process Emergency	☐ Snow-Storm / Blizzard / Ice-Storm
☐ Fire, Structure	☒ Tornado
☒ Flood	☐ Volcanic Activity
☐ High Winds	☒ Wildfire

ADDITIONAL COMMENTS

Flash floods are a possibility but risk is lower in summer months.

COMMUNICATION METHODS

The following methods are used to signal an evacuation and communicate during an emergency.

☐ Air Horn	☐ Hand Signals
☐ Audible Fire Alarm	☒ Portable Radio
☒ Cell Phone	☐ Public Address System
☒ Gas Detector Alarm	

COMMENTS

Refer to GC EAP for further details.

MUSTER AREAS AND SAFE REFUGES

Coordinate plans with the controlling employer for consistency. In an emergency, report missing personnel to first responders and the controlling employer immediately.

MUSTER AREA (☒ PRIMARY ☐ SECONDARY) (☒ ON-SITE ☐ OFF-SITE)

Stop work and immediately proceed to this location when an “evacuate to muster area” is announced:

Muster area will be adjusted daily as wind and other conditions dictate. This is communicate during morning meetings.

SAFE REFUGE (☒ PRIMARY ☐ SECONDARY) (☒ ON-SITE ☐ OFF-SITE)

Certain emergencies, such as severe weather, require evacuation to an indoor location. Report to this location when an “evacuate to safe refuge” is announced:

Jobsite trailer will be safe refuge provided the weather conditions permit this (i.e. no extreme wind conditions).

COMMENTS

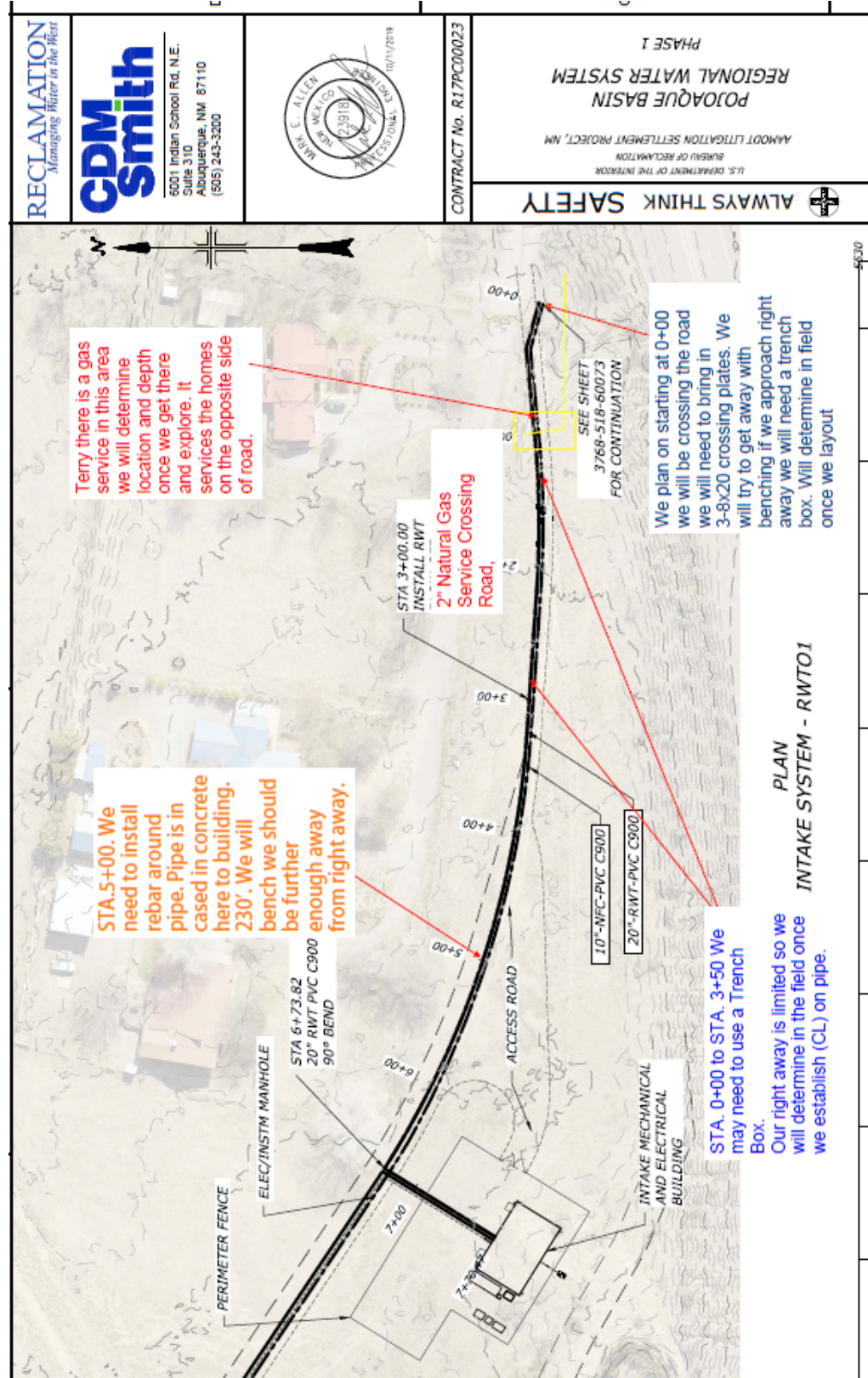
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SITE MAP

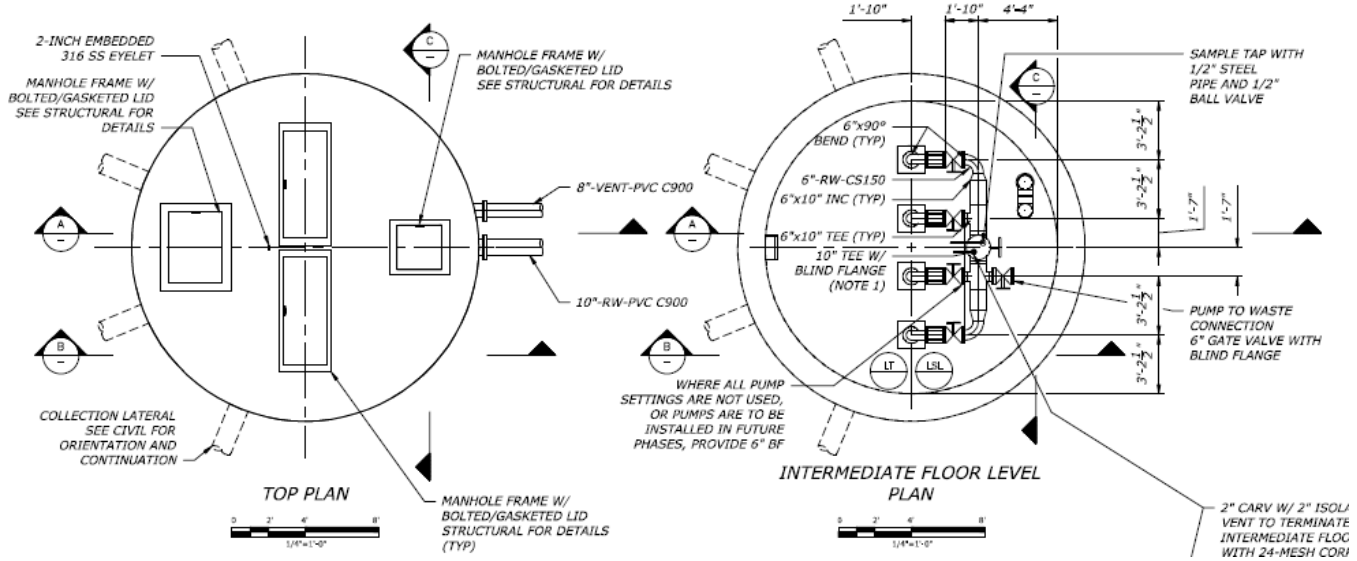
Overall Site View - North is to Left of Page - © Google Earth



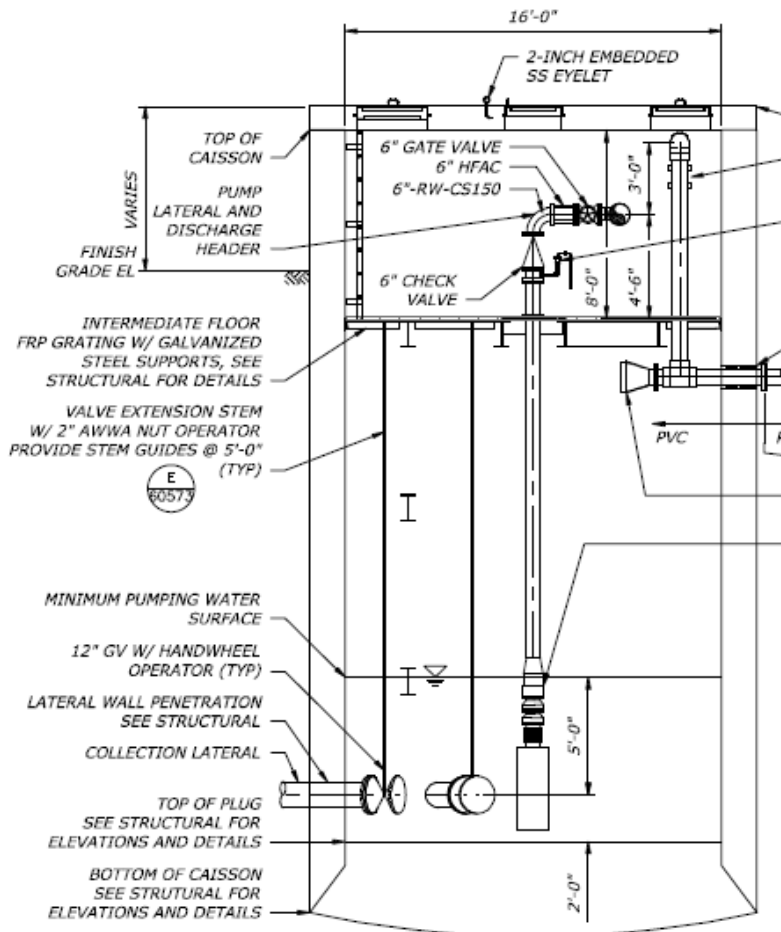
Site Drawing Show Work Locations



Collector Wells - Top View (Left) and Intermediate Deck Plan (Right)



Collector Wells Profile



UTILITIES CONTACT INFORMATION

☒ OVERHEAD POWERLINES ON LOCATION.

The work involves scaffold, ladders, aerial lifts, scissor lifts, heavy equipment, or cranes near overhead power lines or equipment and vehicles must pass under overhead power lines. Identify powerline owners in the table below. Refer to the overhead powerline section of this SSSP, the safety and health program manual, and the completed overhead powerline safety form for all requirements.

☐ EXCAVATIONS NEAR OIL AND GAS WELLS AND RELATED INFRASTRUCTURE.

The work involves excavations and is, or could be, in an area with co-located oil wells, pipelines, or related infrastructure. Locates required. Contact call before you dig / one call service. Identify oil and gas and infrastructure owners/operators in the table below.

☒ EXCAVATIONS IN PUBLIC RIGHTS OF WAY AND/OR UTILITIES.

The work involves excavations and is, or could be, in or near a public right of way, near utility lines on private property, involves a tie in, or similar situation, where the work may impact one or more utilities or other underground service. Locates required. Contact call before you dig / one call service. Identify underground facility owners in table below.

Utility	Organization Name	Emergency #	Non-Emergency #
New Mexico One Call	New Mexico 811	1-800-517-1009	811 or 800-321-2537

COMMENTS

Overhead power lines at entrance only (> 20-feet from ground).

No nearby oil and gas activity.

Excavation will cross a road.

Pipelines will cross over or under natural gas line. Potholing required to ascertain exact location and depth.

Private locates may be required. Always confirm all UFOs with 811.

CONTRACTOR'S EMERGENCY CONTACTS

Name	Job Title / Tole	Email	Cell Phone
David Rosales	Foreman	drosales@integratedwaterservices.com	262-327-0032
Shane Sanders	Superintendent	ssanders@integratedwaterservices.com	575-649-7718
Todd Brunetti	Project Manager	tbrunetti@integratedwaterservices.com	559-451-6692
Terry Brem	Safety Director	tbrem@integratedwaterservices.com	970-819-8462

COMMENTS

None

LOCAL EMERGENCY SERVICES CONTACT INFORMATION

Type	Organization Name	Emergency #	Non-Emergency #
Ambulance, Fire, Police	Santa Fe Regional Emergency Communications Center	911	505-428-3710

COMMENTS

None

EMERGENCY MEDICAL SERVICES

The closest emergency medical facilities include the following location(s):

Type	Organization Name	Street Address	Non-Emergency #
24/7 ER (Closest)	Los Alamos Medical Center	3917 West Rd, Los Alamos, NM 87544	505-662-4201 (ER)
Medical Clinic	Concentra Urgent Care	720 St Michaels Dr STE C, Santa Fe, NM 87505	505-438-9402

Refer to the next page for maps and directions.

COMMENTS

For life and limb threatening emergencies, call 911, send another employee to meet the ambulance at the entrance, render aid until help arrives.

For after hours emergency care, proceed to the Los Alamos Medical Center in Los Alamos.

For non life and limb threatening care during the hours of 8:00 am to 5:00 pm Monday through Friday, proceed to Concentra Urgent Care in Santa Fe. Always call in advance to confirm hours and availability. Always report occupational injuries and illnesses to your foreman and the superintendent.

Complete a first report of injury as soon as possible after the incident.

Superintendent – Communicate all incidents and injuries to your PM with follow ups to the GC as necessary to meet the GC's reporting requirements. Always investigate incidents. Contact safety director with questions or for assistance.

WORKPLACE INJURY AND ILLNESS REPORTS

Always report incidents and injuries to your frontline leader as soon as possible after the event. Initial notification is verbal followed by a completed First Report of Injury Form within 24-hours.

Always seek medical attention for:

- Lift or limb threatening emergencies
- Unconsciousness, regardless of duration
- Head trauma without unconsciousness
- Eye injuries
- Actual or suspected heat stroke
- Chemical or thermal burns to face, eyes, groin

When in doubt, seek medical attention!

If the scene is unsafe after an event, make it as safe as possible, or ask someone to do so.

ADDITIONAL INFORMATION

None

//
POST THIS ADDENDUM IN A CONSPICUOUS PLACE
//
END OF EMERGENCY ACTION PLAN ADDENDUM
//

SSSP APPENDIX 2: TRAINING RECORDS

This appendix contains training records relevant to the jobsite and the work.

INCLUDED TRAINING RECORDS

When required by the host employer and/or the general contractor, training records applicable to this jobsite are found in this appendix. These may include:

- Competent-person qualifications
- Equipment operator qualifications
- Other specialized training records

OSHA Education Center at The University of Texas at Arlington

certifies that on October 29, 2018 in El Paso, TX

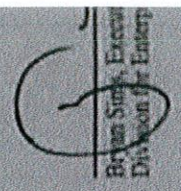
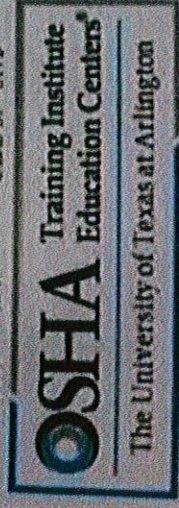
Shane Sanders

successfully completed the

OSHA #7410

Managing Excavation Hazards

Hours: 7.50 CEUs: 0.75



Bryan Smith, Executive Director
State of Training and Education

14107284

26-6020436

This card acknowledges that the recipient has successfully completed:

30-hour Construction Safety and Health

This card issued to:

Shane Sanders

us Miranda

er Name

02/21/2020

Date of Issue

Safety Consulting Services

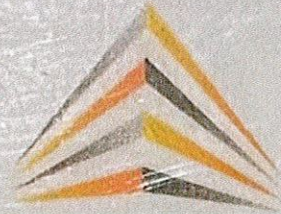
SAFE RIGGING PRACTICES

SHANE SANDERS

**IN RECOGNITION OF SAFETY TRAINING REQUIREMENT
FOR 29 CFR 1926.251**

GENERAL CONSTRUCTION SUBPART H

Instructor: Ben Avila



Provident

Safety Consulting Services

CONFINED SPACE ENTRANT/ATTENDANT

SHANE SANDERS

**IN RECOGNITION OF SAFETY TRAINING REQUIREMENT
FOR 29 CFR 1910.146 & 1926 AA**

GENERAL INDUSTRY SUB-PART J & SUBPART AA

Instructor: Ben Avila



26-602043614

This card acknowledges that the recipient has successfully completed:

30-hour Construction Safety and Health

This card issued to:

Shane Sanders

SSSP APPENDIX 3: FORMS

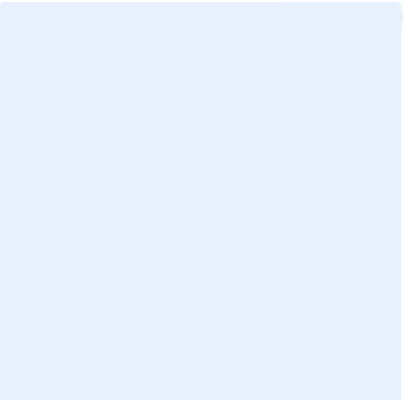
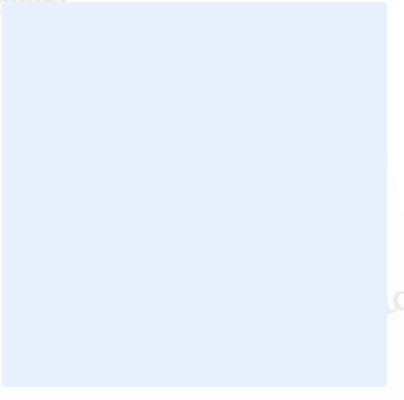
This appendix contains specific forms relevant and useful for this project. Additional forms are available.

LOOKING FOR OTHER FORMS?

Refer to the OSH manual and your form repository to obtain copies of other forms, or editable versions.

General Information		
Confined Space Name	Confined Space Location	Today's Date
Current or Intended Use		
Purpose of this Classification		
☐ Initial Classification ☐ Reclassification ☐ Declassification ☐ Alternate-Entry Classification ☐		
Previous Classification		
☐ No Previous Classification ☐ New Construction ☐ Non-Permit Space ☐ Permit-Space ☐ Alternate-Entry Allowed ☐ Temporary Declassification Allowed ☐ Grain Storage Structure ☐ Flat-Bottom Grain Bin per §1910.272(h)		
This document replaces all prior classifications		
Applicable Regulations		
☐ Construction (29 CFR 1926 Subpart AA) ☐ General Industry (29 CFR 1910.146) ☐ Grain Handling Facilities (29 CFR 1910.272) ☐ Grain storage structure per §1910.272(g) ☐ Flat-bottom grain bin per §1910.272(h) ☐		
Confined Space Characteristics (Classification Step 1)		Confined Space? ☐ Yes ☐ No
Does the space meet the following (check all that apply)? Must meet all three characteristics if it is a confined space		
☐ Large enough, allows bodily entry ☐ Limited / restricted entry and exit ☐ Not designed for continuous employee occupancy		
Permit-Required Confined Space Characteristics (Classification Step 2)		Permit Space? ☐ Yes ☐ No
Does the space contain any of the following (check all that apply)? Any one characteristic indicates a permit space.		
☐ Contains or has potential to contain a hazardous atmosphere? ☐ Has internal configuration that could trap or asphyxiate entrant? ☐ Contains a material with engulfment potential? ☐ other recognized serious safety or health hazard?		
Entry Type and Characteristics		
☐ Horizontal Entry ☒ Vertical Entry ☐ Mechanical Means of Retrieval Required ☐ Fall-Arrest System Required ☐ Floating Roof ☐ Difficult Entry/Exit due to Entry-Way Location ☐ Internal Configuration Can Trap Entrants ☐ Low-Overhead Above Entryway		
Normal Contents		
☐ Only One Chemical/Product ☐ Chemical/Product Mixture ☐ Process Vessel – Normal Contents Vary ☐ Solid ☐ Dust or Flowable Powder ☐ Liquid ☐ Gas / Vapor ☐ Pressure > 1 PSI; Pressure =		
Health Hazards (Inherent)		
Physical Hazards (Inherent)		
Atmospheric Hazards		
Atmospheric Monitoring Results		
Adjacent Hazards		

General Information		
Confined Space Name	Confined Space Location	Today's Date
Recommended PPE and Entry Equipment (include self-rescue and assisted rescue)		
NFPA 350 Rescue Classification The NFPA 350 rescue mode based on the hazards of this space are: ☐ Tier 1: The space has no recognized hazards but could require technical rescue for extraction should a worker become incapacitated. The space does not contain hazards or potential for hazards, however, its configuration prohibits entrants from easy removal if they were to become incapacitated, either due to medical illness or injury. At the minimum, this is applicable to any vertically oriented space greater than 4-feet (1.2 m) in height, whether retrieval equipment is in place. ☐ Tier 2: The space has non-life-threatening hazards that may require rapid intervention. The space contains no IDLH or other potentially immediate life-threatening hazards, but it does contain other actual or potential hazards that could incapacitate entrants or prevent them from exiting the space without assistance (self-rescue). ☐ Tier 3: The space has one or more life-threatening hazards that may require immediate intervention. The space contains IDLH or other immediately life-threatening hazard, either actual or potential.		
Temporary Declassification Status [29 CFR 1926.1203(g), 1910.146(c)(7)] ☐ Allowed ☐ Not Allowed		
The following rules apply to temporary-declassification situations: (1) If it is necessary to enter the space to eliminate hazards to achieve the conditions above, entry must be made as a permit-space, (2) If any hazards occur during entry, the temporary-declassification is rescinded, (3) A competent-person must approve of and sign a temporary-declassification form each time the permit-space is temporarily-declassified, (4) You may not combine temporary-declassification and alternate-entry – Only one may apply in any given situation, (5) You must make this document and any supporting information available to the entry team, (6) Temporary declassification is always disallowed if forced-air ventilation is required to maintain a safe atmosphere and/or work in the space creates a hazardous-atmosphere. Additional documentation required. This permit-space may be temporarily declassified as a non-permit space if answers to each of the following questions is yes: ☐ Yes ☐ No This permit-space poses no actual or potential atmospheric-hazards ☐ Yes ☐ No All hazards within the space can be eliminated without an entry into the space		
Alternate Entry Status [29 CFR 1926.1203(e), 1910.146(c)(5)] ☐ Allowed ☐ Not Allowed		
The following rules apply to alternate-entry situations: (1) Continuous forced-air ventilation with a known clean air-source is always required, (2) Continuous atmospheric-monitoring is required (3) Development of a hazardous atmosphere requires immediate evacuation and evaluation by a competent person, (4) A hazard is controlled when conditions that caused the hazard still exist but are continuously managed so hazard cannot reoccur, (5) You may not combine temporary-declassification and alternate-entry – Only one may apply in any given situation, (6) You must make this document and any supporting information available to the entry team, (7) Supporting documentation must include, at a minimum: (a) Volume of the space to be entered, (b) capacity and configuration of the ventilation equipment to be used, (c) identified atmospheric-hazards and potential hazards, (d) sampling results from routine-testing of the space from the time ventilation was initiated through final determination of acceptable entry-conditions, (e) atmospheric hazards created by work in the space (if any) and (f) the control methods used to eliminate or isolate all hazards, (8) Development of a hazardous atmosphere during an alternate entry requires immediate entrant evacuation with subsequent evaluation by a competent person. Additional documentation required. Alternate-entry procedures allowed if answer to each of the following questions is yes: ☐ Yes ☐ No The only actual/potential hazard is atmospheric; all physical hazards can be eliminated/isolated with engineering controls ☐ Yes ☐ No Continuous forced-air ventilation alone is enough to maintain a safe atmosphere During the final stages of construction, secure power and water as necessary to maintain space isolation; lockout-tagout is required to maintain isolation; If full isolation can't be achieved, alternate entry is disallowed		
Additional Comments and Information		

Images		
		

Identify the Confined Space			
Confined Space ID, Location	Reason for Entry & Work Description	Start Date, Time	End Date, Time
Inherent Chemical Hazards		Inherent Physical Hazards	
☐ Residual Chemicals Present ☐ Dust ☐ Gas, Vapor or Mist ☐ Toxic Atmosphere ☐ O2 Deficiency, Enrichment ☐ Corrosives	☐ Combustible / Flammable ☐ Oxidizer ☐ Toxin and/or Sensitizer ☐ Welding Fumes ☐ ☐	☐ Slag / Sparks ☐ High / Low Temperature ☐ Slippery Surfaces ☐ Sharp Surfaces ☐ Slope of Interior ☐	☐ Fall Hazard ☐ Difficult Entry / Exit ☐ Low Overhead ☐ Engulfment ☐ ☐
Previous Contents	Introduced, Adjacent and Other Hazards		
Isolation, Lockout/Tagout, and Ventilation			
☐ Space isolated from hazardous energy ☐ Lockout/tagout complete for all entrants ☐ Continuous mechanical ventilation running			
Personal Protective Equipment		Entry Equipment Entry Type: ☐ Horizontal ☐ Vertical	
☐ Safety Glasses or Goggles ☐ Safety-Toe Boots ☐ Gloves, Cut Resistant ☐ Gloves, Thermal Resistant ☐ Gloves, Chemical Resistant ☐ Chemical Protective Clothing ☐ Chemical Resistant Boots	☐ Ear Plugs ☐ Welding PPE ☐ Hard Hat ☐ ½-Face Respirator (APR) ☐ Full-Face Respirator (APR) ☐ SCBA or Supplied Air ☐	☐ Tripod or Pole Hoist ☐ Harness & Retrieval Line ☐ Winch ☐ Bosun's Chair ☐ Self-Retracting Lifeline ☐ Portable Ladder ☐ Intrinsically Safe Lighting ☐	☐ Non-Sparking Tools ☐ Class I, Div I, Equipment ☐ Fire Extinguisher Available ☐ Unsafe Areas Barricaded ☐ ☐ ☐
Other PPE & Entry Equipment:			
Necessary and Required Work Permits Issued? ☐ Yes (attach to this permit) ☐ No (Not-Applicable)			
Communication Method: ☐ Verbal ☐ 2-Way Radio ☐ Other:			
Personnel & Safe-Entry Certification			
☐ All sections of this form are completed ☐ Isolation and LOTO adequate, verified ☐ PPE, and entry equipment appropriate ☐ Work-created hazard mitigation in place	☐ Ventilation appropriate, effective ☐ Initial atmospheric monitoring OK ☐ Pre-entry briefing complete ☐ Pre-entry coordination complete	Rescue Mode: ☐ Tier 1 ☐ Tier 2 ☐ Tier 3 ☐ Local rescue team ready or ☐ Local resource availability confirmed *** Refer to last page for details	
Entrant 1	Date/Time	Attendant 1	Date/Time
Entrant 2	Date/Time	Attendant 2	Date/Time
Entrant 3	Date/Time	Atmospheric Monitoring	Date/Time
Entrant 4	Date/Time	Entry Supervisor	Date/Time
Cancellation		Permit Review	
☐ LOTO removed; space returned to normal operations ☐ Post-entry briefing complete ☐ Post-entry, multi-employer communication complete		☐ Reviewed for hazard changes and program improvements	
Name / Signature	Date/Time	Name / Signature	Date/Time
Rescue Procedure: (1) Do not enter (2) Call for assistance (3) Encourage self-rescue (4) Attempt rescue with the retrieval line and retrieval device (5) Keep others out unless they are rescue-team members			

Atmospheric Monitoring

1. Conduct atmospheric monitoring after ventilation is set up but before entry takes place
2. Ventilate continuously and verify clean air at blower intake with gas detector
3. Attendant must conduct atmospheric monitoring continuously for entire entry operation
4. Turn on monitor and zero in fresh air before every use; confirm calibration
5. Record initial results before entry and periodically thereafter
6. Evacuate entrants if atmospheric hazards develop

Control Contaminant Levels

Oxygen: 19.5% - 23.5%

LEL: 10% or less of the LEL

CO: Less than 25 ppm

H2S: Less than 10 ppm

Monitor for all potential atmospheric hazards - Cross off and/or add contaminants below as appropriate

Portable Air Monitor ID #

Last Calibration Date

[illegible]

POST THIS PERMIT AT THE ENTRANCE OF THE CONFINED SPACE AND DURING THE ENTIRE ENTRY OPERATION

Return completed form to the plan administrator after cancellation

Applicable NFPA 350 Rescue-Mode (Select Only One)**Entry Supervisor** – Confirm the required NFPA 350 rescue-mode:

- ☐ **Tier 1:** The space has no recognized hazards but could require technical rescue for extraction should a worker become incapacitated. The space does not contain hazards or potential for hazards, however, its configuration prohibits entrants from easy removal if they were to become incapacitated, either due to medical illness or injury. At the minimum, this should be applicable to any vertically oriented space greater than 4-feet (1.2 m) in height, whether or not retrieval equipment is in place. A Tier 1 capability suggests that a fully trained rescue team meeting NFPA 1670, chapter on confined space rescue, technician level, is available to respond within 5-minutes to the site and is capable of setup and rescue entry within 15-minutes of arrival on site.
- ☐ **Tier 2:** The space has non-life-threatening hazards that may require rapid intervention. The space contains no IDLH or other potentially immediate life-threatening hazards, but it does contain other actual or potential hazards that could incapacitate entrants or prevent them from exiting the space without assistance (self-rescue). A Tier 2 capability suggests that a fully trained rescue team meeting NFPA 1670, chapter on confined space rescue, technician level, is on site with appropriate capability to make safe entry for rescue. The team should be equipped and mobile and capable of setup and rescue entry within 12 to 15-minutes of incident occurrence.
- ☐ **Tier 3:** The space has one or more life-threatening hazards that may require immediate intervention. The space contains IDLH or other immediately life-threatening hazard, either actual or potential. A Tier 3 capability suggests that a fully trained rescue team meeting requirements stated in NFPA 1670, chapter on confined space rescue, technician level, is standing by in the immediate area with appropriate capability to make safe entry for rescue. This team should be completely set up and capable of rescue entry within 2-minutes of incident occurrence. The rescue team should be dedicated to this singular entry with no other responsibilities.

Rescue Team identification and Availability

☐ In-House Team ☐ Contracted Private Company ☐ Municipal Emergency Responders

Team/Organization Name

Team-Leader Name and Contact Method (Dispatch, Mobile #)

Other helpful Information (dispatch number, etc.)

Multi-Employer Coordination Reminders**Host Employer** – (If available) before entry operations begin, the Host Employer must provide the following information to the Controlling Contractor:

- The location of each known permit space
- The hazards or potential hazards in each space or the reason it is a permit space
- Any precautions that the Host Employer, previous Controlling Contractor or Entry Employer implemented for the protection of employees in the permit space

Controlling Contractor – Before entry operations begin, the controlling contractor must obtain the Host Employer's permit space hazards information and previous entry operations. Furthermore, provide the following information to each entity entering a permit space and any other entity at the worksite whose activities could foreseeably result in a hazard in the permitted space:

- The information received from the host employer
- Any additional and relevant information the controlling contractor has about the permit spaces including locations, hazards and precautions
- The precautions that the host employer, controlling contractor, or other entry employers implemented for the protection of employees in the permit spaces

Entry Employer(s) – Before entry operations begin, each Entry Employer must:

- Obtain all the Controlling Contractor's information regarding permit space hazards and entry operations
- Inform the Controlling Contractor of the permit space program that the Entry Employer follows, including any hazards likely to be confronted or created in each permitted space

Controlling Contractor & Entry Employer(s) – The Controlling Contractor and Entry Employer(s) must coordinate entry operations when more than one entity enters at the same time and after entry operations:

☐ **Controlling Contractor** must debrief each entity that entered a permit space regarding the permit space program followed and any hazards confronted or created in the permit space(s) during entry operations

☐ **Entry Employer** must inform the controlling contractor in a timely manner of the permit space program followed and of any hazards confronted or created in the permit space(s) during entry operations

☐ **Controlling Contractor** must apprise the Host Employer of the information exchanged with the entry entities pursuant to this subparagraph



Integrated Water Services, Inc.
4001 North Valley Drive
Longmont, Colorado 80504

Project: 488 42nd Street Pump Station
W 42nd Street and N Trip Ave
Odessa, Texas 79764

Inspection: Daily Excavation Checklist #1

24/24 Items Inspected	16 Pass	0 Fail	8 N/A	0 Neutral

Type	Civil	Status	Closed by Todd Brunetti on 07/13/21
Trade	Excavating	Location	
Spec Section		Linked Drawings	
Description	Excavation Checklist, Subgrade elevation shall be 2960.75 Field verified with Randy from 4X and Todd Brunetti IWS. Two walk outs installed at future pipe locations		
Attachments			

Inspection Details

Inspection Date	Jul 13, 2021	Due Date	
Point of Contact		Responsible Contractor	4X Industrial
Assignee(s)	Todd Brunetti, Chad Wiley		

General

0 Neutral 8 Pass 0 Fail 1 N/A

1.1 What is the nature of the work being performed in the open excavation
Activity: 1 Response Change, 0 Attachments, 0 Photos, 1 Comment, 0 Observations

☒ Pass ☐ Fail ☐ N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with Pass on Jul 13, 2021 at 02:08 PM MDT

Todd Brunetti (Integrated Water Services, Inc.) left a comment on Jul 13, 2021 at 02:07 PM MDT
Excavation to sub grade under pipe galley.

1.2 Soil Classification
Activity: 1 Response Change, 0 Attachments, 1 Photo, 1 Comment, 0 Observations

☒ Pass ☐ Fail ☐ N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with Pass on Jul 13, 2021 at 02:08 PM MDT

Todd Brunetti (Integrated Water Services, Inc.) added 1 photo via web on Jul 13, 2021 at 02:08 PM MDT



[4F9C89F9-D976-48AC-9D03-BE63E7639D7F.jpeg](#)

Todd Brunetti (Integrated Water Services, Inc.) left a comment on Jul 13, 2021 at 02:08 PM MDT
Class A Rock

1.3 Employees protected from cave-ins and loose rock and soil that could fall into excavation

Activity: 1 Response Change, 0 Attachments, 0 Photos, 1 Comment, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with Pass on Jul 13, 2021 at 02:09 PM MDT

Todd Brunetti (Integrated Water Services, Inc.) left a comment on Jul 13, 2021 at 02:09 PM MDT
Barrier Fence to be installed around perimeter.

1.4 Spoils, materials, and equipment set back at least 2 feet from edge of excavation

Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with Pass on Jul 13, 2021 at 02:21 PM MDT

1.5 Engineer's design or manufacturer's data for sheeting or shoring

Activity: 1 Response Change, 0 Attachments, 0 Photos, 1 Comment, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with Pass on Jul 13, 2021 at 02:23 PM MDT

Todd Brunetti (Integrated Water Services, Inc.) left a comment on Jul 13, 2021 at 02:23 PM MDT
Shear wall excavation in solid Rock.

1.6 Engineer's design for excavations over 20 foot deep

Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with N/A on Jul 13, 2021 at 02:23 PM MDT

1.7 Adequate signs posted and barricades provided

Activity: 1 Response Change, 0 Attachments, 0 Photos, 1 Comment, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) left a comment on Jul 13, 2021 at 02:23 PM MDT
Orange safety fence is installed.

Todd Brunetti (Integrated Water Services, Inc.) responded with Pass on Jul 13, 2021 at 02:23 PM MDT

1.8 Proper BMPs installed to prevent erosion along excavation

Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with Pass on Jul 13, 2021 at 02:24 PM MDT

1.9 Competent person onsite while work is being performed

Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with Pass on Jul 13, 2021 at 02:24 PM MDT

Utilities

0 Neutral

1 Pass

0 Fail

4 N/A

2.1 Utility company contacted and utilities are marked and located

Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with N/A on Jul 13, 2021 at 02:25 PM MDT

2.2 Locate Ticket #

Activity: 1 Response Change, 0 Attachments, 0 Photos, 1 Comment, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with Pass on Jul 13, 2021 at 02:26 PM MDT

Todd Brunetti (Integrated Water Services, Inc.) left a comment on Jul 13, 2021 at 02:26 PM MDT

4X Locate On File.

2.3 Overhead lines located and proper signs are in place

Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with N/A on Jul 13, 2021 at 02:26 PM MDT

2.4 Utility locations reviewed with operator and precautions taken to avoid contact with utilities

Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with N/A on Jul 13, 2021 at 02:26 PM MDT

2.5 Underground installations protected, supported, or removed when excavation is open

Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with N/A on Jul 13, 2021 at 02:26 PM MDT

Wet Conditions

0 Neutral

3 Pass

0 Fail

0 N/A

3.1 Precautions taken to protect employees from water accumulation

Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with Pass on Jul 13, 2021 at 03:11 PM MDT

3.2 Surface water or runoff diverted or controlled to prevent accumulation in excavation

Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with Pass on Jul 13, 2021 at 03:11 PM MDT

3.3 Inspections made after weather event or other hazard increasing occurrence

Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with Pass on Jul 13, 2021 at 03:11 PM MDT

Hazardous Atmospheres

0 Neutral

0 Pass

0 Fail

3 N/A

4.1 Air in the excavation is tested

Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with N/A on Jul 13, 2021 at 03:11 PM MDT

4.2 Ventilation used as required

Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with N/A on Jul 13, 2021 at 03:11 PM MDT

4.3 Emergency equipment available when hazardous conditions exist

Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with N/A on Jul 13, 2021 at 03:11 PM MDT

Entry and Exit

0 Neutral

4 Pass

0 Fail

0 N/A

5.1 Ladder or sloped wall placed no further than 25 ft from any employee

Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with Pass on Jul 13, 2021 at 03:11 PM MDT

5.2 Ladders are secured and extend 3 feet above the edge of excavation

Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with Pass on Jul 13, 2021 at 03:11 PM MDT

5.3 Employees are protected from cave-ins when entering or exiting excavation

Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations



Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with Pass on Jul 13, 2021 at 03:11 PM MDT

5.4 Entry and Exit points are adequately defined*Activity: 1 Response Change, 0 Attachments, 0 Photos, 0 Comments, 0 Observations*

Pass



Fail



N/A

Todd Brunetti (Integrated Water Services, Inc.) responded with Pass on Jul 13, 2021 at 03:11 PM MDT

JOBSITE HAZARD ASSESSMENT

Project: #488 42nd Street Pump Station.

Date: 3/24/2022



Today's Tasks:

Processing Materials.
Placing Sub Grade.
Dust Control.

Tools and Equipment Required

Equipment,
138 Excavator.
380 Loader.
2k Water Truck.
Tools.
Grease Gun.
Screw Driver.

Potential Hazards

Struck By.
Pinch Points.
Caught In Between.
Hit By.
Slip, Trip, Falls.
Cut's, Scrapes, Abrasions, Laceration.
Twisting, Sprains.

Steps to Eliminate Hazards

AM Job Site Inspection.
Stretch And Flex.
Toolbox Talks: Today's Topic (Falling Objects. Make sure and look up. Stay Alert. Make sure all are aware of where you are working. When working on roof or above everyone else. Make sure you tie off tools and equipment. if equipment or tools fall they won't knock someone out. There will be no accidents.
Good Housekeeping.
Good Communication.

Start of Shift Signature:

1. _____	6. _____
2. _____	7. _____
3. _____	8. _____
4. _____	9. _____
5. _____	10. _____

Signing indicates employee has reviewed and understands the tasks and hazards

End of Shift Signature:

1. _____	6. _____
2. _____	7. _____
3. _____	8. _____
4. _____	9. _____
5. _____	10. _____

Signing indicates employee was not injured today or all injuries have been reported to supervisor

Additional Notes:

SSSP APPENDIX 4: EXCAVATION WORK PLAN

EXCAVATION WORK PLAN

22 Apr 2022



Integrated Water Services, Inc.

4001 North Valley Drive, Longmont, CO 80504



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www.Anfeald.com Answers@Anfeald.com 970.372.1131

Contents

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Hazards and Controls

A competent-person must evaluate excavations and implement appropriate hazard controls.

When the excavation is less than 5-feet in depth, the competent-person may sometimes require controls, depending on the nature of the work and the hazards.

Competent-person excavation inspections are required:

- At the start of every day or shift
- As needed during the day or shift
- After rain or snow
- After freeze-thaw cycles
- Any time the competent-person or others observe structural instability or other serious condition

Common excavation hazards and controls include the following:

Hazard(s)	Source(s)	Control(s)
Underground utilities (electrical, natural gas, water, sewer, other)	Underground utilities, unmarked or unidentified underground utilities	Before digging, the frontline leader, or competent-person must perform a one-call locate request and excavations may not commence until complete; During excavations, if any unmarked lines are discovered, work stops until the underground facility owner is identified and the lines are properly marked; Refer to one-call and excavation safety programs for details
Locate marks no longer visible	Work activities or weather destroy existing markings prior to the expiration date of the locate request	When markings are no longer visible, and excavations continue, a refresh locate is required; No work is allowed until markings are refreshed
Falls into excavation (construction personnel)	Excavation edge not visible	If the edge of the excavation is obscured, markers are required that indicate the location of the excavation edges; markers can be signs, cones, fencing, or other method.
Falls into excavation (heavy equipment)	Excavation edge not visible to operator	Use stop logs, spotters and similar techniques as necessary
Falls (members of the public)	Fall into excavation from edge, regardless of visibility	When members of the public could fall into an excavation, protect it using fencing; typically this is after hours and on weekends
Fall from ladder	Ladders used for access and egress	Complete pre-use inspections and retire unsafe ladders, use the appropriate ladder for each application, set ladders up properly, conduct ladder inspections periodically, refer to the ladder-safety checklist for full details

Fall from spoil pile or stacked material	All material types	Employees and subcontractors do not climb or work from piled materials. Piled materials must be stored and arranged in a safe manner not subject to falling over or falling to a level below
Spoil pile too close	Increases surcharge, hides development of tension cracks, spoils can fall into hole	Temporary spoils pile must remain at least 2-feet from excavation edge; use long-term spoils storage as needed
Struck by, Caught between	Working under a suspended load, working between a live load and the excavating equipment, working in the swing zone	Employees and subcontractors are not allowed to work under a suspended load, work between a suspended load and any other object, including the excavation face A designated spotter is required during digging operations High visibility vests are always worn on site Employees must stay clear of the swing radius of heavy equipment that rotates, especially when rotating heavy equipment is located near other objects; employees may not cross between the equipment and the object, barricade swing radius if necessary
Cave-in	No or improper sloping, benching, shielding, or shoring	When a trench is five or more feet in depth, the competent-person initially classifies soil types, selects and establishes protective measures, conducts daily or more frequent inspections, and ensures that all protective measures are properly used. Refer to the Excavation program for details Note: When determined by the competent-person, excavations less than 5-feet may also require cave-in protection
Jump to lower level unspecified	Intentional jumping from one level to another	Jumping from an elevation of more than one step is prohibited
Water infiltration and structural instability of soil with or without cave in	Water infiltration	The competent-person will establish appropriate water-management controls up to and including one or more dewatering wells and will include a qualified engineer when necessary. Dewatering may require silt control. Employee entry is prohibited until water infiltration is controlled

Cars, light trucks, and other vehicles	Struck by	If excavation is near a roadway, personnel will wear hi visibility vests and establish a traffic control plan, using flaggers when enccessary

Safety Requirements by the Numbers

Core requirements include the following:

- 0-feet: Competent person must asses soil and control hazards
- 2-feet: Minimum distance of temporary spoils to excavation
- 4-feet: Means of access and egress required
- 4-feet: Atmospheric testing if atmospheric hazards possible
- 5-feet: Protective systems required (slope, bench, shield, shore)
- 6-feet: Protect from falls if excavation obscured from view
- 6-feet: Guardrails required on walkways that cross excavation
- 20-feet: Sloping and benching systems require custom engineering by PE
- 25-feet: Maximum lateral travel-distance to each egress point

Competent-Persons

A designated competent-person, with excavation safety training and excavation experience is required in accordance with the excavation program.

Training

Employees are trained based on their roles and responsibilities when working around excavations and trenches. Employees may be trained in an awareness-level class, as an excavation worker, or as a competent-person, depending on their role and responsibility.



**J.M. TURNER
ENGINEERING, INC.**

Consulting Engineers

CIVIL ENGINEERING • STRUCTURAL ENGINEERING
CONSTRUCTION ENGINEERING

AAMODT LITIGATION SETTLEMENT
4 BUNDY ROAD
SAN ILDEFONSO PUEBLO, NM 87506

SHIELD SHORING
DESIGN CALCULATIONS

Trench Shore Rentals
3540 Lee Blvd.
El Paso, TX 79936

Design an excavation plan for the above-mentioned project. The maximum depth of the excavation is to be 8'. Soil parameters used for active pressure are as follows: Soil Unit Weight = 120 pcf, Internal Angle of Friction = 30 degrees. A 596 psf surcharge from ground surface to the bottom of excavation was added to account for traffic and/or construction equipment adjacent to excavation. Dewater, if necessary, to maintain a maximum water table level at the bottom of the excavation.



REV: 04/19/2022
DATE: 04/07/2022
BY: A.M.A.
BY DIRECTION OF: A.J.V.
SHEET NO: 1 OF 9
JOB NO: 19230-1

4/19/2022

J.M. TURNER ENGINEERING, INC.

1325 COLLEGE AVENUE
SANTA ROSA, CA 95404
PH# : (707) 528-4503
FAX# : (707) 528-4505

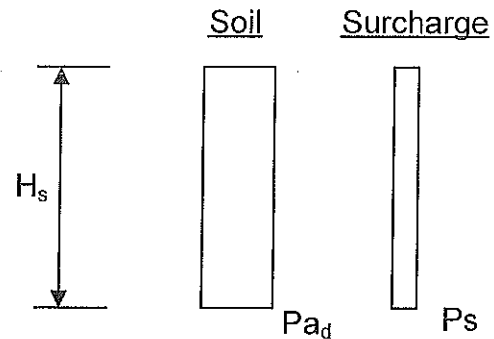
SUBJECT: Trench Shore RentalsSHEET NO.: 2 OF AAMODT Litigation SettlementBY: A.M.A. DATE 04/19/22Shoring Design CalculationsCHKD BY: DATE: Check Shields, Granular Soil, Maximum Depth of 8':Active Pressure:Internal Angle of Friction (deg): $\phi := 30$ Unit Weight of Soil (pcf): $\gamma := 120$ Maximum Height of System (ft): $H_s := 8$

$$K_a := \tan^2 \left[\left(45 - \frac{\phi}{2} \right) \cdot \text{deg} \right]$$

$$K_a = 0.33$$

$$P_{a_d} := 0.65 \cdot K_a \cdot \gamma \cdot H_s$$

$$P_{a_d} = 208$$

Surcharge:

Surcharge used to account for traffic and/or
construction equipment adjacent to excavation.

Surcharge (psf): $P_s := 596$ Total Pressure:Total Pressure (psf): $P_t := P_{a_d} + P_s$

$$P_t = 804$$

Use Shoring Shields, with a Minimum Rating of 804 psf.

John Deere 345G LC Excavator Surcharge

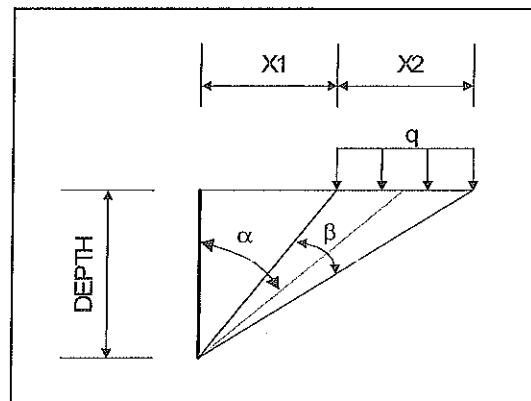
Project: AAMODT LITIGATION SETTLEMENT

Contractor: Trench Shore Rentals

Surcharge Load (ksf): $q = 2.928$

Distance to Start (ft): $X1 = 7.00$

Surcharge Width (ft): $X2 = 2.67$



Using Boussinesq's Formula:

$$\text{Lat. Press.} = 2q[\beta - \sin(\beta)\cos(2\alpha)]/\pi$$

540 psf

Depth	Beta (β) Radians	Beta (β) Degrees	Alpha (α) Radians	Alpha (α) Degrees	Pressure (PSF)
0	0.000	0.000	1.571	90.000	0
1	0.039	2.226	1.448	82.983	143
2	0.074	4.260	1.330	76.185	261
3	0.104	5.963	1.218	69.783	341
4	0.127	7.272	1.115	63.891	381
5	0.143	8.196	1.022	58.560	388
6	0.153	8.783	0.939	53.790	372
7	0.159	9.100	0.865	49.550	343
8	0.161	9.213	0.799	45.792	308
9	0.160	9.180	0.741	42.465	272
10	0.158	9.047	0.690	39.515	239
11	0.154	8.847	0.644	36.895	208
12	0.150	8.607	0.603	34.560	181
13	0.146	8.343	0.567	32.472	157
14	0.141	8.068	0.534	30.599	136
15	0.136	7.792	0.505	28.913	119
16	0.131	7.518	0.478	27.389	104
17	0.127	7.252	0.454	26.006	91
18	0.122	6.995	0.432	24.748	80
19	0.118	6.749	0.412	23.599	71
20	0.114	6.514	0.394	22.547	63
21	0.110	6.290	0.377	21.580	56
22	0.106	6.078	0.361	20.689	50
23	0.103	5.876	0.347	19.866	44
24	0.099	5.685	0.333	19.103	40
25	0.096	5.504	0.321	18.394	36
26	0.093	5.333	0.310	17.735	32
27	0.090	5.170	0.299	17.120	29
28	0.088	5.016	0.289	16.544	27
29	0.085	4.870	0.279	16.006	24
30	0.083	4.732	0.271	15.500	22

Project: AAMODT LITICATION SETTLEMENT

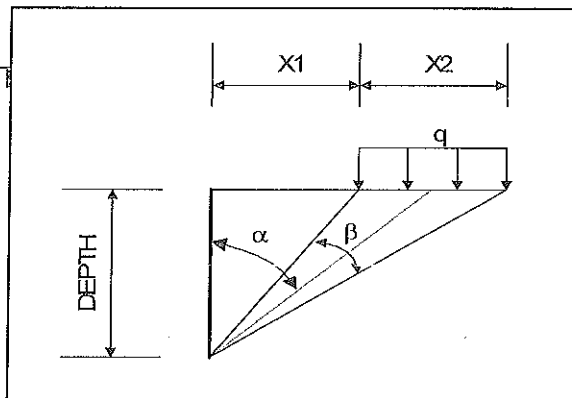
Contractor: Trench Shore Rentals

overall excavator width D = 11.08

Surcharge Load (ksf): q = 2.928

Distance to Start (ft): X1 = 15.41

Surcharge Width (ft): X2 = 2.67



Using Boussinesq's Formula:

$$\text{Lat. Press.} = 2q[\beta - \sin(\beta)\cos(2\alpha)]/\pi$$

Depth	Beta (β) Radians	Beta (β) Degrees	Alpha (α) Radians	Alpha (α) Degrees	Pressure (PSF)
0	0.000	0.000	1.571	90.000	0
1	0.010	0.547	1.511	86.561	35
2	0.019	1.082	1.451	83.146	69
3	0.028	1.595	1.392	79.781	101
4	0.036	2.076	1.335	76.487	128
5	0.044	2.518	1.279	73.282	150
6	0.051	2.915	1.225	70.184	168
7	0.057	3.265	1.173	67.203	181
8	0.062	3.567	1.123	64.348	189
9	0.067	3.823	1.076	61.625	193
10	0.070	4.034	1.030	59.036	193
11	0.073	4.203	0.988	56.582	190
12	0.076	4.336	0.947	54.259	186
13	0.077	4.434	0.909	52.066	179
14	0.079	4.503	0.873	49.996	172
15	0.079	4.547	0.839	48.046	164
16	0.080	4.569	0.806	46.208	155
17	0.080	4.572	0.776	44.477	146
18	0.080	4.560	0.748	42.847	137
19	0.079	4.535	0.721	41.311	129
20	0.079	4.499	0.696	39.864	120
21	0.078	4.455	0.672	38.499	112
22	0.077	4.404	0.649	37.212	105
23	0.076	4.348	0.628	35.996	98
24	0.075	4.288	0.608	34.848	91
25	0.074	4.225	0.589	33.762	85
26	0.073	4.159	0.571	32.735	79
27	0.071	4.092	0.554	31.761	74
28	0.070	4.024	0.538	30.839	69
29	0.069	3.956	0.523	29.963	64
30	0.068	3.888	0.508	29.132	60

Calculated Pressure

Depth	Lateral Pressure (PSF)
0	0
1	178
2	331
3	442
4	509
5	538
6	540
7	523
8	497
9	465
10	432
11	398
12	366
13	336
14	308
15	283
16	259
17	237
18	217
19	199
20	183
21	168
22	154
23	142
24	131
25	121
26	112
27	103
28	96
29	89
30	82

Design Pressure

Depth	Lateral Pressure (PSF)
0	540
1	540
2	540
3	540
4	540
5	540
6	540
7	540
8	540
8	0

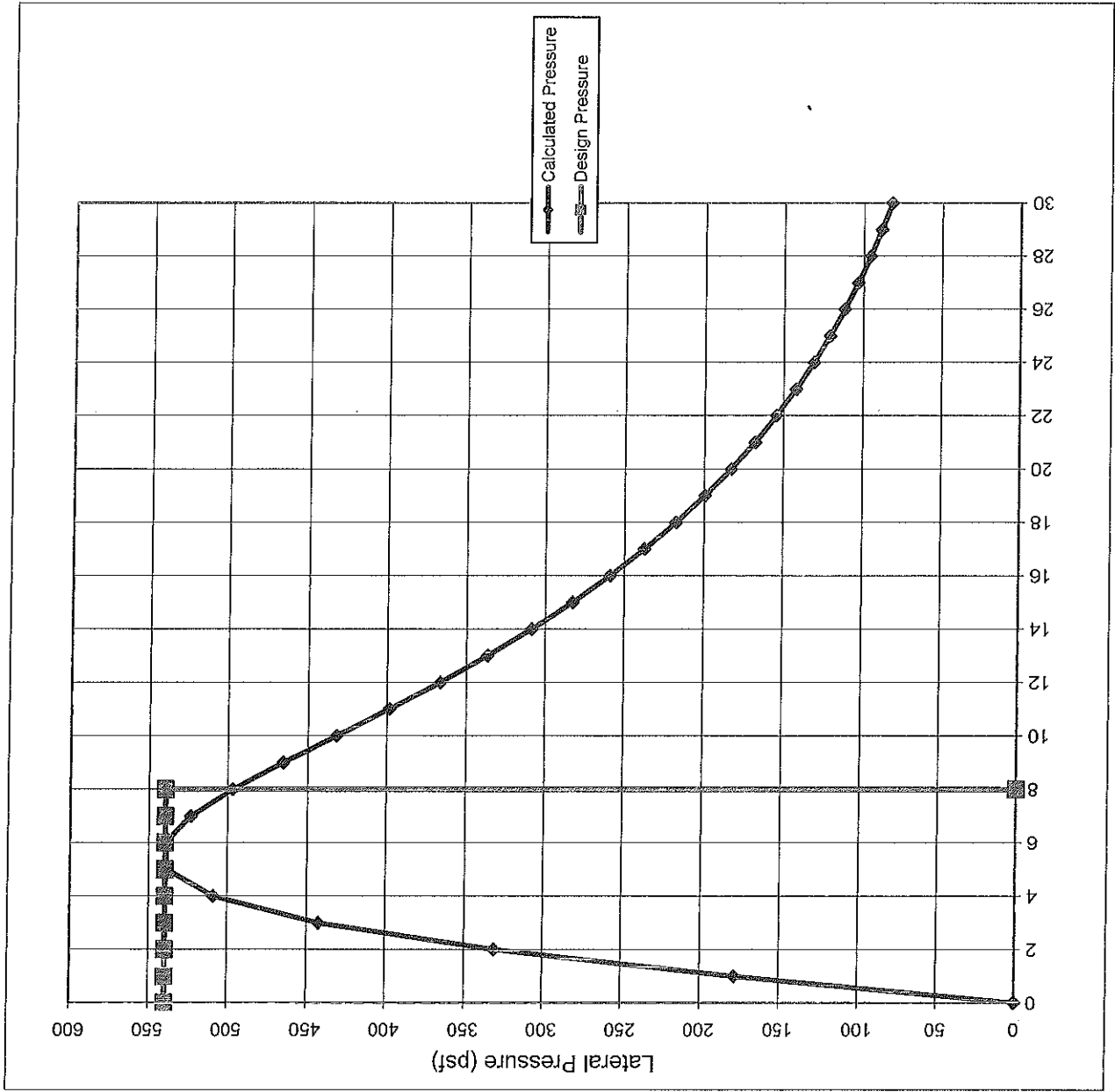
John Deere 345G LC Excavator Surgecharge

AAMODT LITIGATION SE

0.0

Trench Shore Rentals

11.1



Type of Equipment: 624 P Wheel Loader

Point Loads (lbs):
 P1 = 9281
 P2 = 9281
 P3 = 9281
 P4 = 9281

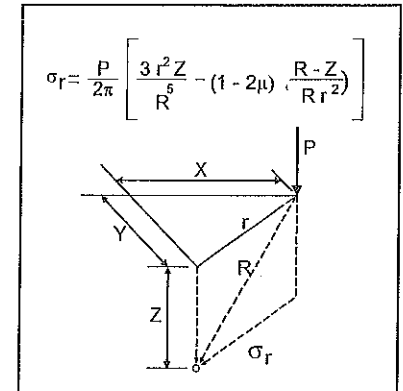
Distances (ft):

Setback Distance (ft): X = 2.5

Between Tires: Dx = 10.08

Dy = 7

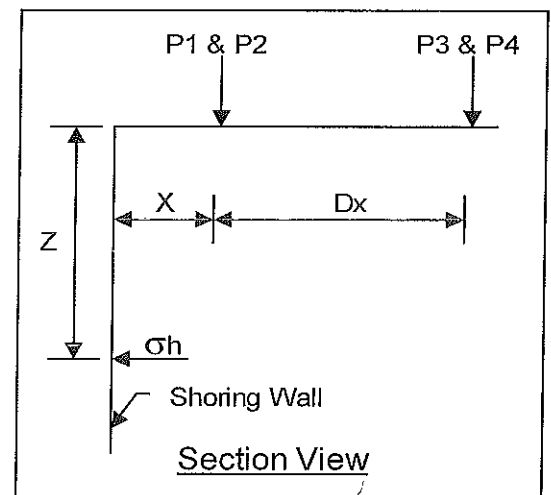
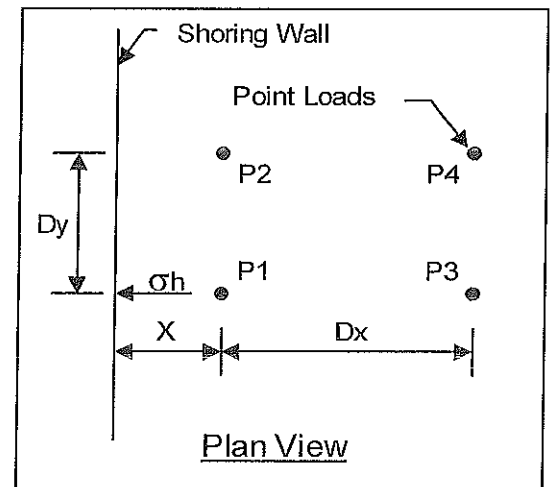
Soil Friction Factor: $\mu = 0.3$



Horiz. Pressure (psf):

$$\sigma_h = \sigma_r \left(\frac{X}{r} \right)$$

Depth (ft)	Horiz. Pressure (psf)				Total (psf)
	P1	P2	P3	P4	
0	0	0	0	0	0
1	136	0	0	0	137
2	129	3	1	0	134
3	70	5	3	2	79
4	33	6	4	2	46
5	15	6	5	3	29
6	7	5	6	4	21
7	3	4	6	4	17
8	1	3	6	4	14
9	0	3	6	4	12
10	0	2	5	4	11
11	0	2	5	4	10
12	0	1	4	3	9
13	0	1	4	3	8
14	0	1	3	3	7
15	0	1	3	2	6
16	0	0	2	2	5
17	0	0	2	2	4
18	0	0	2	2	4
19	0	0	2	1	3
20	0	0	1	1	3
21	0	0	1	1	2
22	0	0	1	1	2
23	0	0	1	1	2
24	0	0	1	1	2
25	0	0	1	1	1
26	0	0	1	1	1
27	0	0	0	1	1
28	0	0	0	0	1
29	0	0	0	0	1
30	0	0	0	0	1



Type of Equipment: 4000 Gal. water Truck

Point Loads (lbs):
 P1 = 10000
 P2 = 10000
 P3 = 10000
 P4 = 10000
 P5 = 7000
 P6 = 7000

Distances (ft):

Setback Distance (ft): X = 2.5

Between Tires: Dx1 = 2.5
 Dx2 = 9
 Dy = 5

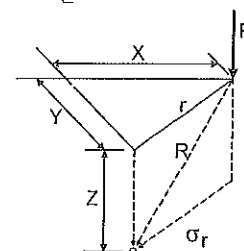
Soil Friction Factor :

$\mu = 0.3$

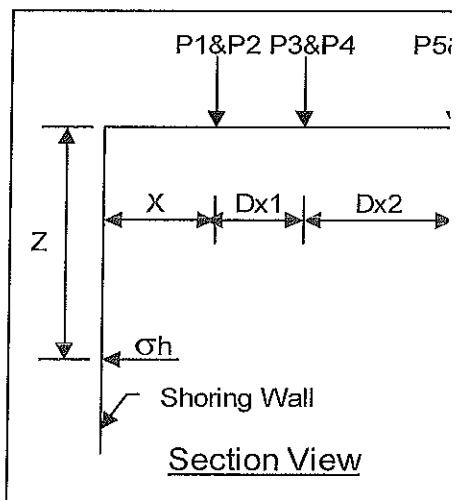
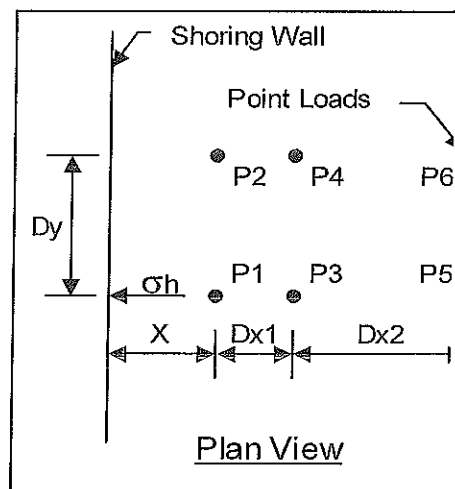
Horiz. Pressure (psf):

$$\sigma_h = \sigma_r \left(\frac{X}{r} \right)$$

$$\sigma_r = \frac{P}{2\pi} \left[\frac{3r^2Z}{R^5} - (1-2\mu) \left(\frac{R-Z}{Rr^2} \right) \right]$$



Depth (ft)	Horiz. Pressure (psf)						Total (psf)
	P1	P2	P3	P4	P5	P6	
0	0	0	0	0	0	0	0
1	147	4	14	1	0	0	166
2	139	12	37	9	0	0	198
3	75	15	41	13	1	1	146
4	36	14	35	15	2	2	103
5	17	11	26	14	3	2	73
6	8	8	19	12	3	3	52
7	3	6	13	9	4	3	38
8	1	4	9	7	4	3	29
9	0	3	6	6	4	3	22
10	0	2	4	4	3	3	17
11	0	2	3	3	3	3	14
12	0	1	2	3	3	3	11
13	0	1	1	2	3	2	9
14	0	1	1	2	2	2	7
15	0	0	1	1	2	2	6
16	0	0	0	1	2	2	5
17	0	0	0	1	2	2	4
18	0	0	0	0	1	1	3
19	0	0	0	0	1	1	3
20	0	0	0	0	1	1	2
21	0	0	0	0	1	1	2
22	0	0	0	0	1	1	2
23	0	0	0	0	1	1	2
24	0	0	0	0	1	1	1
25	0	0	0	0	1	1	1
26	0	0	0	0	0	1	1
27	0	0	0	0	0	0	1
28	0	0	0	0	0	0	1
29	0	0	0	0	0	0	1
30	0	0	0	0	0	0	1





Check Spreaders on Shields:

Loading on Shield (ksf): $P := .804$

Length of Shield (ft): $L := 20$

Height of Shield (ft): $H := 10$

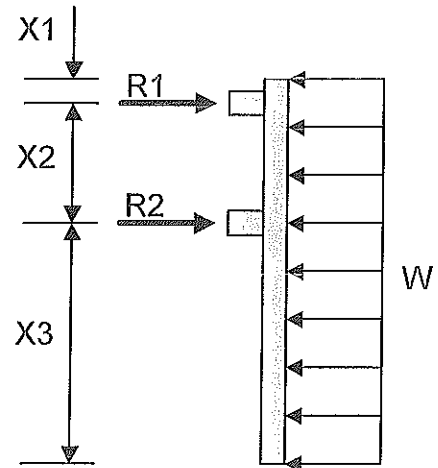
height off the bottom (ft): $H_C := 0$

Distributed Load at Spreaders (klf): $W := P \cdot \frac{L}{2} = 8.04$

Distance Down to Top Spreader (ft): $X1 := 0.67$

Distance Between Spreaders (ft): $X2 := 2.5$

Dist. From Bot. Spreader to Bot. of Shield (ft): $X3 := H - X1 - X2 = 6.83$



$$\text{Reaction at R1 (kips): } R1 := \frac{\left[(W \cdot X1) \cdot \left(X2 + \frac{X1}{2} \right) \right] + \left[(W \cdot X2) \cdot \left(\frac{X2}{2} \right) \right] - \left[(W \cdot X3) \cdot \frac{X3}{2} \right]}{X2}$$

$$R1 = -59$$

$$\text{Reaction at R2 (kips): } R2 := W \cdot (X1 + X2 + X3) - R1$$

$$R2 = 139$$

Check 8" ϕ Sch 80 Pipe Spreader: $A := 11.9$ $r := 2.89$ $S := 23.1$ $BW := 43.4$ $F_y := 35$ $L_s := 10$

Axial (ksi):

$$K := 1 \quad \frac{K \cdot L_s \cdot 12}{r} = 41.5 \quad \text{Thus... } Fa := 19.2$$

$$fa := \frac{\max(R1, R2)}{A} \quad fa = 11.70 < Fa = 19.2 \quad \text{OK} \quad \frac{fa}{Fa} = 0.609$$

Bending Stress:

Length of Spreaders (ft): $L_s = 10$

Distributed Load per Spreader (klf): $W_s := \frac{BW}{1000} \quad W_s = 0.043$

Maximum Moment (k*ft): $M := \frac{W_s \cdot L_s^2}{8} \quad M = 0.542$

Short Term Construction factor: $C_D := 1.33$

Bending Stress (ksi): $fb := \frac{M \cdot 12}{S} \quad Fb := 0.66 \cdot F_y \cdot C_D = 30.723$

Combined Stress:

$$fb = 0.28 < Fb = 30.723 \quad \text{OK}$$

$$CS := \text{if} \left(\frac{fa}{Fa} \geq 0.2, \frac{fa}{Fa} + \frac{8}{9} \cdot \frac{fb}{Fb}, \frac{fa}{2 \cdot Fa} + \frac{fb}{Fb} \right) \quad CS = 0.62 \leq 1.00 \quad \text{OK}$$

Use 8" Sch 80 Pipe Spreader



345G LC SPECIFICATIONS

Engine		345G LC	
Manufacturer and Model		Isuzu 6HK1XASA02	
Non-Road Emission Standard		EPA Final Tier 4/EU Stage IV	
Net Peak Power (ISO 9249)		186 kW (249 hp) at 1,900 rpm	
Cylinders		6	
Displacement		7.79 L (475 cu. in.)	
Off-Level Capacity		70% (35 deg.)	
Aspiration		Turbocharged, air-to-air charge-air cooler	
Cooling			
Cool-on-demand, hydraulic-driven, suction-type fan with remote-mounted drive and enclosed fan guard; side-by-side radiator, oil cooler, and intercooler with dust net			
Powertrain			
2-speed propel with automatic shift			
Maximum Travel Speed			
Low		2.6 km/h (1.6 mph)	
High		4.1 km/h (2.5 mph)	
Drawbar Pull		30 388 kg (66,990 lb.)	
Hydraulics			
Open center, load sensing with variable-displacement pumps			
Main Pumps		3 variable-displacement axial-piston pumps	
Maximum Rated Flow			
Pump 1/Pump 2		235 L/m (62.1 gpm) x 2	
Pump 3		211 L/m (55.7 gpm) x 1	
Pilot Pump		1 gear	
Maximum Rated Flow		36.4 L/m (9.6 gpm)	
Pressure Setting		3900 kPa (566 psi)	
System Operating Pressure			
Circuits			
Implement		34 300 kPa (4,975 psi)	
Travel		35 500 kPa (5,149 psi)	
Swing		32 400 kPa (4,699 psi)	
Power Boost		38 000 kPa (5,511 psi)	
Controls		Pilot levers, short stroke, low-effort hydraulic pilot controls with shutoff lever	
Cylinders			
	Bore	Rod Diameter	Stroke
Boom (2)	135 mm (5.3 in.)	100 mm (3.9 in.)	1578 mm (62.1 in.)
Arm (1)	150 mm (5.9 in.)	105 mm (4.1 in.)	1659 mm (65.3 in.)
Bucket (1)	135 mm (5.3 in.)	90 mm (3.5 in.)	1070 mm (42.1 in.)
Electrical			
Voltage		24 volt	
Number of Batteries (12 volt)		2	
Battery Capacity		860 CCA	
Alternator Rating		50 amp	
Work Lights		3 halogen (1 mounted on frame, 2 mounted on boom)	
Undercarriage			
Rollers (each side)			
Carrier (upper)		2	
Track (lower)		8	
Shoes, Triple Semi-Grousers (each side)		48	
Track			
Adjuster		Hydraulic	
Guides		3 per side	
Chain		Sealed and lubricated	
Ground Pressure			
800-mm (32 in.) Triple Semi-Grouser Shoes		50 kPa (7.3 psi)	

345G LC SPECIFICATIONS



Swing Mechanism	345G LC
Swing	
Speed	10.5 rpm
Torque	90 500 Nm (66,750 lb.-ft.)

Serviceability	
Refill Capacities	
Fuel Tank	380 L (100 gal.)
Diesel Exhaust Fluid (DEF) Tank	16 L (4.2 gal.)
Cooling System	41 L (10.8 gal.)
Engine Oil with Filter	48 L (12.7 gal.)
Hydraulic Tank	160 L (42 gal.)
Hydraulic System	330 L (87 gal.)
Swing Drive	12 L (3.2 gal.)
Gearbox	
Propel (each)	11 L (2.9 gal.)
Pump Drive Gear Case	1.1 L (1.2 qt.)
Swing Bearing Grease Bath	19 kg (41.9 lb.)

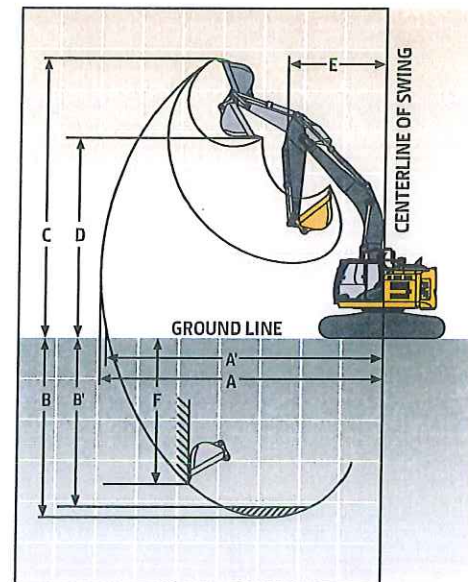
Operating Weights
 With full fuel tank; 79-kg (175 lb.) operator; 1.25-m³ (1.63 cu. yd.), 1067-mm (42 in.), 957-kg (2,110 lb.) bucket; 3.76-m (12 ft. 4 in.) arm; 8680-kg (19,136 lb.) counterweight; and 800-mm (32 in.) triple semi-grouser shoes

SAE Operating Weight 35 700 kg (78,710 lb.)

Component Weights	
Undercarriage	
800-mm (32 in.) Triple Semi-Grouser Shoes	12 710 kg (28,021 lb.)
One-Piece Boom (with arm cylinder)	2385 kg (5,258 lb.)
Arm with Bucket Cylinder and Linkage	
3.76 m (12 ft. 4 in.)	1583 kg (3,490 lb.)
3.11 m (10 ft. 2 in.)	1494 kg (3,294 lb.)
Boom-Lift Cylinders (2), Total Weight	584 kg (1,287 lb.)
Cylinder (1), Total Weight	
Arm	348 kg (767 lb.)
Bucket	211 kg (465 lb.)

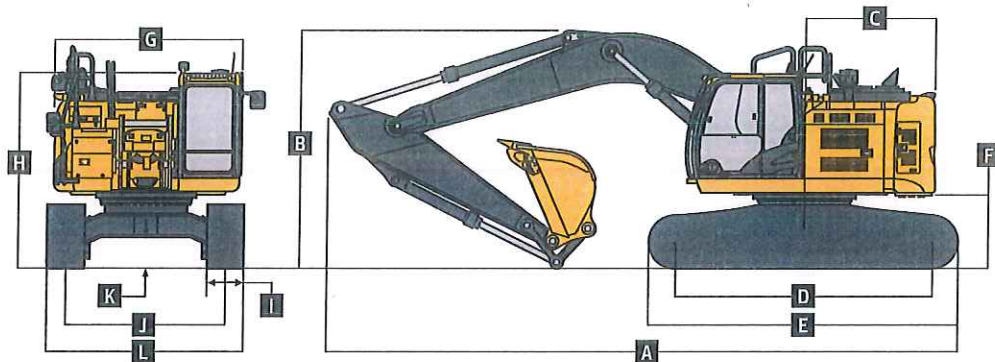
Operating Dimensions

Arm Length with 6.2-m (20 ft. 4 in.) Standard Boom	3.11 m (10 ft. 2 in.)	3.76 m (12 ft. 4 in.)
Arm Digging Force		
ISO	144 kN (32,370 lb.)	127 kN (28,550 lb.)
SAE	138 kN (31,020 lb.)	121 kN (27,200 lb.)
Bucket Digging Force		
ISO	202 kN (45,410 lb.)	202 kN (45,410 lb.)
SAE	175 kN (39,340 lb.)	175 kN (39,340 lb.)
Working Ranges		
A Maximum Reach	10.90 m (35 ft. 9 in.)	11.46 m (37 ft. 7 in.)
A ¹ Maximum Reach at Ground Level	10.64 m (34 ft. 11 in.)	11.22 m (36 ft. 10 in.)
B Maximum Digging Depth	6.92 m (22 ft. 8 in.)	7.57 m (24 ft. 10 in.)
B ¹ Maximum Digging Depth at 2.44-m (8 ft. 0 in.) Flat Bottom	6.74 m (22 ft. 1 in.)	7.41 m (24 ft. 4 in.)
C Maximum Cutting Height	11.41 m (37 ft. 5 in.)	11.69 m (38 ft. 4 in.)
D Maximum Dumping Height	8.38 m (27 ft. 6 in.)	8.67 m (28 ft. 5 in.)
E Minimum Swing Radius	3.40 m (11 ft. 2 in.)	3.39 m (11 ft. 1 in.)
F Maximum Vertical Wall	6.14 m (20 ft. 2 in.)	6.71 m (22 ft. 0 in.)



345G LC

Machine Dimensions		345G LC	
Arm Length		3.11 m (10 ft. 2 in.)	3.76 m (12 ft. 4 in.)
A Overall Length with Arm		9.96 m (32 ft. 8 in.)	10.02 m (32 ft. 10 in.)
B Overall Height with Arm		3.35 m (11 ft. 0 in.)	3.42 m (11 ft. 3 in.)
C Rear-End Length/Swing Radius		2.09 m (6 ft. 10 in.)	2.09 m (6 ft. 10 in.)
D Distance Between Idler/Sprocket Centerline		4.05 m (13 ft. 3 in.)	4.05 m (13 ft. 3 in.)
E Undercarriage Length		4.94 m (16 ft. 2 in.)	4.94 m (16 ft. 2 in.)
F Counterweight Clearance		1.16 m (3 ft. 10 in.)	1.16 m (3 ft. 10 in.)
G Upperstructure Width		3.05 m (10 ft. 0 in.)	3.05 m (10 ft. 0 in.)
H Cab Height		3.23 m (10 ft. 7 in.)	3.23 m (10 ft. 7 in.)
I Track Width with Triple Semi-Grouser Shoes		800 mm (32 in.)	800 mm (32 in.)
J Gauge Width		2.59 m (8 ft. 6 in.)	2.59 m (8 ft. 6 in.)
K Ground Clearance		500 mm (20 in.)	500 mm (20 in.)
L Overall Width with 800-mm (32 in.) Triple Semi-Grouser Shoes		3.39 m (11 ft. 1 in.)	3.39 m (11 ft. 1 in.)



Lift Capacities

Boldface type indicates hydraulically limited capacity; lightface type indicates stability-limited capacity, in kg (lb.). Ratings at bucket lift hook; machine equipped with 6.2-m (20 ft. 4 in.) standard boom; 1.25-m³ (1.63 cu. yd.), 957-kg (2,110 lb.) bucket; 800-mm (32 in.) triple semi-grouser shoes; standard gauge; and situated on firm, uniform supporting surface. Total load includes weight of cables, hook, etc. Figures do not exceed 87 percent of hydraulic capacities or 75 percent of weight needed to tip machine. All lift capacities are based on ISO 10567 (with power boost).

LOAD POINT HEIGHT	HORIZONTAL DISTANCE FROM CENTERLINE OF ROTATION											
	1.5 m (5 ft.)		3.0 m (10 ft.)		4.5 m (15 ft.)		6.0 m (20 ft.)		7.5 m (25 ft.)		9.0 m (30 ft.)	
	Over Front	Over Side	Over Front	Over Side	Over Front	Over Side	Over Front	Over Side	Over Front	Over Side	Over Front	Over Side
With 3.11-m (10 ft. 2 in.) arm												
7.5 m (25 ft.)							7050 (15,300)	7050 (15,300)	4850	4850		
6.0 m (20 ft.)							7950 (17,300)	7950 (17,300)	7100 (15,000)	5550 (11,900)		
4.5 m (15 ft.)					12 000 (25,650)	12 000 (25,650)	9250 (20,050)	7750 (16,750)	7900 (17,200)	5350 (11,500)	4350	3850
3.0 m (10 ft.)					15,250 (32,700)	11 400 (24,600)	10 800 (23,250)	7350 (15,800)	8650 (18,750)	5150 (11,050)	6250 (11,750)	3750 (8,050)
1.5 m (5 ft.)					14 200 (34,350)	10 700 (23,100)	11 950 (25,850)	6950 (15,000)	8750 (18,850)	4950 (10,600)	6550 (13,000)	3650 (7,850)
Ground Line					15 200 (35,500)	10 450 (22,500)	12 300 (26,400)	6750 (14,500)	8600 (18,500)	4800 (10,300)	5550	3600
-1.5 m (-5 ft.)			9950 (22,500)	9950 (22,500)	16 500 (35,750)	10 450 (22,450)	12 150 (26,200)	6650 (14,300)	8550 (18,350)	4750 (10,200)		
-3.0 m (-10 ft.)			16 350 (37,200)	16 350 (37,200)	14 500 (31,300)	10 550 (22,750)	10 850 (23,300)	6700 (14,450)	7850	4800		
-4.5 m (-15 ft.)			14 300 (30,550)	14 300 (30,550)	10 850 (23,100)	10 850 (23,100)	7650 (15,750)	6950 (15,050)				

624 P-TIER WHEEL LOADER SPECIFICATIONS

While general information, pictures, and descriptions are provided, some illustrations and text may include product options and accessories NOT AVAILABLE in all regions, and in some countries products and accessories may require modifications or additions to ensure compliance with the local regulations of those countries.

Engine		624 P-TIER Z-BAR / HIGH-LIFT / HIGH-LIFT PLUS / TOOL CARRIER		
Manufacturer and Model	John Deere PowerTech™ PVS 6068	Gross Peak Torque (ISO 9249)	923 Nm (681 ft.-lb.) at 1,500 rpm	
Non-Road Emission Standard	EPA Final Tier 4/EU Stage V	Net Torque Rise	58% standard	
Cylinders	6	Fuel System (electronically controlled)	High-pressure common rail	
Valves Per Cylinder	4	Lubrication	Full-flow spin-on filter and integral cooler	
Displacement	6.8 L (414 cu. in.)	Aspiration	Turbocharged, charge air cooled	
Net Peak Power (ISO 9249)	143 kW (192 hp) at 1,600 rpm	Air Cleaner	Under-hood, dual-element dry type, restriction indicator in cab monitor for service	
Gross Peak Power (ISO 9249)	152 kW (203 hp) at 1,600 rpm			
Net Peak Torque (ISO 9249)	874 Nm (644 lb.-ft.) at 1,300 rpm			
Cooling				
Fan Drive	Hydraulically driven, proportionally controlled, fan aft of coolers			
Electrical				
Electrical System	24 volt with 130-amp alternator			
Batteries (2 – 12 volt)	950 CCA (each)			
Transmission System				
Type	Countershaft-type PowerShift™			
Torque Converter	Single stage, single phase			
Shift Control	Electronically modulated, adaptive, load and speed dependent			
Operator Interface	Steering-column or joystick-mounted F-N-R and gear-select lever; kick-down button on hydraulic lever			
Shift Modes	Manual/auto (1st-D or 2nd-D); Quick-Shift button with 2 selectable modes: kick-down or kick-up/down; and 4 clutch cutoff settings			
	Standard 5-Speed With Lockup Torque Converter		Optional 5-Speed Without Lockup Torque Converter	
Maximum Travel Speeds (with 20.5 R 25 tires)	Forward	Reverse	Forward	Reverse
Range 1	7.0 km/h (4.3 mph)	6.6 km/h (4.1 mph)	6.3 km/h (3.9 mph)	6.7 km/h (4.1 mph)
Range 2	12.1 km/h (7.5 mph)	12.8 km/h (7.9 mph)	11.4 km/h (7.0 mph)	12.0 km/h (7.4 mph)
Range 3	18.7 km/h (11.6 mph)	30.7 km/h (19.0 mph)	17.5 km/h (10.8 mph)	28.7 km/h (17.8 mph)
Range 4	29.1 km/h (18.1 mph)	N/A	27.2 km/h (16.9 mph)	N/A
Range 5	40.0 km/h (24.8 mph)	N/A	40.0 km/h (24.8 mph)	N/A
Axles/Brakes				
Final Drives	Heavy-duty inboard-mounted planetary			
Differentials	Hydraulic locking front with conventional rear — standard; dual locking front and rear — optional			
Rear Axle Oscillation, Stop to Stop (with 20.5 R 25 tires)	24 deg. (12 deg. each direction)			
Brakes (conform to ISO 3450)				
Service	Hydraulically actuated, spring-retracted, self-adjusting inboard sun-shaft mounted, oil cooled, single disc			
Parking	Automatic spring applied, hydraulically released, driveline mounted, oil-cooled, multi disc			
Tires/Wheels (see page 10 for complete tire adjustments)				
	Tread Width	Width Over Tires		
Michelin 20.5 R 25, 1 Star L-3 XHA2	2053 mm (80.8 in.)	2657 mm (104.6 in.)		
Serviceability				
Refill Capacities		Refill Capacities (continued)		
Fuel Tank (with lockable cap)	299 L (79 gal.)	Axle Oil (each)		
Cooling System	36.5 L (38.6 qt.)	Front	22 L (23 qt.)	
Diesel Exhaust Fluid (DEF)	15.6 L (16.5 qt.)	Rear	17 L (18 qt.)	
Engine Oil With Vertical Spin-On Filter	19.5 L (20.6 qt.)	Hydraulic Reservoir and Filter	102.8 L (27.2 gal.)	
Transmission Reservoir With Vertical Filter	27 L (28.5 qt.)	Park Brake Oil (wet disc)	0.3 L (10 oz.)	
Hydraulic System/Steering				
Pump (loader and steering)	Variable-displacement, axial-piston pump; closed-center, pressure-compensating system			
Maximum Rated Flow at 6895 kPa (1,000 psi) and 2,200 rpm	261 L/m (69 gpm)			
System Relief Pressure (loader and steering)	24 821 kPa (3,675 psi)			
Loader Controls	2-function valve, joystick control or fingertip controls, hydraulic-function enable/disable, optional 3rd- and 4th-function valve with auxiliary lever			
Steering (conforms to ISO 5010)	Steering-column-mounted, twist-grip shift lever; Quick-Shift button on hydraulic lever			
Type	Power, fully hydraulic			
Articulation Angle	80-deg. arc (40 deg. each direction)			
Turning Radius (measured to centerline of outside tire)	5.27 m (17 ft. 4 in.)			

624 P-TIER WHEEL LOADER SPECIFICATIONS

624

P

While general information, pictures, and descriptions are provided, some illustrations and text may include product options and accessories NOT AVAILABLE in all regions, and in some countries products and accessories may require modifications or additions to ensure compliance with the local regulations of those countries.

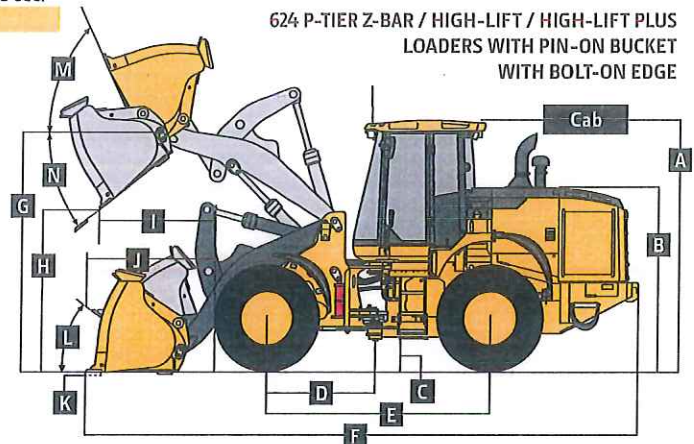
Hydraulic System/Steering (continued) 624 P-TIER Z-BAR / HIGH-LIFT / HIGH-LIFT PLUS / TOOL CARRIER

Hydraulic Cycle Times	Z-Bar / High-Lift / High-Lift Plus	Tool Carrier
Raise	5.5 sec.	5.8 sec.
Dump	2.0 sec.	2.5 sec.
Lower (power down)	4.0 sec.	4.0 sec.
Total	11.5 sec.	12.3 sec.

Bucket Capacity Range

Bucket Type	
Pin-On	2.7–2.9 m ³ (3.5–3.75 cu. yd.)
Coupler	1.9–4.0 m ³ (2.5–5.25 cu. yd.)

Dimensions and Specifications With Pin-On Bucket With Bolt-On Edge



624 P-TIER Z-BAR / HIGH-LIFT / HIGH-LIFT PLUS
LOADERS WITH PIN-ON BUCKET
WITH BOLT-ON EDGE

	Z-Bar 2.7-m ³ (3.5 cu. yd.) general purpose	Z-Bar 2.9-m ³ (3.75 cu. yd.) general purpose	High-Lift 2.7-m ³ (3.5 cu. yd.) general purpose	High-Lift 2.9-m ³ (3.75 cu. yd.) general purpose	High-Lift Plus 2.7-m ³ (3.5 cu. yd.) general purpose	High-Lift Plus 2.9-m ³ (3.75 cu. yd.) general purpose
A Height to Top of Cab	3.40 m (11 ft. 2 in.)	3.40 m (11 ft. 2 in.)	3.40 m (11 ft. 2 in.)	3.40 m (11 ft. 2 in.)	3.40 m (11 ft. 2 in.)	3.40 m (11 ft. 2 in.)
B Hood Height	2.46 m (8 ft. 1 in.)	2.46 m (8 ft. 1 in.)	2.46 m (8 ft. 1 in.)	2.46 m (8 ft. 1 in.)	2.46 m (8 ft. 1 in.)	2.46 m (8 ft. 1 in.)
C Ground Clearance	384 mm (15.1 in.)	384 mm (15.1 in.)	384 mm (15.1 in.)	384 mm (15.1 in.)	384 mm (15.1 in.)	384 mm (15.1 in.)
D Length From Centerline to Front Axle	1.52 m (5 ft. 0 in.)	1.52 m (5 ft. 0 in.)	1.52 m (5 ft. 0 in.)	1.52 m (5 ft. 0 in.)	1.52 m (5 ft. 0 in.)	1.52 m (5 ft. 0 in.)
E Wheelbase	3.09 m (10 ft. 1 in.)	3.09 m (10 ft. 1 in.)	3.09 m (10 ft. 1 in.)	3.09 m (10 ft. 1 in.)	3.09 m (10 ft. 1 in.)	3.09 m (10 ft. 1 in.)
F Overall Length, Bucket on Ground	7.76 m (25 ft. 6 in.)	7.83 m (25 ft. 8 in.)	8.22 m (27 ft. 0 in.)	8.22 m (27 ft. 0 in.)	8.52 m (27 ft. 11 in.)	8.58 m (28 ft. 2 in.)
G Height to Hinge Pin, Fully Raised	3.96 m (13 ft. 0 in.)	3.96 m (13 ft. 0 in.)	4.32 m (14 ft. 2 in.)	4.32 m (14 ft. 2 in.)	4.57 m (15 ft. 0 in.)	4.57 m (15 ft. 0 in.)
H Dump Clearance, 45 deg., Full Height	2.84 m (9 ft. 4 in.)	2.80 m (9 ft. 2 in.)	3.20 m (10 ft. 6 in.)	3.16 m (10 ft. 4 in.)	3.46 m (11 ft. 4 in.)	3.41 m (11 ft. 2 in.)
I Reach, 45-deg. Dump, Full Height	1.07 m (3 ft. 6 in.)	1.12 m (3 ft. 8 in.)	1.21 m (4 ft. 0 in.)	1.25 m (4 ft. 1 in.)	1.22 m (4 ft. 0 in.)	1.27 m (4 ft. 2 in.)
J Reach, 45-deg. Dump, 2.13-m (7 ft. 0 in.) Clearance	1.59 m (5 ft. 2 in.)	1.61 m (5 ft. 3 in.)	1.98 m (6 ft. 6 in.)	2.00 m (6 ft. 7 in.)	2.20 m (7 ft. 2 in.)	2.22 m (7 ft. 3 in.)
K Maximum Digging Depth	0.10 m (4 in.)	0.11 m (4 in.)	0.20 m (8 in.)	0.21 m (8 in.)	0.20 m (8 in.)	0.20 m (8 in.)
L Maximum Rollback at Ground Level	44 deg.	44 deg.	48 deg.	48 deg.	49 deg.	49 deg.
M Maximum Rollback, Boom Fully Raised	60 deg.	60 deg.	60 deg.	60 deg.	60 deg.	60 deg.
N Maximum Bucket Dump Angle, Fully Raised	48 deg.	48 deg.	46 deg.	46 deg.	45 deg.	45 deg.
Loader Clearance Circle, Bucket Carry Position	12.02 m (39 ft. 5 in.)	12.04 m (39 ft. 6 in.)	12.32 m (40 ft. 5 in.)	12.5 m (41 ft. 0 in.)	12.66 m (41 ft. 6 in.)	12.78 m (41 ft. 11 in.)
Specifications With Bucket With Bolt-On Edge						
Capacity, Heaped	2.7 m ³ (3.5 cu. yd.)	2.9 m ³ (3.75 cu. yd.)	2.7 m ³ (3.5 cu. yd.)	2.9 m ³ (3.75 cu. yd.)	2.7 m ³ (3.5 cu. yd.)	2.9 m ³ (3.75 cu. yd.)
Capacity, Struck	2.2 m ³ (2.9 cu. yd.)	2.4 m ³ (3.1 cu. yd.)	2.2 m ³ (2.9 cu. yd.)	2.4 m ³ (3.1 cu. yd.)	2.2 m ³ (2.9 cu. yd.)	2.4 m ³ (3.1 cu. yd.)
Bucket Weight With Bolt-On Cutting Edge	1196 kg (2,637 lb.)	1239 kg (2,732 lb.)	1196 kg (2,637 lb.)	1239 kg (2,732 lb.)	1196 kg (2,637 lb.)	1239 kg (2,732 lb.)
Bucket Width	2.69 m (8 ft. 10 in.)	2.69 m (8 ft. 10 in.)	2.69 m (8 ft. 10 in.)	2.69 m (8 ft. 10 in.)	2.69 m (8 ft. 10 in.)	2.69 m (8 ft. 10 in.)
Breakout Force	13 605 kg (29,994 lb.)	12 929 kg (28,503 lb.)	13 443 kg (29,638 lb.)	12 774 kg (28,163 lb.)	13 510 kg (29,785 lb.)	12 839 kg (28,304 lb.)
Tipping Load, Straight, No Tire Deflection	13 205 kg (29,113 lb.)	13 116 kg (28,915 lb.)	11 132 kg (24,541 lb.)	11 060 kg (24,383 lb.)	10 297 kg (22,701 lb.)	10 231 kg (22,555 lb.)
Tipping Load, Straight, With Tire Deflection	12 435 kg (27,414 lb.)	12 345 kg (27,216 lb.)	10 563 kg (23,287 lb.)	10 488 kg (23,122 lb.)	9792 kg (21,588 lb.)	9723 kg (21,436 lb.)
Tipping Load, 40-deg. Full Turn, No Tire Deflection	11 439 kg (25,218 lb.)	11 359 kg (25,042 lb.)	9595 kg (21,153 lb.)	9530 kg (21,010 lb.)	8837 kg (19,483 lb.)	8778 kg (19,351 lb.)
Tipping Load, 40-deg. Full Turn, With Tire Deflection	10 425 kg (22,983 lb.)	10 338 kg (22,791 lb.)	8820 kg (19,445 lb.)	8754 kg (19,299 lb.)	8145 kg (17,957 lb.)	8091 kg (17,838 lb.)
Rated Operating Load, 50% Full-Turn Tipping Load, No Tire Deflection (conforms to ISO 14397-1)*	5719 kg (12,609 lb.)	5680 kg (12,521 lb.)	4797 kg (10,576 lb.)	4765 kg (10,505 lb.)	4419 kg (9,741 lb.)	4389 kg (9,676 lb.)
Rated Operating Load, 50% Full-Turn Tipping Load, With Tire Deflection (conforms to ISO 14397-1)*	5213 kg (11,492 lb.)	5169 kg (11,396 lb.)	4410 kg (9,722 lb.)	4377 kg (9,650 lb.)	4073 kg (8,978 lb.)	4046 kg (8,919 lb.)
Operating Weight	15 747 kg (34,715 lb.)	15 790 kg (34,810 lb.)	15 953 kg (35,171 lb.)	15 996 kg (35,266 lb.)	16 195 kg (35,703 lb.)	16 238 kg (35,798 lb.)

Loader operating information is based on machine with identified linkage and standard equipment, PowerTech PVS 6068 (EPA Final Tier 4/EU Stage V) engine, ROPS cab, rear cast bumper/counterweight, transmission side-frame guards, bottom guards, standard tires, full fuel tank, and 79-kg (175 lb.) operator. This information is affected by changes in tires, ballast, and different attachments, and assumes no tire deflection per the standard ISO 14397-1 section 5.

*Rated operating capacity based on Deere attachments only.

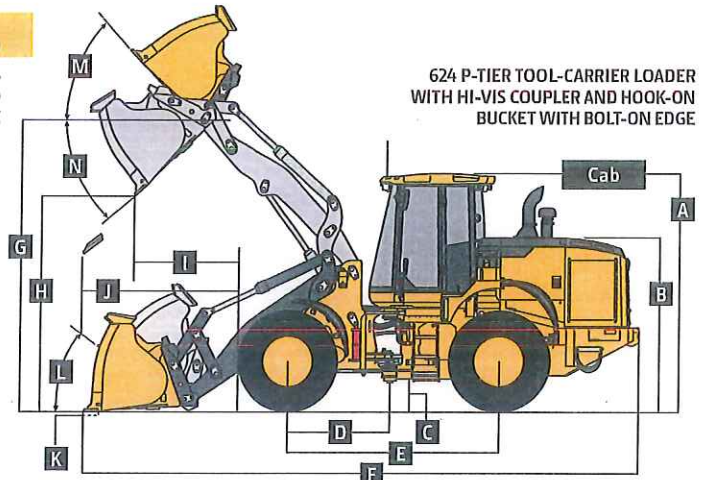
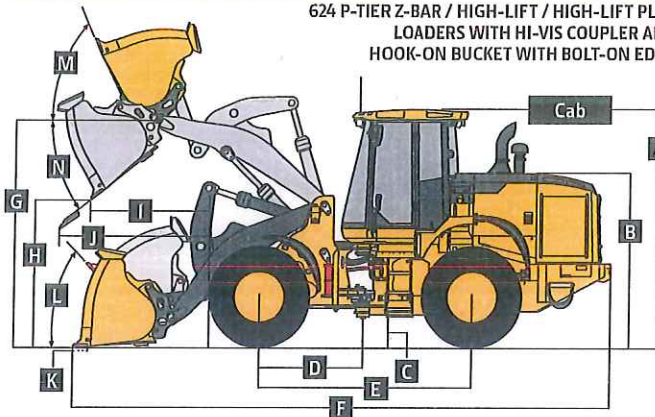
624 P-TIER

While general information, pictures, and descriptions are provided, some illustrations and text may include product options and accessories NOT AVAILABLE in all regions, and in some countries products and accessories may require modifications or additions to ensure compliance with the local regulations of those countries.

Dimensions and Specifications With Hi-Vis Coupler and Hook-On Bucket With Bolt-On Edge

624 P-TIER Z-BAR / HIGH-LIFT / HIGH-LIFT PLUS / HIGH-LIFT PLUS / TOOL CARRIER

624 P-TIER Z-BAR / HIGH-LIFT / HIGH-LIFT PLUS LOADERS WITH HI-VIS COUPLER AND HOOK-ON BUCKET WITH BOLT-ON EDGE



624 P-TIER TOOL-CARRIER LOADER WITH HI-VIS COUPLER AND HOOK-ON BUCKET WITH BOLT-ON EDGE

	Z-Bar 2.7-m ³ (3.5 cu. yd.) general purpose	Z-Bar 4.0-m ³ (5.25 cu. yd.) light material	High-Lift 2.5-m ³ (3.25 cu. yd.) general purpose	High-Lift 3.4-m ³ (4.5 cu. yd.) light material	High-Lift Plus 2.3-m ³ (3.0 cu. yd.) general purpose	High-Lift Plus 3.1-m ³ (4.0 cu. yd.) light material	Tool Carrier 2.7-m ³ (3.5 cu. yd.) general purpose	Tool Carrier 3.4-m ³ (4.5 cu. yd.) light material
A Height to Top of Cab	3.40 m (11 ft. 2 in.)	3.40 m (11 ft. 2 in.)	3.40 m (11 ft. 2 in.)	3.40 m (11 ft. 2 in.)	3.40 m (11 ft. 2 in.)	3.40 m (11 ft. 2 in.)	3.40 m (11 ft. 2 in.)	3.40 m (11 ft. 2 in.)
B Hood Height	2.46 m (8 ft. 1 in.)	2.46 m (8 ft. 1 in.)	2.46 m (8 ft. 1 in.)	2.46 m (8 ft. 1 in.)	2.46 m (8 ft. 1 in.)	2.46 m (8 ft. 1 in.)	2.46 m (8 ft. 1 in.)	2.46 m (8 ft. 1 in.)
C Ground Clearance	384 mm (15.1 in.)	384 mm (15.1 in.)	384 mm (15.1 in.)	384 mm (15.1 in.)	384 mm (15.1 in.)	384 mm (15.1 in.)	384 mm (15.1 in.)	384 mm (15.1 in.)
D Length From Centerline to Front Axle	1.52 m (5 ft. 0 in.)	1.52 m (5 ft. 0 in.)	1.52 m (5 ft. 0 in.)	1.52 m (5 ft. 0 in.)	1.52 m (5 ft. 0 in.)	1.52 m (5 ft. 0 in.)	1.52 m (5 ft. 0 in.)	1.52 m (5 ft. 0 in.)
E Wheelbase	3.09 m (10 ft. 1 in.)	3.09 m (10 ft. 1 in.)	3.09 m (10 ft. 1 in.)	3.09 m (10 ft. 1 in.)	3.09 m (10 ft. 1 in.)	3.09 m (10 ft. 1 in.)	3.09 m (10 ft. 1 in.)	3.09 m (10 ft. 1 in.)
F Overall Length, Bucket on Ground	7.89 m (25 ft. 11 in.)	8.04 m (26 ft. 5 in.)	8.31 m (27 ft. 3 in.)	8.50 m (27 ft. 11 in.)	8.53 m (28 ft. 0 in.)	8.66 m (28 ft. 5 in.)	7.99 m (26 ft. 2 in.)	8.13 m (26 ft. 8 in.)
G Height to Hinge Pin, Fully Raised	3.96 m (13 ft. 0 in.)	3.96 m (13 ft. 0 in.)	4.32 m (14 ft. 2 in.)	4.32 m (14 ft. 2 in.)	4.57 m (15 ft. 0 in.)	4.57 m (15 ft. 0 in.)	4.00 m (13 ft. 1 in.)	4.00 m (13 ft. 1 in.)
H Dump Clearance, 45 deg., Full Height	2.76 m (9 ft. 1 in.)	2.66 m (8 ft. 9 in.)	3.15 m (10 ft. 4 in.)	3.02 m (9 ft. 11 in.)	3.45 m (11 ft. 4 in.)	3.37 m (11 ft. 1 in.)	2.74 m (9 ft. 0 in.)	2.64 m (8 ft. 8 in.)
I Reach, 45-deg. Dump, Full Height	1.17 m (3 ft. 10 in.)	1.28 m (4 ft. 2 in.)	1.28 m (4 ft. 2 in.)	1.42 m (4 ft. 8 in.)	1.24 m (4 ft. 1 in.)	1.34 m (4 ft. 5 in.)	1.39 m (4 ft. 7 in.)	1.51 m (4 ft. 11 in.)
J Reach, 45-deg. Dump, 2.13-m (7 ft. 0 in.) Clearance	1.64 m (5 ft. 5 in.)	1.69 m (5 ft. 7 in.)	2.03 m (6 ft. 8 in.)	2.10 m (6 ft. 11 in.)	2.21 m (7 ft. 3 in.)	2.27 m (7 ft. 6 in.)	1.83 m (6 ft. 0 in.)	1.89 m (6 ft. 2 in.)
K Maximum Digging Depth	0.10 m (4 in.)	0.11 m (4 in.)	0.20 m (8 in.)	0.21 m (8 in.)	0.19 m (7 in.)	0.19 m (7 in.)	0.13 m (5 in.)	0.13 m (5 in.)
L Maximum Rollback at Ground Level	44 deg.	44 deg.	48 deg.	48 deg.	49 deg.	49 deg.	52 deg.	52 deg.
M Maximum Rollback, Boom Fully Raised	60 deg.	60 deg.	60 deg.	60 deg.	60 deg.	60 deg.	57 deg.	57 deg.
N Maximum Bucket Dump Angle, Fully Raised	48 deg.	48 deg.	46 deg.	45 deg.	45 deg.	45 deg.	50 deg.	50 deg.
Loader Clearance Circle, Bucket Carry Position	12.06 m (39 ft. 7 in.)	12.44 m (40 ft. 10 in.)	12.34 m (40 ft. 6 in.)	12.80 m (42 ft. 0 in.)	12.76 m (41 ft. 11 in.)	13.00 m (42 ft. 8 in.)	12.24 m (40 ft. 2 in.)	12.5 m (41 ft. 0 in.)
Specifications With Bucket With Bolt-On Edge								
Capacity, Heaped	2.7 m ³ (3.5 cu. yd.)	4.0 m ³ (5.25 cu. yd.)	2.5 m ³ (3.25 cu. yd.)	3.4 m ³ (4.5 cu. yd.)	2.3 m ³ (3.0 cu. yd.)	3.1 m ³ (4.0 cu. yd.)	2.7 m ³ (3.5 cu. yd.)	3.4 m ³ (4.5 cu. yd.)
Capacity, Struck	2.17 m ³ (2.8 cu. yd.)	3.46 m ³ (4.53 cu. yd.)	2.1 m ³ (2.7 cu. yd.)	2.9 m ³ (3.8 cu. yd.)	1.9 m ³ (2.4 cu. yd.)	2.6 m ³ (3.4 cu. yd.)	1.9 m ³ (2.4 cu. yd.)	2.9 m ³ (3.8 cu. yd.)
Bucket Weight With Bolt-On Cutting Edge	1655 kg (3,649 lb.)	1925 kg (4,245 lb.)	1633 kg (3,601 lb.)	1843 kg (4,063 lb.)	1586 kg (3,496 lb.)	1780 kg (3,924 lb.)	1437 kg (3,167 lb.)	1626 kg (3,584 lb.)
Bucket Width	2.68 m (8 ft. 10 in.)	3.05 m (10 ft. 0 in.)	2.69 m (8 ft. 10 in.)	2.89 m (9 ft. 6 in.)	2.69 m (8 ft. 10 in.)	2.89 m (9 ft. 6 in.)	2.68 m (8 ft. 10 in.)	2.89 m (9 ft. 6 in.)
Breakout Force	12 161 kg (26,810 lb.)	10 789 kg (23,785 lb.)	13 052 kg (28,776 lb.)	10 709 kg (23,610 lb.)	13 266 kg (29,246 lb.)	11 874 kg (26,331 lb.)	11 477 kg (25,302 lb.)	10 290 kg (22,686 lb.)
Tipping Load, Straight, No Tire Deflection	12 357 kg (27,242 lb.)	11 990 kg (26,434 lb.)	10 624 kg (23,422 lb.)	10 177 kg (22,437 lb.)	9779 kg (21,559 lb.)	9547 kg (20,701 lb.)	11 577 kg (25,523 lb.)	11 544 kg (25,450 lb.)
Tipping Load, Straight, With Tire Deflection	11 613 kg (25,602 lb.)	11 220 kg (24,736 lb.)	10 074 kg (22,209 lb.)	9600 kg (21,164 lb.)	9294 kg (20,490 lb.)	9042 kg (19,577 lb.)	10 920 kg (24,074 lb.)	10 854 kg (23,929 lb.)
Tipping Load, 40-deg. Full Turn, No Tire Deflection	10 652 kg (23,483 lb.)	10 292 kg (22,690 lb.)	9130 kg (20,127 lb.)	8690 kg (19,158 lb.)	8348 kg (18,405 lb.)	8120 kg (17,581 lb.)	9939 kg (22,031 lb.)	9939 kg (21,912 lb.)
Tipping Load, 40-deg. Full Turn, With Tire Deflection	9663 kg (21,303 lb.)	9273 kg (20,443 lb.)	8385 kg (18,486 lb.)	7911 kg (17,441 lb.)	7686 kg (16,945 lb.)	7437 kg (16,032 lb.)	9108 kg (20,080 lb.)	9006 kg (19,855 lb.)
Rated Operating Load, 50% Full-Turn	5326 kg (11,742 lb.)	5146 kg (11,345 lb.)	4565 kg (10,064 lb.)	4345 kg (9,579 lb.)	4174 kg (9,203 lb.)	4060 kg (8,790 lb.)	4997 kg (11,015 lb.)	4970 kg (10,956 lb.)
Tipping Load, No Tire Deflection (conforms to ISO 14397-1)*								
Rated Operating Load, 50% Full-Turn	4832 kg (10,652 lb.)	4637 kg (10,222 lb.)	4193 kg (9,243 lb.)	3956 kg (8,720 lb.)	3843 kg (8,472 lb.)	3719 kg (8,016 lb.)	4554 kg (10,040 lb.)	4503 kg (9,927 lb.)
Tipping Load, With Tire Deflection (conforms to ISO 14397-1)*								
Operating Weight	16 225 kg (35,769 lb.)	16 495 kg (36,365 lb.)	16 410 kg (36,178 lb.)	16 620 kg (36,641 lb.)	16 605 kg (36,607 lb.)	16 799 kg (37,174 lb.)	15 939 kg (35,140 lb.)	16 128 kg (35,556 lb.)

Loader operating information is based on machine with identified linkage and standard equipment, PowerTech PVS 6068 (EPA Final Tier 4/EU Stage V) engine, ROPS cab, rear cost bumper/counterweight, transmission side-frame guards, bottom guards, standard tires, full fuel tank, and 79-kg (175 lb.) operator. This information is affected by changes in tires, ballast, and different attachments, and assumes no tire deflection per the standard ISO 14397-1 section 5. / *Rated operating capacity based on Deere attachments only.

2022 Kenworth T370 4000 Gallon Water

[Request More Info](#) [Brochure](#) [Download Specs](#) [Apply For Financing](#)



Specs / Features

Condition	New
Year	2022
Chassis	Kenworth
Body	Water
Application	On Road
Size	4000 Gallon
GVWR	58000

Stock #s Available:

#740381	#740385	#440215
#740382	#740387	#143051

Work Ready Units: 6*

*IMPORTANT: Work Ready Units represent both available inventory on the ground and units in the pipeline scheduled to be produced. Contact your Curry Supply salesperson to confirm lead times and availability.

Contact Us

Curry Supply Company
Hollidaysburg, PA 16648
☎ 800-345-2829
✉ sales@currysupply.com

Chassis Specs:

Engine:
Paccar PX-9 300 HP @ 1850 RPM

Transmission:
Allison 3000 RDS 6-speed, Gen 5

Front Axle:
Meritor 14,600 lb.

Rear Axle:
Dana Spicer 40,000 lb.

GVWR:
54,000 lb.

Fuel Tank:
24.5" 56 Gallon Aluminum

Body Specs:

Dimensions:
198" long x 96" wide x 64.75" tall

Material:
A36 Steel

Shape:
Modified Ellipse
Large Radius Corners

Baffles:
A36 Steel w/ 20" Crawl Hole

Runners:
A36 Steel
Formed Angle Style
Full Length

Man-Way:
24" Round
Mesh Lift-Out Grate
No Lid

Fill Pipe:
2-1/2" Pipe
Ball valve
Cam Groove Coupler

Ladder:
Rear Mounted
Anti-Slip Rungs

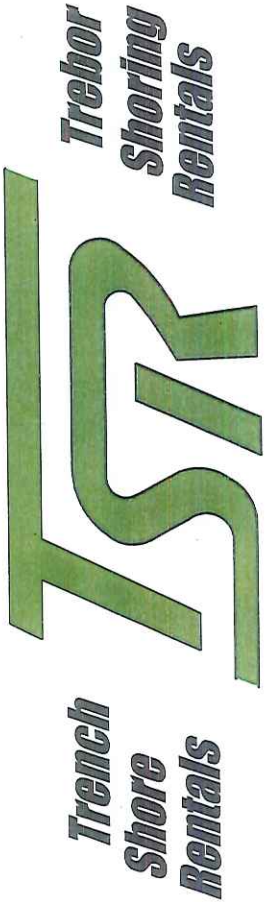
Fenders:
A36 Steel
Spray Lined Finish
Trough Style Tray

Media Blast Surface, Primer, Top Coat Tank White

Water Pump:
4x3 Shaft Driven

Spray Systems:
Front & Rear: Two Independently Operated
Mid: One Independently Operated

Hose Reel Assembly:
1-1/2" x 50' Manual Hose Reel mounted at rear of truck



GENERAL NOTES

1. PROVIDE ACCESS AND BARRICADING PER OSHA REQUIREMENTS.
2. VERIFY LOCATION AND SIZE OF ALL EXISTING UNDERGROUND UTILITIES AND/OR PIPES, PRIOR TO COMMENCING EXCAVATION.
3. THIS PLAN IS DESIGNED FOR PROTECTION OF WORKERS, EXISTING UTILITIES, STRUCTURES AND/OR SUBSTRUCTURES CLEARLY SPECIFIED ON PLANS. LAYOUT IS PER CONTRACT DRAWINGS.
4. VERIFY THAT REQUIRED CLEARANCES ARE OBTAINED AND THAT THERE IS SUFFICIENT WORKING SPACE.
5. THIS PLAN IS IN ACCORDANCE WITH FEDERAL AND/OR STATE OSHA REGULATIONS, DESIGN BY A REGISTERED CIVIL ENGINEER.
6. THESE PLANS ARE NOT INTENDED TO SHOW THE METHOD AND MEANS OF EXCAVATION OF THE WORK, WHICH IS THE RESPONSIBILITY OF THE CONTRACTOR.
7. PROVIDE A COMPETENT PERSON AT THE SITE WHERE THIS PLAN IS IN USE. THEY SHALL BE RESPONSIBLE MAKING SURE THAT ALL ELEMENTS OF THIS PLAN ARE ADHERED TO AND SHALL NOTIFY THE ENGINEER IF CONDITIONS ENCOUNTERED ARE DIFFERENT THAN ANTICIPATED AND SHOWN ON THIS PLAN. IF CONDITIONS ARE DIFFERENT, THIS PLAN MUST BE MODIFIED TO COVER THOSE CONDITIONS OR A NEW PLAN SHALL BE USED.
8. CONTACT J.M. TURNER ENGINEERING FOR PLAN REVIEW AND/OR POSSIBLE PLAN REVISIONS IF ANY EXISTING STRUCTURE(S), BUILDING(S) OR RAILROAD(S), NOT ALREADY SHOWN HEREON, ARE WITHIN A DISTANCE EQUAL TO THE DEPTH OF EXCAVATION, FROM EDGE OF EXCAVATION TO STRUCTURE.
9. CONTACT J.M. TURNER ENGINEERING FOR PLAN REVIEW AND/OR PLAN REVISIONS IF EXISTING PARALLEL UTILITIES ARE 48" IN DIAMETER OR LARGER AND ARE CLOSER THAN 48" FROM EDGE OF EXCAVATION.
10. REVIEW SHORING PLANS TO VERIFY PROPOSED DESIGN IS IN ACCORDANCE WITH CONTRACT SPECIFICATIONS AND/OR REQUIREMENTS.



KNOW WHAT'S BELOW.
CALL BEFORE YOU DIG.

**AAMODT LITIGATION SETTLEMENT
4 BUNDY ROAD
SAN ILDEFONSO PUEBLO, NM**

**SHIELD SHORING
EXCAVATION PLAN**

INDEX:

**SHEET S/1 COVER PAGE
SHEET S/2 PLAN VIEW**

STEEL REQUIREMENTS

- PROVIDE STEEL IN ACCORDANCE WITH MANUFACTURER'S TABULATED DATA SHEETS UNLESS OTHERWISE SPECIFIED ON PLANS.
- PROVIDE ASTM A53, MINIMUM Fy=35 KSI TUBE STEEL.
- PROVIDE ASTM A572/A992, MINIMUM Fy=50 KSI STEEL BEAM.
- PROVIDE ASTM A36, MINIMUM Fy=36 KSI STEEL PLATES.

WELDING REQUIREMENTS

- WELD IN ACCORDANCE W/MANUFACTURER'S TABULATED DATA SHEETS UNLESS OTHERWISE SPECIFIED ON PLANS.
- WELD IN ACCORDANCE W/ AWS D1.1. USE E70XX ELECTRODES.

TIMBER REQUIREMENTS

- PROVIDE TIMBER IN ACCORDANCE WITH MANUFACTURER'S TABULATED DATA SHEETS, UNLESS OTHERWISE SPECIFIED ON PLANS.

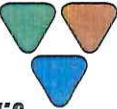
DEWATERING REQUIREMENTS

- DEWATER INSIDE EXCAVATION AS NEEDED TO ALLOW CONSTRUCTION OF SHORING AND/OR STRUCTURES.
- DEWATERING IS THE RESPONSIBILITY OF THE CONTRACTOR. IF DEWATERING WELLS, SPECIAL SUMP PUMPS OR ANY REQUIREMENTS FOR DEWATERING REQUIRED BY THE REVIEWING AGENCY, CONTRACTOR SHALL ADDRESS IN A SEPARATE SUBMITTAL.
- DEWATERING WELLS MAY BE REQUIRED (AS MANY AS NEEDED) TO MAINTAIN THE WATER LEVEL AT THE BOTTOM OF THE EXCAVATION.

SHIELD NOTES:

- PROPERLY INSTALL SHORING PRIOR TO ENTERING EXCAVATION. WORKERS MUST ENTER, EXIT, AND WORK IN SHORED AREAS ONLY.
- PROVIDE TABULATED DATA FOR EQUIPMENT TO BE USED AT THE JOBSITE.
- MANUFACTURERS TABULATED DATA APPLIES EXCEPT AS IS NOTED HERE.
- FILL VOID BETWEEN SHIELD AND EXCAVATION LINE WITH SOIL OR BEDDING MATERIAL.





J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS
1325 COLLEGE AVE., SANTA ROSA, CA 95404
(707) 528-4503 FAX (707) 528-4505

DATE:	04/07/22
DRAWN BY:	A.M.A.
CHECKED BY:	A.J.V.
DRAWING NO:	19230-1/ ST
SHEET:	1 OF 2



Trebor Shoring Rentals

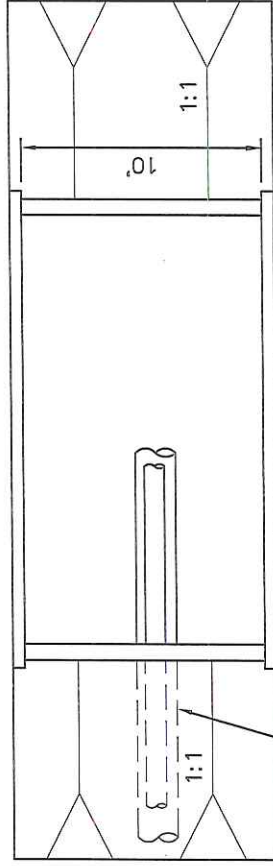
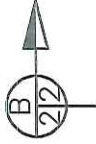
AAMODT LITIGATION SETTLEMENT
4 BUNDY ROAD
EL PASO, TX
EXCAVATION SHORING PLAN

REVISIONS BY	
04/19/22 AMA	

NATIONAL GUARD
EL PASO, TX
EXCAVATION SHORING PLAN

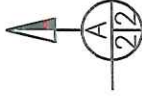
POSSIBLE BUILDING OR
STRUCTURE (SEE NOTE 8)

POSSIBLE UTILITIES
(SEE NOTE 9)



PROPOSED PIPELINES
SHIELD SHORING

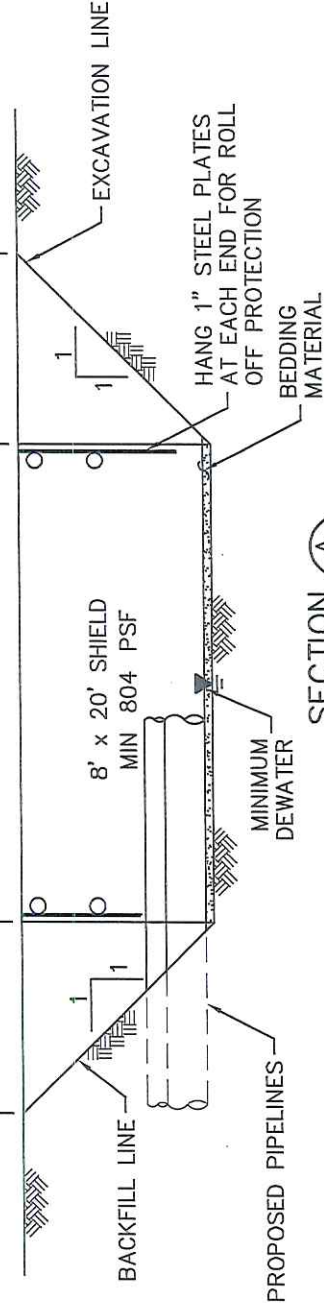
PLAN VIEW



NO WORKERS
ALLOWED IN THIS AREA

WORKERS ALLOWED
IN THIS AREA ONLY

NO WORKERS
ALLOWED IN THIS AREA



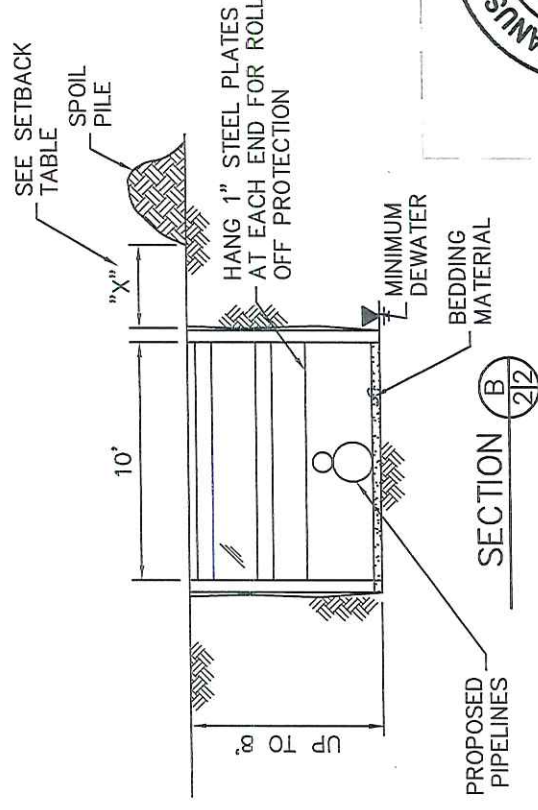
SECTION A

POSSIBLE PERPENDICULAR
UTILITIES, PROTECT AND/OR
SUPPORT IN PLACE



SETBACK TABLE	
X = SETBACK	
K-RAIL	X=1'
HS 20-44 TRAFFIC	X=4'
SPOIL PILE	X=4'
EXCAVATOR	X=4'
DUMP TRUCK	X=4'
3 CY LOADER	X=4'
5 CY LOADER	X=5'
CRANE TO 30 TON	X=8'
CONCRETE TRUCK	X=10'

WHEEL LOADER 624 P X=2.5'
345G LC EXCAVATOR X=7'
KENWORTH T370 GALLON WATER TRUCK X=2.5'



SECTION B



4/19/2022

0 4' 8' 16'
SCALE: 1/8" = 1'-0"

SSSP APPENDIX 5: NEW MEXICO ONE CALL INFORMATION



EXCAVATION HANDBOOK



Notice of Disclaimer

This publication is for informational purposes only. It is your responsibility to know and comply with the provisions of New Mexico law, the Public Regulation Commission's rules and federal regulations in their entirety, including any modifications made subsequent to this publication. Some or all of the methods or procedures described may not be applicable or appropriate for use by your organization. In any event and regardless of errors, inaccuracies, or omissions in this guide, New Mexico 811, and the Public Regulation Commission assume no liability of any kind arising out of any use or reliance upon this information by you or anyone in your organization, including, but not limited to, any liability for any injury to persons or any damage to property.

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Regulation Commission, Department of Transportation
Pipeline Safety Bureau and New Mexico One Call, Inc.
DBA New Mexico 811 2004, 2007, 2009, 2012,
2016, 2019*

Pipeline Safety Bureau

NM Public Regulation Commission
P.O. Box 1269 • Santa Fe, NM 87504-1269
[www.nmprc.state.nm.us/transportation/
pipeline-safety.html](http://www.nmprc.state.nm.us/transportation/pipeline-safety.html)

New Mexico 811

1021 Eubank Blvd NE • Albuquerque, NM 87112
www.nm811.org

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PREFACE

Excavation is a regulated activity in New Mexico. The Public Regulation Commission, Pipeline Safety Bureau (PSB) has statutory authority to administer New Mexico's Excavation Law Chapter 62, Article 14 NMSA 1978, including the assessment of fines for violations of the excavation law. This publication has been prepared for New Mexico's contractors, excavators and underground facility owners/operators (UFOs) as a reference for complying with the New Mexico Excavation law and interacting with New Mexico 811 (NM811).

A copy of this publication should be provided to all employees who regularly contact NM811 or participate in planning or conducting excavation activities. Familiarity with its contents is essential for successful communication between the NM811 customer service representative and the caller.

There is no copyright on the material in this publication. You have permission to copy part or all of it for fellow employees. Additional copies of this handbook may be requested from New Mexico 811, or the New Mexico Public Regulation Commission.

NOTE: The contents of this guide are subject to change without notice.

INTRODUCTION

Who we are

New Mexico One Call, Inc. DBA New Mexico 811 (NM811) is a statewide one-call notification center that was formed in 1990. Our mission is to serve as the state's communication hub promoting safe excavation and damage prevention.

All underground facility owners/operators (UFOs) are required by New Mexico state law to be a member of a one-call notification system. This includes all state and local government agencies, quasi governmental organizations, private corporations and non-profit entities owning and/or operating pipelines, gas distribution, telecommunications, cable, water, sewer and electric underground facilities within the state of New Mexico.

Striking any one of these lines can cause service interruptions, injury and, potentially death!

New Mexico state law requires everyone involved in any excavation utilizing mechanical means to provide at least two working days' notice to UFOs. This notification is accomplished by contacting the one-call center at least two working days prior to beginning your excavation. The UFOs are then required to mark the locations of their underground lines within the two working days.

PREPARING TO MAKE A LOCATE REQUEST

Preparing plans for excavation

New Mexico excavation law requires a person who prepares engineering plans for excavation to provide certain underground utility information on the plans to prevent damage by the person who will be doing the actual digging. Plans, in a broad sense, include engineering construction documents (plans/specifications), work orders, maintenance orders, or any other format that provides instructions to the person digging. The requirements include determining the location of existing underground facilities, planning the excavation to avoid or minimize the interference with the existing facilities, providing support for existing facilities, and providing for select backfill when necessary to prevent damage to existing facilities. The design or bid locate process is the method(s) used by the preparer of the plans to gather the information regarding the facilities, which must be included in the plans, **prior to excavation.** A preparer may select, after completing the conference process, either a design or bid locate request for obtaining information on the location of underground facilities. However, the preparer may not switch methods once having made a choice. For an explanation of the design or bid tickets, please see the section of this handbook titled "Other Types of One-Call Tickets."

Planning your excavation

New Mexico excavation law requires excavators to plan every excavation to minimize interference and prevent damage to underground facilities in or near the excavation area. Standard locate requests should only include the amount of work that can be reasonably completed in 15 working days.

Excavators are required by law, with limited exceptions, and it is an industry best practice, to mark the excavation site in white paint, flags, stakes, whisksers or other appropriate white markings before requesting a locate. White Linings should include the name of the company doing the excavation work. *See Appendix C for White-lining Marking Guidelines.*

Collecting information for the locate request

New Mexico's excavation law requires excavators to provide certain information to the one-call center. If you do not supply the necessary information, your request may be delayed or denied until the necessary information is provided. As you plan for the request, be prepared to provide the following information:

1. Excavator's name (company), a contact person (first and last name), contact's daytime phone number, mailing address. Contact should be the "Boots on the Ground".
2. Alternate contact information and daytime phone number.

3. A brief description and purpose for the type of work to be done. For example: "Repairing sewer line," or "New electric service," or "Installing new signs."
4. The name of the person or company for whom the work is being done.
5. Whether or not the excavation site is premarked in white. If required by law that the dig site be marked in white, you must provide this information. Having the site marked in white using paint or flags or stakes etc. can make the spotting instructions in number 8, below easier to describe. It will also make it easier for the spotter to locate your dig site.
6. An accurate physical description of the location and size of the excavation location. For example: a street address or GPS coordinates (with degrees in decimal format), or TRSQ legals are all good location descriptions. Reference to a plat of a subdivision is not a sufficient description. The one-call customer service representative will also ask for the nearest cross streets. This greatly helps in locating the dig site in the mapping system.
7. Driving instructions to a rural excavation site or a site within a city or town that needs additional directions. These should start from an easily describable location. For example: a city or town, an intersection or mile marker on a major highway or the intersection of two mapped roads. Landmarks such as a restaurant, gas station, casino or a tree are not usable for driving directions.
8. Spotting instructions: accurately describe the actual dig area that needs to be spotted,

such as “a white-lined bore path” with the width included. Dig locations should be specific in size and location(s) describing where the actual digging is going to take place on a location or property. Sites pre-marked in white per Appendix C make it much easier to say, “Spot the area marked in white,” or “Spot a 25-ft radius of stake with white flag.” “Spotting the entire property” is not a good description because the spotter needs to know where on the property you are going to be digging. PSB recommends always requesting flags and whisksers for the entire excavation area.

9. Any appropriate remarks regarding access to or hazards at the excavation site. This should include comments about animals, locked gates or other hazards the locators should know about.

10. Rural locations need to either be white-lined or provide GPS coordinates.

MAKING THE LOCATE REQUEST

When to contact NM811

If you plan on digging, excavating, blasting or moving earth in any way, contact New Mexico 811 and all non-members two working days prior to starting excavation. Non-members include homeowners, master meter systems, non-jurisdictional members (i.e. Native American reservations, and federal facilities).

New Mexico 811 is open from 7:00 am to 5:00 pm, Monday thru Friday, except holidays. The one-call center observes and is closed on the following holidays:

New Year's Day
Martin Luther King, Jr. Birthday,
Memorial Day,
Independence Day,
Labor Day,
Thanksgiving Day,
The day after Thanksgiving,
and Winter Holiday, Dec. 24th, & Dec. 25th.

If any of the holiday(s) fall on a weekend, NM811 will post the holiday closures at nm811.org.

Contacting NM811

When requesting line locates, NM811's preference is for you to call by telephone or enter your requests at nm811.org. Calls to New Mexico 811 (NM811) are free.

NM811 can be reached:

Toll free from anywhere in New Mexico:

Call 811

Toll free from anywhere in the United States:

1-800-321-2537

Standard locate requests can be submitted online 24 hours a day, seven days a week.

Locate requests made online during the hours of 8 am and 4 pm are processed within three working hours. Requests received after 4 pm or on weekends or holidays will not be processed until the next normal business day (Monday

- Friday, 7:00 am to 5:00 pm). To access the online entry form, visit nm811.org.

The Standard Locate Request

The standard locate request is the most common form of locate request. The request must be made at least two working days before the start of the excavation and is valid for a 15 working day period. Regulations require that you only request a standard locate for the amount of work that can reasonably be completed in 15 working days. You must also pre-mark your intended dig site in white.

If you suspect your project is going to take longer than 15 working days, you may want to consider using the wide area locate process to schedule and coordinate your work, or break the work up into multiple 15 working day increments.

The wide area locate process may be used for any work that exceeds 15 working days. A general rule of thumb for deciding which process to use is, if the project is more than 30 days in length or more than 30 acres in size, it is probably more beneficial to use the wide area process. If it is less than this, it is probably easier to use the standard 15 day ticket process. The difference between the two processes is that the excavator assumes the role of scheduling and coordinating the work among the UFOs for the wide area process.

When you call NM811

At the time of your call, the New Mexico 811 customer service representative will ask for the information needed for your locate ticket. When the ticket is complete, the customer service

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representative will process the ticket and read you the list of companies that will be notified. They will also inform you of the start work date and time and the date the ticket expires. You will also be given a unique ticket number for your request. You should record this information and have it available at your dig site. Pipeline Safety Bureau personnel could stop at your dig site and request that information. At your choosing, the customer service representative can also send you a confirmation copy of your ticket by email.

During the process of collecting your ticket information, the one-call customer service representative will also read back all pertinent information from the request. Please listen carefully to this verification and make corrections as necessary. If the caller verifies incorrect information, the excavator is liable for any damages to unmarked facilities due to the incorrect information dispatched. If, at any time, it is discovered that incorrect information was provided to New Mexico 811, the excavator should immediately notify New Mexico 811. A customer service representative will assist you in creating a new ticket if the situation warrants it. A corrected request will require two working days from the time of the correction request to allow UFOs to mark their facilities. Corrections will only be accepted from the company or person that originated the ticket.

For online requests, a confirmation will be returned to the excavator, and it is the excavator's responsibility to immediately verify that the information is correct. If you find any errors, contact the one-call center immediately.

Please note, when locates are requested after 4:00 pm or on weekends or holidays, they will not be processed until the next normal

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business day (Monday-Friday 7:00 am - 5:00 p.m.). For work being planned on a weekend, locate requests must be made prior to 4:00 pm Wednesday.

Legal matters

NM811 records all telephone conversations with the one-call customer service representatives and maintains a copy for five years. NM811 can provide copies of these records in case of disputes. In some cases, there may be a fee involved for archived record retrieval. New Mexico law requires that UFOs and the one-call center maintain records related to excavation for five years. It is also recommended that excavators, engineers and designers also maintain records related to excavation and planning for five years.

WHAT HAPPENS AFTER YOU CALL

After you contact NM811

Once you've contacted New Mexico 811, the UFOs that may be affected by your excavation will be notified. Within two working days, the UFOs will either clear the ticket, or will mark any underground facilities using the standard APWA marking guidelines. These marks are valid for 15 working days. If an excavation is delayed due to circumstances beyond your control (i.e. weather, access restrictions), then you may request an additional standard locate for the scope of work remaining only.

Locating all underground facilities

New Mexico law requires the excavator to physically expose (via non-mechanical means) all underground facilities in conflict with the excavation area when encroaching the 18 inch minimum tolerance zone of a marked facility. After you make your locate request, the one-call center will provide a list of all UFOs being notified.

Service lines from the UFO's meter, or other demarcation point, to the home or business usually belong to the homeowner or business. It is the excavator's responsibility to ensure service lines and private lines are marked before digging. Typically, homeowners and businesses do not have knowledge of this requirement nor do they have knowledge of the location of their facilities.

Private line locating services may be used to assist in these circumstances and a list of providers can be obtained at nm811.org. UFOs are required to locate and mark the location of the underground facilities within 18 inches. The depth of underground facilities is not required to be provided.

Positive response

Underground facility owners/operators (UFOs) have two working days to provide a positive response to the one-call center. An excavator is required to verify that all underground facilities have been marked and a positive response has been provided prior to commencing excavation. If the excavator determines that underground facilities have not been marked and positive response has not been provided, then the excavator is required to call the one-call center to verify that advance notice

was transmitted to the UFO, the two working days have expired and response has not been received.

The excavator is not permitted to dig until all the facilities have been marked or cleared. If an excavator is delayed or incurs costs because a UFO failed to mark or provide a “positive response” within the two working day marking period, the excavator may recover the reasonable “downtime” costs incurred from the UFO under the law. The UFO may also be subject to additional penalties and enforcement action from the PSB.

If a UFO fails to respond or mark a facility, the excavator should document the incident and notify the Pipeline Safety Bureau for compliance assistance. The Pipeline Safety Bureau may assess enforcement actions including civil penalties for failure to provide positive response within 48 hours.

Barricading

Often the area to be marked encompasses one or more traffic lanes of a heavily traveled street or highway. In this type of environment, it may be necessary to take extra precautions, including barricading, to protect the locators. If a UFO deems barricades are necessary prior to marking, it is recommended they contact the excavator and arrange to mark the area after the excavator's construction barricades are erected. This does not relieve the UFO from marking within the two working days. If necessary the UFO will need to make arrangements with their own company to ensure safety. The Pipeline Safety Bureau recommends notifying excavator that barricades will be needed within four – six hours of receiving a locate ticket.

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DIG SAFELY

Dig safely around facilities

1. Only begin excavation after the area is marked or cleared and positive response has been provided by all UFOs and the two working day marking period has expired.
2. State law requires the excavator to preserve line location markings or provide an offset mark before obliterating a locate mark.
3. Maintain the required minimum tolerance zone (18 inches on either side of the mark) until the underground facility has been exposed (by hand digging or vacuum excavation) and can be clearly seen.
4. Provide the required support for exposed underground facilities during the excavation as necessary.
5. Use the proper procedures to backfill with care and avoid damage to existing underground facilities.

Preserve line location and markings

The excavator is required by law not to fabricate markings, move or obliterate markings made by the UFOs without first providing offset marks. UFOs and excavators are encouraged to keep and maintain their own records to show their compliance with marking and preserving marks in the field. The use of offset marks may be necessary to reconstruct actual locate marks, especially in a damage investigation. Excavators may request chalk, paint, flags, stakes or whisksers, for marking a site to withstand the construction activity

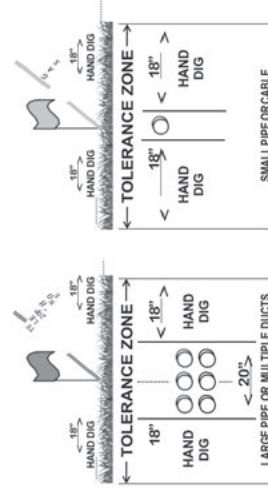
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occurring at the site. The excavator is usually responsible for cleaning the excavation site of any locate marks after construction. When multiple excavators are on the same job site it is recommended that each company identifies their own intended excavation area. For example, white flags or paint showing company initials. In addition, project managers should have coordination meetings on preserving locate marks throughout the project. This is especially important in congested areas with multiple excavators on the same project.

Tolerance Zone: The 18-inch rule

The excavator is required by law to maintain a clearance of 18 inches from the cutting edge of his mechanical equipment, including mechanical boring, to the edge of the underground facility as determined by the horizontal mark on the surface of the ground. Depth of facilities is not provided.

TOLERANCE ZONE



Expose conflicts

Where conflicts with the planned excavation and existing underground facility lines exist, the excavator is required to expose the marked facility line using non-invasive techniques, such as vacuum or hydro excavation, or by hand digging.

After the excavator has completely exposed the underground facility in the tolerance zone sufficient to maintain all applicable clearance requirements, he is allowed to enter the tolerance zone with his mechanical equipment. This is especially important where the excavator uses directional boring or tunneling techniques. In these situations, an excavator must pothole any utility crossings and watch the drill head and back reamer pass by the facility.

Supporting the underground facilities

The excavator is required to provide support for existing facilities in or near the excavation area as necessary to prevent damage to them. In some cases, the excavator may need to, or may be required to, enlist the help of the UFO who has the expertise, the equipment and the qualifications to work near or on hazardous facilities to ensure the safety of the excavator's workers.

Backfill in a careful manner

The excavator is required by law to fill all excavations in a manner and with select materials as may be necessary to prevent damage to and provide reliable support during and following backfilling activities for pre-existing underground

facilities in or near the excavation area.

Relocates

Standard locate tickets are valid for 15 working days. An excavator is not permitted to request a relocate for failure to complete the work in 15 working days. This will require a new standard locate and the excavator may only make a request for the scope of work remaining. The PSB recommends that an excavator wait the full 15 working days before requesting a relocate.

An excavator may request relocates for the same area and scope of work only if justified by circumstances outside of the excavator's control and the markings have been compromised. The reason for the relocate must be stated and will be added to the relocate ticket. UFOs will have two working days to remark their facilities, and provide a positive response. During this time excavation must cease and the excavator is not permitted to dig until all the facilities have been marked or cleared and the two working day period has expired. A Relocate ticket will supersede any prior ticket.

Precautions when working around gas pipelines

During construction, when working in or near an area containing underground gas facilities, be alert to the following signs of a potential hazard:

1. Natural gas odor in or near your excavation site.
2. Apparent or suspected damage to pipes that have been broken, pulled, dislodged or gouged.
3. Brown patches in vegetation on or near a right-of-way.

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4. Dry spots in moist earth.
5. Evidence of blowing (gas) noise, blowing dirt or bubbling mud or water.
6. Fire coming from the ground or burning above the ground.

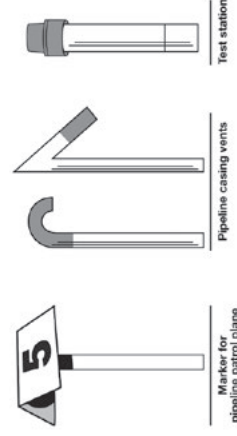
Immediately notify the gas UFO if you observe any of the above and call 911 if appropriate!

Typical Pipeline Markers

Pipeline markers are used to let you know there are underground pipelines in the area. **Do not use pipeline markers for line-locating purposes.** The markers indicate the presence of a pipeline within a right-of-way, not the exact location of the pipeline in the right-of-way. Excavators must contact NM811 and



Pipeline Markers
Located near roads, railroads, fences and along pipeline right-of-way



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request a line locate to determine where the line is actually located.

You have the right to contact the Pipeline Safety Bureau

UFOs, excavators and one-call center(s) are encouraged to work together to resolve any issues. However, if the problem has not been resolved to your mutual satisfaction, you have the right and are encouraged to contact the PSB at:

New Mexico Pipeline Safety Bureau
PO Box 1269, Santa Fe, NM 87504-1269
www.nmptc.state.nm.us/transportation/pipeline-safety.html

(505) 476-0298

For emergencies only, call (505) 490-2375.

If you damage an underground facility

If an underground facility is damaged during excavation, you must stop excavation, call 911 if appropriate, notify the UFO immediately, and call 811 to report the damage. Damage may include nicks, dents, gouges, cuts, scrapes or scratches to the coating, insulating jacket, or tracer wire. New Mexico law requires the excavator contact the utility to report the damage.

Contacting the UFO allows them the opportunity to examine and correct potential future hazards. Failure to notify the UFO of any damage could result in future corrosion and/or failure or other life threatening situations and is a violation of the state law.

The excavator must stop work until the UFO

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determines it is safe to resume work. Damage may not only occur at the point of contact but may also occur at one or both ends of the pipe, cable or wire by damaging the termination points where the facilities enter buildings or are fed from other facilities. If you need contact information for a UFO for damage reporting purposes, please contact NM811.

What to do if you damage a gas pipeline

In the event an underground gas facility is damaged, the excavator (machine operator) should take immediate action to minimize the hazard:

- If you can do so safely, turn off equipment to prevent possible ignition of any gas and abandon the equipment immediately.
- If the motor stalls, **DO NOT** attempt to restart it.
- **CLEAR THE IMMEDIATE AREA.** Avoid use of cellular phones, machinery and other devices that may be an ignition source. **DO NOT** cover the damaged pipe with dirt as a means of stopping the leak. **DO NOT** crimp plastic gas facilities. **DO NOT** attempt to plug damaged pipes. Allow the gas to vent into the atmosphere.
- If natural gas ignites, let it burn. **DO NOT** put out the flame – burning gas will **NOT** explode.
- Move away from the area and immediately call 911 to seek the aid of local law enforcement officers and fire departments.
- Notify the owner of the gas pipeline.

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- Notify 811 of the damaged pipeline.

Evacuation

In an emergency, when gas is escaping from a broken pipe, it is the excavator's responsibility to evacuate everyone to an area upwind from the damage until the emergency responders arrive. If you, the excavator, have damaged a gas line and suspect leaking gas may be entering or blowing into a building, you should take immediate action:

- Be certain 911 and the gas facility owner have been notified.
- Evacuate the occupants and leave the doors open.
- Inform occupants they must not return to the building for any reason.
- **DO NOT** operate light switches, door bells, or use telephones in the building.
- **PROHIBIT** smoking in the area.
- Keep people far away from the leak area.
- **PROHIBIT** the operation of machinery. Prompt action by you could save lives or prevent serious injury or property damage. **NEVER** leave a potentially hazardous situation to chance.

OTHER TYPES OF ONE-CALL TICKETS

Design conference

Allows the designer/engineer to obtain locate data directly from the UFO(s). The designer/

engineer must provide the date, time, and location of the conference when requesting the ticket. The UFOs are required to be represented at the design conference. Otherwise, UFOs are required to notify the designer/engineer and reschedule a conference within 5 working days from the proposed conference date. The requester and the UFOs will continue working together until the project is awarded and an excavation locate ticket is requested.

This type of request is useful when it is more practical to exchange information than to have a site marked. No relocates are allowed for this type of ticket.

Design locate

Allows the designer/engineer to have a site marked for the purpose of capturing the locate ticket information. The UFOs have two working days to complete the marking. The ticket is valid for 15 working days. No relocates are allowed for this type of ticket.

Bid conference

Allows the project owner to obtain locate information directly from the UFO to be used by the project bidders. The project owner must provide the date, time, and location of the conference when requesting the ticket. The UFOs are required to be represented at the bid conference. Otherwise, UFOs are required to notify the project owner and reschedule a conference within 5 working days from the proposed conference date. The project owner and UFOs will continue working together until the bid for the project is awarded and an excavation locate ticket is requested. No

relocates are allowed for this type of ticket.

Bid locate

The project owner has the underground facilities marked at the project site so that the persons bidding on the project can capture the location information of the underground facilities. The UFOs have two working days to complete the marking. The bidders have 15 working days to capture the locate information. No relocates are allowed for this type of ticket.

Wide area locate process

The wide area locate process is designed for handling large areas or long-term projects that will take longer than 15 working days to complete. A rule of thumb is to use the process for projects that are longer than 30 days in length or greater than 30 acres in size.

Wide area conference

The process starts with the excavator calling the one-call center to request a wide area conference and provides a date, time and location for the conference. The UFOs are required to be represented at the wide area conference. If necessary, the UFOs are required to notify the excavator and reschedule a conference within 5 working days from the proposed conference date. The excavator will develop a written wide area work plan prior to the wide area conference. The plan should include the ten things required for a standard locate ticket and a schedule of what needs to get spotted by who and by when. At the conference, the excavator will present each UFO with the wide area work plan including the scope of work and constraints they are under. All parties must agree to the final

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work plan, sign it, and receive a final copy of the work plan. Once the UFOs have received the work plan, they must provide positive response. The excavator is responsible for ensuring the communication between the excavator and UFOs properly occurs and is documented in the work plan. In the event of an incident, the work plan is the governing document for determining violations of the excavation law. A template of a work plan can be found on NM811's web site nm811.org.

Wide area locate

When all parties have signed off to approve the work plan, then the excavator will contact the one-call center 2 working days prior to starting the excavation project and request a wide area locate ticket. The excavator must provide the ticket number that was issued for the wide area conference by the one-call center. The wide area locate ticket will reference the wide area conference ticket number and cite the work plan as the description of the work to be performed. Once the positive responses are confirmed by the one call, a wide area locate ticket is issued by the one-call center, this informs the UFOs that the project's excavation will start after two working days and follows the work plan.

Updates or revisions to the work plan shall be agreed to and put in writing and signed by all parties. The wide area locate ticket must be reaffirmed by the excavator prior to its expiration every 15 working days to maintain a valid ticket for the duration of the project. The wide area locate ticket expires if it is not reaffirmed and the excavator must begin the wide area locate process again with a wide area conference. Unless the excavator communicates to the UFOs that the existing markings are

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sufficient for the time being, the UFOs shall verify that existing markings are still visible, refresh them if needed, and continue to locate according to the work plan.

Road maintenance locates

Road maintenance requires a valid locate request. Road maintenance is defined as the routine grading (depth of no more than four inches) of non-paved roads and includes recovery of material from a borrow (bar) ditch. It does not include activities associated with road construction or reconstruction.

If a UFO has facilities in the area but deems their facilities are not in conflict with the road maintenance activity, they may “clear” the ticket. A non-conflicted facility is covered by at least 24 inches of earth. Otherwise, the UFO must mark the location of all their facilities. A UFO may install permanent physical markers for facilities that cross the road.

RESPONSIBILITIES OF UNDERGROUND FACILITY OWNERS/ OPERATORS

State law requirements for UFOs

New Mexico state law requires all UFOs to be a member of a one-call notification system. The UFO shall join a one-call center that is operating statewide or within a region of the state. All of a UFO's underground facilities must be covered by one or more one-call notification systems. UFOs must respond to

all notifications for locates, conferences, and damages.

Marking the facilities

Unless it is an emergency excavation, the UFO has two working days from the time the excavator called the one-call center to mark their underground facilities. The law requires the UFO to locate the facility by some means. In many cases, locating a facility is more art than science and requires trained personnel to accurately determine the facility's location. In instances where plastic lines are used and there is no tracer wire or the wire has been damaged, it may be necessary for the UFO to perform subsurface exploration to ensure it is properly located.

The UFO must mark the location of the underground facility, within 18 inches of the actual location of the underground facility, otherwise it is considered mis-marked. Failure to locate the line before an excavation is scheduled to start, or neglect marking a facility location is a violation of the excavation law, and the UFO may be subject to penalties, as well as additional costs incurred by the excavator (i.e., downtime.)

What happens if a UFO's facility is damaged?

If an excavator damages an underground facility, it is the excavator's responsibility under the law to immediately notify by telephone the UFO that may have been damaged or dislocated, and to immediately report the damage to the one-call center.

The UFO is required by law to respond immediately and assess the situation. If not contacted directly, the UFO may need to contact emergency responders (911). The first priority is to make the damage site safe. If the UFO determines that an emergency condition exists and must excavate, the UFO shall request an emergency locate, and all UFOs in the area shall respond within two hours and mark their facilities. The UFO/excavator must take all necessary and reasonable precautions to avoid or minimize interference with or damage to underground facilities in and near the site while excavating.

Communication regarding locate status (positive response) clears

When a UFO receives a locate request from an excavator and the UFO has determined that they have no facilities in the area, and does not provide service to a private facility, the UFO is required to register a "clear" with the one-call center's positive response system and may write "clear" or "no underground facilities" and the UFOs name at the excavation site. The appropriate positive response when a UFO has no conflicting facilities but provides service to a private facility in the area of excavation is "Privately Owned Facility." This provides the excavator with a positive response so the excavator will know the UFO has no conflicting facilities. The facility owner must inform the one-call center of the "clear" within the two-working-day marking period.

Positive Response

Positive Response is a requirement of the excavation law and is a best practice. UFOs

must register the status of a locate with NM811's "positive response registration system." Permissible status for a locate can be registered as "UFO Cleared," "Site Marked," "Site Marked Not White-lined," "No Access/Not Marked/Call UFO," "Bad Address Not Marked," "Conference Scheduled," "Spotted Per the Work Plan," "Not Marked Call UFO," and "Privately Owned Facility." The positive response exists to improve the communication efforts between the UFO and excavator on the status of a locate before the excavator goes out to excavate.

Approved colors and marking standards

New Mexico has adopted the industry use of the APWA color scheme and the CGA marking guidelines. The guidelines can be found in Appendix D of this handbook.

Locate marks must last at least 15 working days and must be appropriate for the dig site. It may be prudent for the UFO to work directly with the excavator on when and how to provide locate marks at the excavation site. Many times projects require large work areas and will take several days to complete marking. The use of whiskers and offset marks may be necessary in high traffic areas.

When multiple excavators are on the same job site it is recommended that each company identifies its own intended excavation area. For example, white flags or paint showing company initials. In addition, project managers should have coordination meetings on preserving locate marks throughout the project. This is especially important in congested areas with multiple excavators on the same project.

When locating marks are vandalized or removed, the excavator shall call for a relocate, and shall stop working for 2 working days and UFOs will be required to remark. UFOs should consider using chalks and water-based paints, which can be more easily removed in areas where permanent marks will not be tolerated.

Moving or obliterating markings

It is a violation of the excavation law for the UFO or the excavator to move, obliterate or fabricate markings for the purpose of concealing or avoiding a violation of the state's excavation law. The use of offset marks or stakes must be used when it is necessary to obliterate any marks in the field. UFOs and excavators are encouraged to keep and maintain their own written records to show their compliance with marking and preserving marks in the field.

Reporting damages

New Mexico law requires all excavators to immediately report damage of any underground facility to 911 if appropriate, UFOs, and NM811 by phone. Existing law also requires UFOs to report third-party damages to the Pipeline Safety Bureau. The UFO must report the damage within 30 days of occurrence using the required form and format. The format for reporting third-party damages can be found at www.nmprc.state.nm.us/transportation/pipeline-safety.html.

Emergency locate requests

Emergencies are unplanned excavations and have different requirements under the excavation law. An emergency is defined as an excavation that must be performed due

to circumstances beyond the control of the excavator (UFO) and that affects public safety, health, or welfare.

An emergency locate request is designed to dispatch line locators within two hours to excavation sites. Emergency requests are provided for UFOs to help them avoid damaging other underground facilities while bringing their situation under control. Once an emergency situation is brought under control, (i.e., the hazard is mitigated) the UFO should call for a standard locate request to make any further corrective actions that may require excavation.

An emergency locate request should not be used to circumvent poor job planning or economic consequences. Abuse of an emergency locate request is a violation of the excavation law and may be subject to administrative penalties.

Guidelines for determining an emergency

If an existing utility customer has interrupted service that needs to be restored immediately, the situation is considered an emergency. This does not include new services or maintenance activities.

The situation is considered an emergency if an imminent hazard or danger exists to the general public potentially affecting the public's safety, health or welfare. In such an emergency it may be necessary to notify 911 and evacuate and secure the area until emergency responders arrive.

If public infrastructure becomes unavailable for use by emergency responders (such as a bridge

or culvert that is damaged in such a way that excavation is required to repair the damage), it could be considered an emergency situation.

Abuse of the emergency locate request is considered a violation of the excavation rules and regulations.

FOR EMERGENCIES ONLY

24/7 call:

811 or 1-866-344-6662

Contacting the Pipeline Safety Bureau

You may contact the Pipeline Safety Bureau for pipeline emergencies at:

(505) 490-2375

APPENDIX A – THE LAW

CHAPTER 62. ARTICLE 14

(Known as the New Mexico Excavation Law)

The following information contains the wording of Chapter 62, Article 14 NMSA 1978, including the 2013 amendment. It has been formatted to allow ease of reading. Please consult the New Mexico Compilation Commission to obtain an exact copy of the statute: www.nmonesource.com/nmstatadmin/NMPublic.aspx

62-14-1. Purpose and Intent

The purpose of Chapter 62, Article 14 NMSA 1978 is to prevent injury to persons and damage to property from accidents resulting from damage to pipelines, underground utility lines, cable television lines and related facilities by excavating and blasting.

62-14-2. Definitions

As used in Chapter 62, Article 14 NMSA 1978:

- A. “advance notice” means two working days;
- B. “blasting” means the use of an explosive to excavate;
- C. “cable television lines and related facilities” means the facilities of any cable television system or closed-circuit coaxial cable communications system or other similar transmission service used in connection with any cable television system or other similar closed-circuit coaxial cable communications system;

D. “commission” means the public regulation commission;

E. “emergency excavation” means an excavation that must be performed due to circumstances beyond the excavator’s control and that affects public safety, health or welfare;

F. “excavate” means the movement or removal of earth using mechanical excavating equipment or blasting and includes augering, backfilling, digging, ditching, drilling, grading, plowing in, pulling in, ripping, scraping, trenching, tunneling and directional boring;

G. “excavator” means a person that excavates;

H. “master meter system and operators” means a pipeline system that distributes natural gas or liquid propane gas within a public place, such as a mobile home park, housing project, apartment complex, school, university or hospital where the operator of the master meter system purchases gas from a distributor through a single large meter and resells the gas through a gas distribution pipeline system. The resale may occur as a payment included in a rental payment or association dues or as a separately metered system;

I. “means of location” means a mark such as a stake, a flag, whiskers or paint that is conspicuous in nature and that is designed to last at least ten working days if not disturbed;

J. “mechanical excavating equipment” means all equipment powered by any motor, engine or hydraulic or pneumatic device used for excavating and includes trenchers, bulldozers, backhoes, power shovels, scrapers, draglines, clam shells, augers, drills, cable and pipe plows or other plowing-in or pulling-in equipment;

K. “one-call notification system” means a communication system in which an operation center provides telephone services or other reliable means of communication for the purpose of receiving excavation notice and damage reporting information and distributing that information to owners and operators of pipelines and other underground facilities;

L. “person” means the legal representative of or an individual, partnership, corporation, joint venture, state, subdivision or instrumentality of the state or an association;

M. “pipeline” means a pipeline or system of pipelines and appurtenances for the transportation or movement of any oil or gas, or oil or gas products and their byproducts subject to the jurisdiction of federal law or regulation, with the exception of master meter systems and operators;

N. “positive response” means a response, within the advance notice period, initiated by owners or operators of pipelines and underground facilities by reliable means of communication, to the one-call notification system’s positive response registry system. A positive response allows the excavator to verify whether all affected pipeline and underground facility owners or operators have marked their underground facilities

pursuant to Section 62-14-5 NMSA 1978 prior to commencing the excavation site and commencing excavation;

- O. “reasonable efforts” means notifying the appropriate one-call notification center or underground facility owner or operator of planned excavation;
- P. “underground facility” means any tangible property described in Subsections C, M and Q of this section that is underground, but does not include residential sprinklers or low-voltage lighting; and
- Q. “underground utility line” means an underground conduit or cable, including fiber optics, and related facilities for transportation and delivery of electricity, telephonic or telegraphic communications or water, sewer and fire protection lines, with the exception of master meter systems and operators.

62-14-3. Excavation

A person who prepares engineering plans for excavation or who engages in excavation shall:

- A. determine the location of any underground facility in or near the area where the excavation is to be conducted, including a request to the owner or operator of the underground facility to locate the underground facility pursuant to Section 62-14-5 NMSA 1978;
- B. plan the excavation to avoid or minimize interference or damage to underground facilities in or near the excavation area;
- C. provide telephonic advance notice of the commencement, extent and duration of the

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excavation work to the one-call notification system operating in the intended excavation area, and to the owners or operators of any existing underground facility in and near the excavation area that are not members of the local one-call notification center, in order to allow the owners to locate and mark the location of the underground facility as described in Section 62-14-5 NMSA 1978 prior to the commencement of work in the excavation area, and shall request reaffirmation of line location every ten working days after the initial request to locate;

- D. prior to initial exposure of the underground facility, maintain at least an estimated clearance of eighteen inches between existing underground facilities for which the owners or operators have previously identified the location and the cutting edge or point of any mechanical excavating equipment utilized in the excavation and continue excavation in a manner necessary to prevent damage;
- E. provide such support for existing underground facilities in or near the excavation area necessary to prevent damage to them;
- F. backfill all excavations in a manner and with materials as may be necessary to prevent damage to and provide reliable support during and following backfilling activities for preexisting underground facilities in or near the excavation area;
- G. immediately notify the one-call notification system operating in the area in the form and format required by the commission and by telephone the owner of any underground

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facilities that may have been damaged or dislocated during the excavation work; and

- H. not move or obliterate markings made pursuant to Chapter 62, Article 14 NMSA 1978 or fabricate markings in an unmarked location for the purpose of concealing or avoiding liability for a violation of or noncompliance with the provisions of Chapter 62, Article 14 NMSA 1978.

62-14-4. Emergency Excavation

Every person who engages in emergency excavation shall take all necessary and reasonable precaution to avoid or minimize interference with or damage to existing underground facilities in and near the excavation area and shall notify as promptly as possible the owners of underground facilities located in and near the emergency excavation area and the one-call notification system operating in the area in the form and format required by the commission.

In the event of any damage to or dislocation of any underground facility caused by the emergency excavation work, the person responsible for the excavation shall immediately notify the owner of the underground facility and the one-call notification system operating in the area in the form and format required by the commission.

62-14-5. Marking of Facilities

- A. A person owning or operating an underground facility shall, upon the request of a person intending to commence an excavation and upon advance notice, locate and mark on the surface the actual horizontal location, within eighteen

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inches by some means of location, of the underground facilities in or near the area of the excavation so as to enable the person engaged in excavation work to locate the facilities in advance of and during the excavation work.

- B. If the owner or operator of the underground facility finds that the owner or operator has no underground facilities in the proposed area of excavation, the owner or operator shall provide a positive response and, at the option of the owner or operator of the underground facility mark the area as "Clear" or "No Underground Facilities" in the appropriate color code as specified in Section 62-14-5.1 NMSA 1978.
- C. If the owner or operator fails to correctly mark the underground facility after being given advance notice and such failure to correctly mark the facility results in additional costs to the person doing the excavating, then the owner or operator shall reimburse the person engaging in the excavation for the reasonable costs incurred.
- D. move or obliterate markings made pursuant to Chapter 62, Article 14 NMSA 1978 or fabricate markings in an unmarked location for the purpose of concealing or avoiding liability for a violation of or noncompliance with the provisions of Chapter 62, Article 14 NMSA 1978.

62-14-5.1. Uniform Color Code for Location of Underground Facilities

In marking an excavation site and the location of underground facilities, both the excavator and the owner or operator shall use the following uniform color code:

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- A. blue for water;
- B. green for sewer;
- C. orange for communications or coaxial cable;
- D. pink for survey;
- E. purple for reclaimed water;
- F. red for electric;
- G. white for proposed excavation area; and
- H. yellow for gas.

62-14-6. Liability for Damage to Underground Facilities

- A. If any underground facility is damaged by any person who failed to make reasonable efforts to determine its location as provided in Chapter 62, Article 14 NMSA 1978, that person shall reimburse the owner of the underground facility for the actual cost of the damage to the underground facility, including the cost of restoration of services. The person engaging in the excavation may also be liable to the owner or operator of the underground facility for the comparative negligence of the person engaging in the excavation which results in damage to the facility for an additional amount not to exceed three hundred thousand dollars (\$300,000) for each occurrence.

- B. If any underground facility is damaged by any person who has made reasonable efforts to determine its location and the damaged underground facility was correctly located by the owner or operator of the underground facility as provided in Section 62-14-5 NMSA 1978, then that person

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causing the damage shall be liable to the owner or operator of the underground facility for only the actual cost of damage to the underground facility, including the cost of restoration of service.

- C. If any underground facility is damaged by any person who has made reasonable efforts to determine its location and damage to the underground facility is caused by the failure of the owner or operator to correctly locate that underground facility as provided in Section 62-14-5 NMSA 1978, then the person engaging in the excavation shall have no liability for the damage to that facility.
- D. It is not the intent of Chapter 62, Article 14 NMSA 1978 to impose civil liability to any person beyond that provided in this section.

62-14-7. Liability for Negligence Notwithstanding Information Obtained

The act of obtaining or making reasonable efforts to obtain information as required by Chapter 62, Article 14 NMSA 1978 shall not excuse any person making any excavation from doing so in a careful and prudent manner; nor shall it excuse such person from liability for any damage or injury resulting from his negligence as limited in Section 62-14-6 NMSA 1978.

62-14-7.1. One-Call Notification System

- A. An owner or operator of an underground facility subject to Chapter 62, Article 14 NMSA 1978 shall be a member of a one-call notification system operating in the region with the exception of

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private underground facilities owned by a homeowner and operated and located on residential property. A one-call notification system may be for a region of the state or statewide in scope, unless federal law provides otherwise.

B. Each one-call notification system shall be operated by:

- (1) an owner or operator of pipeline facilities;
- (2) a private contractor;
- (3) a state or local government agency; or
- (4) a person who is otherwise eligible under state law to operate a one-call notification system.

C. If the one-call notification system is operated by owners or operators of pipeline facilities, it shall be established as a nonprofit entity governed by a board of directors that shall establish the operating processes, procedures and technology needed for a one-call notification system. The board shall further establish a procedure or formula to determine the equitable share of each member for the costs of the one-call notification system. The board may include representatives of excavators or other persons deemed eligible to participate in the system who are not owners or operators.

D. Excavators shall give advance notice to the one-call notification system operating in the intended excavation area and provide information established by rule of the commission, except when excavations are by or for a person that:

- (1) owns or leases a mineral leasehold interest in the real property on which the excavation occurs; and
- (2) operates all underground facilities located in the intended excavation area.

E. The one-call notification system shall promptly transmit excavation notice information to owners or operators of pipeline facilities and other underground facilities in the intended excavation area.

F. After receiving advance notice, owners and operators of pipeline facilities and other underground facilities shall locate and mark their facilities in the intended excavation area and shall provide a positive response. The one-call notification center shall make available to the commission appropriate positive response records for investigations of alleged violations of Chapter 62, Article 14 NMSA 1978.

G. The one-call notification system shall provide a toll-free telephone number or another comparable and reliable means of communication to receive advance notice of excavation. Means of communication to distribute excavation notice to owners or operators of pipeline facilities and other underground facilities shall be reliable and capable of coordination with one-call notification systems operating in other regions of the state.

H. Operators of one-call notification systems shall notify the commission of its members and the name and telephone number of the contact person for each member and make available to the commission appropriate records in investigations of alleged violations of Chapter 62, Article 14 NMSA 1978.

I. One-call notification systems and owners and operators of pipeline facilities shall promote public awareness of the availability and operation of one-call notification systems and work with state and local governmental agencies charged with issuing excavation permits to provide information concerning and promoting awareness by excavators of one-call notification systems.

J. The commission may prescribe reasonable maximum rates for the provision of one-call services in New Mexico, provided that if the reasonableness of such rates is contested in the manner provided by commission rule, the burden of proof to show the unreasonableness of such rates shall be upon the person contesting their reasonableness.

62-14-8. Penalties

In addition to any other liability imposed by law, an excavator, after a formal hearing and upon a finding, who has failed to comply with Subsection C of Section 62-14-3 NMSA 1978 is subject to an administrative penalty of up to five thousand dollars (\$5,000) for a first offense as assessed by the commission. Thereafter, the commission may assess an administrative penalty of up to a maximum of twenty-five thousand dollars (\$25,000) for subsequent violations of Subsection C of Section 62-14-3 NMSA 1978. In addition to any other penalty imposed by law, an operator of underground pipeline facilities or underground utilities, excavator or operator of a one-call notification system, after formal hearing and upon a finding, who has willfully failed to comply with Chapter 62, Article 14 NMSA 1978 shall be subject to an administrative penalty of up to five thousand dollars (\$5,000) for a first offense as assessed by

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the commission.

Thereafter, upon finding that a violation of Chapter 62, Article 14 NMSA 1978 has occurred, the commission may, upon consideration of the nature, circumstances, gravity of the violation, history of prior violations, effect on public health, safety or welfare and good faith on the part of the person in attempting to remedy the cause of the violation, assess an administrative penalty up to a maximum of twenty-five thousand dollars (\$25,000) per violation consistent with federal law. No offense occurring more than five years prior to the current offense charged shall be considered for any purpose. All actions to recover the penalties provided for in this section shall be brought by the commission. All penalties recovered in any such action shall be paid into the state general fund.

62-14-9. Enforcement

If any person excavates or intends to excavate in violation of Chapter 62, Article 14 NMSA 1978, the commission or any interested or affected owner or operator of an underground facility may file, in the district court of the county in which the excavation is occurring or intended, an action seeking to enjoin the excavation.

62-14-9.1. Alternative Dispute Resolution

The commission shall promulgate rules for voluntary alternative dispute resolution procedures available to owners or operators, excavators and other interested parties regarding disputes that cannot be resolved through consultation and negotiation arising from

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damage to underground facilities, including any cost or damage incurred by the owner or operator or the excavator as a result of any delay in an excavation project while an underground facility is restored, repaired or replaced. The alternative dispute resolution procedure shall not affect civil penalties levied pursuant to Section 62-14-8 NMSA 1978 or change the basis for civil liability for damages.

62-14-10. Rule-making

The commission shall promulgate rules and regulations to implement the provisions of Chapter 62, Article 14 NMSA 1978.

APPENDIX B – THE RULES

EXHIBIT A

18.60.5.1 Issuing Agency:

New Mexico Public Regulation Commission.

18.60.5.2 Scope:

This rule applies to all one-call notification systems, excavators, and owners and operators of pipelines and other underground facilities in New Mexico with the exemption of those preempted by Federal Law.

18.60.5.3 Statutory Authority:

Sections 8-8-4, 62-14-7.1, 62-14-10, 70-3-4, and 70-3-13 NMSA 1978.

18.60.5.4 Duration:

Permanent.

18.60.5.5 Effective Date:

August 15, 2012, unless a later date is cited at the end of a section.

18.60.5.6 Objective:

The purpose of this rule is to implement Chapter 62, Article 14 NMSA 1978 by providing procedures for preventing damage to underground utilities and for dealing with damage when it occurs during excavation activities.

18.60.5.7 Definitions:

In addition to the definitions in Section 62-14-2 NMSA 1978, 18.60.2.7 NMAC and 18.60.4.7 NMAC, as used in this rule:

- A. access information means a telephone number, a facsimile number, an email address, and, if available, a web site address;
- B. bid locate means the marking of underground facilities at the request of a project owner for the purpose of providing information to persons bidding on a project;
- C. design locate means the marking of underground facilities at the request of a project owner or project engineer for the purpose of providing information to persons designing a project;
- D. emergency locate means the marking of underground facilities at the request of a person for an underground facility owner as soon as practical, ideally within 2 hours for the purpose of an emergency excavation;
- E. excavation locate means the marking of underground facilities for the purpose of providing information at the request of an excavator planning to commence excavation for the excavator's project
- F. holiday means the day New Mexico state government observes New Year's Day, Martin Luther King, Jr.'s Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veteran's Day, Thanksgiving Day, President's Day, and Christmas Day;
- G. non-member UFO means a private underground facility owned by a homeowner and operated and located on

a residential property or not subject to the jurisdiction of the commission;

- H. project owner or project engineer means the owner of a project involving excavation or the person designated by the owner to be in charge of the project involving excavation;
- I. road maintenance means routine grading and resurfacing of the earth and gravel surface, but not the subbase, of a roadway for the purpose of maintaining the surface condition of the road and includes recovery of material from a borrow ditch but does not include road construction or reconstruction and shall entail moving no more than four (4) inches of earth; road maintenance does not include street sweeping or road milling and resurfacing as long as the subsurface is not disturbed;
- J. underground facility operator (UFO) means a person who operates an underground facility;
- K. working day means a twenty-four (24) hour period excluding weekends and holidays; and
- L. mechanical vacuum excavation is deemed an appropriate non-mechanical method of excavating safely around underground facilities provided that the equipment has been specifically designed and built for this purpose [and] is operated in accordance with practices that provide appropriate levels of worker and public safety and prevent damage to buried facilities.

18.60.5.8 Responsibilities of One-Call Notification Systems:

- A one-call notification system shall:
- A. provide toll-free access;
 - B. provide to the commission quarterly the name, contact person, and access information for each member of the one-call notification system;
 - C. notify the commission of the service area in which the one-call notification system operates;
 - D. have a written coordination agreement with other one-call notification systems operating in New Mexico;
 - E. keep a record of all locate requests, tickets, and clears for five (5) years and make such records available to the commission upon request;
 - F. provide monthly reports to the commission, no later than the 10th of each month, with the following information:
 - (1) average wait time for answered calls for the previous month;
 - (2) number of calls received for the previous month;
 - (3) number of tickets generated for the previous month;
 - (4) number of requests by type (regular, priority, emergency) for the previous month;

- G. report any changes in access information to the commission on or before the date the information will change;
 - H. establish a registry of non-member UFOs that voluntarily provide their contact and underground facility information for excavation purposes;
 - I. establish a positive response registry system; and
 - J. inform any person who calls with a complaint that he or she may file a complaint with the commission's pipeline safety bureau, and provide the commission's pipeline safety bureau access information, if the one-call system is unable to satisfactorily resolve the matter.
- K. Processing Locate Requests.
- (1) A one-call notification system may hold a locate request in suspension until it is complete. The one-call notification system shall contact an excavator within three (3) hours to request any missing information that prevents the one-call notification system or non-member UFO from processing the request.
 - (2) A one-call notification system shall process all complete locate requests within three (3) hours of receipt. A one-call notification system shall deem locate requests received on a weekend or holiday, or after 4:00 pm on a working day, to have been received at 7:00 am on the next working day and shall deem locate requests received before 7:00 am on a working day to have been received at 7:00 am on that working day.

(3) Upon receipt of a complete conference or locate request, a one-call notification system shall issue a ticket with a unique number to the requesting person as confirmation, and shall send a ticket to all members of the system that have underground facilities in the excavation area, or notify the members by telephone. A ticket shall become effective at the date and time a one-call notification system issues a ticket number; if the ticket is for a conference, the ticket shall be marked "wide area conference," "bid conference," or "design conference," as appropriate.

(4) Any person may contact the one-call notification system and request confirmation of damage reports, conferences, and locate requests.

18.60.5.9 Responsibilities of UFOs:

A. A UFO shall report any changes to the information required by 18.60.5.8(B) to the one call notification system(s) at least seven (7) days prior to the effective date.

B. A UFO shall retain records of locate requests, excavation notices and underground facility damage information for a period of five (5) years and make such records available to the commission upon request.

C. A UFO that utilizes contractors to perform locate and excavation activities or damage investigations on its behalf shall be responsible for compliance with Chapter 62 Article 14 NMSA 1978 and these rules.

18.60.5.10 Locate Requests:

An excavator shall make an excavation locate request for all projects involving excavation, including road maintenance, with the exception of subsurface potholing or vacuum excavation activities conducted solely for the purpose of physically exposing or locating underground facilities. However, this exception does not preclude compliance with 18.60.5.18 NMAC. Although not required under the Excavation Damage to Pipelines and Underground Utility Lines Law, Sections 62-14-1, et seq. NMSA 1978, or this rule, locate requests are encouraged for excavation projects involving purely non-mechanical means.

A. Submittal.

(1) An excavator shall submit an excavation locate request to each one-call notification system:

(a) by telephone or in person during normal business hours Monday to Friday, excluding holidays; or

(b) by facsimile or electronically via online web portal with appropriate one call notification center twenty-four hours a day, seven days a week.

(2) An excavator shall also submit an excavation locate request to each non-member UFO.

B. Size of locate requests.

(1) An excavator shall determine the maximum area that the excavator can reasonably expect to excavate within a fifteen (15) working day period and shall request an excavation locate for that

area only. The excavator shall pre-mark the actual intended excavation route or site(s) for any incorporated city, town or village including extra territorial zone(s) in accordance with American public works association (APWA) marking guidelines to communicate to facility owners where the actual excavation will take place for standard fifteen (15) working day ticket requests only. Outside these incorporated areas, excavators shall provide clear and accurate driving and marking instructions; and either GPS coordinates or pre-marks as described above which define the parameters of the proposed excavation. The pre-marked excavation shall encompass location(s) where excavation equipment that may penetrate the surface will be setup such as directional boring equipment. If the location markings have been removed or are no longer visible and there are no marking offsets, the person engaging in the excavation activity shall suspend excavation activities and reinitiate a locate request set forth in this section. Such relocate request shall be limited to the area yet to be excavated only.

- (2) An excavator may request relocates for the same area only if justified by the circumstances and nature of the work; such justification shall be made part of the relocate request.

C. Minimum information required. When requesting an excavation locate or a locate conference, an excavator shall comply with the requirements of the one-call notification system or non-member UFO operating

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in the intended excavation area and shall provide accurate and truthful information. A locate request shall be deemed incomplete if it does not contain, at a minimum:

- (1) the name and contact information of the excavator personnel directly involved with or conducting the excavation at the actual excavation site;
- (2) if available, an alternate name and contact information of the excavator;
- (3) a description and the purpose of the type of work to be done;
- (4) the name of the person for whom the work is being done;
- (5) whether or not the excavation site is pre-marked in white;
- (6) an accurate physical description of the location and size of the excavation site; reference to a plat of a subdivision shall not by itself be sufficient description;
- (7) driving instructions to a rural excavation site;
- (8) spotting instructions;
- (9) any appropriate remarks regarding access to or hazards at the site.
- (10) if available, GPS coordinates which define the parameters or start and end points of the actual excavation.

18.60.5.11 Wide Area Locate Requests:

An excavator who expects a project to take more than fifteen (15) working days to complete shall either request separate locates which meet

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the requirements of Subsection B of 18.60.5.10 NMAC or follow the conference procedure set forth in this section.

A. If an excavator expects that an excavation will take more than fifteen (15) working days to complete, the excavator shall contact the one-call notification system to request a wide area conference a minimum of two (2) working days prior to the wide area conference and provide the proposed date, time, and location for the conference. The one-call notification system shall process the request as provided in Subsection K of 18.60.5.8 NMAC.

B. A UFO shall contact an excavator who requests a wide area conference within two (2) working days of the issuance of the conference ticket and confirm proposed conference schedule. A UFO shall be physically represented at a scheduled wide area conference. If a UFO cannot attend the scheduled wide area conference, it shall make arrangements to meet with the excavator who requested the wide area conference not to exceed five (5) working days of the scheduled wide area conference.

C. At the conference, the excavator shall develop a written work plan [that includes the minimum information required under Subsection C of 18.60.5.10 NMAC] in consensus with each UFO, which shall be signed by all parties. Updates or revisions to the work plan shall also be in writing and signed by all parties.

D. After the work plan has been signed by all parties, an excavator shall request a wide area excavation locate. The one-call notification system shall process the request as provided

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in Subsection K of 18.60.5.8 NMAC. The excavation ticket shall reference the wide area conference ticket number and cite the work plan as the description of the work to be performed.

E. An excavator working pursuant to a wide area excavation locate ticket shall request reaffirmation of the wide area locate ticket every fifteen (15) working days. For the purpose of reaffirmation, a working day begins on the date and time stamped on the ticket and ends fifteen (15) working days from such date and time. The excavator and UFO(s) shall continue to comply with the approved work plan established per 18.60.5.11(C) NMAC.

18.60.5.12 Design and Bid Locate Requests:

A project owner or project engineer shall request information regarding the location of underground facilities for design projects or bids in accordance with either Subsection A or B of this section, but may not switch methods once having made an election.

A. Physical locates.

(1) A project owner or project engineer may request a design or bid locate from one-call notification systems and non-member UFOs.

(2) The one-call notification system and non-member UFOs for the intended excavation area shall issue a ticket marked "bid locate" or "design locate" as appropriate.

(3) UFOs shall physically mark the location of underground facilities on the site

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within two (2) working days from the date of the ticket.

- (4) Designers or bidders, as appropriate, shall capture data from the site within ten (10) working days from the end of the two day marking period.

- (5) A project owner or project engineer shall not request relocates or time extensions.

B. Conferences.

- (1) A project owner or project engineer may request a design or bid conference a minimum of two (2) working days prior to conference from the one-call notification system and non-member UFOs for the intended excavation area and provide the proposed date, time, and location for the conference.

- (2) A UFO shall contact the project owner or project engineer within two (2) working days of the issuance of the conference ticket and confirm the proposed conference schedule, and if necessary, make arrangements to reschedule the conference not to exceed five working days from the proposed conference schedule on the proposed ticket. A UFO shall be physically represented at the scheduled design or bid conference.

- (3) The one-call notification system for the intended excavation area shall process the request as provided in Subsection K of 18.60.5.8 NMAC.

- (4) UFOs shall arrange to provide information to designers or bidders within a reasonable time following the conference.

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- (5) A project owner or project engineer and UFOs shall continue with utility coordination until the design is complete or bid for the project has been awarded and an excavator requests an excavation locate.

18.60.5.13 Marking Excavation Sites:

- A. Excavators. As provided under Subsection B of 18.60.5.10 NMAC, excavators shall mark all proposed excavation sites in accordance with American public works association (APWA) standards to improve communication between the excavator and UFO. In assessing administrative penalties for violation of the Excavation Damage to Pipelines and Underground Utility Lines Law, NMSA 1978, Section 62-14-1 et seq. and this rule, the commission may consider whether and how well an excavator marked a proposed excavation site. Pre-marking a site in white indicates the actual excavation site (not limits of construction) and, therefore, will supersede marking instructions provided on locate requests and be used to determine alleged violations during staff investigations. When an excavator fails to pre-mark the actual excavation site, UFOs shall mark per the spotting instructions provided on the locate request and register a positive response indicating the site was not pre-marked.

B. UFOs.

- (1) A UFO shall mark underground facilities for excavation purposes in accordance with the APWA standards.

- (2) A UFO shall locate and mark its underground facilities within two (2)

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working days from the effective date of the ticket in accordance with Subsection A of 62-14-5 NMSA 1978.

(3) If a UFO determines it does not have underground facilities within the proposed limits of the excavation site, a UFO shall provide positive response to the one-call notification's positive response registry system and may write "clear" or "no underground facilities" and the UFO's name at the site in the appropriate color.

(4) The locate markings shall be valid for fifteen (15) working days from the end of the two (2) day marking period. For the purpose of excavation, a working day begins on the work to begin date and time stamped on the ticket and ends fifteen (15) working days from such date and time.

(5) A UFO shall provide appropriate positive response to the one-call notification's positive response registry system for all advance notifications, including wide area, design, bid, standard, and road maintenance locate requests or conferences.

(6) If a UFO fails to mark its underground facility in accordance with the requirements of applicable laws, the UFO may be liable to the excavator in accordance with Subsection C of 62-14-5 NMSA 1978.

18.60.5.14 Identifying Underground Facilities for Road Maintenance:

In response to an excavation locate request for

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road maintenance, a UFO shall physically mark or locate by marker its underground facilities that are parallel or cross the road, as provided in Subsection A.

A. Underground facilities parallel or cross the road.

(1) Physical locate. A UFO may physically mark the location of all underground facilities that are parallel or cross the road to be maintained if the UFO deems the facilities to be in conflict with the road maintenance activity. If the UFO deems the facilities not to be in conflict with the road maintenance activity, then the UFO may "clear" the ticket with the excavator using the procedure for positive response set forth in 18.60.5.13 NMAC.

(2) Locate by permanent marker.

Alternatively, a UFO may use a system of permanent markers to indicate the location of underground facilities that are parallel or cross the road to be maintained. Such markers shall:

- (a) only be used for the purposes of road maintenance;
- (b) be durable enough to withstand normal weathering;
- (c) be the same APWA color as is designated for marking the UFO's type of underground facility; and
- (d) have a decal on the marker specifying the depth of the underground facility at the marker.

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B. A UFO shall be deemed to have failed to correctly locate or mark its underground facility that is parallel or crosses a road to be maintained unless it:

- (1) maintains a minimum eighteen (18) inches of coverage over the underground facility;
- (2) ensures that the permanent markers are in place;
- (3) verifies the depth of its underground facilities at the permanent marker locations at least annually; and
- (4) ensures that the decal is visible and the information on it is readable.

18.60.5.15 Excavation Procedures:

A. Pre-excavation. Before excavating, an excavator shall determine whether all underground facilities have been marked.

- (1) If all underground facilities have been marked or cleared through a positive response system and the two working day marking period has expired, the excavator may begin excavating.
- (2) If one or more underground facilities have not been marked and positive response has not been provided, an excavator shall, prior to commencing excavation, call the one-call notification system for verification that advance notice was transmitted to the UFO and to provide notice that the underground facilities have not been located or cleared via a warning locate request.

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UFO's shall promptly respond to warning locate requests ideally within 2-hours.

B. Excavation.

- (1) If, while excavating, an excavator observes evidence that an unmarked underground facility may exist, the excavator shall, before excavating in the immediate area of such evidence:
 - (a) make a reasonable effort to identify and contact the UFO and wait until the UFO marks or clears the immediate area of the evidence; the UFO shall mark or clear the area within two (2) hours of contact or as expeditiously as possible if the excavation site is in a rural area;
 - (b) expose the underground facility by non-mechanical means or mechanical vacuum excavation methods.
- (2) If excavation activity encroaches within eighteen (18) inches either side of a marking made by a UFO, an excavator shall, prior to excavating, expose the underground facility by non-mechanical means or mechanical vacuum excavation methods.
- (3) If the exact subsurface location of the underground facility or utility cannot be determined by non-mechanical means or mechanical vacuum excavation methods as required in (1)(a) and (2) above, the excavator shall contact the UFO directly and the UFO shall work with the excavator, to locate and expose the actual subsurface location of the underground

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facility or utility. If the UFO must resort to performing excavation to locate the facility, the UFO shall perform such excavation within five working days of notice from the excavator. If requested, the local one call notification center shall provide the excavator with the contact telephone number of the UFO.

- (4) If excavation activity cannot proceed without obliterating all or some of the markings made by a UFO, an excavator shall provide temporary offset marks or stakes to retain the information regarding the location of each UFO's underground facilities.
- (5) The requirement to provide positive response for a facility does not apply to the homeowner of a residential property.
- (6) The Commission encourages excavators to notify UFO when excavation activity will be within twenty five feet (25') of the actual utility marking provided or as agreed upon by a right of way encroachment agreement or permit for infrastructure identified by the UFO as critical (i.e., transmission and trunk line pipelines, fiber optic, power, 911, etc.).

- C. Temporary suspension of excavation activity. If staff determines that an excavation activity is not in compliance with the requirements of this rule, and that continued noncompliance may result in injury to persons or damage to property, staff may suspend the excavation activity until the excavation activity is brought into compliance with the requirements of this rule and excavation conditions are safe.

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18.60.5.16 Emergency Excavation and Damage Reporting Procedure:

This section applies whenever failure of or damage to underground facilities or public infrastructure requires emergency excavation as defined in NMSA 1978, Section 62-14-2(E) and excavation shall be promptly commenced, ideally within twenty four (24) hours.

- A. Excavators. An excavator who damages an underground facility while excavating shall exercise prudence and shall:
 - (1) stop excavating immediately;
 - (2) call 911 if appropriate and the operator of the damaged underground facility and 811 to report the damaged facility;
 - (3) secure the site and direct people and traffic a safe distance away from the site of the damage;
 - (4) not leave the scene until authorized by an emergency responder or the operator of the damaged underground facility; an excavator may leave the scene without such authorization only if the excavator has made reasonable, if unsuccessful, efforts to contact the affected UFOs and has safely secured the site;
 - (5) not resume work within an unsafe distance of the damage until authorized by the operator of the damaged underground facility.
- B. Operators of failed or damaged underground facilities. The operator of a failed or damaged underground facility shall exercise prudence and shall:

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- (1) immediately respond to a report of damage or failure to its underground facilities and travel to the site;
 - (2) prior to traveling to the site or upon arrival, call the one-call notification system for the excavation area to request an emergency locate;
 - (3) make the site safe and get the emergency situation under control;
 - (4) locate its own underground facilities as soon as practical, ideally within two (2) hours;
 - (5) begin remedial action to restore service as soon as practical, ideally within twenty four (24) hours; and
 - (6) obtain a standard excavation locate ticket for repair work beyond resolution of the emergency situation.
- C. Operators of failed or damaged public infrastructure. The entity responsible for the failed or damaged public infrastructure shall:
- (1) call the one-call notification system for the excavation area to request an emergency locate;
 - (2) obtain an excavation locate ticket for repair work beyond resolution of the emergency situation.
- D. One-call notification system. A one-call notification system shall upon request:
- (1) issue an emergency excavation notice which shall be valid until the emergency is resolved, or for forty-eight (48) hours, whichever is longer;

- (2) issue a notice of a reported damage to each affected UFO.

18.60.5.17 Abuse of the Law:

A person shall be deemed to have willfully failed to comply with this rule or Chapter 62, Article 14 NMSA 1978 and shall be subject to the penalties in Section 62-14-8 NMSA 1978 if the person:

- A. requests a locate for an area that cannot reasonably be excavated in fifteen (15) working days;
- B. provides misinformation or withholds information regarding the size of an excavation area;
- C. requests locates that unduly burden a one-call notification system or UFO;
- D. requests a locate for fraudulent reasons;
- E. fails to process locate requests within the requisite timeframe;
- F. fails to mark, or provide positive response for its underground facilities within the requisite timeframe;
- G. fails to determine if all underground facilities have been marked or cleared;
- H. commences excavation prior to the expiration of the two (2) day notice period;
- I. obliterates markings at an excavation site without providing temporary offset marks or stakes;
- J. alters any record relating to excavation activity;

K. fails to pre-mark the actual intended excavation route or site(s) as required;

L. fails to report or file a report of damage within requisite time frame; or

M. commits any other act that the commission determines violates Chapter 62, Article 14 NMSA 1978 or this rule.

18.60.5.18 Reports of Third Party Damage:

A. A UFO shall report to the director or Pipeline Safety Bureau any incident in which the owner or operator's underground facility is damaged by excavation activities. Such report, where practicable, shall be submitted using the commission's website at: www.nmprc.state.nm.us/transportation/pipeline-safety.html. For purposes of this subsection, incident is to be taken in its general sense and is not to be restricted to the definition given in 49 CFR 191.3.

B. The report shall be filled out in its entirety and should include any and all information, such as pre dig and post damage photos, the UFO used to determine probable cause and supports or justifies its position.

C. The report shall be submitted within thirty (30) calendar days of occurrence. Any additional information provided after the thirty (30) day deadline may be considered on a case by case basis.

D. The UFO shall make available to the director or staff, within a reasonable time, such other information or documentation as the director or staff may require regarding any damage reportable under this section.

18.60.5.19 Alternative Dispute Resolution:

A. The commission encourages owners and operators of underground facilities and excavators to privately negotiate and settle disputes arising from excavation damage to underground facilities.

B. In the event the parties are unable to resolve such disputes privately, any owner or operator of underground facilities or any excavator may request mediation or arbitration from the commission.

C. Staff may participate in mediation or arbitration proceedings.

D. In mediation and arbitration proceedings, persons shall be represented in accordance with the requirements of 18.60.4.11 NMAC.

18.60.5.20 Mediation of Excavation Damage Disputes:

A. Designation of mediator. If any of the parties request mediation, the commission shall designate a mediator. The mediator may be a permanent or temporary employee of the commission or another state agency or any other individual acceptable to the parties. If the parties request a mediator who is not an employee of the commission, the commission shall not approve the request unless the parties agree in writing to bear as their own the costs of obtaining the mediator's services. The mediator shall have no official, financial, or personal conflict of interest with respect to the issues in controversy, unless such interest is fully disclosed in writing to all

parties at the time the mediator is assigned by the commission and all parties agree that the mediator may serve. The mediator shall not, subsequent to serving as a mediator in an excavation damage dispute, participate in any subsequent proceeding in the same cause as a hearing examiner, advisory staff, staff counsel or expert witness, or as an attorney, expert witness, or representative of any party to the proceeding.

- B. Duties of mediator. The mediator shall notify the parties by telephone or mail of the time and place of the mediation conference, which will be held at commission offices unless otherwise directed by the mediator. The notice may direct the parties to send the mediator, but not other parties, their settlement positions and other necessary information that could facilitate the mediation conference, including the results of staff's investigation of the damage. In addition, the mediator may require counsel to have their clients present at the mediation conference or accessible by telephone. The mediation conference shall be held within twenty (20) days of the date of the notice unless good cause is shown for an extension. If the parties are able to reach a settlement of their dispute, in appropriate cases the mediator shall assist the parties in preparing a written agreement to reflect that resolution. If the parties are unable to reach a complete settlement of their dispute, the mediator shall advise the parties that they may request arbitration or file an action for civil liability for damages in district court.

- C. Inadmissibility of settlement offers. Offers of settlement and statements in furtherance of

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settlement made in the course of mediation are privileged and, except by agreement among all parties, shall not be admissible as evidence in any formal hearing before the commission nor disclosed by the mediator voluntarily or through discovery or compulsory process.

18.60.5.21 Binding Arbitration of Excavation Damage Disputes:

- A. Request for arbitration. Any party to a dispute arising from excavation damage to underground facilities may request binding arbitration of the dispute. The request shall be in writing to the commission and shall include a concise statement of the grounds for the dispute, the remedy sought, and an acknowledgment that the requesting party agrees to be bound by the decision of the arbitrator. The commission shall forward the request for arbitration to all other parties and require that they submit a written response within ten (10) days of receipt of the commission's letter forwarding the request.

- (1) If the other parties agree to arbitration of the dispute, they shall include in their response to the commission a concise statement of their position with regard to the merits of the dispute and an acknowledgment that they agree to be bound by the decision of the arbitrator.

- (2) If the other parties will not agree to arbitration, they shall so state in their response.

- (3) If the other parties either fail to respond to a request for arbitration or do not agree to arbitration, the requesting party

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retains the right to proceed with an action for civil liability for damages in district court.

- B. Designation of arbitrator. If all parties agree to arbitration, the commission shall designate an arbitrator. The arbitrator may be a permanent or temporary employee of the commission or another state agency or any other individual who is acceptable to the parties to the dispute. The designated arbitrator shall have no official, financial or personal conflict of interest with respect to the issues in controversy, unless such interest is fully disclosed in writing to all parties at the time of the commission's designation and all parties agree that the arbitrator may serve. The parties shall be required to indicate their consent in writing to the designated arbitrator within ten (10) days of the date of the commission's letter of designation. If the parties request an arbitrator who is not an employee of the commission, the commission shall not approve the request unless the parties agree in writing to bear as their own the costs of obtaining the arbitrator's services. Any employee of the commission designated to arbitrate a dispute under these provisions shall not participate in any subsequent proceeding in the same cause regarding excavation damage to underground facilities as a hearing examiner, advisory staff, staff counsel, or expert witness or as an attorney, expert witness, or representative of any party to the proceeding.

C. Duties of arbitrator.

- (1) The arbitrator shall render a decision in the arbitration proceeding within sixty (60) days of the date the parties

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approved the arbitrator, unless good cause exists to extend the time.

- (2) The arbitrator shall fix a time and place for an arbitration and shall serve notice of arbitration on all parties at least ten (10) days in advance of the arbitration. The arbitrator may issue subpoenas for the attendance of witnesses and for the production of books, records, documents, and other evidence and shall have the power to administer oaths. The parties may offer such evidence and produce such additional evidence as the arbitrator may deem necessary to an understanding and determination of the dispute. The arbitrator shall decide the relevancy and materiality of the evidence offered. The arbitrator shall give consideration to but shall not be bound by the New Mexico rules of evidence. No stenographic or electronic record will be made of the testimony at the hearing unless requested by a party, who shall bear the cost of the record.
- (3) The arbitrator shall permit discovery only if it will not unduly complicate, burden, or impede the expeditious and informal nature of the proceeding.
- (4) At the close of or soon after the hearing, the arbitrator will issue a brief written decision, which need not contain findings of fact and conclusions of law. The arbitrator's decision will be binding on the parties, but will not be deemed a decision of the commission and shall have no precedential effect.

- D. Inadmissibility of settlement offers. Unless agreed to by all the parties, no statements,

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admissions, or offers of settlement made during the course of arbitration proceedings shall be admissible as evidence in any formal proceeding nor shall the arbitrator disclose the same voluntarily or through discovery or compulsory process. Nothing in this section, however, shall preclude the arbitrator from issuing a brief written decision describing his conclusions and the bases for them.

18.60.5.22 Waiver or Variance from Rule Requirements:

A. The commission may, in its discretion, waive or vary any requirement of this rule whenever the commission finds that such waiver or variance would be in the public interest.

B. An excavator, one-call notification system, or UFO that cannot meet one or more of the requirements of this rule may petition the commission for a waiver or variance. The petition shall be in writing and shall include:

- (1) a list of those requirements which the excavator, one-call notification system, or UFO wishes to have waived or varied;
- (2) an explanation and description of the specific conditions which prevent the requirement from being met; and
- (3) a statement of steps already taken and to be taken, with projected time limits for each step, in attempting to meet the requirements.

C. The commission may order a hearing on the merits of the petition.

D. An excavator, one-call notification system, or UFO shall be required to comply with requirements it has petitioned to have waived or varied until the commission has issued an order on the merits of the petition, unless the commission or its designee grants an interim waiver of or variance from one or more of the requirements that are the subject of the petition.

APPENDIX C — WHITE LINING MARKING GUIDELINES

Published White Lining Marking Guidelines

Prepared by NMRCGA's White Lining Marking Guidelines Committee

Recent Amendments to Rule 18.60.5.10 of the New Mexico Administrative Code (NMAC), Pipeline Safety Excavation Damage Prevention, were adopted by the New Mexico Public Regulation Commission. One of the amendments mandates excavator white lining before requesting an excavation locate from the one-call notification system. Specifically Rule 18.60.5.10-B (1) states, "...In every incorporated area, or when an excavation site cannot be clearly and adequately identified on the locate ticket, the excavator shall pre-mark the actual intended excavation route or site(s) in that area in accordance with American Public Works Association (APWA) marking guidelines to communicate to facility owners where the actual excavation will take place..." For the purpose of this Rule, "Incorporated area" is defined as, "any area within the limits of any incorporated city, town, or village including extra territorial zone(s)(not in 18.60.5.10 any more).

Excavator white lining of proposed excavation routes or sites should be in accordance with the Common Ground Alliance Best Practices resources (Version 15.0 or updates) listed below:

5. Practice Statement 5-2, White Lining
6. Appendix B Guidelines for Excavation Delineations

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In addition:

7. White marking tape/flagging on existing structures (e.g., well-head structure) or foliage is acceptable.
8. For pipelines, existing surveyed centerline markings with construction zone boundaries marked in white at 4' to 50' stations is acceptable.

White lining is a communication tool between the excavator and the locator. If a proposed excavation site is unclear after it has been white lined, locators are encouraged to immediately contact the excavator for clarification in box:

BEST PRACTICES CHAPTER 5 — EXCAVATION

Practice Statement 5-2: White Lining:

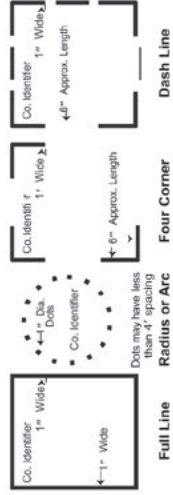
When the excavation site cannot be clearly and adequately identified on the locate ticket, the excavator designates the route and/or area to be excavated using white premarking prior to the arrival of the locator.

Guidelines for Excavation Delineation

The following marking illustrations are examples of how excavators may choose to mark their area of proposed excavation. The use of white marking products (e.g., paint, flags, stakes, whiskers, or a combination of these) may be used to identify the excavation site.¹

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Single Point Excavation Markings



Delineate in white the proposed area of excavation using a continuous line, dots marking the radius or arcs, dashes marking the four corners of the project, or dashes outlining the excavation project. Limit the size of each dash to approximately 6 in. to 12 in. long and 1 in. wide with interval spacing approximately 4 ft to 50 ft apart. Reduce the separation of excavation marks to a length that can reasonably be seen by the operator's locators when the terrain at an excavation site warrants. Dots of approximately 1 in. diameter typically are used to define arcs or radii and may be placed at closer intervals in lieu of dashes.

Single Stake Marking Center Point of Excavation Site

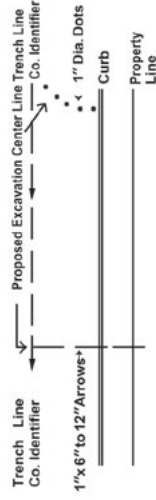


When an excavation site is contained within a 50 ft. maximum radius or less, it can be delineated with a single stake that is positioned at the proposed center of the excavation. If the excavator chooses this type of delineation,

they must convey that they have delineated the excavation site with a single stake at the center of the excavation and include the radius of the site in the notification to the one call center.

This single stake is white in color and displays the excavator's company identifier (name, abbreviations, or initials) and the radius of the excavation site in black letters on the stake or with a notice attached to the stake.

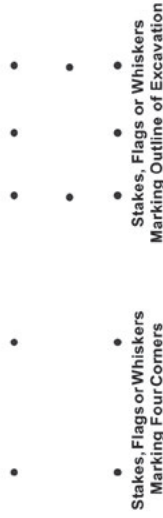
Trenching, Boring, or Other Continuous-Type Excavations



Continuous Excavation Marking

Mark in white the proposed centerline of planned excavation using 6 in. to 12 in. $\times$ 1 in. arrows approximately 4 ft to 50 ft apart to show direction of excavation. Reduce the separation of excavation marks to a length that can reasonably be seen by the operator's locators when the terrain at an excavation site warrants. Mark lateral excavations with occasional arrows showing excavation direction from centerline with marks at curb or property line if crossed. Dots may be used for curves and closer interval marking.

Stake, Flag, or Whisker Excavation Markers



Delineate the proposed area of excavation using stakes, flags, or whiskers instead of spray paint to mark radius or arcs; the four corners of the project; or when outlining the excavation project. Limit the interval spacing to approximately 4 ft. to 50 ft. Reduce the separation of excavation marks to a length that can reasonably be seen by the operator's locators when the terrain at an excavation site warrants. Stakes, flags, or whiskers provided to illustrate arcs or radii may be placed at closer intervals to define the arc or radius. Stakes, flags, or whiskers are white in color and display the excavator's company identifier (name, abbreviations, or initials).

¹ TR-2001-05: Amendment approved by the CGA Board on September 24, 2004

APPENDIX D – APWA MARKING GUIDELINES

Recommended Marking Guidelines For Underground Utilities

Adopted by APWA Board of Directors
September 12, 2001

The APWA Marking Recommendations Committee

The APWA Marking Recommendations Committee was organized and operated under guidelines similar to those used by the Common Ground: Best Practices committees.

- Anyone on the committee could propose or recommend existing marking practices.
- Only those practices receiving a consensus of all committee members were included in the final recommendations.

The committee felt that the original name for the committee: "APWA Marking Standards Committee" be changed to the "APWA Marking Recommendations Committee," this change was agreed to by all committee members. Henceforth, all proposals from the committee will be referred to as recommendations versus standards.

1. "Utility lines will be indicated by markings using current APWA color codes. Markings should be 18"-24" in length and 2" in width."
2. "The owner of a facility should be indicated by initials or by name in letters 6" high at the beginning and end of the locate. On long locates the

facility owner should be indicated every 100’.”

3. **“When known, the total number of lines within the ground will be indicated.”** The number of lines indicated should be based on the physical lines “that you could place your hands on. Multiple cables twisted together to form a single facility, as in the case of electric lines, would be considered one cable for locate purposes.
4. **“If a facility is known to be present but the total number of lines for a facility cannot be determined a corridor marker may be used. The corridor marker should indicate the approximate width of the facility.”** A marking resembling the letter “H” lying on its side will indicate the corridor marker.
5. **“When known, the size of the line being located will be indicated. Line size will indicate the outside diameter of the pipe or structure. The oversized utility marking should indicate the approximate size of pipe or structure.”** A mark resembling the letter “H” lying on its side, bisected by line extending along its length will indicate the oversized utility marking. The committee discussions centered on indicating sizes of single physical structures such as gas lines, sewer lines, water lines, and storm drains.
6. **“Duct structures, whether a single duct or multiple ducts, will be indicated by duct symbol indicating the approximate width of the duct structure.”** The duct marker will be indicated by a marking resembling a

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diamond bracketed by two parallel lines. The committee did not state whether indicating size should extend to indicating size of duct structures (telecommunications, electric) or indicating pair count for telephone lines.

7. **“When known, the pressure of a gas facility will be indicated.”** Gas pressure will be indicated as either low pressure, intermediate high pressure or high pressure. The committee did not determine whether gas pressure would be indicated in instances of high pressure only or for all pressures. The committee did not determine whether the type of pipe should be indicated (plastic, steel, cast iron, etc.).
8. **“When known, termination points, dead ends and stub outs should be indicated.”** The committee reviewed NULCA’s recommendation, which resembles the letter “T” with drop downs.
9. **“When there is a strong likelihood that marks may be destroyed offsets should be used.”** Offsets are indicated on a permanent surface and are placed parallel to the running line of the facility. The offset should indicate the distance from the offset to the facility and should identify the facility owner and if necessary size of the facility.

The following issues were discussed but either a consensus could not be reached or further discussion was considered necessary:

1. How does a locator indicate that access could not be gained to a yard or location and the locate request could not be completed? This is usually due to locked fences, dogs or other physical obstructions. The

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committee felt that a marking standard for this issue would not be developed. Suggestions that would be acceptable included the use of door hangers (indicating that the locator needed access to the property) and/or telephone calls to the requester.

2. How and when do we indicate the presence of buried, abandoned facilities? Excavators felt that the utilities should indicate ALL facilities in the ground regardless of status. Utility records often do not indicate the presence of abandoned facilities. Access may not be available to abandoned facilities or those facilities may not be capable of being located. An additional issue is whether the abandoned facility should be identified as abandoned.
3. How to indicate the presence of electronic markers (EMs).
4. How to indicate the presence of buried splices, valves and manholes.

The following are samples on how the previous suggestions would look:



Marking Gas Lines – High Pressure

< SWG 8" HP STL →

Marking Termination Point, Dead End, Stub Outs

[MF 4" IHP

Marking Offsets

SBC ^ 12'

Indicate – Facility owner, direction to utility and distance to facility

No Conflict (No utilities within the requested area)

NO/MCI NO/EPG

Proposed Markings – Consensus not reached by committee

Electronic Marker

EM

Marking Buried Splices, Valves, Manholes

⊗

Notes

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APPENDIX B

Uniform Color Code and Marking Guidelines

The information contained in this appendix is intended to supplement information for existing practices found within CGA Best Practices.^{8/}

BEST PRACTICES CHAPTER 4—LOCATING AND MARKING

Practice Statement 4–3: Color Code: A uniform color code and set of marking symbols is adopted nationwide.

Uniform Color Code^{9/}

The following APWA uniform color code (ANSI Z535.1) shall be adopted as the uniform color code for marking excavation sites and underground facilities in conflict with an excavation. This recommendation is not intended to preempt any existing state requirement that specifies other colors.

White	Proposed Excavation
Pink	Temporary Survey Markings
Red	Electric Power Lines, Cables, Conduit, and Lighting Cables
Yellow	Gas, Oil, Steam, Petroleum, or Gaseous Materials
Orange	Communication, Alarm or Signal Lines, Cables, or Conduit
Blue	Potable Water
Purple	Reclaimed Water, Irrigation, and Slurry Lines
Green	Sewers and Drain Lines

References:

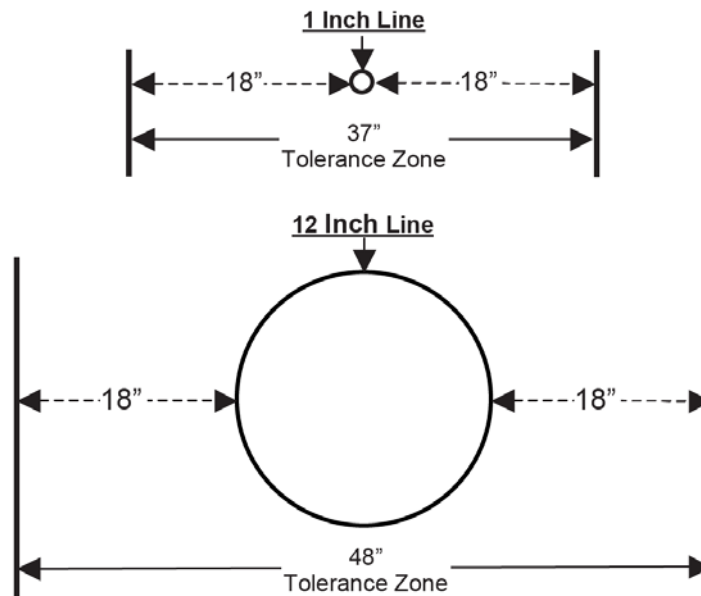
- APWA Uniform Color Code
- Existing operating practices from various states' one call centers
- Existing one call laws from various states
- ANSI Standard Z535.1 Safety Color Code

BEST PRACTICES CHAPTER 5—EXCAVATION

Practice Statement 5-19: Excavation Tolerance Zone: The excavator observes a tolerance zone that is comprised of the width of the facility plus 18 in. on either side of the outside edge of the underground facility on a horizontal plane. This practice is not intended to preempt any existing state/provincial requirements that currently specify a tolerance zone of more than 18 in.

Tolerance Zone^{40/}

The following examples are of tolerance zones for a 1 in. and 12 in. line:

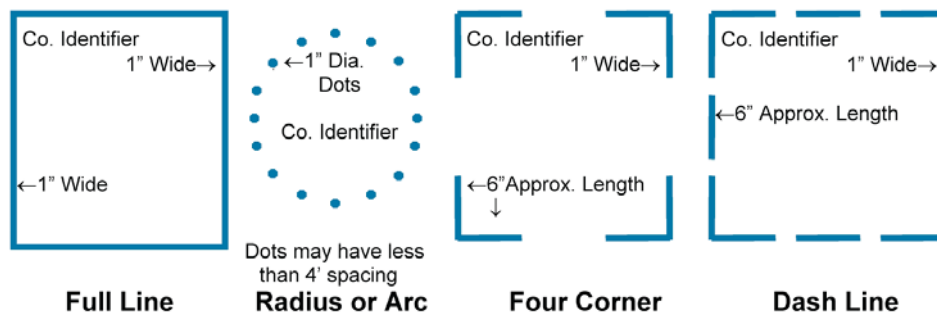


BEST PRACTICES CHAPTER 5—EXCAVATION

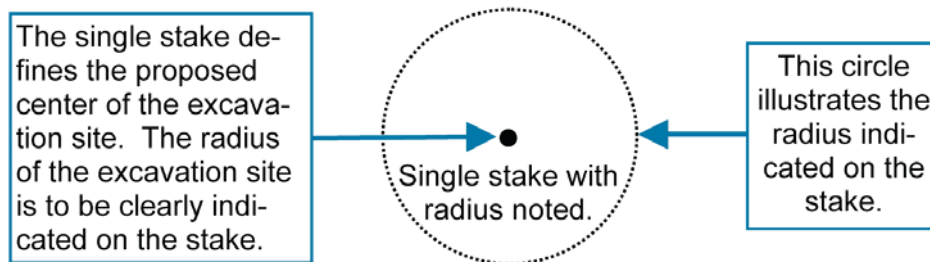
Practice Statement 5-2: White Lining^{67/}: *When the excavation site cannot be clearly and adequately identified on the locate ticket, the excavator designates the route and/or area to be excavated using white premarking, either onsite or electronically (when available through the one call center), prior to or during the request for the locate ticket.*

Guidelines for Excavation Delineation^{9/}

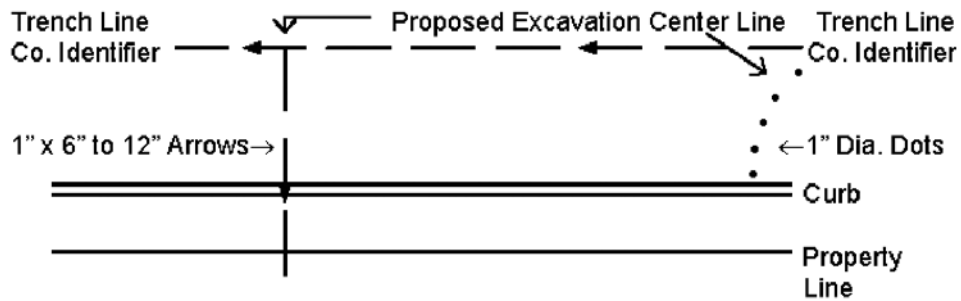
The following marking illustrations are examples of how excavators may choose to mark their area of proposed excavation. The use of white marking products (e.g., paint, flags, stakes, whiskers, or a combination of these) may be used to identify the excavation site.

Single Point Excavations Markings

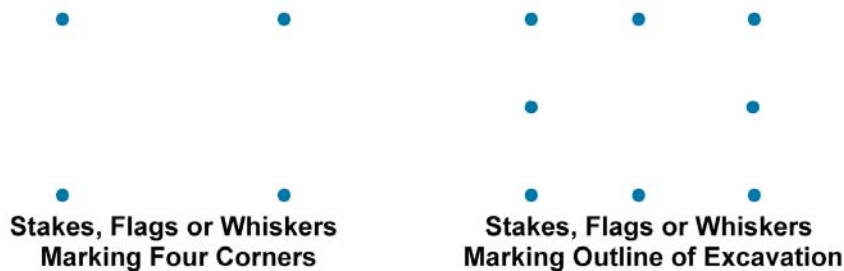
Delineate in white^{62/} the proposed area of excavation using a continuous line, dots marking the radius or arcs, dashes marking the four corners of the project, or dashes outlining the excavation project. Limit the size of each dash to approximately 6 in. to 12 in. long and 1 in. wide with interval spacing approximately 4 ft to 50 ft apart. Reduce the separation of excavation marks to a length that can reasonably be seen by the operator's locators when the terrain at an excavation site warrants. Dots of approximately 1 in. diameter typically are used to define arcs or radii and may be placed at closer intervals in lieu of dashes.

Single Stake Marking Center Point of Excavation Site

When an excavation site is contained within a 50 ft maximum radius or less, it can be delineated with a single stake that is positioned at the proposed center of the excavation. If the excavator chooses this type of delineation, they must convey that they have delineated the excavation site with a single stake at the center of the excavation and include the radius of the site in the notification to the one call center. This single stake is white in color and displays the excavator's company identifier (name, abbreviations, or initials) and the radius of the excavation site in black letters on the stake or with a notice attached to the stake.

Trenching, Boring, or Other Continuous-Type Excavations***Continuous Excavation Marking***

Mark in white^{62/} the proposed centerline of planned excavation using 6 in. to 12 in. x 1 in. arrows approximately 4 ft to 50 ft apart to show direction of excavation. Reduce the separation of excavation marks to a length that can reasonably be seen by the operator's locators when the terrain at an excavation site warrants. Mark lateral excavations with occasional arrows showing excavation direction from centerline with marks at curb or property line if crossed. Dots may be used for curves and closer interval marking.

Stake, Flag, or Whisker Excavation Markers

Delineate the proposed area of excavation using stakes, flags, or whiskers instead of spray paint to mark radius or arcs; the four corners of the project; or when outlining the excavation project. Limit the interval spacing to approximately 4 ft to 50 ft. Reduce the separation of excavation marks to a length that can reasonably be seen by the operator's locators when the terrain at an excavation site warrants. Stakes, flags, or whiskers provided to illustrate arcs or radii may be placed at closer intervals to define the arc or radius. Stakes, flags, or whiskers are white in color and display the excavator's company identifier (name, abbreviations, or initials).

BEST PRACTICES CHAPTER 4—LOCATING AND MARKING

Practice Statement 4-3: Color Code: A uniform color code and set of marking symbols is adopted nationwide.

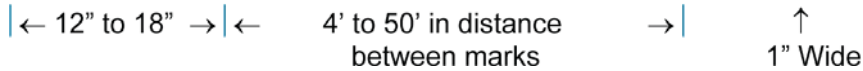
Guidelines for Operator Facility Field Delineation^{9/}

Operator markings of facilities include the following:

- The appropriate color for their facility type
- Their company identifier (name, initials, or abbreviation) when other companies are using the same color
- The total number of facilities and the width of each facility
- A description of the facility (HP, FO, STL, etc).

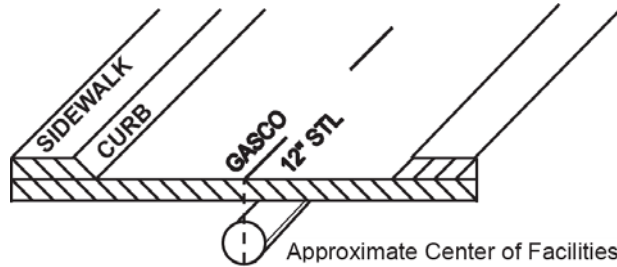
Use paint, flags, stakes, whiskers, or a combination to identify the operator's facility(s) at or near an excavation site.

1. Marks in the appropriate color are approximately 12 in. to 18 in. long and 1 in. wide, spaced approximately 4 ft to 50 ft apart. When marking facilities, the operator considers the type of facility being located, the terrain of the land, the type of excavation being done, and the method required to adequately mark the facilities for the excavator.

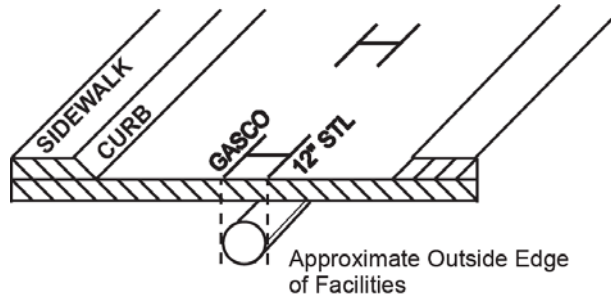


2. The following marking examples illustrate how an operator may choose to mark their subsurface installations:

- a. **Single Facility Marking:** Used to mark a single facility. This can be done in one of two ways—1) placing the marks over the approximate center of the facility:



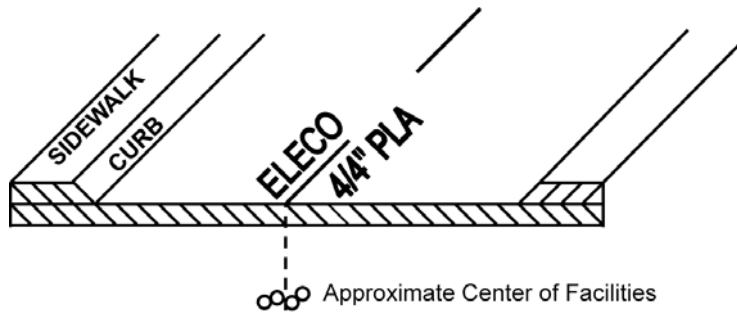
or 2) placing the marks over the approximate outside edges of the facility with a line connecting the two horizontal lines (in the form of an H) to indicate there is only one facility:



These examples indicate an operator's 12 in. facility. When a facility can be located or toned separately from other facilities of the same type, it is marked as a single facility.^{41/}

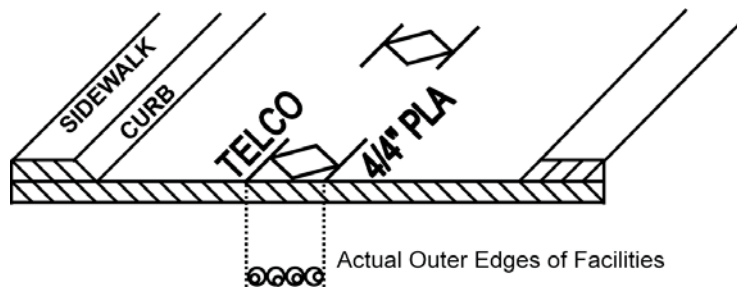
- b. **Multiple Facility Marking:** Used to mark multiple facilities of the same type (e.g., electric), where the separation does not allow for a separate tone for each facility, but the number and width of the facilities is known. Marks are placed over the approximate center of the facilities and indicate the number and width of the facilities.

Example: four plastic facilities that are 4 in. in diameter (4/4" PLA)



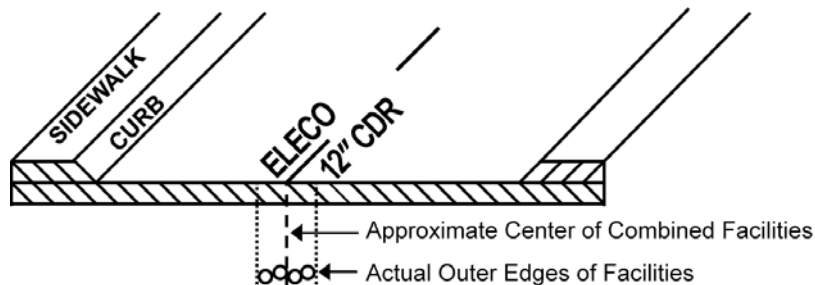
- c. **Conduit Marking:** Used for any locatable facility being carried inside conduits or ducts. The marks indicating the outer extremities denote the actual located edges of the facilities being represented.

Example: four plastic conduits that are 4 in. in diameter (4/4" PLA), and the marks are 16 in. apart, indicating the actual left and right edges of the facilities



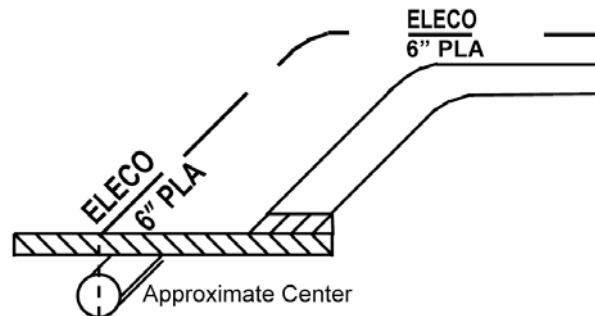
- d. **Corridor Marking:** Used to mark multiple facilities of the same type (e.g., electric), bundled or intertwined in the same trench, where the total number of facilities is not readily known (operator has no record on file for the number of facilities). Marks are placed over the approximate center of the facilities and indicate the width of the corridor. The width of the corridor is the distance between the actual located outside edges of the combined facilities.

Example: a 12 in. corridor (12" CDR)

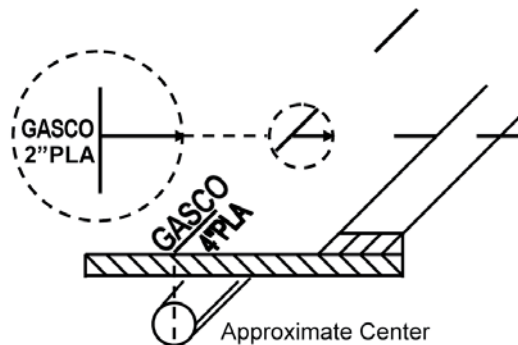


3. Changes in direction and lateral connections are clearly indicated at the point where the change in direction or connection occurs, with an arrow indicating the path of the facility. A radius is indicated with marks describing the arc. When providing offset markings (paint or stakes), show the direction of the facility and distance to the facility from the markings.

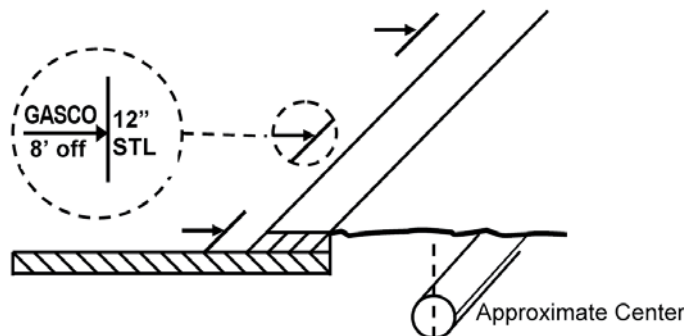
Example: radius



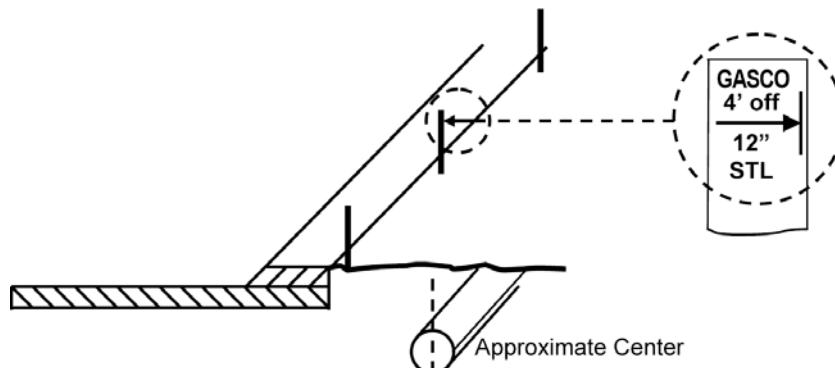
Example: lateral connection



Example: painted offset (off)



Example: staked offset (off)



4. An operator's identifier (name, abbreviation, or initials) is placed at the beginning and at the end of the proposed work. In addition, subsequent operators using the same color mark their company identifier at all points where their facility crosses another operator's facility using the same color. Reduce the separation of excavation marks to a length that can reasonably be seen by the operator's locators when the terrain at an excavation site warrants.

Examples:

CITYCO

ELECO

TELCO

5. Information regarding the size and composition of the facility is marked at an appropriate frequency.

Examples: the number of ducts in a multi-duct structure, width of a pipeline, and whether it is steel, plastic, cable, etc.

TELCO
9/4" CAB

GASCO
4" PLA

WATERCO
12" STL

6. Facilities installed in a casing are identified as such.

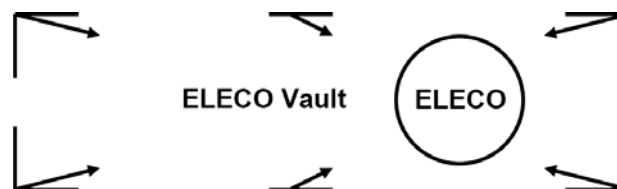
Examples: 6 in. plastic in 12 in. steel and fiber optic in 4 in. steel

GASCO
6" PLA/12" STL

TELCO
FO (4" STL)

7. Structures such as vaults, inlets, and lift stations that are physically larger than obvious surface indications are marked so as to define the parameters of the structure.

Example:



8. Termination points or dead ends are indicated as such.

Example:



9. When there is "No Conflict" with the excavation, complete one or more of the following:

- Operators of a single type of facility (e.g., TELCO) mark the area "NO" followed by the appropriate company identifier in the matching APWA color code for that facility.

Example: NO TELCO

- Operators of multiple facilities mark the area "NO" followed by the appropriate company identifier in the matching APWA color code for that facility with a slash and the abbreviation for the type of facility for which there is "No Conflict."

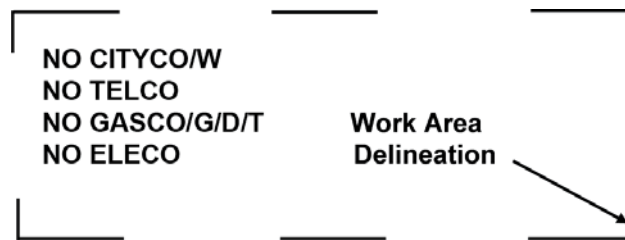
Example: NO GASCO/G/D illustrates that GASCO has no gas distribution facilities at this excavation site. The following abbreviations are used when appropriate: /G/D (gas distribution); /G/T (gas transmission); /E/D (electric distribution); /E/T (electric transmission).

- Place a clear plastic (translucent) flag that states “No Conflict” in lettering matching the APWA color code of the facility that is not in conflict. Include on the flag the operator’s identifier, phone number, a place to write the locate ticket number, and date. Operators of multiple facilities indicate on the flag which facilities are in “No Conflict” with the excavation (see the previous example).
- If it can be determined through maps or records that the proposed excavation is obviously not in conflict with their facility, the locator or operator of the facility may notify the excavator of “No Conflict” by phone, fax, or e-mail, or through the one call center, where electronic positive response is used. Operators of multiple facilities indicate a “No Conflict” for each facility (see the previous examples).
- Place “No Conflict” markings or flags in a location that can be observed by the excavator and/or notify the excavator by phone, fax, or e-mail that there is “No Conflict” with your facilities. When the excavation is delineated by the use of white markings, place “No Conflict” markings or flags in or as near as practicable to the delineated area.

Caution: Allow adequate space for all facility mark-outs.

“No Conflict” indicates that the operator verifying the “No Conflict” has no facilities within the scope of the delineation; or when there is no delineation, there are no facilities within the work area as described on the locate ticket.

Example:



Color Code Identifiers

White	Proposed Excavation
Pink	Temporary Survey Markings
Red	Electric Power Lines, Cables, Conduit, and Lighting Cables
Yellow	Gas, Oil, Steam, Petroleum, or Gaseous Materials
Orange	Communication, Alarm or Signal Lines, Cables, or Conduit
Blue	Potable Water
Purple	Reclaimed Water, Irrigation, and Slurry Lines
Green	Sewers and Drain Lines

Common Abbreviations

Facility Identifier

CH	Chemical
E	Electric
FO	Fiber Optic
G	Gas
LPG	Liquefied Petroleum Gas
PP	Petroleum Products
RR	Railroad Signal
S	Sewer
SD	Storm Drain
SS	Storm Sewer
SL	Street Lighting
STM	Steam
SP	Slurry System
TEL	Telephone
TS	Traffic Signal
TV	Television
W	Water
W	Reclaimed Water "Purple"

Underground Construction Descriptions

C	Conduit
CDR	Corridor
D	Distribution Facility
DB	Direct Buried
DE	Dead End
JT	Joint Trench
HP	High Pressure
HH	Hand Hole
MH	Manhole
PB	Pull Box
R	Radius
STR	Structure (vaults, junction boxes, inlets, lift stations)
T	Transmission Facility

Infrastructure Material

ABS	Acrylonitrile - Butadiene - Styrene
ACP	Asbestos Cement Pipe
CI	Cast Iron
CMC	Cement Mortar Coated
CML	Cement Mortar Lined
CPP	Corrugated Plastic Pipe
CMP	Corrugated Metal Pipe
CU	Copper
CWD	Creosote Wood Duct
HDPE	High Density Polyethylene
MTD	Multiple Tile Duct
PLA	Plastic (conduit or pipe)
RCB	Reinforced Concrete Box
RCP	Reinforced Concrete Pipe
RF	Reinforced Fiberglass
SCCP	Steel Cylinder Concrete Pipe
STL	Steel
VCP	Vertrified Clay Pipe

Guide for Abbreviation Use

Follow these guidelines when placing abbreviations in the field:

- Place the Company Identifier at the top or at the left of the abbreviations.
- Place the abbreviations in the following order: Company Identifier / Facility Identifier / Underground Construction Descriptions / Infrastructure Material

Example: TELCO/TEL/FO/PLA indicates that TELCO has a telecommunication fiber optic line in a single plastic conduit. The use of the abbreviation /TEL is not necessary, because the orange marking would indicate that the facility was a communication line; but its use is optional.

- To omit one or more of the abbreviation types, use the order described above but omit the slash and abbreviation that does not apply.

Example: to omit /TEL), the result would be TELCO/FO/PLA.