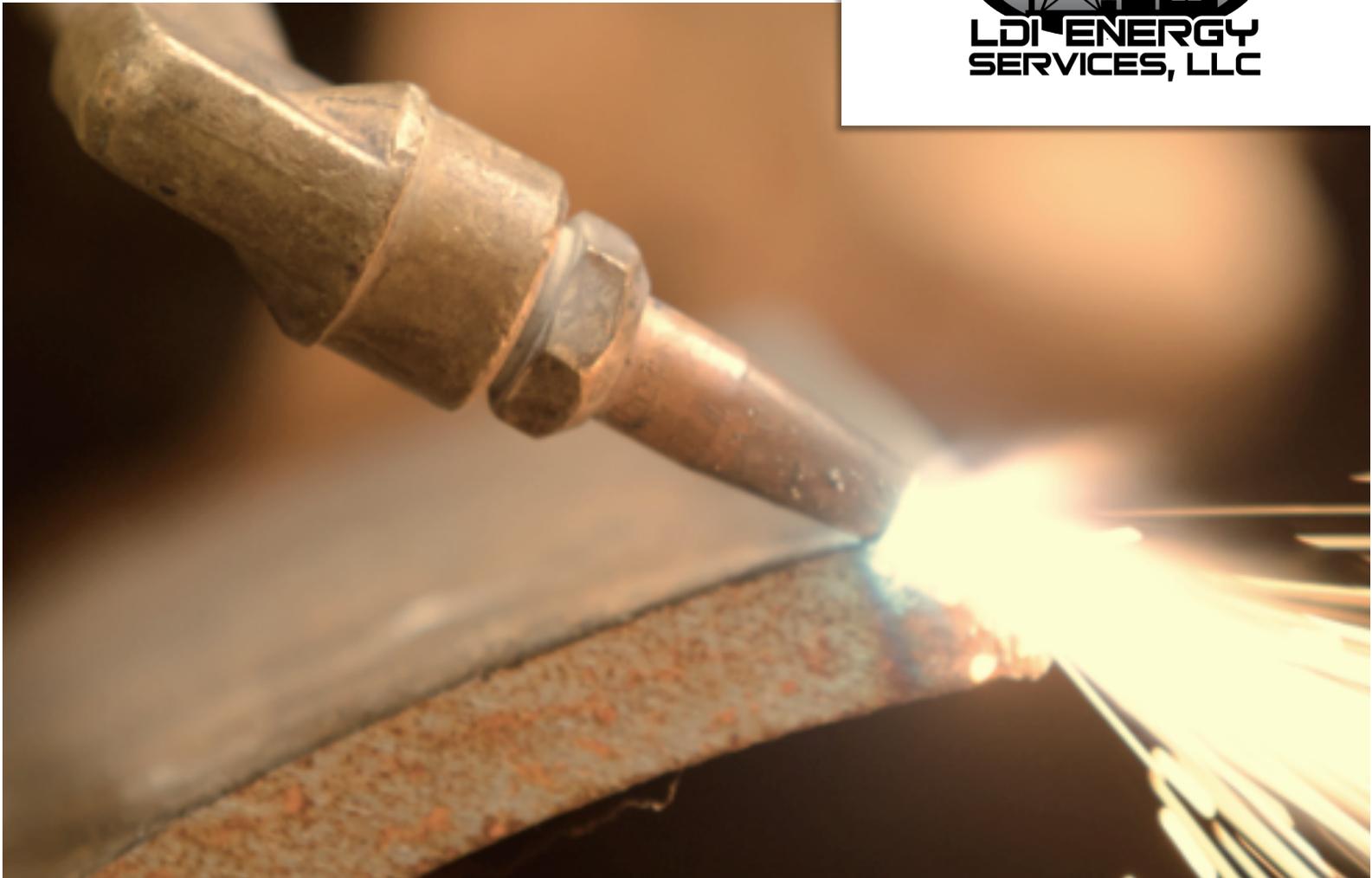


HEALTH & SAFETY MANUAL

Powered by Basin Safety Consulting
VERSION NO. 02 | REVISED JUNE 8, 2018





About Basin Safety Consulting:

Basin Safety Consulting began as a training firm, existing to educate employees, empower management, and safeguard company assets. Now we have expanded into safety coaching and program management—as well as a plethora of safety services—in order to do just that. We develop programs that are specific to your company, your industry, and the types of hazards your company experiences.

We strive to offer the highest-quality safety training and services, partnering with national organizations to offer the most cost-effective and integrated service possible.

President's Statement

Our company, LDI Energy Services LLC, is committed to providing employees with a safe and healthful workplace. Our management team will give top priority to—and provide the financial resources for—correcting unsafe conditions. Similarly, management will take disciplinary action against employees who willfully or repeatedly violate workplace safety rules.

The primary responsibility for the coordination, implementation, and maintenance of our workplace safety program has been assigned to:

Name: Lucas Dunlap

Title: President

Telephone: (307) 315-0770

Senior management will be actively involved with employees in establishing and maintaining an effective safety program. Our management team will participate with employees in ongoing safety and health program activities outlined in the *Safety & Health Policy Statement* on the following pages.

This policy statement serves to express LDI's commitment to the safety and health of our employees. This workplace safety program will be incorporated as the standard of practice for this organization.


Lucas Dunlap, President

Dec. 6, 2017

Date

Safety & Health Policy Statement

The Occupational Safety and Health Act of 1970 clearly defines the requirements for providing safe working conditions for all employees. With this in mind, the safety and health of our employees is the first consideration in operating this business. Prevention of occupationally induced injuries and illnesses is so important to us that it takes precedence over productivity when necessary. Production is never so urgent that we cannot take the time to do our work safely.

It is LDI Energy Services LLC's intent to follow all local, state, and federal regulations. To do this, we need to constantly be on the lookout for conditions that could cause injuries. It requires cooperation in all safety and health matters—not only between supervisors and employees, but between each employee and their co-workers. Without question, it is every employee's responsibility at all levels. Only through cooperation can a safety and health program be successful.

No employee is required to work at a job they know is not safe or healthful. Your cooperation in detecting hazards—and, in turn, controlling them—is a condition of your employment. Inform your supervisor immediately of any dangerous situation beyond your ability or authority to correct.

Our objective is to reduce the number of injuries and illnesses to an absolute minimum while operating a profitable business. We do not merely aim for our safety program to *keep up* with the best operations in our field, but to *surpass* them. Risks of injury, damage to assets, and harm to the environment are all present in our line of work and need to be managed well. The benefits of meeting this goal? Zero injuries, fatalities, and illnesses; no damaged property or equipment; no OSHA fines; and reduced workers' compensation costs and operating costs.

When work is done on a non-LDI-operated site, the operator's program takes precedence over this one. However, this document covers LDI employees, contractors, and consultants, and it will be used on owned premises or when an operator's program doesn't exist or is less stringent.

The basics of our program come down to this:

- **Providing safeguards**—mechanical and physical—to the maximum extent possible.
- **Conducting inspections** to find and eliminate unsafe conditions or practices, to control health hazards, and to fully comply with OSHA standards for every job.
- **Training all employees** in good safety and health practices.
- **Providing necessary personal protective equipment** and instructions for proper use and care.

- **Developing and enforcing safety and health rules** and requiring that employees cooperate with these rules as a condition of employment.
- **Investigating every accident** promptly and thoroughly to find out what caused it, and correct the problem so it will not happen again. We recognize that responsibilities for occupational safety & health are shared:

Who is responsible for what?

Our safety culture begins at the top and cascades down through the entire organization.

Corporate & field safety staff

Corporate and field safety staff will assist all levels of management in the implementation, training, and day-to-day activities of the safety program, including:

- Introducing the safety program to new employees
- Emphasizing to employees that accidents create unnecessary personal and financial losses
- Helping personnel in the execution of standard policies
- Documenting and following up about concerns mentioned at safety meetings
- Conducting safety inspections
- Addressing all hazards or potential hazards as needed
- Preparing monthly accident reports and investigations
- Maintaining adequate stock of first aid supplies and other safety supplies
- Making sure there are enough qualified first aid-certified people on site
- Becoming familiar with OSHA regulations and local and state safety codes
- Holding each employee accountable for their results through a formal appraisal system and, where necessary, disciplinary procedures

Management

Management accepts responsibility for leadership of the safety and health program, for its effectiveness and improvement, and for providing the safeguards needed for safe work conditions. Management is also responsible for building, maintaining, and updating written policies and making sure employees are properly trained. They will appoint safety coordinators/chairmen as appropriate, set up safety goals, and establish and enforce disciplinary procedures for accountability.

Some specific responsibilities of management:

- Regularly emphasizing that accident and health hazard exposure prevention are not only moral responsibilities, but also a condition of employment
- Identifying operational oversights that could contribute to accidents which often result in injuries and property damage

- Participating in safety and health related activities, including routinely attending safety meetings, reviews of the facility, and correcting employee behavior that can result in accidents and injuries
- Spending time with each person hired explaining the safety policies and the hazards of his/her particular work
- Ensuring that initial orientation of new hires is properly carried out
- Never short-cutting safety for expediency or allowing workers to do so
- Enforcing safety rules consistently, in keeping with company discipline and enforcement procedures
- Conducting job site inspections and correcting noted safety violations

Supervisors

Supervisors are responsible for making sure all operations are performed with the utmost regard for the safety and health of all personnel—and for demonstrating safety leadership to employees through their own behaviors.

Employees

Employees are responsible for thoroughly understanding complying with all OSHA policies and LDI-specific policies. Disregarding these rules will be grounds for disciplinary action, including dismissal. Every employee must receive an orientation when hired in addition to:

- Reading, understanding, and following safety and health rules and procedures
- Signing policy acknowledgements
- Wearing personal protective equipment whenever required
- Wearing suitable work clothes as determined by the supervisor
- Performing all tasks safely as directed by their supervisor
- Reporting all injuries, no matter how small, to their supervisor immediately and seeking treatment quickly
- Knowing where first aid, firefighting equipment, and safety devices are kept
- Attending any and all required safety and health meetings
- Not performing potentially hazardous tasks or using any hazardous material until properly trained and following correct safety procedures
- **STOPPING AND ASKING QUESTIONS IF EVER IN DOUBT ABOUT THE SAFETY OF ANY OPERATION**

Environmental commitment

Protecting America's natural environment is a national concern. Our company shares that concern and is committed to minimizing the impact of its activities on the environment while managing also its operation economically and efficiently.

LDI's commitment will be integrated with corporate decisions and strategies based on our guiding principles.

A culture of safety

To demonstrate the company's commitment to support the employees in these responsibilities, the company will develop a communication system to encourage employees to inform the company about workplace hazards without fear of reprisal. We may set up a centrally located safety bulletin board where current information can be easily reviewed by employees and provide a safety suggestion box so that employees, anonymously if desired, can communicate their concerns to management.

Additionally, the company will schedule general employee meetings where safety is freely and openly discussed. Meetings will be announced to all employees and managers to achieve maximum attendance. The meetings will concentrate on occupational incident history at our work sites, potentially utilizing guest speakers or brief audio-visual materials.

Training

Training is another essential element of any injury and illness prevention plan. OSHA rules require each employer to train workers for any job or task they are assigned. Our plan includes training and instruction:

- For all employees when they are first hired
- For all new employees for each specific task
- For all employees given new job assignments for which training has not already been received
- Whenever new substances, processes, procedures, or equipment are introduced into the workplace and present a new hazard
- Whenever new personal protective equipment or different work practices are used on existing hazards
- Whenever the company is made aware of a new or previously unrecognized hazard
- For all supervisors to ensure they are familiar with the safety and health hazards to which employees under their immediate direction and control may be exposed

Program re-evaluation

Periodically, we will schedule re-evaluations to look at each critical component in our safety plan and determine what is working well and what would benefit from a change. All employees are encouraged to participate by letting the company know when they have concerns about the elements of this safety and health plan.

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SECTION 1

Abrasive Blasting

Purpose

- To **educate** LDI employees about the dangers of abrasive blasting and to outline some safe work practices for controlling these dangers.
- To **establish** training standards and PPE requirements for employees involved in abrasive blasting activity.

Scope

LDI policy allows only trained and authorized employees to use abrasive blasting equipment. This policy applies both to workers who use the equipment daily and to those who only use it occasionally, including supervisors.

The company draws many of the rules in this chapter from OSHA regulation 1926.57.

Dangers of sand blasting

Abrasive blasting (“sand blasting”) is commonly done using **silica sand**. Silica sand can create many hazards to employees:

PHYSICAL HAZARDS	CHEMICAL HAZARDS
Bouncing media	Fungal infections from inhaling silica dust
High noise levels	Silicosis (permanent scarring of the lungs) from inhaling silica dust
High pressure	Inhalation of lead/other paint pigments
Reduced visibility	
Heat stressed	

Symptoms of **silicosis**, an irreversible scarring of the lungs, include shortness of breath, fever, and bluish skin. It may be diagnosed as pulmonary edema, pneumonia, or tuberculosis. Silicosis can cause many types of health problems.

The 3 types of silicosis are:

- **Acute:** Very high exposures. Symptoms develop in a few weeks to years.

- **Accelerated:** Symptoms develop after high exposures in about 6 to 10 years.
- **Chronic:** Low exposures. Takes 10+ years to show symptoms.

Safe work practices

General

Protection must be provided to all personnel working in the vicinity of abrasive blasting operations. When possible, **use of silica sand will be restricted or eliminated**. Product substitution for the abrasive blasting media—e.g., using metal shot, glass beads, plastic pellets, carbon dioxide, walnut shells, etc. instead—will be looked into.

Containment structures, cabinets, and walls will be used when possible to protect other workers and the environment from blasting hazards. Cleanup will be done according to the appropriate site requirements.

Threshold limit values (TLVs)

During blasting operations, the pulverized and shattered materials form dust in the air. The toxicity of dust formed from materials shattered and pulverized during the blasting operation should be considered when evaluating health hazards beforehand.

Whenever hazardous substances like dusts, fumes, mists, vapors, or gases exist or are produced during work, their concentrations should not exceed the limits specified in "Threshold Limit Values of Airborne Contaminants - 1970" published by the American Conference of Governmental Industrial Hygienists. Employee exposure to airborne contaminants above threshold limit values (TLVs) is avoided by following the guidelines set in this chapter.

Warnings

Blast areas should be labelled with signs as needed or required. The instructions on these signs—like the ones to the right—should be followed by everyone on site.



Inspections

A **pre-startup inspection** should be done using air filtration panels with carbon monoxide (CO) alarms and temperature-regulating devices (Vortex or Vortemp).

Daily **operational inspections** take a look at the blasting system itself:

- Hoses should be inspected for damage and leakage.

- Blast cleaning nozzles should be equipped with an operating valve that must be held open manually or have a "deadman valve."
- A support should be provided to mount the nozzle on when not being used. The blast nozzle should be bonded and electrically grounded to stop the buildup of static charges.
- Ventilation systems, if available, should be tight and in good repair.
- Housekeeping should be good. Note that compressed air must not be used for cleaning unless the pressure is reduced to less than 30 psi (pounds per square inch).

Personal protective equipment (PPE)

Employees must use respiratory protection while blasting. Sand blast operators need to wear an approved airline respirator—usually type “CE” hood that has a hard hat system and a protective blouse. Heavy gloves and safety boots are also required, as is eye/face protection (assuming that the respirator design doesn’t already protect the eyes and face).

The breathing air system for the blasting hoods must meet the Compressed Gas Association’s requirements for Grade D breathing air or better. Air for abrasive blasting respirators must be free of harmful quantities of dust, mist, or noxious gases.

More information on PPE use, care, medical clearances, storage, and cleaning requirements can be found in the *Respiratory Protection* chapter of this manual.

Medical surveillance

For affected employees, medical monitoring should be done before job placement and at least every 3 years after job assignment. Based on the exposures and other risk factors, medical exams might need to be done more often.

The exams should include:

- Medical and occupational histories
- Chest X-ray
- Pulmonary function tests
- Annual evaluation for tuberculosis

If there are positive findings, the safety department will report the condition to the state health department and OSHA.

Training

Training is required on all abrasive blasting operations. Affected employees will be trained in:

- HAZCOM refresher on the hazards of silica, including silicosis

- Proper personal hygiene
 - Washing before eating, drinking, or smoking
 - Shower and clean clothes to change into before leaving the blasting area
- Air monitoring, conducted by AESI or another certified industrial hygiene consultant to gauge exposure levels
- Pre-startup inspection
- Operational inspection

SECTION 2

Aerial Lifts

Purpose

- To **outline** safe work practices for all LDI employees who use aerial lifts—including required equipment specifications, operator behaviors, and personal protective equipment (PPE).

Scope

This program applies to all LDI employees who use aerial lifts, extensible boom platforms, articulating boom platforms, vertical towers, or any combination of those devices.

The specs of aerial equipment may vary. Some equipment might be made of metal, wood, fiberglass-reinforced plastic (FRP), or other material; some may be powered and others manually operated. Regardless, equipment is considered an aerial lift if it can rotate about a substantially vertical axis.

General regulations

All aerial lifts should be used in compliance with OSHA 1926 Safety & Health Regulations for Construction, Subpart L.

Modifications to the equipment must not be made without written approval from the manufacturer (or an equivalent, like a nationally recognized testing lab). Changes made must be in line with all relevant provisions of ANSI A92.21969 and this chapter, and the modified equipment needs to be at least as safe as it was before modification.

Safe work practices

General

- Only authorized persons are allowed to operate the equipment.
- Boom and basket load limits should not be exceeded.

- Lift controls and equipment must be tested or inspected each day before use to make sure the controls are in safe working order. Before moving an aerial lift for travel, the boom should be inspected as well to make sure it's properly cradled and that outriggers are in stowed position.

Operator behaviors

- Employees should stand firmly on the floor and should not climb on the rails or the edge of the basket.
- Belting off to a neighboring pole, structure, or equipment while working from an aerial lift is not allowed.
- The brakes must be set and when outriggers are used, they should be positioned on pads or a solid surface.
- An aerial lift truck must not be moved when the boom is elevated in a working position with men in the basket, except for equipment that is specifically designed for this type of operation.
- Aerial lifts should not be driven over drain gratings, hole covers, or other surfaces that aren't designed to support the weight of the machine.
- When aerial lifts are traveling in congested areas, a flagman should direct the operation.
- When moving an aerial lift in reverse, equipment will have a working back-up alarm, or a spotter will be used when backing.
- Minimum clearance between electrical lines and any part of the equipment is at least 10 feet. If the aerial lift is insulated for the voltage involved—and if a qualified person performs the work—refer to OSHA 1910.333(c)(3)(ii)(C) Table S-5 for clearance distance.

Equipment specs

- Articulating boom and extensible boom platforms, primarily designed as personnel carriers, must have both platform (upper) and lower controls. Upper controls should be in or beside the platform within easy reach of the operator. Lower controls should provide for overriding the upper controls.
- Controls should be plainly labelled. Lower level controls must not be used except in emergency unless the employee in the lift has given permission.
- The insulated section of an aerial lift should not be altered in any way that would reduce its insulating ability.

Personal protective equipment (PPE)

- An approved fall restraint system must be worn while working from an aerial lift. The fall restraint system must be attached to the boom or basket—not a nearby pole or structure—for additional safety.
- Climbers must not be worn while performing work from an aerial lift.

- Body belts are not acceptable as part of a personal fall arrest system. The use of a body belt in a tethering system or in a restraint system is acceptable and is regulated under 1926.502(e).

Recordkeeping

Aerial lift training should be documented and kept on file. Documentation should include the date of training, the names of employees trained, and the name of the trainer.

SECTION 3

Assured Equipment Grounding Conductor Program

Purpose

- To **establish** that an assured equipment grounding program is in place.
- To **explain** the specifics of LDI's assured equipment grounding conductor program.

Availability

These guidelines will be made available at job sites to management and to any affected employees.

Scope

This program applies to all cord sets, receptacles (if not built into the building/structure), and equipment connected by cord and plug. LDI will not let employees use equipment that hasn't met the requirements below.

Defining “competent person”

LDI requires that a competent person is charge of the program.

OSHA defines a **competent person** as someone “who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.”

Basic rules

- **Cords and equipment are inspected daily before use.** This means taking a look at each cord set, attachment cap, plug/receptacle, and any equipment connected by cord and plug—the exceptions being cord sets/receptacles that are fixed and not exposed to damage. You're looking for external

defects (deformed or missing pins, insulation damage, etc.) and for signs of possible internal damage.

- **Defective electrical equipment is removed from service.** If equipment is found damaged, tag it “DO NOT USE” and put it away until it can be repaired and tested.

Testing guidelines

Types of testing performed

What to check for in tests performed on cord sets, receptacles, and cord-and-plug-connected equipment requiring grounding:

- **Continuity** – All equipment-grounding conductors (EGC) need to be electrically continuous.
- **Attachment** – Each receptacle and attachment cap/plug should be tested for correct attachment of the EGC. The EGC should be connected to its proper terminal.

When testing is done

- Before first use;
- Before equipment is returned to service after being repaired;
- Before equipment is used after any incident that can be reasonably *suspected* to have caused damage; and
- At least every 3 months. This doesn’t apply to cord sets and receptacles that are fixed and not exposed to damage; those should be tested at least every 6 months.

How tests are recorded

These tests should always be recorded. Label each receptacle, cord set, and cord-and-plug-connected equipment that’s tested, using this color-coding system to show when the test took place:

COLOR CODE QUARTERLY TAPE CHART		
1st Quarter	December – February	WHITE (color of snow)
2nd Quarter	March – May	GREEN (color of spring)
3rd Quarter	June – August	RED (hot weather)
4th Quarter	September – November	ORANGE (color of fall)
Repair on Incident color code		BLACK

Summary

In short, the assured equipment grounding program has 3 main parts:

- Inspect
- Test
- Color code

Make sure all electrical equipment has been tested and color-coded before use.

SECTION 4

Benzene Awareness

Purpose

- To **educate** employees about the health effects of benzene exposure, as well as possible locations where employees may be exposed to benzene during their job functions.
- To **establish** safe work practices for when working in benzene environments.

Scope

This program applies to all LDI employees and contractors who come into contact with benzene on the job. The benzene control program is written and implemented to comply with OSHA regulation 29 CFR 1910.1028 (benzene).

Possible locations where employees may be exposed to benzene during their job functions: petroleum refining sites, tank gauging (tanks at producing, pipeline, and refining operations), and field maintenance operations.

Definitions

Action level: An OSHA standard for the maximum acceptable amount of exposure to potential dangers (not just benzene levels but also levels of noise, chemicals, and so on). The action level of benzene is an airborne concentration of 0.5 ppm calculated as an 8-hour time-weighted average.

Benzene: A toxic, colorless liquid or gaseous material.

Company responsibilities

Employees

- Know where benzene is used at LDI.
- Comply with the medical surveillance program and attend examinations as required.
- Keep respiratory protection equipment in good working order and let the supervisor or safety representative know of any problems before working.

- Review safety data sheets (SDS) or talk with the supervisor to identify containers with benzene-containing material.
- Do not smoke in areas where benzene is present.
- Report exposures resulting in any symptoms immediately.

Supervisor

- Make sure employees have the right personal protective equipment (PPE) and are properly trained in its use and care.
- Make sure employees comply with the benzene control program.

Manager

- Make sure personnel are aware of work with potential benzene exposure.
- Make sure individuals responsible for monitoring areas of exposure are properly trained.
- Make sure personnel receive documented medical surveillance exams.
- Ensure that emergency exams are done if an overexposure or suspected overexposure occurs.

Upper management

- In coordination with the safety department, develop and implement project-/task-specific benzene control procedures before starting activities that may include exposure to benzene.
- Coordinate monitoring activities, making sure the monitoring equipment is in proper working order and, as necessary, modifying the benzene control procedures to reflect exposure monitoring data.
- Maintain the benzene control program, notify management of any regulatory changes, and ensure regulatory compliance.
- Coordinate training activities.
- Coordinate the medical surveillance program, including maintenance of medical records and administration of exams.
- Make sure fire extinguishers are always readily available where benzene is used or stored. Benzene liquid is highly flammable, and vapors may form explosive mixtures in air. Fire extinguishers must be readily available in areas where benzene is used or stored.

About benzene

Characteristics of benzene

- Toxic
- Colorless
- Aromatic odor
- Not soluble in water

- Flammable

Potential health effects of benzene

In the short term, benzene exposure can cause irritation of the eyes, nose, and skin; breathlessness; irritability; euphoria; headache; dizziness; and nausea. Long term, it may cause blood disorders like leukemia and anemia.

Permissible exposure limits (PEL)

The **time-weighted average limit (TWA)** for benzene is:

- 8-hour TWA 1 ppm
- 12-hour TWA 0.67 ppm

The **short-term exposure limit (STEL)** for benzene is 5 ppm.

Safe work practices

Regulated areas

LDI will establish regulated areas wherever airborne concentration of benzene can reasonably be expected to exceed the PEL or STEL. The company will control access to these areas and limit access to authorized personnel.

Safety precautions such as prohibition of smoking in areas where benzene is used/stored will be taken. This signage should be posted in all regulated areas when the potential exists for benzene vapors to be greater than the PEL:

DANGER

**BENZENE REGULATED AREA • CANCER CAUSING AGENT • FLAMMABLE
NO SMOKING • AUTHORIZED PERSONNEL ONLY • RESPIRATOR REQUIRED**

Exposure monitoring

Exposure monitoring will be performed for the 8-hour and 12-hour TWAs or for the 15-minute STEL exposure when:

- Regulated areas are established.
- An emergency occurs that could require a regulated area.
- A change in the production, process, control equipment, personnel, or work practices may result in new or additional exposure to benzene.
- Cleanup of a spill, leak repair, or rupture occurs.

IF MONITORING SHOWS...	THEN...
Employee exposure at or above the action level but at or below the TWA	LDI will repeat the monitoring for each employee at least every year
Employee exposure below the action level, as shown by at least 2 consecutive measurements taken at least 7 days apart	LDI may discontinue the monitoring

Direct reading detection instruments will be used where benzene vapors may be present in work areas not previously monitored.

Personal monitoring will be done using vapor monitoring badges following manufacturer requirements. All samples will be analyzed at an American Industrial Hygiene Association-certified laboratory (AIHA).

Personal protective equipment (PPE)

PPE will be selected based on its ability to prevent absorption, inhalation, and ingestion of benzene. It should reflect the needs of the employee based on work conditions, the amount and duration of exposure, and other known environmental factors.

The necessary PPE required includes eye and face protection, boots, gloves, sleeves, and aprons. The PPE must meet the requirements of 29 CFR 1910.133 and will be provided to the employees at no cost to them.

Respiratory protection

A respiratory protection program will be established to comply with 29 CFR 1910.134. Respiratory protection is required during:

- The time period needed to implement engineering controls or work practices
- Times when engineering and work practices aren't feasible
- Emergencies

Approved respirators will be chosen according to the airborne concentrations of benzene and other relevant conditions.

CONCENTRATION	RESPIRATORY PROTECTION REQUIRED
0-0.67 ppm	None
0.67-6.7 ppm	Half-mask respirator with OV cartridges
6.7-33 ppm	Full-face respirator with OV cartridges
Greater than 33 ppm	SCBA required

Medical surveillance

Baseline and annual medical exams will be provided to affected employees who:

- May be exposed to benzene at/above the action level 30+ days a year
- Who are or may be exposed to benzene at or above the PELs 10 or more days per year
- Who have been exposed to more than 10 ppm of benzene for 30 or more days in a year before their employment with LDI

Within 15 working days of the testing, employees will be notified about their results.

Site-specific plans

Project- and site-specific contingency and emergency procedures will be updated by a designee and made available to affected staff. Employees will be made aware of provisions of site-specific contingency/emergency plans before beginning work at a specific site.

SECTION 5

Bloodborne Pathogens

Purpose

- To **establish** that employees are provided training on bloodborne pathogens.
- To **explain** LDI's exposure control plan and give guidelines for minimizing occupational exposure to bodily fluids.

Availability

This exposure control plan is readily available to employees at the management office(s) of LDI. Access to a copy of it will be provided in a reasonable time, place, and manner.

The human resources department is responsible for keeping records of the plan, which can be requested by OSHA at any time for review.

Scope

LDI's exposure control plan is based on OSHA standard 29 CFR 1910.1030. It applies to all on-the-job exposure to **blood** and **other potentially infectious materials** (OPIM).

OPIM include human body fluids such as:

- Semen
- Vaginal secretions
- Saliva
- Cerebrospinal fluid¹
- Synovial fluid²
- Pleural fluid³
- Peritoneal fluid⁴
- Amniotic fluid⁵

Any body fluid visibly contaminated with blood—and any body fluids that can't be identified or told apart from another—are also considered OPIM.

Exposure control plan (ECP)

This exposure control plan (ECP) is designed to eliminate or minimize employee contact with blood and OPIM. Universal precautions are used for all materials possibly infections. And remember: **If you can't identify or differentiate body fluids, they are considered OPIM.**

Exposure determination

LDI has determined which employees are most likely to be exposed to blood or OPIM on the job. This *doesn't* factor in the use of personal protective equipment (PPE); i.e., employees are considered exposed even if they wear PPE.

All employees trained in first aid and CPR will be exposed to bloodborne pathogens and need to receive this training.

Workplace practices

The company's engineering and work practice controls will be used to minimize exposure. If there's still risk of exposure after using these controls, employees need to wear PPE.

To make sure engineering controls are effective, they should be examined and maintained or replaced regularly. LDI requires that:

- **Procedures are performed in a way** that minimizes splashing, spraying, splattering, and producing drops of blood or OPIM.

¹ A clear fluid found in the brain and spinal cord.

² A fluid with egg white consistency found in joints.

³ A fluid filling the tissue space around the lungs.

⁴ A fluid that lines most of the organs in the abdomen.

⁵ A clear, yellowish fluid that surrounds a fetus during pregnancy.

- **Soiled PPE is removed** as soon as possible.
- **All equipment and working surfaces are cleaned** after contact with blood or other infectious material.
- **Handwashing facilities** or antiseptic hand cleansers/towelettes are available at the work site.
- **Eating, drinking, smoking, applying cosmetics including lip balm, and handling contact lenses are prohibited** in exposed areas. Food and drink should not be kept in refrigerators, freezers, shelves, cabinets, or on counter tops/bench tops where blood or OPIM are present.
- Contaminated disposable waste or laundry is stored in leak-proof, labeled containers.
- **Hazards must be appropriately communicated to employees.** All bags and containers containing blood or OPIM should be **red** in color.

Handling regulated wastes

When handling regulated wastes (other than contaminated needles and sharps—see *Sharps* section), make sure the waste is:

- Put in containers that are closeable, built to contain all contents, and built to prevent fluid leaks during handling.
- Labeled or color-coded (red) and closed prior to removal to prevent spillage or protrusion of contents during handling.

Hand washing facilities

Hand washing facilities are available to all employees at risk of exposure. **Sinks** should be located near spots where exposure could occur. When soap-and-water hand washing facilities aren't available, either an **antiseptic cleanser and paper towels** or **antiseptic towelettes** are provided. Employees must then wash their hands with soap and water as soon as possible.

If an employee's skin or mucous membranes become contaminated with blood or OPIM, those areas should be washed or flushed with water as soon as possible.

Housekeeping

LDI requires that all equipment and working surfaces contaminated with blood/OPIM are cleaned before servicing or shipping. It's mandatory that:

- All contaminated work surfaces are decontaminated after an exposure.
- All bins, pails, cans, and other receptacles are inspected and decontaminated on a regular basis.
- Any broken glassware that may be contaminated is not picked up directly with your hands.

Laundry

Avoid handling laundry contaminated with blood or OPIM. Place this laundry in an appropriately marked bag (biohazard-labeled or color-coded red bag) at the place it was used.

Sharps

Employees may not bend, recap, remove, shear, or purposely break contaminated needles and other sharps. If a task requires that the contaminated needle be recapped/removed and there's no alternative, the employee should use a mechanical device or a one-hand technique. Other requirements:

- **Contaminated sharps must be discarded** as soon as possible in containers that are closable, puncture-resistant, leak-proof on all sides, and labeled or color-coded.
- **During use, containers for contaminated sharps should be easily accessible** and located as close as possible to the immediate area where sharps are expected to be used (e.g., first aid stations). The containers should be kept upright and replaced often so they don't get overfilled.
- When moving these containers from an area, they must be closed before removal or replacement to prevent leaks during handling, storage, transport, and shipping.
- **The containers must be placed in a secondary container if leakage of the primary container is possible.** The second container should be closable, built to contain all contents and prevent leakage during handling, storage, and transport. The second container should also be labeled or color-coded.
- **Reusable containers should not be opened, emptied, or cleaned manually** or in any other way that would expose employees to the risk of injury to the skin. Any employee within a given area will collect and sterilize the reusable sharps.

Personal protective equipment (PPE)

Personal protective equipment (PPE) is provided to employees at no cost to them and is chosen based on the anticipated exposure to blood and OPIM. PPE (e.g., gowns, gloves) is considered appropriate only if it can completely stop blood and OPIM from reaching the employee's clothing, skin, eyes, mouth, or other mucous membranes under normal conditions/timeframes of use.

LDI makes sure that the right sizes PPE are readily available at the work site. PPE should be used unless an employee has temporarily declined to use PPE under rare circumstances.

Employees must remove all garments penetrated by blood/OPIM immediately or as soon as possible. They must remove all PPE before leaving the work area—and

when PPE is removed, employees must place it in a designated container for disposal, storage, washing, or decontamination.

Gloves

Employees must wear gloves in these situations:

- When they expect hand contact with blood, OPIM, non-intact skin, and mucous membranes
- When performing vascular access⁶ procedures
- When handling or touching contaminated items or surfaces

Disposable gloves should not be washed for re-use. They should be replaced as soon as practical when they become contaminated, when they are torn/punctured, or when their ability to function as a barrier is compromised.

Utility gloves may be washed and decontaminated for re-use if the integrity of the glove hasn't been compromised. Utility gloves should be discarded if cracked, peeling, torn, punctured, or deteriorated in another way that affects their ability to work as a barrier.

Training

LDI employees are trained by the owner or designee. All exposed employees are trained. All employees covered by the bloodborne pathogens standard are trained at both the time of initial assignment to tasks with potential exposure and every year after that as a refresher.

Training is tailored to the education level and language level of the employee. It is offered during the normal work shift and at no cost to the employee. The training will be interactive and will cover the following:

- Ins and outs of the bloodborne pathogens standard
- Epidemiology/symptoms of bloodborne diseases
- How bloodborne pathogens are transmitted
- What the exposure control plan is and how to get a copy of it
- How to recognize tasks that might involve exposure
- How to reduce exposure—e.g., certain work practices—and the limitations of these methods
- The types, use, location, removal, handling, decontamination, and disposal of PPE, as well as how to select the right PPE
- The Hepatitis B vaccination's efficacy, safety, and method of administration
- How to respond and who to contact when there's an emergency involving blood or OPIM

⁶ The insertion of a catheter into a blood vessel for the purpose of drawing blood or delivering medical treatment.

- What measures to take after an exposure incident happens, including how to report it
- What evaluations and follow-ups are required after an incident

Additional training is given to employees when there are any changes in tasks/procedures that affect the employee's exposure.

Employees who have received training on bloodborne pathogens in the 12 months preceding the effective date of this particular ECP will only receive training in provisions of the plan that were not originally covered.

Hepatitis B vaccination program

The Hepatitis B vaccine is provided to all employees with occupational exposure to bloodborne pathogens. In addition to the vaccine, LDI offers post-exposure follow-up to employees who have had an exposure incident.

These evaluations and procedures are made available at no cost to the employee and at a reasonable time and place. They are to be performed by/under the supervision of a licensed physician or another licensed healthcare professional and provided according to the recommendations of the U.S. Public Health Service.

All lab work is conducted by an accredited laboratory at no cost to the employee. The Hepatitis B vaccination is made available:

- After employees have been trained in occupational exposure (see *Information & training* section)
- Within 10 working days of initial assignment
- To all employees who have occupational exposure, unless one of three things is true:
 - The employee has previously received the complete Hepatitis B vaccination series.
 - Antibody testing has revealed that the employee is immune.
 - The vaccine is contraindicated for medical reasons.

Participation in a pre-screening program is not a prerequisite for receiving the Hepatitis B vaccination.

All employees who decline the Hepatitis B vaccination must sign the OSHA-required waiver indicating their refusal. If an employee initially declines the vaccination but, at a later date while still covered under the standard, decides to accept the vaccination, it will be made available. If a routine booster dose of Hepatitis B vaccine is recommended by the U.S. Public Health Service at a future date, such booster doses will be made available as well.

Recordkeeping

Training records

Each employee's training records must be kept for 3 years or more from the training date. The records should include:

- Date(s) of the training session(s)
- An outline describing the material presented
- The names/qualifications of those conducting the training
- The names/job titles of all people attending the training

When employees first join the company—and at least every year after that—they should be reminded that these records exist and be told who they can talk to if they want to access them.

Medical records

Medical records will be maintained according to OSHA Standard 29 CFR 1910.20. An **employee medical record** is a record maintained by a physician, nurse/healthcare personnel, or technician about the health status of the employee.

LDI provides exposure records for biological monitoring, with results assessing the absorption of toxic substances/harmful agents by the body (e.g., the level of a chemical in the blood, urine, breath, hair, fingernails, etc.). However, results don't assess the biological *effect* of those substances, nor are they used to monitor drug/alcohol use.

Medical records must be kept for the duration of employment plus 30 years, and they must be kept confidential. Records should include:

- The name and social security number of the employee
- A copy of the employee's HBV vaccination status, including dates of vaccination
- A copy of all examination results, medical testing, and follow-up procedures
- A copy of the information given to the healthcare professional, including a description of the employee's duties as they relate to the incident and the details of the exposure

Availability

All employee records are available to the employee at no cost, in keeping with 29 CFR 1910.20. All employee records will also be made available upon request to OSHA's assistant secretary of labor and the director of the National Institute for Occupational Safety and Health (NIOSH). Releasing medical records requires written consent from the employee.

If an employee requests access to records and the company can't provide it within 15 business days, LDI will let the employee know why there is a delay and when the records will be made available.

Whenever access is requested to an analysis that gives the contents of employee medical records by either direct identifiers (name, address, social security number, payroll number, etc.) or by information that could reasonably be used to identify specific employees (age, height, weight, race, sex, date of initial employment, job title, etc.), personal identifiers will be removed before access is granted.

Transfer of records

If LDI closes and there isn't a successor employer to keep the records for the prescribed periods (3 years for training records and 30 years for medical), the director of the NIOSH will be contacted for the transfer of these records.

Evaluation & review

This bloodborne pathogens program and its effectiveness is reviewed every year and updated as needed. All provisions required by this standard will be implemented by the owner or designee.

SECTION 6

Confined Space

Purpose

- To **define** confined spaces.
- To **outline** a system for safely entering, working in, and exiting confined spaces.

Scope

This program applies to all LDI employees and subcontractors who work in confined spaces, whether on a client location or a company-owned one.

Definitions

Acceptable entry conditions: The conditions that must exist in a permit space to allow entry and ensure that employees involved with a permit-required confined space can safely enter into and work in the space.

Attendant: A person stationed outside a permit space who monitors entrants.

Authorized entrant: An employee authorized by the employer to enter a permit space.

Blanking or blinding: The absolute closure of a pipe, line, or duct by the fastening of a solid plate (like a spectacle blind or a skillet blind) that completely covers the bore and is able to withstand the maximum pressure of the pipe/line/duct with no leakage.

Confined space: A space that:

- Is large enough that employees can bodily enter and perform assigned work
- Has limited or restricted means of entry or exit (e.g., tanks, vessels, silos, storage bins, hoppers, vaults, and pits)
- Is not designed for continuous human occupancy

Double block and bleed: The closure of a line, duct, or pipe by closing and locking 2 in-line valves and by opening and locking a drain/vent valve in the line between the 2 closed valves.

Emergency: Any situation or event inside or outside the space that could harm entrants—including any failure of hazard control or monitoring equipment.

Engulfment: The surrounding of a person by a liquid or finely divided (flowable) solid substance that can be breathed in to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

Entry: Passing through an opening into a confined space. “Entry” includes ensuing work that takes place in the space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Entry permit: The written or printed document provided by the employer to allow and control entry into a permit space. Permits verify that all hazardous conditions have been eliminated or mitigated before entry.

Entry supervisor: The person (e.g., the employer, supervisor, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned.

Hazardous atmosphere: An atmosphere that could expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness from:

- Flammable gas, vapor, or mist over 10% of its **lower flammable limit (LFL)**
- Airborne combustible dust at a concentration that meets or exceeds its LFL
- Oxygen concentration in the air below 19.5% or above 23.5%
- A concentration of any substance in the atmosphere for which a dose or a permissible limit (PEL) is published in CFR 29’s Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances
- Any other atmospheric condition immediately dangerous to life or health (IDLH)

Hot work permit: Written authorization to perform work or activity capable of providing a source of ignition (e.g., riveting, welding, cutting, burning, and heating).

Immediately dangerous to life or health (IDLH): The code of federal regulations defines an IDLH condition as one that “poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual’s ability to escape unaided from a permit space.”⁷

Inerting: The displacement of the atmosphere in a permit space by a noncombustible gas (e.g., nitrogen) so that the resulting atmosphere becomes

⁷ Some materials like hydrogen fluoride gas and cadmium vapor may produce immediate short-term effects that, even if severe, may pass without medical attention but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. The victim “feels normal” from recovery short-term effects until collapse. These materials are still considered IDLH.

noncombustible. Note that doing this creates an IDLH oxygen-deficient atmosphere.

Isolation: The process by which a permit space is removed from service and completely protected against the release of energy/material into the space (e.g., by blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout of all sources of energy; or blocking or disconnecting all mechanical linkages).

Line breaking: The intentional opening of a pipe, line, or duct that is or has carried flammable, corrosive, or toxic material, an inert gas, or any fluid capable of causing injury because of its volume, pressure, or temperature.

Non-permit confined space: A confined space that doesn't have the potential to contain IDLH hazards.

Oxygen-deficient atmosphere: An atmosphere made of less than 19.5% oxygen.

Oxygen-enriched atmosphere: An atmosphere made of more than 23.5% oxygen.

Permit-required confined space (PRCS): A confined space with one or more of these traits:

- Contains or has a potential to contain a hazardous atmosphere
- Contains a material that could potentially engulf an entrant
- Has an internal layout that could trap or asphyxiate an entrant by inwardly converging
- Contains any other recognized serious safety or health hazard.

Prohibited condition: Any condition in a permit space that isn't allowed by the permit during the period when entry is authorized.

Rescue service: Personnel designated to rescue employees from confined spaces.

Retrieval system: The equipment (including a retrieval line, chest harness, full-body harness, and lifting device or anchor) used for non-entry rescue of personnel from permit spaces.

Testing: The process by which the hazards that may confront entrants of a permit space are identified and evaluated.

Confined space employee roles

This section outlines the duties of entrants, attendants, and entry supervisors. Please talk to your supervisor or manager if there's any confusion about your role.

All affected employees—whether entrants, attendants, or supervisors—are responsible for knowing the hazards that can be faced during entry, including information on the mode, signs/symptoms, and consequences of the exposure.

Note that an entry supervisor can also serve as an attendant or authorized entrant as long as that person is trained for the role they're filling. The duties of entry supervisor can be passed from one individual to another during work if needed.

CONFINED SPACE ROLES	
Authorized entrants	<ul style="list-style-type: none"> • Properly use equipment as required by this policy. • Communicate well with the attendant, enabling them to monitor the status and alert entrants if an evacuation is needed. Alert the attendant whenever: <ul style="list-style-type: none"> ○ You see any warning sign of exposure to a dangerous situation. ○ You detect a prohibited condition. • Exit from the permit space as quickly as possible whenever: <ul style="list-style-type: none"> ○ An order to evacuate is given by the attendant or entry supervisor. ○ You see any warning sign of exposure to a dangerous situation. ○ You detect a prohibited condition. ○ An evacuation alarm is activated.
Attendants	<ul style="list-style-type: none"> • Be aware of possible behavioral effects of hazard exposure in authorized entrants. • Keep an accurate count of authorized entrants in the permit space and make sure the means for identifying authorized entrants under the entry permit accurately does so. • Stay outside the permit space during operations until relieved by another attendant. • Communicate with entrants to monitor status and alert them if evacuation is needed. • Monitor activities inside and outside the space to make sure it's safe for entrants to stay in the space. Order immediate evacuation if: <ul style="list-style-type: none"> ○ You detect a prohibited condition. ○ You detect the behavioral effects of hazard exposure in an entrant. ○ You notice a situation outside the space that could endanger entrants. ○ If you cannot effectively perform all the duties required of you. • Summon rescue and other emergency services as soon as you determine that the entrants may need help to escape from permit space hazards. • Take these actions when an unauthorized person approaches/enters a permit space: <ul style="list-style-type: none"> ○ Warn the person that they need to stay away from the permit space. ○ Advise the person that they must exit immediately if they've already entered. ○ Inform the authorized entrants and the entry supervisor if unauthorized personnel have entered. • Perform non-entry rescues if specified by the specific PRCs procedure. • Perform no duties that could get in the way of their primary duty. • An attendant should never break the plane of an opening into the space with any part of their body.
Entry supervisors	<ul style="list-style-type: none"> • Before endorsing the permit and allowing work to begin, make sure—by checking that the appropriate entries have been made on the permit—that all tests specified by the permit have been conducted and that all procedures/equipment specified by the permit are in place. • Terminate the entry and cancel the permit as required by this policy. • Verify that rescue services are available and that the means for summoning them are operable; • Remove unauthorized individuals who enter or attempt to enter the permit space during entry operations; and • Determine, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operation performed within the space that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

Safe work practices

Identification & labeling of confined spaces

The supervisor should ensure that the entire site is evaluated and that all confined spaces are identified. Once a list of all confined spaces is put together, a review of each space will be conducted and a determination made about whether each space is a **permit-required confined space (PRCS)** or a **non-permit confined space**.⁸ Appendix A can help with this. The list of these spaces and their permit/non-permit statuses will be kept at the site.

All spaces will be labeled with signs telling workers whether or not the spaces are PRCS. All signs will be located as close to all confined space entry locations as practical. Preferably, the sign will be placed at the entrance itself.

PRCS non-entry option

Once spaces are identified and labeled, site management will make a decision about whether entry into PRCS by site personnel is necessary.

- If entry is necessary, skip to the next section, *PRCS entry*.
- If no entry is selected, the employer must:
 - Re-evaluate all non-permit-confined spaces when there are any changes in the use or configuration of these spaces that might increase the risk to the entrant. If necessary, reclassify it as a PRCS.
 - When management arranges to have contractors do work that involves permit space entry, the manager needs to make sure all requirements of the *Contractors in confined spaces* section are followed.

PRCS entry

Each site that has identified a permit-required confined space and is planning employee entry will develop a written entry plan for that space that includes:

- Location of space
- List of all hazards/potential hazards making the confined space a PRCS
- Specification of acceptable entry conditions
- Measure for proper isolation of the PRCS
- Procedures for purging, inerting, flushing, or ventilating the space
- Need for barriers for pedestrians, vehicles, etc. (barriers/barricades are used to prevent unauthorized entry into a confined space)

⁸ All confined spaces are considered PRCS until it's proven that they don't contain or—in the case of atmospheric hazards—doesn't have the potential to contain—any hazard capable of causing death or serious harm to the entrant.

- List of testing and monitoring equipment that can determine if the space is available for entry and safe throughout the period of entry
- List of ventilation equipment and procedures for use
- List of communications equipment needed for use between the authorized entrant(s) and attendant(s)
- List of personal protective equipment (PPE) that may be needed
- List of lighting equipment needed in the space
- List of equipment needed for safe ingress and egress (e.g., ladders)
- Procedure for summoning rescue and emergency services
- Other special needs or requirements for a safe PRCS entry

To protect personnel during PRCS entry, these steps must be followed in order:

1. Acquire and review the specific procedure for entry for the PRCS.
2. Complete an entry permit.
3. Perform all necessary lockout, blanking, blinding, ventilation, and other control measures.
4. Test conditions in the PRCS to see if acceptable conditions exist before entry is authorized. The company requires informing entrants of pre-entry atmospheric test results and continuous monitoring results. Entrants also need to participate in the permit review and signing. Ventilation must be used & testing must be conducted before entry and during work. Employees, or their representatives, are entitled to request additional monitoring at any time.
5. Provide at least one attendant outside the space, one entry supervisor, and one authorized entrant. (Entry supervisor can assume the dual role of entrant or attendant.) LDI requires that an attendant is stationed outside a confined space while it is occupied by workers. **There must be one attendant per confined space**; a single attendant monitoring multiple confined spaces is not allowed.
6. Verify that a means of communication to summon rescue is functional.
7. Perform entry, continually monitoring for hazards that might require evacuation. Re-evaluate the space if there's reason to believe hazards have changed.
8. Cancel and collect the permit to be maintained (see procedures for terminating and closing out a confined space permit in next section).
9. Return the space to an operable condition.
10. Once entry is done, review the operation for any future improvements, corrections, or revisions that may help make the next one be more effective.

Confined space entry permit

A confined space entry permit must be completed before entering a confined space. The entry supervisor identified on the permit should sign the entry permit to authorize entry. The completed permit will be maintained and posted at or near the entry portal so that entrants, attendants, and supervisors can review the permit at any time.

The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit.

The entry supervisor will terminate entry and cancel the permit when:

- The entry operation has been completed.
- A condition that isn't allowed under the permit arises in or near the space.
- The permit will be collected and kept for at least 2 years after the entry. Any problems encountered should be documented and attached to the permit when filed.

Contractors in confined spaces

The safety supervisor will handle the coordination of operations when multiple employers are working in the same confined space. The supervisor will make sure that:

- The contractor is aware that the work place contains PRCS and that permit space entry is allowed only through compliance with a PRCS program meeting the requirements of this program.
- The contractor is kept updated on the elements of the space—including the hazards identified and any known experiences with the space—that makes it a PRCS.
- The contractor is kept updated on precautions and procedures that the employer has implemented for the protection of its employees in or near permit spaces where contractors will be working.
- Entry operations are coordinated with the contractor when both the employer and contractor personnel will be working in or near permit spaces.
- The contractor is debriefed at the end of the entry operations.

Rescue & emergency services

The supervisor will be responsible for notifying the hiring client of any entry of LDI employees into client-owned confined spaces as defined in this program.

Who will provide rescue services in the event of a confined space emergency? The company does not maintain an in-house confined space rescue service. The employer will rely on the services of outside municipal rescue and fire departments.

Each site that engages in PRCs entry must:

- Set up an agreement with the rescue service to provide rescue to the site in the event of an emergency.
- Let the rescue service know about the potential needs in the site as well as:
 - Types of confined spaces
 - Hazards associated with the spaces
 - Special conditions
 - PPE that may be necessary
 - Blue prints and drawings of the site or special operations (if requested or needed)
 - Other unique information on the site or confined space
 - Safety data sheets on any chemicals rescue workers may be exposed to
- The site must provide access to all the PRCs from which rescue may be needed so that the service can develop rescue plans and practice rescue.
- To facilitate non-entry rescue, retrieval systems or methods should be utilized whenever an authorized entrant enters a PRCs (unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant). Details:
 - A full body harness with a retrieval line should be attached to the center of the entrant's back.
Note: When entry without a retrieval line is elected, a full body harness must still be worn by the entrant.
 - The retrieval line must be attached to a mechanical device or a fixed point outside the permit space so that non-entry rescue can begin as soon as the attendant becomes aware that it's necessary.
 - A mechanical retrieval device must be used to retrieve personnel from vertical-type spaces deeper than 5 feet.
- Rescue services must be on site when conditions immediately dangerous to life and health (IDLH) exist within an occupied confined space.

Training

All affected employees are provided confined space training. This training should take place before employees are first assigned to confined space duties, whenever there's a change in permit space operations that introduces a new hazard, and whenever employees demonstrate that they don't fully understand the PRCs policy.

Training is documented and certified with each employee's name, the name of their trainer, and the date(s) of the training. A copy of documentation will be kept on file.

Program review

The safety director and supervisors will conduct an annual review of the confined space entry program, using the canceled permits within 1 year after each entry and revising the program as needed.

Employers can do a single annual review covering all entries performed during a 12-month period. If no entry is performed during a 12-month period, no review is needed.

Additional reading

- 29 CFR 1910.146 – "Permit Required Confined Spaces"
- 29 CFRL 1926 – "Hazard Communication"

Appendix A – Assistance with Identifying Confined Spaces

This supplement to the policy is only intended as a guide for identifying confined spaces at the employer’s customer locations. If you need help identifying confined spaces at your location, contact the supervisor.

Confined space is defined as an area that:

1. Has adequate size and configuration for human entry;
2. Has limited means of access or egress; and
3. Is not designed for continuous human occupancy.

Examples of confined spaces:

- Boilers
- Degreasers
- Furnaces
- Pipelines
- Pumping stations
- Reaction or process vessels
- Septic tanks
- Sewers
- Utility vaults
- Vats
- Manholes

The standard defines a **permit-required confined space (PRCS)** as a confined space with one or more of these characteristics:

- Has the potential to contain a hazardous atmosphere
- Contains a material with the potential to engulf an entrant
- Has an internal configuration that could leave the entrant trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section
- Contains any other serious safety or health hazard

Some examples of permit-required confined spaces:

- Sanitary sewer pits
- Bulk tanks
- Lift stations

Appendix B – Procedures for Atmospheric Testing

Atmospheric testing is required for two distinct purposes: **evaluation** of the hazards in the permit space and **verification** that acceptable entry conditions exist.

1. **Evaluation testing.** The atmosphere of a confined space should be analyzed using equipment sensitive and specific enough to identify any hazardous atmospheres that may exist or arise so that right permit entry procedures can be developed. Evaluation and interpretation of these data—as well as development of the entry procedure—should be done by, or reviewed by, a competent person based on evaluation of all serious hazards.
2. **Verification testing.** The atmosphere of a permit space that may contain a hazardous atmosphere should be tested for residues of all contaminants identified by evaluation testing using permit specified equipment to determine that residual concentrations at the time of testing and entry are within the range of acceptable entry conditions. Results of testing (e.g., actual concentration, etc.) should be recorded on the permit in the space provided adjacent to the stipulated acceptable entry condition.
3. **Duration of testing.** Measurement of values for each atmospheric parameter should be made for at least the minimum response time of the test instrument specified by the manufacturer.
4. **Testing stratified atmospheres.** When monitoring for entries involving a descent into atmospheres that may be stratified, the atmospheric envelope should be tested a distance of approximately 4 feet (1.22 m) in the direction of travel and to each side. If a sampling probe is used, the entrant's rate of progress should be slowed to accommodate the sampling speed and detector response.
5. **Order of testing.** A test for oxygen is done first because most combustible gas meters are oxygen-dependent and will not give reliable readings in an oxygen-deficient atmosphere. Combustible gases are tested for next because the threat of fire or explosion is both more immediate and more life-threatening, in most cases, than exposure to toxic gases and vapors. If tests for toxic gases and vapors are necessary, they are performed last.
 - First: Oxygen (O₂)
 - Second: Combustible gases (LEL / methane / pentane, etc.)
 - Third: Toxic gases (H₂S, SO₂, etc.)

SECTION 7

Disciplinary Program

Purpose

- To **define** safety violations.
- To **explain** LDI’s disciplinary procedures as they relate to health, safety, and environmental policies.

Scope

This program applies to all employees working for LDI. Different procedures may be followed for different types of employees; e.g., disciplinary action may look different for workers than it does for supervisors.

Enforcement

Managers and supervisors are responsible for enforcement of the disciplinary program. The management team—as well as supervisors, subcontractors, and consultants—should teach safe work practices to all employees under them and vigorously enforce the company’s safety program. Supervisors should take immediate corrective action to eliminate hazardous conditions and practices to prevent accidents, personal injury, and property damage. They should not allow workplace safety to be compromised for any reason.

LDI requires that **workplace inspections** are conducted to ensure employees are following safety rules and policies. If these physical inspections uncover safety violations, the designee will take disciplinary actions as explained in the *Corrective action* section on the next page.

Defining “safety violation”

Any of the following may be considered a safety violation:

- Not following verbal or written safety procedures, guidelines, or rules
- Failure to wear the proper personal protective equipment (PPE)
- Horse play
- Substance abuse

Corrective action

Below are the procedures to be followed after issuing a safety violation notice. You'll notice that different types of employees—workers, supervisors, subcontractors, and consultants—are subject to different types of action.

Depending on the seriousness of the situation, one or more of the steps below may be skipped. If more than 12 months have gone by since the last disciplinary action, the processes will normally start over.

Workers

After a worker's first violation, management will meet with them to talk about the infraction and let them know about the rule they violated. They'll get extra training as needed to stop the problem from happening again. After the second violation, employees will be required to take time off without pay. After the third violation, the affected employee will be immediately fired.

Supervisors

After a supervisor's first violation, management will meet with them to talk about the infraction and let them know about the rule they violated. They'll get extra training as needed to stop the problem from happening again. After the second violation, they'll get a written warning. The written warning will include next steps to take if future violations happen, and it should be documented and entered into the affected employee's file. After the third violation, the affected employee may be dismissed.

Subcontractors & consultants

After a subcontractor's or consultant's first violation, they'll get a written warning. After the second violation, they'll be removed from the job site.

SECTION 8

Electrical Safety Awareness

Purpose

- To **establish** that all employees are provided electrical awareness training.
- To **educate** LDI employees about electrical equipment, emphasizing safe work practices to use when working on or near exposed energized parts.

Availability

Employees can get copies of the electrical safety plan from the company upon request.

Scope

This program applies to all work operations where LDI employees may be exposed to live electrical parts or electrical parts that have been de-energized. The electrical safety plan is evaluated and updated every year to make sure it's effective.

Hazard analysis report

Supervisors or an onsite safety representative will run a **hazard analysis** of the workplace. This analysis will help LDI identify:

- Which departments have equipment using electricity
- What types of wiring installations are present
- Which employee functions must be covered by the electrical safety program

The departments/areas of the workplace shown to have electrically operated equipment or wiring installations are reviewed for each project.

Defining “qualified person”

At LDI, all employees working on or near energized or de-energized electric sources have received the appropriate training and certification to work safely with electricity and are thus considered **qualified**. In addition to the basic training

elements, qualified employees are trained to identify exposed live parts, determine nominal voltages, and determine clearance distances/corresponding voltages.

Electrical work may only be performed by qualified persons.

Safe work practices

Certain safe work practices should be used to prevent electric shock and other injuries resulting from either direct or indirect electrical contacts. Some of these practices are explained here in the separate subsections below.

In general, **electrically operated equipment must be de-energized before work can be done on it.** Conductors and parts of electrical equipment that have been de-energized but have not been locked or tagged out should be treated as live parts. Treating exposed de-energized parts as live when working on or around the equipment is a mandatory safety rule at LDI.

Conductive apparel

LDI requires that **conductive apparel should not be worn** unless it's rendered non-conductive by covering, wrapping, or other insulating means. Examples of conductive apparel:

- Watch bands
- Bracelets
- Rings
- Key chains
- Necklaces
- Metalized aprons
- Cloth with conductive thread
- Metal headgear

Conductive materials & equipment

Conductive materials and equipment that touch any part of an employee's body should be handled in a way that prevents them from touching exposed energized conductors or circuit parts. If an employee must handle long dimensional conductive objects (like ducts and pipes) in areas with exposed live parts, LDI will put work practices in place—e.g., the use of insulation, guarding, and material handling techniques—to minimize the hazard.

Portable ladders

Portable ladders should have **non-conductive side rails** if used where the employee or the ladder could contact exposed energized parts.

Confined or enclosed work spaces

When employees work in confined or enclosed spaces—e.g., a manhole or vault—containing exposed energized parts, **insulating shields/barriers** are used where necessary to avoid accidental contact.

Doors, hinged panels, etc. should be secured to keep them from swinging into employees and causing them to touch the exposed parts.

Equipment grounding conductor program

The **equipment grounding conductor program** outlines a series of tests to perform on cord sets, receptacles, and equipment connected by cord and plug to make sure everything is in working order. Find a detailed version of the program in the *Assured Equipment Grounding* chapter; this is only a summary.

All relevant equipment should be inspected for external defects every day. It should be tested for continuity issues and attachment issues before use as well—and if defects are found in the equipment, it should be tagged and serviced.

Illumination

Employees should not enter spaces with exposed energized parts without **illumination** to help them do their work safely. Where lack of illumination or another kind of visual obstruction makes it hard for them to see their work, employees should not perform tasks near exposed energized parts.

Employees may not reach blindly into areas that might contain energized parts. LDI requires proper illumination before employees are permitted to enter work areas containing exposed energized parts.

Lockout/tagout program

LDI's policy is that that circuits and equipment must be disconnected from all electric energy sources before work on them begins. Lockout and tagging devices are used to prevent accidental re-energization of the equipment. These **lockout/tagout procedures** are the main component of our electrical safety

program as found in the company’s *Lockout/Tagout* chapter. Lockout/tagout is used before performing electrical work.

Working near overhead lines

If work needs to be performed near overhead lines, the lines should be de-energized and grounded—or other protective measures should be provided—before the work starts.

When an **unqualified person** is working in an elevated position near overhead lines, the person and the longest conductive object he/she may be touching should not come closer to any unguarded, energized line than these distances:

- For voltages to ground 50kv or below: 10 feet
- For voltages to ground over 50kv: 10 feet plus 4 inches for every additional 10 kv

When a **qualified employee** is working near overhead lines, the person may not bring any conductive object closer to unguarded, energized lines than the approach distances outlined in Table S5 of OSHA standard 1910.333(c)(3)(ii):

VOLTAGE RANGE (PHASE TO PHASE)	MINIMUM APPROACH DISTANCE
300V and less	Avoid contact
Over 300V, not over 750V	1 ft. 0 in. (30.5 cm)
Over 750V, not over 2kV	1 ft. 6 in. (46 cm)
Over 2kV, not over 15kV	2 ft. 0 in. (61 cm)
Over 15kV, not over 37kV	3 ft. 0 in. (91 cm)
Over 37kV, not over 87.5kV	3 ft. 6 in. (107 cm)
Over 87.5kV, not over 121kV	4 ft. 0 in. (122 cm)
121kV, not over 140kV	4 ft. 6 in. (137 cm)
Information from Table S5, OSHA 1910.333(c)(3)(ii)	

Vehicles

Vehicles and mechanical equipment must maintain a clearance distance of 10 feet or greater from energized overhead lines, and under no circumstances should it be less than that. If the voltage is greater than 50kv, the distance should increase 4 inches for every added 10kv.

Employees standing on the ground should not touch the vehicle/equipment while the equipment is under overhead lines unless keeping the appropriate clearance distance or using PPE rated for the voltage. If any vehicle/equipment able to elevate parts of its structure near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding may not stand at the grounding location whenever there's a possibility of overhead line contact. Additional precautions—like barricades or insulation—should be taken to protect employees from hazardous ground potentials (depending on earth resistivity and fault currents, which can form within the first few feet around the grounding point).

Training

LDI employees who face a risk of electric shock but who are not considered qualified must still be trained in basic electrical safety practices and clearance distances. The goal of this training is to make sure all employees understand the risks associated with electricity and can take the right steps to protect themselves and their coworkers.

The LDI electrical training program includes:

- Lockout/tagout of conductors and parts of electrical equipment
- Safe ways to de-energize circuits and equipment
- Verification that the equipment has been de-energized
- How to re-energize circuits or equipment
- Guidelines for working on or near exposed energized parts or overhead lines
- The assured equipment grounding conductor program

A record of the training should be kept, noting who was trained, the dates of training, and the signature of the person conducting the training.

When changes happen at LDI that involve electrical elements, we provide additional training to ensure the safety of all affected workers.

SECTION 9

Fall Protection

Purpose

- To **establish** that all employees are provided training on fall protection.
- To **minimize** the risks posed by working in elevated locations, helping LDI employees understand fall prevention and protection systems.

Scope

This program applies to all of LDI's facilities and operations. The height at which fall protection is required is **4 feet**; these guidelines are relevant at any elevated work location where an employees' feet are 4 or more feet above the floor or grade level.

Definitions

Anchorage: A secure point of attachment for lifelines, lanyards, or deceleration devices.

Body harness: Straps that can be secured around the employee to distribute the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders with means of attaching it to other components of a personal fall arrest system.

Deceleration device: Any mechanism—like a rope grab, shock-absorbing lanyard, or automatic self-retracting lifeline/lanyard—that dissipates a substantial amount of energy during a fall arrest or otherwise limits the energy imposed on an employee during fall arrest.

Free fall: The act of falling before a personal fall arrest system begins to apply force to arrest the fall.

Free fall distance: The vertical displacement of the fall arrest attachment point on the employee's body harness between onset of the fall and just before the system begins to apply force to arrest the fall.

Lanyard: A flexible line of rope, wire rope, or strap that generally has a connector at each end for connecting the body harness to a deceleration device, lifeline, or anchorage.

Personal fall arrest system: A system used to arrest an employee in a fall from a working level.

Self-retracting lifeline/lanyard: A deceleration device containing a drum wound line that can be slowly extracted from (or retracted onto) the drum under slight tension during normal employee movement—and which, after the beginning of a fall, automatically locks the drum and arrests the fall.

Safe work practices

General

If work must be done in places with fall hazards, employees should use proper fall prevention measures or a fall protection system.

Common examples of **fall prevention measures** include guardrails, scaffolds with proper guardrails, and platform ladders. These measures will be provided at job sites with free fall hazards.

Personal **fall protection equipment** includes proper anchorage, full-body harnesses, shock-absorbing lanyards, and self-retracting lifelines. Any employee whose feet are more than 4 feet above the floor or grade level should wear personal fall protection if other means of fall prevention can't be used—e.g., on roofs or platforms with unprotected sides/edges of floors.

Site-specific fall protection plan

All jobs should be evaluated to determine the need for fall prevention or protection systems. LDI requires that a **site-specific fall protection plan** is developed by a qualified person.⁹ The supervisor of the job and the employee performing the job are responsible for evaluating the site. When evaluating, they should consider:

- The height of the job
- Other hazards that may be present (e.g., electrical hazards, un-insulated piping, other trades working overhead)

All employees working at elevated heights should thoroughly inspect all components of the fall protection system before using it.

Regulatory thresholds

Regulatory thresholds decide when fall prevention/protection measures like guard rails, safety nets, or personal fall arrest systems should be used. Some applicable regulatory thresholds include:

⁹ OSHA defines a **qualified person** as someone who, “by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.”

- **General Industry 1910.23(b) – Protection for wall openings and holes:**
Every wall opening from which there's a drop of more than 4 feet should be guarded.
- **Construction Industry 1926.501(b)(1) – Unprotected sides and edges:**
Employees on walking/working surfaces with unprotected sides or edges that are 6 feet (1.8 meters) or more above a lower level should be protected by guardrail systems, safety net systems, or personal fall arrest systems.

LDI will follow either the 4-foot or 6-foot standard required by the operator whose location is being worked on. When the standard isn't specified, the company will follow industry-specific standards appropriate for the location, either General or Construction as explained above.

Signs

Fall protection signs reading "Danger: Fall Protection Required" will be permanently posted at fixed work locations requiring a fall protection system.

All **floor holes** will be covered and secured. These coverings should be capable of bearing at least twice the weight of the person and his/her equipment. The cover should be marked "hole" or "cover," and the words "Do Not Remove" should appear on it as well.

Equipment

Fall protection equipment should be worn by any employee who might be exposed to a free fall hazard. Examples:

- Full-body harnesses
- Shock-absorbing lanyards
- Self-retracting lifelines
- Anchoring devices
- Platforms with railings or cages

Note that body belts are not considered adequate fall protection, and should not be used.

When ascending or descending **ladders**, employees are not required to use fall protection equipment. However, employees are required to maintain at least 3 points of contact on the ladder at all times.

Fall protection equipment may not be modified without written approval from the manufacturer. LDI requires that fall protection equipment meets industry or regulatory standards, including any applicable ANSI, ASTM, or OSHA regulations.

Equipment storage & inspection

A clean, dry storage area should be set up specifically for fall protection equipment. Never store fall protective equipment near solvents, chemicals, oil, grease, etc.

Equipment will be inspected regularly and before each use, and any frayed or damaged equipment should be removed from service and replaced.

Safety monitoring systems

LDI will designate a competent person to monitor the safety of other employees. The safety monitor needs to meet these requirements:

- The monitor is competent to recognize fall hazards.
- The monitor will warn other employees when it seems like these employees are unaware of a fall hazard or are acting unsafely.
- The monitor will be on the same walking/working surface and within visual sighting distance of the employees being monitored;
- The monitor will be close enough to communicate orally with the employees they're monitoring.
- The monitor will not have other responsibilities that could take their attention away from monitoring.

Training

All employees who might be exposed to fall hazards should be trained in:

- Identifying free-fall hazards in a work area
- Using and operating all protection equipment
- Properly inspecting fall protection equipment
- Properly storing and caring for fall protection equipment

LDI requires that fall protection training is documented and kept in employee files.

Retraining is performed as necessary. Some examples of times retraining is needed:

- Deficiencies are found in an employee's training
- The location of work changes
- Fall protection systems or equipment are changed/updated

Incidents

LDI requires that all incidents involving a fall are investigated and that the fall protection program is revisited each time for potential improvements that could prevent similar incidents from happening again.

The company is committed to prompt rescue of employees in the event of a fall or will make sure that the employees are able to rescue themselves.

Additional reading

- 29CFR1926.500, 501, 502, 503 – “Fall Protection”
- STD-1-1.13 OSHA Instruction – “Fall Protection in General Industry”

SECTION 10

Fire Protection & Extinguishers

Purpose

- To **establish** that employees should be trained on how to prevent fire or smoke injuries in the event of a workplace fire.
- To **educate** staff on how to place, use, maintain, and test the portable fire extinguishers provided for LDI employees.

Extinguisher requirements

LDI will provide approved **portable fire extinguishers** and will mount and identify them so that they're readily accessible to employees. These extinguishers should always be in a fully charged/operable condition and kept in their designated places at all times except during use. The company will not provide extinguishers that use carbon tetrachloride or chlorobromomethane extinguishing agents.

Inspection, maintenance, & testing

LDI is responsible for the inspection, maintenance, and testing of all portable fire extinguishers in the workplace. This means that fire extinguishers are visually inspected monthly and subjected to an annual maintenance check.

The date of this annual check should be recorded, and the record should be kept for 1 year after the last entry or for the life of the shell, whichever is less. This record may be made available to the OSHA assistant secretary upon request.

Training

LDI requires that employees who may be required to use fire extinguishing equipment are provided training. The company has an educational program in place to get employees familiar with fire extinguishers and the hazards of incipient-stage firefighting.

This required education is given to employees when they're first hired. After that, re-training on use of fire extinguishing equipment is performed annually.

SECTION 11

First Aid Policy

Purpose

- To **establish** a first aid policy for LDI that creates a safe working environment.
- To **explain** the company's four-tiered approach to first aid, which hinges on identifying potential hazards before the work begins, leveraging the number of employees on each shift, making medical emergency resources available to all staff, and being aware of the site's proximity to medical facilities.

Scope

While the bulk of this safety manual puts emphasis on preventing accidents and injuries, this chapter focuses on responding to these incidents after they happen. Prompt and knowledgeable treatment of injured employees will, in many cases, prevent minor injuries from becoming major ones.

Emergency response plan

LDI will train personnel in basic first aid and bloodborne pathogens exposure so that someone is available to render first aid in response to medical incidents. The company requires that these first aid providers are certified by the American Red Cross (or equivalent). Only personnel trained in first aid should render first aid.

An **emergency response plan** should be created by a supervisor before work begins to make sure prompt medical care is available for emergencies. This plan should be communicated to all employees and visibly posted wherever first aid facilities/kits, eye wash stations, and other first aid equipment items are stocked. They should also be carried in employee, contractor, and company vehicles.

The plan should:

- List emergency phone numbers for LDI staff, the appropriate jurisdictional regulatory agencies, and medical service providers.
- Identify medical response procedures and designate a chain of command.
- Provide a map of the service area showing access routes, mileage, and worksites.

- Identify medevac contact numbers for emergency responders close to the company work location.

The supervisor should also make sure that:

- First aid requirements are determined (see *Application* section for more details) and first aid personnel, equipment, and transportation are adequate.
- Prior arrangements have been made with the providers of air evacuation services, and these air evacuation providers are aware of the specific work locations or designated transfer points.

LDI is responsible for making sure first aid services and supplies meet all applicable requirements, including county and state laws. The company will make sure supplies are kept in a clean, dry, and serviceable condition and are clearly labeled. Signs should be visibly posted so that everyone knows where first aid facilities, kits, eye wash stations, etc. are located.

The company will also make sure an emergency communication system is in place for employees to summon first aid services.

Application

An effective contingency plan provides the necessary resources and training to deal with any potential incident. All stakeholders should not only be fully aware of the plan, but must also be trained to respond emergencies.

When an injury happens, it's LDI's responsibility to provide first aid and promptly transport injured employees to the closest medical facility. If it's not possible for the company to handle transport, the company should have a communication system for contacting an ambulance or flight service.

The guidelines in this section apply to all company worksites except for those with site-specific guidelines.

General

- All field personnel should be certified in emergency first aid and cardio pulmonary resuscitation (CPR).
- All first aid administered should be recorded on a First Aid Report form.
- Administer first aid and keep the patient comfortable until help arrives or the patient is taken to a medical facility.

Standard regulations

The required **number of trained first aid responders** and related **equipment** on site is addressed before the job starts. and its contractors will have an appropriate number of their personnel trained in first aid. LDI will make sure that their staff's first aid training (e.g., basic life support or advanced life support) is facilitated through certified agencies like the American Red Cross. On state-regulated worksites, the

company and its contractors will meet or exceed OSHA's medical and first aid standard (29 CFR 1910.151).

First aid kits

The contents of each **first aid kit** will vary depending on the hazard level of the work, the site's distance to medical facilities, and the number of workers at the site. OSHA suggests that employers ask local emergency response departments for help deciding what supplies should be stocked at sites. LDI will periodically assess the needs of its worksites and adjust inventory to make sure the first aid kits are adequate for the job.

The company requires that first aid supplies are readily available and that kits are easily accessible at all work locations. Kits should contain items specific to the work environment. For remote locations, kits (including a burn kit) should be stored in operators' vehicles and reflect the fact that response by medical personnel could be delayed.

All kits are inspected periodically to ensure they are adequately stocked.

Eye wash stations

LDI requires that emergency **eye washing equipment** is readily available. Eye wash stations—which may be portable at remote locations—need to be available at any location where chemicals and other hazardous materials are handled, stored, or transported. Stations should be inspected monthly.

Eye wash stations and/or showers will be available for quick drenching or flushing of the eyes when any person may be exposed to injurious corrosive materials.

Transportation to a medical facility

When preparing for transportation to the nearest health care facility in the event of an incident, employers have two options: a **local ambulance service** (if it can arrive within 40 minutes) or an **employee-owned vehicle** that meets these requirements:

- Suits distance to be traveled
- Is safe and comfortable for the injured employee
- Is clean and able to accommodate a seriously injured worker so that additional injuries are prevented
- Offers protection from weather conditions
- Has enough heat to keep injured worker warm
- Have a means of communication
- Is large enough to accommodate a stretcher

These requirements are found in the Occupational Health & Safety Act Code, Part 11, Subsection 180(2).

In some situations, it might be necessary to transport the patient to the nearest medical facility by air. Whatever the case, the supervisor should contact the nearest medical facility and give information about the incident and the status of the patient.

Accompaniment

If a worker needs to be accompanied during transport, they should be accompanied by at least one first responder other than the driver.

Documentation

The following information about the incident and medical status of the patient(s) should be given to the designated medical provider:

- First responder's name and telephone number
- Exact location (coordinates or township and range) and a description of it
- Number and age(s) of patient(s) requiring transport
- Condition, type of injury, and the treatment that's been provided
- Type of transport requested and location of transfer point
- A list of any harmful substances related to the patient's injuries

Provide the safety data sheet (SDS) as well, if available.

Additional reading

- OSHA Best Practices Guide: Fundamentals of a Workplace First-Aid Program: <https://www.osha.gov/Publications/OSHA3317first-aid.pdf>

SECTION 12

Fit for Duty

Purpose

- To **ensure** that employees are physically capable of performing their job function and are not held back by drugs/alcohol or lack of training.

Training

LDI will make sure all employees are properly trained for their assigned tasks before they start working. Employees will receive specific training as identified in the competency program. Examples of training topics may include:

- Facility and equipment inspection
- Safe driving
- Forklift
- Benzene
- Fall protection
- EAP

Drug and alcohol testing

LDI maintains a drug-free workplace program. The company requires drug and alcohol screening for pre-employment, post-accident, return-to-duty, or random as prescribed by the host facility. **Employees must notify their supervisor when taking prescription or over-the-counter medication** that could impair their ability to work safely.

For more information, see LDI's DOT and non-DOT drug and alcohol policy.

Physical fitness

During the pre-employment process the STEPS test may be administered to determine potential employees are physically fit for duty pending the job's requirements. **Employees are responsible for notifying their supervisor if they are fatigued** to the point of not being able to perform their duties safely.

The company may periodically be monitoring employee activities and behaviors to determine if employees should be removed from the work site.

SECTION 13

Forklift & Industrial Trucks

Purpose

- To **establish** a training program for anyone involved with forklift operations.
- To **educate** LDI employees on how to safely use forklifts and powered industrial trucks.

Scope

This program applies to anyone at LDI who works in areas where forklifts and powered industrial trucks are used.

Safe work practices

Forklifts can be dangerous for both the operator and to other workers in the area. The hazards can range from minor to severe, even resulting in death. Some basic safety rules can help you avoid these dangers: **lawful riding, speed limits, unauthorized operations, proper signals, and load carrying capacity**. Most of the time, accidents happen because these rules aren't followed.

This section gives you other specific safety tips to keep in mind.

Inspecting

LDI requires that **forklifts are inspected daily**. If the forklift is used on a round-the-clock basis, it should be examined after each shift. If any problem is found, it must be promptly attended to. Never operate unsafe machinery, as you will put yourself and the lives of others at risk.

Moving

You should **continuously monitor the direction** the machine is heading in. When turning, stop and have a look, and move only when everything is clear. Never try to turn on ramps.

Give necessary signals, like sounding the horn when approaching an area where people are working. Extra precautions need to be taken when working on a ramp or congested area. Keep an eye on overhead clearance as well.

Most importantly, follow the speed limit.

Loading/unloading

The operator must verify trailer chocks, supports, and dock plates prior to loading/unloading. Never try to raise or lower the load when the machine is moving. When the forks are loaded, drive at the restricted speed.

Never exceed the **loading capacity** of the machine. The load on the fork should be properly balanced. When the forks are empty, make sure they're lowered and tilted back.

Personnel

The driver shouldn't carry riders unless the vehicle has a passenger seat. Allowing people to ride on the machine—especially on the forks—can lead to serious trouble.

Currently, forklifts may be used to lift personnel *only* if these guidelines are followed:

- A work platform equipped with standard guardrails—firmly secured to the lifting carriage or forks—must be used.
- The hydraulic system must be designed so that the lift mechanism will not drop faster than 135 feet per minute if any part of the system fails.
- An operator must attend the lift equipment while workers are on the platform.
- The operator must be in the normal operating position when raising or lowering the platform.
- When workers are on the platform, the vehicle must not go from point to point with the work platform elevated higher than 4 feet. When necessary, at heights greater than 4 feet, inching is permitted if it is done very slowly.
- The area between workers on the platform and the mast must be guarded to prevent contact with chains or other shear points.
- A safe and adequate access/egress must be provided for workers entering and exiting the platform.

Storage

When not in use, the machine should be properly turned off. The brakes should be set and the forks should be lowered completely.

Training

Forklifts may only be operated by trained, certified personnel. The certification process includes formal instruction—like lectures, discussion, or videos—as well as hands-on practical training and a workplace-specific operator evaluation.

Forklift training is provided by a qualified instructor, covering topics including

operating instructions, use of controls, capacity, and load stability. Certification documents should include the employee's name, training date, evaluation date, and trainer/evaluator name. Forklift operators are re-evaluated every 3 years, at minimum.

Mandatory refresher training will be given to operators when:

- Someone has observed them operating the vehicle in an unsafe manner.
- They have been involved in an accident or near-miss accident.
- They did not operator the truck safely during their re-evaluation.
- A new type of vehicle is introduced at the work site.

SECTION 14

Hand & Power Tool Safety

Purpose

- To **identify** the hand and power tools used by LDI.
- To **educate** employees on safe work practices to use when working with these tools.

Scope

These guidelines apply to all LDI employees working on any location or project.

Company responsibilities

Good tools and equipment help us work without strain and can replace jobs that hands alone can't do, keeping employees from getting hurt. LDI is committed to providing employees with the right hand/power tools for each job. If employees find that they need a specific tool to do their work well and that tool isn't available, they should contact their immediate supervisor.

Safe work practices

When used incorrectly, power tools are dangerous. Every year, thousands of injuries to the eye, head, and face happen because these tools are misused.

General rules to keep in mind:

- Never carry a tool by the cord or hose.
- Never yank the cord to disconnect a plug from the outlet.
- Keep cords away from heat, oil, and sharp edges.
- Disconnect tools when not in use, before servicing, and when changing blades, bits, or cutters.
- Do not disconnect the safety switches on tools. If the safety switch doesn't work, the tool should be taken out of service and tagged Do Not Use.
- Always point tools—e.g., power saws—away from walk ways and other employees.

- Keep observers a safe distance from the work area.
- Secure work with clamps or a vice so that both hands are free to operate the tool.
- Avoid accidental starts. Never carry a tool with a finger on the switch button while the tool is plugged in or connected to an air supply.
- Tools must be kept sharp and clean for proper performance. (See Tool upkeep section below.)
- Keep good footing and maintain good balance when using power tools.
- Always wear the proper clothing. Loose clothing, ties, jewelry, can get caught in moving parts.
- Long hair must be tied back.
- Employees may not use tools that are damaged or noncompliant. These tools should be taken out of service or marked using tags or locks.
- Always use the right tool for the job.

Tool upkeep

One important key to tool is good maintenance. LDI requires that all hand and/or power tools are maintained in a safe condition. **Defective tools must be removed from service and tagged Do Not Use.**

Personal protective equipment (PPE)

Personal protective equipment (PPE) for using hand and/or power tools is especially necessary if employees are exposed to either of these hazards:

- Hazards of objects that are falling, flying, abrasive, or splashing
- Harmful dust, fumes, mists, vapors, or gases

Make sure you're using the right kind of PPE to adequately protect yourself from the dangers of your specific work. PPE should always be kept in good condition.

Safety guards

Appropriate guarding must be in place when using power tools. Guards should be well-maintained and operable at all times when the tool is in use. The guard may not be manipulated in a way that compromises its integrity or ability to protect.

Guarding should meet the requirements of ANSI B15.1.

SECTION 15

Hazard Communication (HazCom) Program

Purpose

- To **establish** that LDI has a written Hazard Communication program and that employees are provided training/information on the hazardous chemicals they may be exposed to.
- To **reduce risk** of working with hazardous chemicals by teaching safe work practices.

Scope

This program applies to all employees. It's reasonable to expect that, in one form or another, everyone who works at LDI will come across chemicals and substances that could be dangerous if not handled carefully. In certain situations—like if a valve fails during operations on a “live line”—this will almost certainly be the case. This is why it's so important for employees to be trained in the **type of chemicals** they work with and in **safe work practices** to protect themselves, others, and the environment.

Definitions

Safety data sheet (SDS): A sheet with detailed information on a hazardous chemical, including its potential hazardous effects, its physical and chemical characteristics, and recommendations for appropriate protective measures. It also has instructions for safe handling, emergency first aid, and required personal protective equipment (PPE).

Hazard group: The Globally Harmonized System of Classification and Labeling of Chemicals divides hazards into three major hazard groups: health, physical, and environmental.

Class: Subsections of hazard groups. For example, “gases under pressure” is a class in the physical hazards group.

Category: Subsections of classes. For example, the “self-reactive chemicals” class has seven categories. Each category has specific criteria that determine which chemicals are assigned to it.

Health hazard: A chemical classified as posing one of these effects:

- Acute toxicity
- Skin corrosion or irritation
- Serious eye damage or eye irritation
- Respiratory or skin sensitization
- Germ cell mutagenicity
- Carcinogenicity
- Reproductive toxicity
- Specific target organ toxicity
- Aspiration hazard

These effects can range from **acute** (short-lived symptoms) to **chronic** (persistent symptoms).

Physical hazard: A chemical classified as one of the following:

- Explosive
- Flammable (gases, aerosols, liquids, or solids)
- Oxidizer (liquid, solid, or gas)
- Self-reactive
- Pyrophoric (liquid or solid)
- Self-heating
- Organic peroxide
- Corrosive to metal
- Gas under pressure
- Emits flammable gas when in contact with water

Safe work practices

General

LDI requires that:

- A HazCom plan is written and made available to employees.
- Containers of hazardous chemicals are labeled.
- And inventory/list of hazardous chemicals is maintained and reviewed every quarter.
- Safety data sheets (SDS) are obtained for all hazardous chemicals on site.
- Safety data sheets (SDS) are readily available to employees.
- Chemical information is provided to employees on multiple worksites or multiple employer worksites.
- Employees are given information and training on chemicals in their work areas when they're first assigned and whenever new hazards are introduced into their work area.

The company will conduct workplace inspections and site assessments periodically to make sure sites and employees are compliant.

Hazard assessments

This section outlines how employees are informed of the hazards of non-routine tasks. When employees are doing non-routine activities (e.g., cleaning of pipes), and the chemicals present aren't clearly labeled, a **hazard assessment** should be done before work starts. All hazardous chemicals—as determined in the hazard assessment—will be dealt with using the appropriate controls. This may require specialized personnel or equipment.

Hazard communication plan

All workplaces where employees are exposed to hazardous chemicals should have a written plan describing how that facility will implement the plan. The plan should list the chemicals present at the site and indicate where written materials will be made available to employees. It should describe site-specific actions for labels and other forms of warning, safety data sheets, and employee information/training.

Hazardous chemical inventory

Each location should keep an inventory of health hazards using the **Health Hazards Inventory form**. At a minimum, the inventory should include the produced fluids/hazardous materials listed in this chapter. It should also include an overview of how each hazard is controlled.

The inventory should:

- Determine the person responsible for identifying the controls for each material listed
- Be updated every 3 years
- Be available to employees at a specific location

Purchased chemicals that come with SDS information are not required to be included in the inventory.

Safety data sheets (SDS)

The company keeps **safety data sheets (SDS)** for each hazardous chemical used on site. (See the *Definitions* section of this chapter.) The SDS must be accessible to employees in the work area.

The site supervisor is should maintain an inventory (updated every year) of purchased chemicals used on site. The SDS is the primary source of hazard information for purchased chemicals. Purchased chemicals should come with an SDS and may not be used if the supplier neglected to include it.

An SDS should also be received before contractors bring hazardous materials/chemicals onto a LDI worksite.

Labels

Containers of hazardous chemicals (e.g., vessels, tanks, drums) should be labeled with the **name of the material** and **appropriate hazard warnings**. If the material is transferred from a labeled container to another container, this second container should be labeled unless the portable container exemption applies.

Purchased and shipped chemical containers should include the name and address of the manufacturer.

Chemical suppliers need to be transparent about their products. Suppliers are responsible for:

- Labeling hazardous materials supplied to the workplace
- Preparing and updating an SDS for each chemical sold, including the required 16 sections of information

Multiple work sites

If employees have to travel between work sites during their shifts, the written HazCom program should be kept at the primary job site. If there is no primary job site, then the program should be sent *with* the employees.

Training

Workers who might come into contact with hazardous materials should be trained in those materials. Training should include information about:

- The local health hazard inventory
- The labeling system
- Accessing and using SDSs
- Recognizing the presence or release of hazardous chemicals
- Identifying hazard controls, including engineering methods, PPE, work practices and emergency procedures

Refresher training is required every year. Employees should also be retrained whenever new chemicals are brought into the workplace and whenever their performance shows that retraining might be necessary.

Recordkeeping

Training records should be kept for at least 3 years. These should include:

- Names of employees trained
- Type of training provided
- Dates of the training

LDI should also keep **current SDS binders** and a historical file of all past SDS.

A **workplace chemical list** should be maintained and reported to the state every year. Medical surveillance and annual program inspections should also be recorded.

Additional reading

- OSHA Hazard Communication Standard 29 CFR 1910.1200:
<https://www.osha.gov/dsg/hazcom>

SECTION 16

Hydrogen Sulfide (H₂S)

Purpose

- To **educate** employees about the health effects of hydrogen sulfide (H₂S) exposure, as well as possible locations where employees may be exposed to H₂S during their job functions.
- To **establish** safe work practices for when working in H₂S environments.

Scope

This program applies to all LDI employees and contractors who come into contact with hydrogen sulfide (H₂S) on the job. What sort of work leaves employees susceptible to H₂S exposure? Some examples:

Department	Details
Trucking	Servicing pumps and equipment, safety during rig moves, transferring water, gauging tanks
Well Testing	Managing waste water, managing crude oil, managing gas, gauging tanks
Water Transfer	Location operations, water transfer operations
Rental	Work completed near existing well operations

Definitions

5-minute escape pack: A breathing apparatus that gives the user about 5 minutes of breathable air so that they can escape hazardous environments, including IDLH atmospheres.

Hydrogen sulfide (H₂S, often written “H₂S”): A toxic, colorless gas with the odor of rotten eggs at low concentrations. Formed during the decomposition of organic material, H₂S can be fatal in even one breath if the concentration is high enough.

Immediately dangerous to life or health (IDLH): The code of federal regulations defines an IDLH condition as one that “poses an immediate or delayed threat to life

or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space." For H₂S, the IDLH threshold is 100 ppm.

Parts per million (ppm): Unit of measure for the airborne concentration of a vapor/gas in the atmosphere.

Personal air monitor (PAM): A continuous air sensor worn by personnel within 10 inches of the breathing zone, intended to provide early detection, audible and visual alarm. PAM must be set to alarm no higher than 10 ppm.

Permissible exposure limit (PEL): Set up by OSHA, permissible exposure limits are legal U.S. maximum levels of exposure to potential dangers.

Self-contained breathing apparatus (SCBA) / Supplied air breathing apparatus (SABA): SCBAs/SABAs provide breathable air in IDLH atmospheres.

"Sour" site: A site containing H₂S.

"Sweet" site: A site that doesn't have significant amounts of H₂S.

Company responsibilities

Employees

Employees are responsible for:

- Stopping work immediately, evacuating the area, and contacting their supervisor and the safety department after discovering or suspecting the presence of H₂S on a job site
- Protecting themselves and others from unnecessary exposure to H₂S
- Conducting all work according to their H₂S training and this policy
- Immediately reporting to their supervisor and the safety department any changes, deficiencies, or breach of site controls in regard to mitigating H₂S hazards
- Participating in all JSAs, tailgate meetings, and other hazard assessment activities
- Following all written safe work and confined space entry permit procedures
- Respecting and adhering to all controlled access areas and H₂S hazard signs/postings

Supervisors

Supervisors are responsible for:

- Understanding and enforcing H₂S policy
- Implementing and enforcing isolation controls for H₂S hazards when discovered or suspected

- Immediately letting management and the safety department know about H2S exposures and contacting the safety department when H2S is discovered or suspected

Management

Management is responsible for:

- Making sure this H2S policy exists and is updated as needed
- Providing H2S hazard training for all employees
- Providing leadership and supporting all employees when they exercise **stop work authority (SWA)** in H2S areas
- Providing resources to address/mitigate H2S concerns and hazards

About hydrogen sulfide

Characteristics of hydrogen sulfide

- Toxic
- Colorless
- Smells like rotten eggs at low concentrations (around 10 ppm) but not at high concentrations (over 100 ppm)
- Soluble in water
- Flammable
- Has a specific gravity of 1.18 and is heavier than air (tends to settle in vessels and low areas)
- Slightly less lethal than hydrogen cyanide
- More lethal than carbon monoxide

Health effects of exposure to hydrogen sulfide

Concentration	Symptoms
10 ppm	Beginning eye irritation
100 ppm	Coughing, eye irritation, loss of sense of smell after 2-5 minutes
200-300 ppm	Marked eye inflammation and respiratory tract irritation after hour of exposure
500-700 ppm	Loss of consciousness and possibly death in 30 minutes to 1 hour
700-1000 ppm	Rapid unconsciousness, stopping or pausing of respiration, and death
1000-2000 ppm	Immediate unconsciousness, early stopping or pausing of respiration, death in a few minutes. Death may occur even if individual is removed to fresh air immediately

The most important thing to remember about hydrogen sulfide (H₂S) is that its strong, sulfurous odor will disappear when a 100 ppm or more concentration of H₂S deadens the nerves in the nose. Employees must leave an area immediately if the odor is detected.

Safe work practices

General

When H₂S is discovered or suspected at the job site, LDI employees need to stop the work immediately, evacuate the area, and let their supervisor/safety department know.

All employees assigned to sites where H₂S could be present will participate in the identification, evaluation, and control of H₂S hazards. These employees must be aware of site-specific contingency/emergency plans, and they need to monitor the immediate work area with a fixed field monitor or personal gas monitor. Personal H₂S monitors should be worn in the upper breathing zone, outside of all clothing with the sensor facing outwards and unobstructed.

Employees should note and follow the various warning signs, fences, wind indicators, and H₂S monitors at production sites. LDI requires the detecting of H₂S through the use of fixed or portable monitors that will alarm at the appropriate permissible exposure limits of 20 ppm for 1910 or 10 ppm for 1926. When the alarms sound, the employees must either evacuate the area or don the SCBAs or airline respirators.

Controls

Always use this hierarchy of control to protect employees from H₂S exposure:

1. **Engineering control** – Always the preferred method of control. Whenever possible, exposure should be minimized by using methods like ventilation and isolation.
2. **Work Practice Control** – Methods like hazard identification, emergency response plans, and controlled access can help reduce the risk of exposure.
3. **Personal Protection Equipment** – Always the last line of defense, PPE should only be used when all other options have been exhausted. Proper PPE might include an H₂S/LEL monitor, a respirator mask, a breathing air system, or a 5-minute escape pack. For more information, check out the *Personal Protective Equipment (PPE) Part II: H₂S/Hazard Chemical Exposure Areas* or *Respiratory Protection* chapters of this manual.

Special requirements when working inside tanks/vessels

If LDI employees need to do work inside tanks or vessels, they should follow OSHA 1910.146 and be trained in this type of work. Specific rules are outlined in the *Confined Space* chapter.

Training

LDI will make sure all affected employees are trained in H2S. Training should cover general H2S awareness, company H2S policy, employee responsibilities, and best practices for recognizing and controlling H2S.

Training should happen when employees are first hired, when employees are transferred to a new position with possible exposure, or when new hazards are discovered at an existing location. Refresher training should happen every year or as needed.

Some hiring clients may require our employees to take specific H2S courses—e.g., PEC H2S Clear—with a specially certified instructor. If required, LDI employees will go through the specific training.

Recordkeeping

Records need to be kept on all training as well as any reported H2S-related events, incidents, and near misses.

Additional reading

- 29 CFR 1910.1000, 1926.64, 1910.134
- ANSI Z930

Standard Operating Guidelines

This standard operating guideline (SOG) is set up to help make sure safe work practices are being used by all employees to control exposure to hydrogen sulfide (H₂S). These guidelines specifically apply to all workers of LDI Energy Services LLC—both employees and contractor—who do work on any site where H₂S exposure at or above 10 ppm might occur.

Areas where this SOG applies include, but are not limited to:

- Entry into confined spaces
- Manual tank gauging
- Fluid transfer
- Fluid loading and unloading
- Drilling locations
- Hydraulic fracturing locations
- Production locations
- Spill/leak response
- Operating process equipment, or vehicles in areas where H₂S is known to be or may be present
- Other activities being performed in areas which H₂S monitoring has determined H₂S concentrations are recorded at or above 10 ppm

Before arriving at any hydrocarbon location (drilling, fracking, production, disposal site, pipeline, compressor station, etc.), you must make sure you have a functioning **H₂S monitor** with current calibration and bump test. 4-gas monitors must be calibrated every 180 days, and all monitors must be bump tested before each shift. If the monitor is rechargeable, make sure you have enough charge for the whole duration of the job. All monitors should be set to alarm no higher than 10 ppm.

Monitors must be worn within 10 inches of your breathing zone, on the outermost layer of clothing, and on the front side of your body. Monitors are not allowed on the back of your hard hat or below your chest.

When you get to location, you must identify **wind direction**. Locations typically have a windsock or flag to identify direction. If no wind direction indicator is present, use another approved method for verifying direction. Contact your supervisor or a member of the safety team if you have any questions.

Always approach release sources from upwind. If possible, park vehicle upwind from potential release sources. Once you have identified the current wind direction, designate a primary as well as a secondary muster point. Keep in mind that your route of escape in the event of an emergency is upwind from the source of release; however, you may need to travel crosswind away from the source first and then proceed upwind, depending on your current proximity to the source as well as the current wind direction.

Continually monitor wind direction throughout shift as direction can and does frequently change. Adjust the escape plan and muster points as needed.

If your monitor alarms, move quickly and safely upwind and away from the source of release. Do not hesitate. Employee escape, health, and safety is the only concern. Do not try to recover tools or equipment. If there are other contractors, or employees on location alert them to the alarm, but do not deviate from escape route. Follow the incident response flowchart and contact your supervisor immediately once you get to a safe location. Do not re-enter the original location under any circumstances until the safety department and management have pronounced the site safe.

If, during your job, you're required to open any hatch, valve, vessel, etc. that may potentially release gas into the environment—or if you're required to work near an opening that may do the same—stick to the following procedures:

- Always approach from upwind.
- Double-check that monitor is functioning and tested before approaching.
- If hatch/valve/vessel is under pressure, open slowly.
- Stay out of line of all bull plugs, end caps, etc.
- Move upwind, away from source, and allow to bleed off, monitoring your gas detector at all times.
- After pressure is bled off, if your alarm hasn't sounded, approach and continue work.
- If you're doing work in an area known to have 10 ppm of H₂S or greater—or if H₂S is present but the concentration is unknown—you must use an SCBA or SABA.

At no time is it acceptable to remove your personal gas monitor. NO EXCEPTIONS.

If at any time you feel unsafe while working on an H₂S location, immediately evacuate and contact your supervisor or a member of the safety team.

I, _____ the undersigned employee, have read and understood the above guideline. I understand that failure to follow LDI's H₂S standard operating procedure could result in disciplinary action—including termination—and could be harmful to my health or even fatal.

Signature: _____

Date: _____

SECTION 17

Incident Investigations

Purpose

- To **outline** the steps of incident investigation and reporting so that all LDI employees know what to do if an incident or near miss happens.

Scope

This program applies to all LDI personnel. Incidents and accidents must be reported, and anyone who witnesses or is involved in an incident plays a part in the incident investigation process.

Company responsibilities

Employees & supervisors

When an injury, incident, near miss, or spill happens, it's the responsibility of the involved employee to call the emergency on-call health and safety phone number, assuming that the incident isn't immediately dangerous to life or health (IDLH). Then the employee should notify their direct supervisor. The employee and supervisor are responsible for participating in the incident response procedures that follow as directed by the health and safety representative.

Health & safety representative

The health and safety employee should respond to the incident and submit an **initial incident notification** to LDI's management team within 2 hours of the incident. Preparation of a written **incident report** should be completed within 48 hours and submitted to the management team.

Incident procedures

Reporting

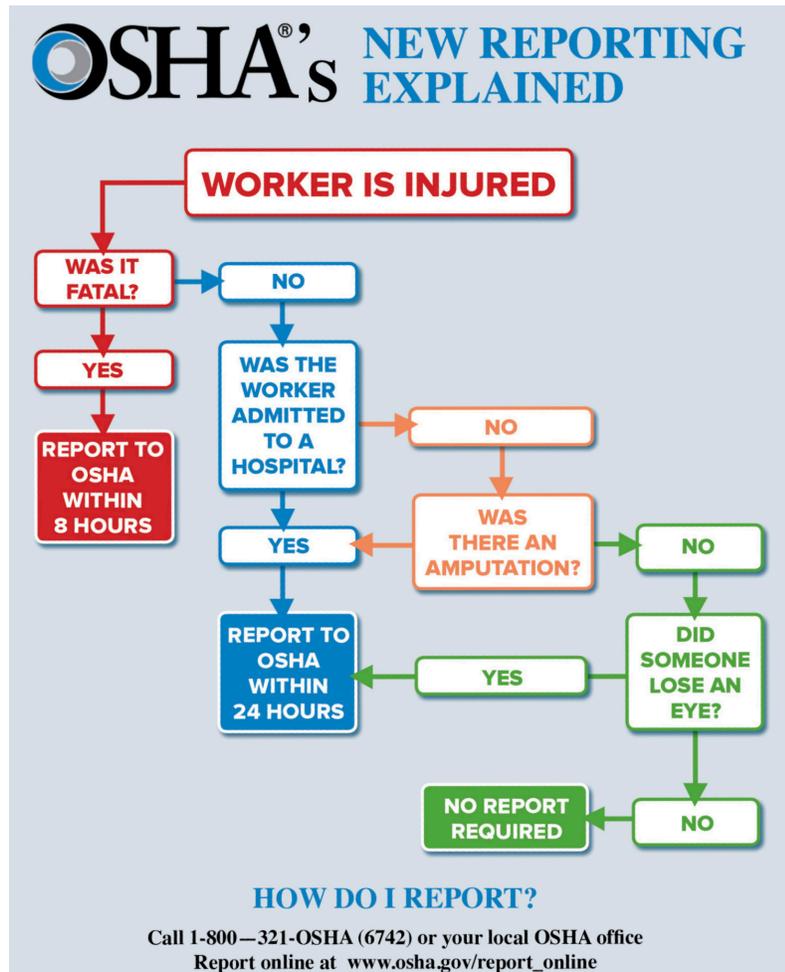
The steps of immediate reporting need to happen in a specific way and order, and details about this reporting sequence should be posted. For example, if an incident happens, the following are contacted in order: 911 (if IDLH, significant injury, or

fatality), department supervisor, safety department, dispatch (if applicable), and other organizations as required.

The employee will complete the **employee section of the incident report** and give it to their supervisor immediately for all accidents, near misses, injuries, and spills. The supervisor will be responsible for completing the **supervisor’s investigation section of the incident report** and cooperating with the safety department to help them investigate the incident. The supervisor and safety department will do their best to figure out the root cause(s) of the incident from the information gathered and take corrective action immediately, if necessary.

The incident report, including a detailed narrative about what happened, should be completed within 48 hours by the safety department and will be submitted to the safety committee and management team for review.

OSHA requires reporting of work-related incidents resulting in the death or hospitalization of an employee. Host clients require all incidents to be reported, including but not limited to near misses, injuries, spills, property damage, fires, explosions, and vehicle damage. Required incidents must be reported to OSHA within 8 hours and to the client (host facility) within 24 hours.



Investigating

All incidents will be investigated to the appropriate level with regards to incident severity, using a root cause analysis process or other similar method.

The collection, preservation, and security of **evidence** is a mandatory part of the investigation process. Initial identification/assessment of evidence immediately

following the incident might include a listing of people, notes about equipment (including equipment positioning), photographs of the area, notes about other materials involved, and a record of environmental factors (weather, amount of light, temperature, noise, ventilation, etc.).

Witness interviews and statements must be collected. Finding witnesses, making sure their testimonies are unbiased, obtaining appropriate interview locations, and using trained interviewers should be detailed. Follow-up interviews may also be necessary.

Equipment

Proper equipment will be available to assist in conducting an investigation. This might include writing equipment like pens/paper, measurement equipment like tape measures/rulers, cameras, small tools, audio recorder, PPE, marking devices like flags, equipment manuals, etc.

Corrective actions & lessons learned

Identifying corrective actions resulting from incident investigations is another important part of incident procedures. The safety department will be responsible for the documentation and communication of lessons learned and the review of similar operations to prevent reoccurrence. The department will determine whether the incident was caused by insufficient policy or by not complying with existing policy. They'll also determine whether training was adequate.

Lessons learned should be reviewed with affected employees. Individuals should be assigned responsibilities relative to the corrective actions, and these actions should be tracked to closure. Some processes may need to change to stop similar events from happening again.

Documentation

The incident report will be maintained by the safety department and kept available for review. Documentation of corrective actions will also be kept available for review.

Near miss procedures

Employees are responsible for reporting all near misses. These should be reported to their direct supervisor or a member of the health and safety department.

A **safety concern report** should be completed by the employee after any of the following happen:

- They witness or are involved in a close call resulting in no damage or personal injury, but where there was potential for both to occur.
- They have identified an unsafe condition or hazard.

The employee, when possible, should fill out what corrective action was taken. For example:

Hazard: Broken rung on ladder.

Corrective action taken: Tagged ladder as “Broken – Do Not Use” and notified supervisor.

The safety concern report will be given to the supervisor or the health and safety representative for investigation. They will attempt to determine the cause of the incident/hazard and take corrective action immediately, if necessary. Near misses will also be submitted to and tracked by LDI.

Training

The company requires that individual responsibilities for incident investigation be assigned prior to occurrence of an incident. Training personnel in their responsibilities and incident investigation techniques is mandatory.

Training requirements relative to incident investigation and reporting (awareness, first responder, investigation, and training frequency) should be identified in the program.

First aid

Employees who could be first responders should be trained and qualified in first aid techniques to control the degree of loss during the immediate post-incident phase.

After rescue, actions to prevent further loss should be taken. For example, maintenance personnel should be summoned to assess the integrity of buildings and equipment, engineering personnel to evaluate the need for bracing of structures, and so on. Special equipment/response requirements—like safe rendering of hazardous materials or explosives—should be employed.

Form 001 – Accident Investigation Information Gathering Report

Attention: This form contains information relating to employee health and other privacy concerns and must be used in a manner that protects the confidentiality of employees to the fullest extent possible while the information is being used for occupational safety and health purposes.

Reason for report: Injury Illness Accident Fatality

Primary investigator's name: _____ Investigation date: _____

Job title: _____ Phone: _____

Investigators: _____

Employee Injury/Property Damage Information

Employee name: _____ Date of birth: _____

Occupation: _____ Phone: _____

Gender: Male Female

Date of injury/damage: _____ Time: _____ AM / PM

Exact location of incident: _____

Witnesses: _____

Did the accident result in the death of one or more persons? Yes No

Did the accident result in the hospitalization of three or more persons? Yes No

Was medical treatment provided? Yes No

Was this a recordable injury or illness? Yes No

If so, describe the treatment: _____

Did the employee lose time from work? Yes No

Was the employee placed on restricted or light duty, or transferred to another job? Yes No

(continue to next page)

If so, describe: _____

Amount of property damage: \$ _____

Accident Account

Describe the **accident** (in the sequence that the events occurred):

Describe the **extent of injury or illness** and body parts affected/property damage:

Specify the **hazardous condition** (source of unsafe energy or hazardous material):

Specify the **unsafe act**:

Discussion

Direct Causes – Energy Sources or Hazardous Materials

Discuss the specific energy sources (e.g., moving object or machine part) or hazardous materials, including how and why the sources or materials resulted in injury or property damage:

Indirect Causes – Unsafe Acts or Hazardous Conditions

Discuss the normal or expected safe work conditions and practices, and the deviations from such conditions and practices that resulted in the injury or property damage:

Basic Causes – Management Policies, Personal, or Environmental Factors

Was injury or damage caused by employee's willful misconduct, intoxication, or intent to injure self or another? *(If yes, explain using next page)* Yes No

Was the incident a result of violation of established safety policies? *(If yes, explain using next page)* Yes No

Has the employee received training to perform this procedure safely? *(If no, explain using next page)* Yes No

Was adequate personal protective equipment provided for the required tasks? *(If no, explain using next page)* Yes No

Are changes necessary in the operations or procedures to prevent this type of incident in the future? *(If yes, explain using next page)* Yes No

Use this space to elaborate on your answers to the previous yes/no questions, if necessary:

Discuss any additional policies, personal factors, and environmental factors that led to hazardous conditions or unsafe acts:

Recommended Corrective Actions

Describe recommendations for corrective action(s):

Schedule for the completion of corrective action(s):

Safety director: _____

Employee signature: _____

Primary investigator's signature (supervisor): _____

Form 002 – Incident / Accident / Near Miss Report Form

Date of event: _____ Time: _____ AM / PM

Location of event (include location name, rig #, address, as well as area on location):

Name of supervisor (include company name): _____

Was the supervisor on or off site? On site Off site

Name: _____

Phone (H): _____ Phone (W): _____

Address: _____

Company (include how long with company): _____

Job title (include how long with current job title): _____

Were you involved in the event, or were you a witness to it? Involved Witnessed

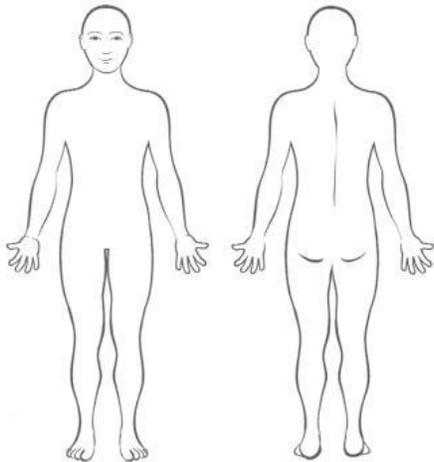
Fully describe what happened from your perspective; include exactly what work was being performed before, during and immediately following the event including intended purpose and any tools/equipment you were using. Also include what PPE (if any) was in use and whether you were working alone or with a group.

Were the police notified? Yes If yes, which agency? _____ No

Please indicate any other factors that may have contributed to the event. Include things like adverse weather, extreme heat or cold, fatigue, deadlines, etc.:

Were any injuries sustained? Please describe in detail where on the body the injury(s) occurred as well as exactly what caused the injury (example: elbow struck concrete, hot pipe burned hand, etc.)

Please indicate on the diagram below exactly where the injury(s) occurred:



If you need more space to complete any of these sections please use the back of this form.

Name: _____ Date of completion: _____

Signature: _____

REPORT COMPLETION INFORMATION			
Report #	Date Follow Up	Responsible Person	Date Report Complete
NM			
INC			
ACC			

SECTION 18

Ladder Safety

Purpose

- To **establish** written ladder safety guidelines for LDI.
- To **educate** employees on how to safely use ladders.

Scope

These ladder safety rules apply to all LDI employees on all locations/projects. They explain safe work practices related to the use, inspection, and maintenance of all ladders—whether they’re constructed, fixed, or portable.

Safe work practices

Both at home and at work, more injuries happen from using ladders than from any other kind of equipment. Part of the problem is that we become so used to using them that we take their safety for granted. These safe work practices are meant to keep LDI safe both on the job and at home.

General

- Ladders used by the company's employees must meet OSHA/ANSI specifications, as well as those of the American Ladder Institute.
- Ladders should be set up on a firm, level base.
- More than one employee should not work from the same ladder unless it’s specifically designed for two or more people.
- Ladders may only be used for the purposes for which they were designed— not as guys, braces, skids, etc. Do not use them in a horizontal position.
- When going up or down a ladder, employees should use both hands and feet to maintain **three points of contact** with the ladder at all times. Change the ladder’s position as often as necessary to stay in comfortable reach of the work.

- If material needs to be moved from one level of a ladder to another, use a tool (like a rope, block and tackle, gin wheel, etc.). Material should not be carried by hand on ladders.
- Load limits for ladders may not be exceeded. They should never carry more weight than the manufacturer’s rated capacity/the maximum intended load. All portable ladders should be of the extra heavy-duty type IA variety, capable of handling three times the maximum load.
- Metal ladders should never be used near electrical circuits.
- Straight, extension, and stepladders are considered a “safe work platform” when properly selected, inspected, set up, and used.

Straight or extension ladders

All extension ladders should be equipped with **non-slip feet**.

The company requires that extension ladders are placed against the top support at a **4:1 incline**. In other words, the base of the ladder should never be farther from the wall than $\frac{1}{4}$ of the ladder height.

The upper supports of ladders used to access elevated work areas must extend a minimum of **3 feet** above the elevated surface. Also note that employees should never work from the top 3 rungs of any straight or extension ladder.

Portable ladders

Portable ladders should not be put in front of doors that open toward the ladder unless the door is locked or otherwise prevented from opening and warning signs are posted. Portable ladders also need to be adequately tied off at the top or securely held in place at the bottom.

Stepladders

Stepladders should be set up with all 4 of their feet level and the spreaders locked in place. Whenever used by an employee who is 10 feet or more off the ground, they should be held in place.

Employees should not step onto the top step/platform of a stepladder. They should also not step on its back section, which is meant to support the ladder itself.

Though it’s often tempting, do not put tools or other materials on any step of the ladder (including the top platform).

Fall protection

Fall arrest equipment is not normally required when using a portable ladder. But here’s when it should be used:

- When the employee needs to use both hands to push, pull, or handle either tools, equipment, or materials that put the worker in a potentially unstable position.
- When the worker must extend his/her “**belt buckle**” area beyond the side rails.
- When the portable ladder is used near a platform handrail, leading edge, or other similar area with significant differences in elevations.
- When the employee can’t reposition the ladder and must instead work backwards (facing away from the ladder).

Fall arrest equipment must be anchored independently of the ladder to a suitable anchor point. If that isn’t possible, the ladder should not be used, and the work should be done using another method (e.g., scaffolding or an aerial lift).

Inspections

Ladders must be inspected periodically. Anyone about to use a ladder should give it a thorough visual inspection before doing so: Are the rungs, cleats, and steps parallel? Are they level and uniformly spaced?

A few more things to note:

- **Wooden ladders** should be inspected monthly for deterioration and damage.
- **Metal ladders** should be inspected monthly. All parts should be checked for wear, corrosion, and structural failure.
- **Fiberglass ladders** should be inspected monthly for deterioration of glass fibers and sharp edges.

LDI requires that defective ladders are tagged and/or removed from service.

All employees who need to use ladders will be trained in ladder safety and pre-use inspection techniques. This training will be documented and records maintained.

Additional reading

- OSHA Construction Ladder Safety:
<https://www.osha.gov/SLTC/etools/construction/falls/4ladders.html>
- OSHA Portable Wood Ladder – Standard 1910.25:
https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9717
- ANSI A14.1-2007 – Safety Requirement for Portable Wood Ladders
- ANSI A14.2-2007 – Safety Requirements for Portable Metal Ladders

SECTION 19

Lockout/Tagout (LOTO) Program

Purpose

- To **establish** that a lockout/tagout (LOTO) program is in place.
- To **explain** the circumstances when LOTO programs are required, and describe the specifics of proper LOTO device use.

Scope

LDI's LOTO program (also known as an energy control program) includes energy control procedures, employee training, and periodic inspections.

These guidelines are based on the OSHA Control of Hazardous Energy (Lockout/Tagout) standard (29 CFR 1910.147), which deals with the control of energy during equipment maintenance. These standards apply to maintenance done on equipment where the unexpected energization, startup of machines or equipment, or release of stored energy could cause injury to employees.

Types of potential energy that may require lockout/tagout include:

- Electrical
- Mechanical
- Hydraulic
- Nuclear thermal
- Pneumatic
- Chemical

Normal production operations aren't covered by the standard, but the standard *does* apply to normal maintenance if an employee needs to remove or bypass a guard or other safety device. It also applies if an employee needs to put any part of their body into an area of a piece of equipment where work is actually performed on the material being processed (point of operation), or where an associated danger zone exists during a machine operating cycle.

Out of scope

Small tool changes/adjustments and other minor servicing aren't covered by the standard if they're routine, repetitive, and necessary for everyday use of the equipment. (Other safe work practices should still be followed in these cases.)

Cord-and-plug-connected electrical equipment that has already been unplugged by the employee is also out of the scope of this standard—as long as the employee has the plug in their exclusive control.

Definitions

Affected employee: An employee whose job requires them to operate/use a machine being serviced under LOTO.

Authorized employee: An employee who locks out or tags out equipment to service it.

Capable of being locked out: An energy isolating device is capable of being locked out if it has a hasp or other means of attachment that a lock can be attached to or has a locking mechanism built into it. Other energy isolating devices are capable of being locked out if lockout can be achieved without dismantling, rebuilding, or replacing the energy isolating device or permanently changing its energy control capability.

Energized: Connected to an energy source or containing residual or stored energy.

Energy isolating device: A mechanical device that physically prevents the transmission or release of energy. Manually operated disconnect switches, line valves, blocks, and slide gates are examples of energy control devices that provide visible indication of the position of the device. On/off buttons, selector switches, and other control circuit devices are not energy control devices.

Energy sources: Any source of electrical, mechanical, hydraulic, pneumatic, chemical, nuclear, thermal, or other energy.

Lockout: The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout device: A device that uses a positive means—such as a lock, either key or combination—to hold an energy isolating device in a safe position and prevent energization of a machine or equipment.

Normal production operations: The use of a machine or equipment in its intended production function.

Servicing and/or maintenance: Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubricating, cleaning, or unjamming equipment and making adjustments or tool changes where the employee may be exposed to the unexpected energization/startup of the equipment or to the release of hazardous energy.

Tagout: The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout device: A prominent warning device (like a tag) that can be securely fastened to an energy isolating device according to an established procedure. The device indicates that the energy isolating device and the equipment being controlled may not be operated until the tagout device has been removed.

Energy control procedures

The goal is to make sure authorized employees know when, why, and how to control hazardous energy. Before any employee performs servicing or maintenance on equipment where stored energy could cause injury by unexpectedly energizing, starting up, or releasing, the equipment will be isolated from the energy source, making it unable to start up.

The 6 steps of energy control

To safely practice energy control using LOTO devices, authorized employees have to perform certain steps in a specific order.

1. Preparation for shutdown

LDI requires that the employee who turns off the machine has knowledge of the energy magnitude, what dangers it presents, and how to control it.

2. Machine/equipment shutdown procedure

The equipment must be turned off/shut down in the correct way for that machine.

3. LOTO device application

LOTO devices must be applied following the standard protocol (see next section).

4. Machine or equipment isolation

All energy sources must be isolated before maintenance is performed.

5. Stored energy

Stored energy must be released after a lockout device is installed. All potentially hazardous stored or residual energy must be relieved, disconnected, restrained, or otherwise rendered safe. If there is a possibility of re-accumulation of stored energy to a hazardous level, energy isolation must continue to be verified until servicing or maintenance is complete or until it's determined that there's no more risk.

6. Verification of isolation

Isolation/zero energy of the equipment must be verified after a lockout device is installed and before maintenance can begin.

Applying LOTO devices

These guidelines for applying LOTO devices are part of step 3 from the previous subsection.

- Authorized employees must attach LOTO devices to each energy-isolating device they're servicing.
- Each authorized employee must place their own personal LOTO device on the energy isolating device(s). Locks and/or tags should identify the individual applying the device.
- When an energy-isolating device cannot accept multiple locks or tags, a multiple LOTO device (hasp) may be used.
- If lockout is used, a single lock may be used to lock out the machine or equipment. The key can then be put in a lockout box or a cabinet that allows the use of multiple locks to secure it. Each authorized employee should then use their own lock to secure the box or cabinet.
- Lockout devices must be attached to equipment in a way that will hold the energy isolating devices in a "safe" or "off" position.
- When tagout devices are used, attach them in a way that will clearly show that moving the energy isolating devices from the "safe" or "off" position is prohibited. If a tagout device is used on an energy isolating device that can be locked, fasten the tag at the same point where the lock would normally be attached.
- If the tag cannot be attached directly to the energy isolating device, attach it as close as safely possible to the device, in a place that will be immediately obvious to anyone attempting to operate the device.

Release from LOTO

These procedures must be completed before LOTO devices are removed and energy is restored:

- **Machine/equipment inspection:** Check the work area to make sure all equipment parts are working and that all nonessential items (tools, spare parts) are removed.
- **Positioning of employees:** Check the work area to make sure all employees are safely positioned or have cleared the area. Notify all affected employees that the LOTO devices have been removed before the equipment is started.
- **LOTO device removal:** Only the authorized employee who placed the LOTO devices should remove them.

There may be times when a LOTO device needs to be removed, but the employee who put it on the equipment isn't available to remove it. In those cases, LDI must first verify that the authorized employee who applied the device is in fact not at the facility. The company must then make all reasonable efforts to contact them to let them know that their device has been removed. It's mandatory that the authorized employees know before they resume work that the lockout device has been removed.

Sometimes, employees need to temporarily restore energy to a machine during maintenance to test or reposition the equipment. LOTO devices may be removed temporarily in order to perform these tasks. In those cases, the standard steps for releasing from LOTO, starting machinery, and replacing LOTO devices all apply.

Restoring equipment to service

When servicing is complete and the equipment is ready to get back to normal operating condition, an authorized employee must do the following before restarting the equipment:

1. Visually inspect equipment and the surrounding area to make sure that the equipment is in working order, and that there are no loose tools or objects on the machinery or in the way.
2. Visually confirm that all employees are safely positioned or removed from the area.
3. Verify that the controls are in neutral.
4. Remove the lockout device(s) and re-energize the equipment.

Note: The removal of some forms of blocking may require re-energization of the machine before safe removal.

5. Notify affected employees that the servicing is completed and the equipment is ready to use.

Group lockout

Certain machinery requires group LOTO. In those cases, follow these steps:

1. Each authorized employee must attach a personal LOTO device to the group lockout device or comparable mechanism when they begin work, and they must remove their device when they stop working on the equipment.
2. A **primary authorized employee** (like a supervisor) will be responsible for coordinating the LOTO of hazardous energy sources for the equipment being serviced.
3. The primary authorized employee will coordinate with equipment operators before and after servicing.

4. When more than one crew, craft, department, etc. is involved, a **principal authorized employee** from each group will account for the work of every member of their team.

The principal authorized employee is an authorized employee who oversees or leads a group of servicing or maintenance workers like plumbers or electricians. Each principal authorized employee reports to the primary authorized employee for each worker in their specific group.

LOTO procedures for shift/personnel changes

Employers must make sure that employees are protected during shift changes by facilitating orderly transfer of LOTO device protection. This will help minimize exposure to hazards.

In cases of shift/personnel changes, each employee must attach their personal LOTO device to the group LOTO device before engaging in the servicing and maintenance operation. LDI requires that an individual is assigned to be in charge of a group/shift change lockout operation. This individual (usually a supervisor) must not remove the group LOTO device until each employee in the group has removed their personal device.

Outside personnel (contractors)

Whenever contractors and other outside servicing personnel perform tasks covered by the LOTO standard, they must adhere to all the standard's requirements.

The contractor or outside employer and the onsite employer must inform each other of their respective energy control program responsibilities. The onsite employer must make sure that their employees understand and comply with the restrictions and prohibitions of the outside employer's energy control program.

Equipment

Employees will receive appropriate LOTO equipment in order properly implement LOTO procedures. Equipment will include:

- Padlocks
- Lockout tags/devices
- Lockout clamps
- Circuit breaker lockout

One or more **padlocks** will be issued to each authorized employee. Each employee will have an individual key. Only one key per lock will be issued. Only the authorized person may apply and remove the lock, and the key may never be given to another person—although a second or master key may be issued to designated supervisors so that they can open/remove a padlock under certain circumstances.

Authorized employees will also be issued **warning tags** that must be used whenever a padlock can't be applied.

Clamps are designed to accommodate more than one lockout padlock during times when multiple workers are servicing same equipment.

Requirements for LOTO devices

LOTO devices must be durable so that they can withstand the environment they're exposed to for as long as necessary. They must be standardized in color, shape, or size (at least one of those criteria), and they must not be used for other purposes.

These devices should have the ID or name of only one employee.

Lockout devices

- Must be substantial enough to prevent removal without the use of excessive force or unusual techniques (like using bolt cutters or other metal cutting tools).
- Must be the only devices used for controlling energy.

Tagout devices

- Must identify the authorized person applying them and the date they are applied.
- Must have standardized print and format that is easy to read by all employees.
- Must be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible. Must not deteriorate when used in corrosive environment, like areas where acid and alkali chemicals are handled and stored.
- Must be substantial enough to prevent accidental removal. Must be attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds.
- The tie used to attach the tag must be single-use, and it must have the general design and basic characteristics of a one-piece all-environment-tolerant nylon cable tie.
- Must warn against hazardous conditions if the machine or equipment is energized.
- Warning signs must comply with ANSI-Z535 (2001) standards.
- Must have a warning label including, but not limited to:
 - DANGER Do Not Start
 - DANGER Do Not Energize
 - DANGER Do Not Open
 - DANGER Do Not Operate
 - DANGER Do Not Close

- DANGER Hands Off

Training

General

Employees are provided lockout training so that they understand the purpose of the energy control program and have the skills needed to safely apply and remove energy controls. All training—including retraining—must be documented, signed, and certified.

- **Authorized employees** must be trained to recognize hazardous energy sources, the type and magnitude of the energy available in the workplace, and how to properly isolate and control energy sources. These employees will be informed that they have the right to individually verify that hazardous energy has been isolated and/or de-energized during LOTO usage and maintenance.
- **Affected employees** must receive training on the purpose and use of the energy control procedure.
- **Other employees** (who work in an area where energy control procedures might be used) must be generally made aware about the energy control procedure and that they must not attempt to re-energize equipment that is locked out or tagged out.

Retraining on lockout/tagout will be provided whenever there is:

- A change in job assignment.
- A change in machines, equipment, or processes that present a new hazard.
- A change in LDI's LOTO program.
- Whenever an inspection reveals noncompliance.
- Whenever LDI has reason to believe that an employee doesn't fully understand energy control procedures. The retraining will re-establish that the employee understands everything they need to know regarding energy control procedures, and if necessary, revise or add new control methods.

Tag-specific training

Tag-specific training should emphasize to employees that **tags are just warning signs** and don't give us the same physical restraint as a lock. Tags may even create a false sense of security!

Employees should also be taught that when a tag is attached to an energy isolating device, it must not be removed without authorization and it is never to be overlooked or ignored. Demonstrate how tags are securely attached to energy isolating devices so that they can't be accidentally detached during use.

Inspections

LDI requires that the energy control (lockout/tagout) procedure is inspected annually. Inspectors must check that people are following procedures and correct any noncompliant activity. The inspector should be an authorized employee who does not use the LOTO being inspected.

For lockouts, the inspector must review each authorized employee's responsibilities with that employee (group meetings are fine). For tagouts, the inspector must review both the authorized and affected employee's responsibilities with those employees, as well as the additional training responsibilities of 1910.147(c)(7)(ii).

Documentation of the inspection should include a certified review that has the date of inspection, equipment and employees affected, and name of the inspector.

Form 003 – Lockout/Tagout Compliance Checklist

Agency/institution: _____

Contact person: _____

Phone number: _____

Completion date: _____

- | 1. EQUIPMENT, MACHINERY, AND PERSONNEL | Yes <input checked="" type="checkbox"/> | No <input checked="" type="checkbox"/> |
|--|---|--|
| a. A list of equipment and machines that need to be locked out has been developed. | a. <input type="checkbox"/> | <input type="checkbox"/> |
| b. All new machinery (after Jan. 1990) has the ability to accept a lockout device. | b. <input type="checkbox"/> | <input type="checkbox"/> |
| c. Specific <u>written</u> energy control procedures are developed and used for each piece of equipment. | c. <input type="checkbox"/> | <input type="checkbox"/> |
| d. A list of all <u>authorized</u> employees has been developed. | d. <input type="checkbox"/> | <input type="checkbox"/> |
| e. A list of all <u>affected</u> employees has been developed. | e. <input type="checkbox"/> | <input type="checkbox"/> |
|
 | | |
| 2. ENERGY CONTROL PROGRAM | | |
| a. A <u>written</u> energy control program has been developed. | a. <input type="checkbox"/> | <input type="checkbox"/> |
| b. Does the written program state the methods of compliance, including the following? | | |
| • Intended use of procedures | 6. b. <input type="checkbox"/> | <input type="checkbox"/> |
| • Steps for shutdown, isolating, blocking, and securing energy | <input type="checkbox"/> | <input type="checkbox"/> |
| • Steps for placement, removal, and transfer of lockout/tagout devices | <input type="checkbox"/> | <input type="checkbox"/> |
| • Requirements for testing to verify effectiveness of lockout/tagout | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Compliance with energy control procedures is verified <u>at least</u> annually. The results of the inspection are certified and kept on file. | c. <input type="checkbox"/> | <input type="checkbox"/> |

- | | | | |
|--|----|--------------------------|--------------------------|
| d. Lockout/tagout devices are provided (locks, hasps, tags, etc.). | d. | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Lockout devices are singularly identified, durable, standardized, substantial, and employee-identifiable. | e. | <input type="checkbox"/> | <input type="checkbox"/> |
| f. Lockout devices are used <u>only</u> for energy control. | f. | <input type="checkbox"/> | <input type="checkbox"/> |
| g. A tagout system is used only if an isolating device cannot be locked out. | g. | <input type="checkbox"/> | <input type="checkbox"/> |
| h. Tagout devices are located at the same location as lockout devices. | h. | <input type="checkbox"/> | <input type="checkbox"/> |
| i. Tagout devices warn against hazardous conditions (e.g., Do Not Start, Do Not Open). | i. | <input type="checkbox"/> | <input type="checkbox"/> |
| j. Energy isolation is performed <u>only</u> by authorized employees. | j. | <input type="checkbox"/> | <input type="checkbox"/> |
| k. Affected employees are notified before and after lockout/tagout. | k. | <input type="checkbox"/> | <input type="checkbox"/> |
| l. Group lockout/tagout procedures are used when needed. | l. | <input type="checkbox"/> | <input type="checkbox"/> |
| m. Information about each other's lockout program is exchanged with contractors. | m. | <input type="checkbox"/> | <input type="checkbox"/> |
| n. Continuity of lockout/tagout is provided during shift change and personnel changes. | n. | <input type="checkbox"/> | <input type="checkbox"/> |

3. TRAINING REQUIREMENTS

- | | | | |
|---|----|--------------------------|--------------------------|
| a. <u>Authorized employees</u> – Recognition of energy sources, type and magnitude of energy, and methods and procedures necessary for isolation and control. | a. | <input type="checkbox"/> | <input type="checkbox"/> |
| b. <u>Affected employees</u> – Purpose and use of energy control procedures. | b. | <input type="checkbox"/> | <input type="checkbox"/> |
| c. <u>Other employees</u> – Instructed on the procedures locked or tagged out. | c. | <input type="checkbox"/> | <input type="checkbox"/> |
| d. For tagout system – Limitations of tags. | d. | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Retraining – When change in job, assignment, equipment, process, or procedure, or as a result of an inspection. | e. | <input type="checkbox"/> | <input type="checkbox"/> |
| f. Training is <u>certified</u> with names and dates. | f. | <input type="checkbox"/> | <input type="checkbox"/> |

Comments:

3. SHUT DOWN THE MACHINE/EQUIPMENT USING NORMAL STOPPING PROCEDURES.

Specific instructions:

4. ISOLATE ALL ENERGY SOURCES LISTED ABOVE.

Specific instructions:

5a. APPLY LOCKS TO ALL ISOLATE DEVICES OPERATED IN STEP 4.

Specific instructions:

5b. IF A TAG IS USED IN LIEU OF A LOCK WHEN THE ENERGY-ISOLATING DEVICE IS INCAPABLE OF LOCKOUT, THE FOLLOWING ADDITIONAL SAFETY PRECAUTION WILL BE TAKEN:

Specific instructions:

- 6. BLOCK OR DISSIPATE ALL STORED ENERGY IN RAMS, FLYWHEELS, SPRINGS, PNEUMATIC OR HYDRAULIC SYSTEMS, AND STEAM OR GAS LINES.**

Specific instructions:

- 7. VERIFY THAT THE MACHINE/EQUIPMENT IS LOCKED OUT BY TESTING THE MACHINE OPERATING CONTROLS.**

RETURN ALL CONTROLS TO THE “NEUTRAL” OR “OFF” POSITION AFTER TESTING.

Specific instructions:

Procedures for Removing Locks/Tags

- 1. CHECK THE MACHINE/EQUIPMENT TO BE SURE IT IS OPERATIONALLY INTACT, TOOLS HAVE BEEN REMOVED, AND GUARDS HAVE BEEN REPLACED.**

Specific instructions:

2. CHECK TO BE SURE ALL EMPLOYEES ARE SAFELY POSITIONED.

Specific instructions:

3. NOTIFY ALL AFFECTED EMPLOYEES THAT LOCKS/TAGS ARE GOING TO BE REMOVED AND THE MACHINE EQUIPMENT IS READY FOR OPERATION.

Specific instructions:

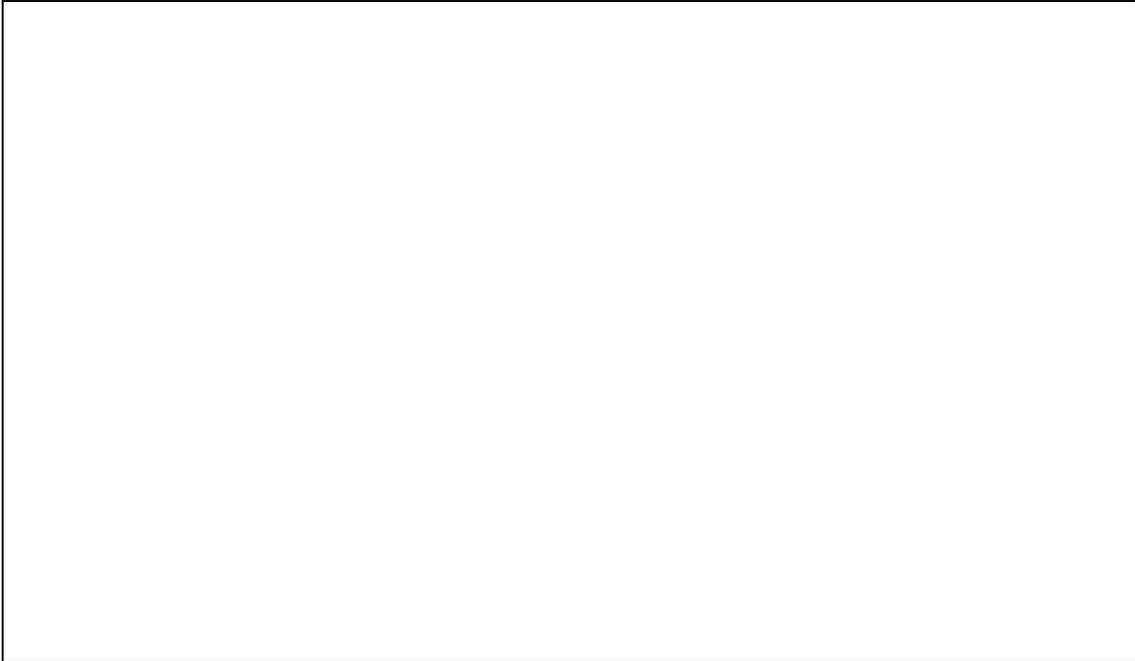
4. REMOVE ALL LOCKS, BLOCKS, OR OTHER ENERGY REESTRAINTS.

Specific instructions:

5. RESTORE ALL ENERGY TO THE MACHINE/EQUIPMENT

Specific instructions:

OTHER COMMENTS/SPECIAL PRECAUTIONS



Form 008 – Annual Lockout/Tagout Inspection Worksheet

Organization: _____	Date: _____
Machine/equipment names: _____	

1. REVIEW THE FOLLOWING WITH EMPLOYEE(S) PERFORMING SERVICE OR MAINTENANCE

Yes No

Have you had lockout training?

Do you have a safety lock?

Are lockout procedures for the above machines/equipment available and/or posted?

Do you know and understand your lockout responsibilities?

2. OBSERVATION

Were lockout procedures followed?
 Yes
 No
 None required

List deviations or inadequacies observed:

Corrections/changes/comments:

Employees observed (print names):

Department:

Inspected by:

Job title:

**Form 009 – Documentation of Information Given to Contractors
Pertaining to Lockout/Tagout Procedures**

Contractor: _____ **Date:** _____

Information given:

Contractor's signature: _____ **Date:** _____

Authorized employee's signature: _____ **Date:** _____

Authorized supervisor's signature: _____ **Date:** _____

SECTION 20

Noise Exposure/Hearing Conservation

Purpose

- To **establish** a hearing conservation program for employees compliant with the federal OSHA standard found at 29 CFR 1926.52.
- To **educate** employees on how to prevent any temporary or permanent noise-induced hearing loss.

Availability

You can get copies of this written program from LDI's owner or the person designated to be in charge of the hearing conservation program.

Scope

The hearing conservation program applies to all employees exposed to noise of 85 decibels (dBA) or greater on an 8-hour time-weighted average.

Definitions

Action level: An OSHA standard for the maximum acceptable amount of exposure to potential dangers (not just noise levels, but also levels of chemicals and so on). The action level of noise exposure is an 8-hour time-weighted average of 85 dBA or higher.

Decibel (dBA): A unit of measurement for the intensity of a sound.

Standard threshold shift: A change in the level of the quietest a noise can be for the person to still be able to hear it. Essentially hearing loss.

Safe work practices**Monitoring**

Monitoring procedures are used when exposure limits may exceed the 85 dBA, 8-hour time-weighted average. The program measures exposure to noise, identifying

which employees may need protection. Employees that meet the criteria are then included in the hearing conservation program.

In addition to the normal annual testing, monitoring is also repeated whenever:

- There's a change in production, process, equipment, or controls that puts more employees at risk of being exposed to noise at or above the action level.
- It's clear that the hearing protectors aren't reducing noise levels enough to stop hearing damage.

Audiometric testing

Audiometric testing is performed annually for individuals exposed to noise at or above the action level. The testing is done at no cost to employees.

How does the testing work? A **baseline audiogram** must be established within the first 6 months of an employee's exposure. At least 14 hours without exposure to workplace noise is required prior to establishing a baseline audiogram. Employees should be given a heads-up about the 14-hour requirement so that they can avoid loud noises during that time. (Hearing protectors can be used to meet this requirement if needed.)

The employee's annual audiogram will be compared to their baseline audiogram to see if a standard **threshold shift** has occurred. If the comparison shows a shift, LDI will let the employee know in writing within 21 days of determination.

Employees or their representatives are allowed to observe any noise measurements conducted.

Hearing protectors

LDI makes hearing protectors available to all affected employees at no cost to them. It is the employer's responsibility to make sure hearing protectors are worn and that employees are properly trained in the use, care, and fitting of the protectors.

Employees that have experienced a standard threshold shift will be given protectors that reduces noise exposure enough to be at the action level or lower. The hearing protectors are evaluated for the specific noise environments in which the protector will be used. Hearing protection is re-evaluated in the event of a standard threshold shift. At that point, more effective hearing protectors will be provided.

Training

Employees will receive annual training on the hearing conservation program. The designee is responsible for providing this training, and LDI will make sure that the training material is up to date on new requirements for protective equipment and work processes.

Training will include information on:

- How noise affects hearing
- Why we use hearing protectors
- The pros and cons of different types of hearing protectors
- How to put on your hearing protector and keep it in good condition
- How and why audiometric testing is done

On top of this training, OSHA-supplied information about the Occupational Noise Exposure Standard will be posted in the workplace.

Recordkeeping

Records of all employee exposure measurements are maintained. LDI keeps noise exposure measurement records for 2 years and audiometric test records for the length of the employee's employment plus 30 years.

Records are available to employees, former employees, representatives designated by the individual employee, and OSHA, upon request.

SECTION 21

Personal Protective Equipment (PPE)

Part I: Overview

Purpose

- To **establish** that LDI has a personal protective equipment (PPE) program in place.
- To **explain** proper selection and use of PPE.

Scope

This policy applies to all employees, visitors, and third-party contractors working in the field on behalf of LDI.

Definitions

Fire-resistant clothing (FRC): Clothing made of specialized fabrics that are treated to be flame-resistant.

Hazard assessment: An evaluation of the workplace for hazards that would require the use of PPE for protection.

High-visibility PPE clothing: Reflective or brightly colored clothing designed to make personnel especially visible when in potentially dangerous traffic conditions, or poor lighting.

Field work: Areas where personnel may be exposed to hazards from work in progress or routine operations. Field work includes work performed on oil and gas locations.

Personal protective equipment (PPE): Any item worn to protect against hazards. These items include, but are not limited to, items worn to protect the body, hands, feet, head, face, eyes, hearing, and respiratory systems. PPE can be divided into two categories: standard/essential and additional.

- **Standard/essential PPE:** Hardhats, fire-resistant clothing (FRC), safety glasses, work shoes/boots, and 4-gas monitors are considered essential or standard PPE. They are required in all LDI work areas.

- **Additional PPE:** PPE that may be needed in addition to standard or essential PPE. For some areas, additional required PPE may include special gloves, certain types of respiratory protection, hearing protection, etc.

PPE-free zone: Areas where individuals are unlikely to be exposed to hazardous conditions and where field work is not routinely performed.

Company responsibilities

Employees & contracted employees

- Understand and follow the PPE policy.
- Use PPE properly.
- Participate in PPE training activities.
- Keep PPE clean, sanitary, and usable (through upkeep).
- Remove broken/defective PPE from service and report it to the supervisor.
- Alert supervisors if it appears that a new hazard might be present.

Team leaders, managers, & supervisors

- Identify job tasks that might expose employees to chemical or physical hazards.
- Determine if engineering controls can control the hazard enough to reduce the need for additional PPE.
- Make sure only approved types of PPE are used.
- Make sure work areas have a dedicated space to care for and maintain PPE.
- Make sure affected employees are aware of PPE requirements.
- Enforce PPE requirements.

Health & safety department

- Develop and maintain the PPE policy and training.
- Conduct hazard assessments to make sure PPE requirements are being followed.
- Assist the facility in developing and presenting PPE policy training.
- Evaluate/approve PPE and all PPE deviation requests.

Certified hazard assessment

LDI requires that a certified hazard assessment is completed to help the company choose adequate PPE. This certification should identify the workplace evaluated and include the date, the name of the assessor, and a certification marker.

During this assessment, the company will evaluate the workplace to see if there's any risk of hazard that requires PPE. If there is risk, LDI will:

- Determine the type of hazard present
- Choose the types of PPE that will protect the affected employee from that hazard
- Let each affected employee know about the selection
- Choose PPE that fits each affected employee

If LDI becomes aware that a new hazard is present that hasn't already been assessed, the company must reassess the area.

PPE requirements are also identified in the JSAs, risk assessments, and PPE assessments performed by health and safety staff.

Types of PPE

Standard/essential PPE requirements

During field work, certain PPE must be worn as a general safety measure. Minimum required PPE includes:

- Fire-resistant clothing as the outermost layer of clothing
- Safety glasses
- Protective footwear
- Hardhat
- Reflective clothing/vest
- 4-gas monitor

Head protection

All employees, contractors, vendors, and visitors must wear non-metal safety helmets clearly marked with the ANSI standard manufacturer certification (ANSI Z89.1). Before wearing, employees should inspect hardhats for flexibility, cracks, or breaks. Damaged or deteriorated hardhats, including hats damaged on their suspension straps, must be replaced. General hardhat rules:

- The hats should not be painted.
- The hats should not have holes in the shell, except mounting holes for suspensions or accessories.
- Suspensions must not be altered or turned around.
- Baseball caps are not to be worn under hardhats.
- Class C hardhats (conductive shell), bump caps, and cowboy-style hardhats are not allowed.
- Removing a hardhat to wear a welding helmet is allowed.

Safety eyewear & side shields

All employees, contractors, vendors, and visitors must wear approved eye protection.

Safety glasses must be ANSI-approved and clearly marked with the ANSI Z87.1 certification. They should be worn over contacts or prescription glasses. In low light conditions, employees must wear clear lenses.

For many tasks, safety glasses offer enough protection, but some need the extra protection of a face shield. In these cases, wear both goggles and the face shield. Tasks that require the use of a face shield include:

- When first opening any pipeline (petroleum, chemical, air, etc.)
- Chipping, cutting, striking, grinding, or blasting

Remember that a face shield should not be used as a substitute for chemical goggles or safety eyewear.

Hearing protection

Hearing protection must be available for all employees, contractors, drivers, and visitors. It must be worn when:

- Working inside areas where “Hearing Protection is Required” signs are posted
- When you can’t hear or talk at a normal speech volume because of loud noise in the area
- Working in areas where the noise levels are higher than 85 decibels over an 8-hour weighted average. Protection is recommended even if noise levels only reach 85 decibels for a short time

Foot protection

Foot protection must have high-impact toes (steel-, plastic-, or fiberglass-reinforced) that meet ASTM 2413 standard.

The shoes must be made of leather or woven material with a defined heel specifically made for industrial areas, and with oil and slip-resistant soles. Canvas and non-industrial fabric may not be worn in industrial areas. If chemical exposure to the feet is a risk, chemical-resistant boots with ASTM-approved toe protection and shanks should be worn.

Winter weather protection

Personnel need to wear snow and ice traction cleats when walking or working on icy/snowy surfaces. Cleats must be approved by the health and safety department.

Gloves

Personnel must use hand protection when there’s a risk of damage to the hands (e.g., pinch points, abrasion, punctures, cuts, etc.). Hand protection needs to be tailored to the hazard. For example:

- Cut-resistant gloves must be available for all employees, contractors, drivers, and visitors. They must be used whenever an employee or contractor is working around sharp objects or machinery.
- Personnel at risk of being exposed to hazardous chemicals must wear chemical-resistant gloves (e.g., Nitrile, Neoprene).

GLOVE TYPE	SPECIFICATIONS & USAGE
Impact gloves	Any time there’s risk of pinch points or crushing/smashing—like when using hand tools, using power tools, or manipulating pipe or other heavy materials.
Electrically insulated gloves	Used by qualified personnel for protection from high-voltage hazards.
Leather gloves	General work putting employees at risk of abrasions and puncture. Used for general day-to-day activities for assembly, construction, fabrication, maintenance, and metal working.
Welding gloves	Welding and torch cutting. Acceptable for minor-impact hazards during welding and torch cutting activities.
Gloves for mixed hazards	When a workplace puts an employee at risk of more than one type of hazard, like abrasion and chemical exposures. Consult with supervisors or the health and safety department for best PPE choices.

Fire-resistant clothing (FRC)

Fire-resistant clothing (FRC) is required at all times when performing field work. This includes all employees, contractors, and casual visitors. All FRC should meet the requirements of NFPA 2112 and 2113.

FRC should be worn as the outermost layer of clothing. It needs to cover the entire body except for the hands, feet, and head. Sleeves must be rolled down and fastened at the cuff to cover the wrists, and the pant legs must be long enough to cover the ankles.

All front fasteners should be fully closed except for the top collar button. If additional clothing is needed during cold or wet weather, outer jackets or rain gear must be flame-resistant as well. Insulated FRC pants or coveralls may also be worn.

Reflective clothing

Reflecting clothing/vests should be DOT-approved. They must either be marked with high-visibility material or made entirely of it. Reflecting clothing should be worn by employees who are:

- Performing field work on any oil and gas location
- Exposed to public, commercial, or construction vehicular traffic

Other considerations

Fit of PPE

LDI will choose the type of PPE necessary to protect against the hazards present in a worker's environment. However, it's just as important to use PPE that's the proper fit and/or size. PPE that doesn't fit properly will not protect against hazards the way it's supposed to.

There are many sizes available for most types of PPE, so employees and employers should work together to pick the best size for each employee.

Availability of PPE

If a job requires PPE, LDI will provide it at no cost to the employee. Employees can also choose to provide their own PPE if they want.

Contractors must provide their own PPE, and their PPE should still meet the company's requirements.

Care of PPE

Maintaining PPE in a sanitary/clean condition is necessary. Defective PPE must be discarded or removed from service (using tags for repair or disposal). If employees want to use their own protective equipment, the company is responsible for ensuring employee-owned PPE is adequate and properly maintained.

Employees must inspect and care for their PPE before each use, checking for wear and tear that would make it unsafe to use.

Training

The company requires that employees are trained on the selection, use, and care of PPE before being allowed to do work that calls for PPE. Training should cover:

- When PPE is required
- What PPE is necessary

- How to properly put on, remove, adjust, and wear PPE
- Limitations of the PPE being used
- The proper care, use, maintenance, and disposal of PPE

PPE training is documented by written certification and a demonstration. The written certification will include the date of the training, the name of the employee, and what they were trained on.

Retraining is performed as necessary. Employees must be retrained when:

- There are changes in training requirements
- There are changes in the types of PPE needed
- An affected employee is using PPE in a way that suggests that the employee does not remember or understand PPE protocol

Recordkeeping

Records of employee training on PPE will be kept for 10 years. Hazard assessment certifications will be kept and made available upon request.

SECTION 22

Personal Protective Equipment (PPE) Part II: H2S/Hazard Chemical Exposure Areas

Purpose

- To **establish** that LDI has a specific inspection program for PPE in H2S areas.
- To **emphasize** the importance of inspections of PPE in H2S areas (due to the special risks).

Scope

This program applies to all LDI employees working on:

- Locations with known H2S levels above 10 parts per million (ppm)
- Locations where H2S levels or other atmospheric hazards are potential or simply not known.
- Equipment or vessels that hold or have held material or liquid with known atmospheric hazards (e.g., frak tanks, upright tanks, piping)

Specific equipment

4-gas monitors

4 gas monitors must be used at all times when doing field work. Monitors must show the calibration and bump tests before each use. This can be seen on the monitor screen.

Calibrations should happen every 180 days. They can be done at the health and safety office using a docking station.



Figure 22-1: 4 gas-monitors

SCBA cylinder

Self-contained breathing apparatus (SCBA) cylinders need to be inspected thoroughly before each use. The cylinder should read “FULL,” and all components should be free-moving. There should be no signs of rust or corrosion, and the tank should not have extensive “cuts” in its surface. The area at the bottom of the tank (where the gauge is located) should be tight and have no cracks. Each cylinder has a **hydro date stamp** that should be checked before each use to make sure the cylinder is current and within its useful life.

Respirator masks

Respirator masks need to be clean, sanitary, and free of damage and cracks. Straps should be in good condition with no tears or cracks and clasps shouldn't have rust or corrosion. All rubber seals and plastic pieces should be easy to see through and sealed tight to the system.

Breathing air regulators

LDI's air systems use two regulators. The first is part of the SCBA system. It has a “pigtail” that connects to the SCBA cylinder. This pigtail should be able to swivel at the cylinder, and all its components must be cleaned after each use.

The second is the regulator at the **breathing air system (BAS)**, which is on site. The gauge must be readable and show an output between 80 pounds per square inch (psi) and 120 psi maximum. This regulator should be snugly connected to the breathing air cylinder and have no rust or corrosion. The bottle pressure (high-

pressure) gauge should show a pressure above 900 psi. **If it shows less than 500 psi, do not use it.** The regulator is not designed to be used at such low pressures.

Breathing air hose & components

BAS hoses should have no cracks, splitting, or other signs of extreme wear and tear. If they do, do not use them. All parts on both ends should have no rust or corrosion, and they should easily slide into the components of the BAS. They will usually have a “locking” Hanson fitting. Turn this fitting 90 to 180 degrees to make sure it doesn’t eject the connection between your SCBA and the BAS.

Breathing air cylinders

The BAS on site includes a breathing air cylinder. These are usually yellow and have a maximum capacity of 2400 psi. These components must be free-moving and show no signs of rust, corrosion, or extensive “cuts” into the tank. The area at the top of the tank (where the gauge is located) should be tight and have no cracks. Each cylinder has a hydro date stamp that should be checked before using to make sure the cylinder is current and within its useful life.

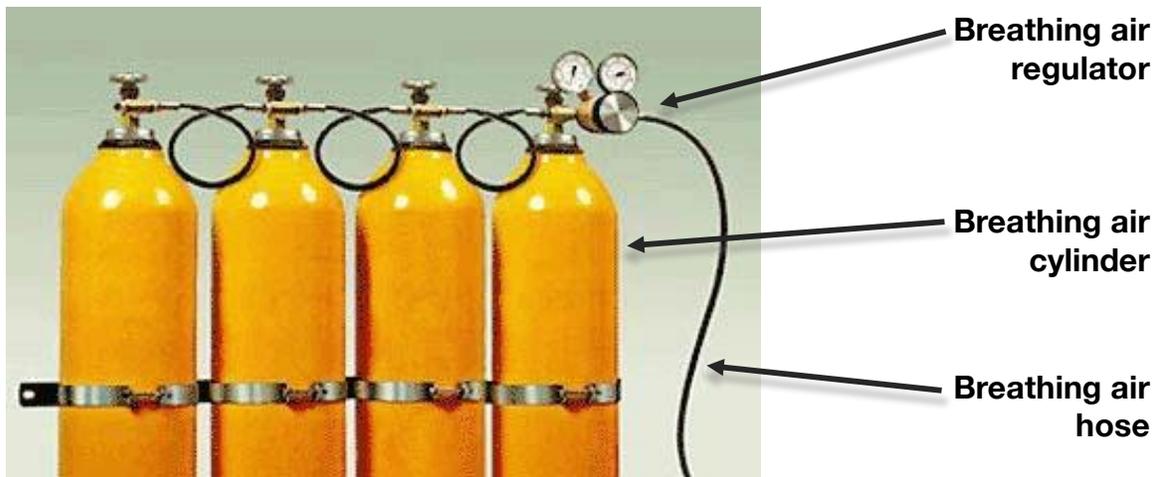


Figure 2: Breathing air system (on-site); cascaded system

Additional reading

- OSHA 29 CFR 1910.132, 1910.133, 1910.135, 1910.136
- ANSI Z89.1, Z87.1
- ASTM 2413
- NFPA 2112, 2113

FORM 010 – HAZARD ASSESSMENT CERTIFICATION	
Assessment	<i>Department:</i> _____ <i>Location:</i> _____
Jobs included in assessment	_____
Person performing assessment	_____
I certify that I performed this hazard assessment on the date indicated.	
_____ <i>Signature</i> _____ <i>Date</i>	

PPE (from the attached assessment worksheets)	Required?	
	Yes	No
Fall protection		
Torso protection		
Eye & face protection		
Head protection		
Foot protection		
Leg protection		
Hand protection		
Hearing protection		
Respiratory protection		

Fall Protection	
<i>Department:</i>	<i>Location:</i>
<i>Jobs included in the assessment:</i>	

- All employees must be protected from fall hazards when working on unguarded surfaces more than 4 feet above a lower level or at any height above dangerous equipment.
- Fall protection systems must be provided, installed, and used according to the criteria in 1926.502(d).

Potential hazards

- Unguarded surfaces more than 10 feet above a lower level or any height above dangerous equipment

Likelihood of injury without PPE

- High
- Medium
- Low

Severity of potential injury without PPE

- Minor first aid required
- Serious, not life-threatening
- IDLH – Life-threatening

PPE required

- Personal fall arrest system
- Personal fall restraint system
- None required

Torso Protection	
<i>Department:</i>	<i>Location:</i>
<i>Jobs included in the assessment:</i>	

- Clothing must be worn which is appropriate to the work performed and conditions encountered.
- Appropriate high temperature protective clothing must be worn by workers who are exposed to molten metals or other substances that can cause burns.
- Loose sleeves, ties, lapels, cuffs, or other loose clothing must not be worn near moving machinery.
- Clothing saturated or impregnated with flammable liquids, corrosive or toxic substances, irritants, or oxidizing agents must be removed immediately and not worn again until properly cleaned.
- Rings, wristwatches, earrings, bracelets, and other jewelry that might contact power driven machinery or electric circuitry, must not be worn.

Potential hazards

- Extreme temperatures
- Hot splashes from molten metal and other hot liquids
- Impacts from tools, machinery, and materials
- Hazardous chemicals
- Ionizing radiation

Likelihood of injury without PPE

- High
- Medium
- Low

Severity of potential injury without PPE

- Minor first aid required
- Serious, not life-threatening
- IDLH – Life-threatening

PPE required

- Chemical-resistant coveralls
- Cut-resistant sleeves, wristlets
- Flame-resistant jacket/ pants
- High-visibility garment
- Insulated jacket, hood
- Lab coat or apron/sleeves
- Long sleeves/apron/coat
- Static control coats/coveralls
- None required

Eye & Face Protection	
<i>Department:</i>	<i>Location:</i>
<i>Jobs included in the assessment:</i>	

- Employees must use appropriate eye or face protection when exposed to flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.
- Eye protection must have side protection when there is a hazard from flying objects. Detachable side protectors meeting ANSI Z87.1 are acceptable.
- Employees who wear prescription lenses must wear eye protection that fits over the lenses without disturbing the proper position of the prescription lenses, or ANSI-approved prescription lenses with side shields.
- Employees who are exposed to potentially injurious light radiation must use filter lenses that have s shade number appropriate for the work being performed.
- Employees whose work exposes them to laser beams must wear laser safety goggles that protect for the wavelength of the laser.

Potential hazards

- Dust, dirt, metal, or wood chips from chipping, grinding, sawing, hammering, and from power tools
- Chemical splashes from corrosive substances, hot liquids, and solvents
- Objects such as tree limbs, chains, tools, or ropes that swing into the eyes/face
- Radiant energy from welding or harmful rays from lasers or other radiant light

Likelihood of injury without PPE

- High
- Medium
- Low

Severity of potential injury without PPE

- Minor first aid required

- Serious, not life-threatening
- IDLH – Life-threatening

PPE required

- Chemical goggles/face shield
- Chemical splash goggles
- Glasses/goggles with face shield
- Glasses/goggles with face shield
- Impact goggles
- Leather welding hood
- Safety glasses with side shields
- Safety goggles with face shield
- Welding goggles
- Welding helmet/shield with safety glasses and side shields
- None required

Head Protection	
<i>Department:</i>	<i>Location:</i>
<i>Jobs included in the assessment:</i>	

- Employees must wear hardhats when they work where there is a potential for head injuries from falling or flying objects.
- Employees must use hardhats designed to reduce electrical shock hazards when they're working near exposed electrical conductors that could contact their heads.
- Employees who are exposed to power-driven machinery or to sources of ignition must wear caps or other head covering that completely covers their hair.

Potential hazards

- Overhead objects that could fall
- Exposed pipes or beams (less than 6.5 feet overhead)
- Energized electrical equipment

Likelihood of injury without PPE

- High
- Medium
- Low

Severity of potential injury without PPE

- Minor first aid required
- Serious, not life-threatening
- IDLH – Life-threatening

PPE required

Head protection that meets ANSI Z89.1 requirements:

- Impact Type I
- Impact Type II
- Electrical Class G (general)
- Electrical Class E (electrical)
- Electrical Class C (conductive)
- None required

Foot Protection	
<i>Department:</i>	<i>Location:</i>
<i>Jobs included in the assessment:</i>	

- Employees must wear protective footwear when they work where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, or electrical hazards.

Potential hazards

- Heavy objects such as barrels or tools that might roll onto or fall on a worker's feet
- Sharp objects such as nails or spikes that could pierce soles or uppers of ordinary shoes
- Molten metal
- Hot, wet, or slippery surfaces
- Energized electrical equipment

Likelihood of injury without PPE

- High
- Medium
- Low

Severity of potential injury without PPE

- Minor first aid required
- Serious, not life-threatening
- IDLH – Life-threatening

PPE required

- Steel toe safety shoes
- Leather boots or safety shoes with metatarsal guards
- Slip-resistant soles
- Puncture-resistant soles
- Chemical-resistant boots/covers
- Rubber boots/closed-top shoes
- Insulated boots or shoes
- None required

Leg Protection	
<i>Department:</i>	<i>Location:</i>
<i>Jobs included in the assessment:</i>	

- Workers exposed to hot substances or dangerous chemical spills must wear leggings or high boots made of leather, rubber, or other suitable material.
- Workers who use chain saws must wear chaps or leg protectors that cover the leg from the upper thigh to mid-calf. Leg protectors must be made from material that resists cuts from the chain saw.

Potential hazards

- Hot substances
- Dangerous chemicals
- Cuts from chain saws

Likelihood of injury without PPE

- High
- Medium
- Low

Severity of potential injury without PPE

- Minor first aid required
- Serious, not life-threatening
- IDLH – Life-threatening

PPE required

- Leggings or boots – Penetration-resistant
- Leggings or boots – Chemical-resistant
- Leggings or boots – Molten metal-resistant
- Chaps or leg protectors – Resists cuts from chain saws
- None required

Hand Protection	
<i>Department:</i>	<i>Location:</i>
<i>Jobs included in the assessment:</i>	

- Employees must use appropriate hand protection when their hands are exposed to harmful substances; severe cuts or lacerations; abrasions; punctures; chemical burns; thermal burns; and extreme temperatures.
- Employers must base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand protection relative to the task, conditions present, duration of use, and the hazards identified.
- Employees must not wear gloves when their hands could be caught in moving parts.

Potential hazards

- Harmful or hazardous temperatures
- Chemicals that can be absorbed into the skin or cause burns
- Energized electrical equipment
- Mechanical equipment that can cause bruises, abrasions, cuts, punctures, fractures, or amputations

Likelihood of injury without PPE

- High
- Medium
- Low

Severity of potential injury without PPE

- Minor first aid required
- Serious, not life-threatening
- IDLH – Life-threatening

PPE required

- Leather/cut-resistant gloves
- General-purpose work gloves
- Chemical-resistant gloves;
- Insulated gloves
- Heat-/flame-resistant gloves
- Latex or nitrile gloves
- Electrician’s insulated rubber gloves;
- Cotton, leather, or anti-vibration gloves
- None required

Hearing Protection	
<i>Department:</i>	<i>Location:</i>
<i>Jobs included in the assessment:</i>	

- Hearing protectors (plugs or muffs) must be worn by workers exposed to an 8-hour time-weighted average of 85 decibels or greater and be workers who have experienced a threshold shift.

Potential hazards

Noise levels that exceed those shown in the table below are hazardous:

Hours of exposure	Sound level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Likelihood of injury without PPE

- High
- Medium
- Low

Severity of potential injury without PPE

- Minor first aid required
- Serious, not life-threatening
- IDLH – Life-threatening

PPE required

- Ear plugs
- Ear muffs
- None required

Respiratory Protection	
<i>Department:</i>	<i>Location:</i>
<i>Jobs included in the assessment:</i>	

- Appropriate respirators are required when workers are exposed above permissible exposure limits (PEL) for specific air contaminants. See 1910.134, Respiratory Protection.

Potential hazards

- Nuisance dust/mist
- Welding fumes
- Asbestos
- Pesticides
- Isocyanates
- Paint spray
- Organic vapors
- Acid gases
- Oxygen-deficient/toxic or IDLH atmosphere

Likelihood of injury without PPE

- High
- Medium
- Low

Severity of potential injury without PPE

- Minor first aid required
- Serious, not life-threatening
- IDLH – Life-threatening

PPE required

Air-purifying respirators

- Filtering facepiece (dust mask)
- Particulate-removing respirator
- Gas-and-vapor-removing respirator
- Combination aerosol filter/gas or vapor-removing respirator
- Powered air-purifying respirator

Atmosphere-supplying respirators

- Supplied-air respirator
- Self-contained breathing apparatus (SCBA)
- Combination self-contained breathing apparatus and air-line respirator
- Combination air-purifying and atmosphere-supplying respirators
- None required

Topic		Start Time		End Time	
Facilitator(s):			Signature(s):		

COURSE PARTICIPANTS

	PRINT NAME	SIGNATURE	COMPANY
1			
2			
3			
4			
5			
6			
7			
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SECTION 23

Respiratory Protection

Purpose

- To **establish** company rules for choosing and using respiratory protection equipment on work sites.
- To **educate** employees on respiratory hazards.
- To **educate** employees on the specs of different respiratory devices.

Scope

Important: This written program is not comprehensive. If you're unsure of anything related to respiratory equipment, its requirements, or its use on the job, you must consult your supervisor before using the equipment.

This program applies to anyone at LDI who might use respiratory protection equipment. Many of the program's rules are general, so it's crucial that affected employees read, understand, and comply with all manufacturer specifications for their specific brand/type of equipment as well.

The rules set up here need to be followed in all buildings and worksites that might have:

- An amount of **airborne contaminants, irritants, or toxins** exceeding government permissible exposure limits
- Atmospheres that are **oxygen-deficient**

Definitions

Hydrogen sulfide (H₂S): A colorless gas that smells like rotten eggs. It's very poisonous, corrosive, and flammable.

Immediately dangerous to life or health (IDLH): The code of federal regulations defines an IDLH condition as one that "poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space."

Oxygen-deficient atmosphere: An atmosphere made of less than 19.5% oxygen.

Permissible exposure limit (PEL): Set up by OSHA, permissible exposure limits are legal U.S. maximum levels of exposure to potential dangers.

Self-contained breathing apparatus (SCBA) / Supplied air breathing apparatus (SABA): SCBAs/SABAs provide breathable air in IDLH atmospheres.

“Sour” site: A site containing H₂S.

“Sweet” site: A site that doesn’t have significant amounts of H₂S.

Respiratory protective equipment

General

Employees potentially exposed to airborne contaminants must wear respiratory protection. The company provides respiratory equipment to employees at no cost to them.

All respirators and equipment should be NIOSH-certified.

Procedures for working in conditions immediately dangerous to life or health (IDLH)

LDI require that if workers are on a site where breathing conditions may become IDLH, they should wear an airline respirator or a self-contained breathing apparatus (SCBA) that must:

- Maintain positive pressure in the facepiece
- Have a capacity of at least 30 minutes (longer if LDI hazard assessment shows the need for a larger time capacity)
- Provide full face protection in situations where contaminants could damage or irritate eyes
- Be equipped with low-pressure alarm warnings on self-contained breathing apparatus (SBCA)
- Be fitted with an auxiliary supply of breathable air to give workers enough time to escape in an emergency

Supplied air respirator systems

A **supplied air breathing apparatus (SABA)** or **self-contained breathing apparatus (SCBA)** must be worn during emergency situations or work tasks in which the breathing atmosphere meets any of these criteria:

- The air’s oxygen levels are less than 19.5%.
- Hydrocarbon gas exists is present.
- H₂S concentration is at a value greater than 20 ppm.

When using an SABA, air is drawn from a remote source of breathing air by a breathing air hose line. When using an SCBA, air supply is carried within a cylinder worn on the back.

Full facepiece breathing air masks are required of both SABAs and SCBAs. Both must also offer a minimum respiratory protection factor (RPF) of 10,000 in the positive pressure mode. In other words, they're required to protect the employee if concentrations of toxic materials reach a value 10,000 times the PEL.

Periodically while work is being done, designated personal should monitor the presence of H₂S.

If SCBAs are being used, employees need to complete a **SCBA checklist** beforehand. Authorized outside standby personnel should maintain constant communication with employees utilizing SABAs or SCBAs.

Thresholds

In atmospheres containing H₂S in concentrations above 10 ppm, cartridge-type respirators are not acceptable and must never be worn. Working in those atmospheres requires full facepiece SABAs or SCBAs.

In operations that have H₂S levels higher than 200,000 ppm (20%), the breathing system must have an RPF greater than or equal to the maximum concentration of H₂S in vessels and pipes.

Egress air

SABAs contain a separate reserve of air (**egress air**) contained in a small 5-minute escape bottle intended to be worn on the hip for emergency evacuation purposes. This egress air supply needs to meet all governing SCBA standards.

Egress air supply in never to be used as a source of breathing air to perform work tasks. It's intended to be used in emergency or evacuation circumstances only.

Renting

If ever renting SABAs or SCBAs, the equipment needs to meet these requirements:

- All equipment must be NIOSH-approved.
- ANSI standards must be met when air is supplied.
- The equipment's volume of delivered air should meet the 100-liters-per-minute flow rate requirement established by the NFPA.
- In-house inspections of received equipment are completed and documented.
- All workers are competent in the use of the equipment being used.
- All equipment is received in clean, hygienic condition.

Air purifying respirators

Instead of supplying employees breathable air from a separate stored supply, **air purifying respirators** remove toxic contaminants from the atmosphere's air.

Air purifying respirators are not always the correct choice of equipment. Do not select an air purifying respirator if:

- The air’s oxygen levels are less than 19.5%.
- The protection factor of the respirator is less than the toxicity of the breathing atmosphere.

Not all air purifying respirator **cartridges** will be effective in all situations. Cartridges should be chosen based on the atmospheric hazards suspected or present. The chart below shows the color coding standards used for air purifying respirator cartridges:

Air Purifying Respirator Chart	
Cartridge Color	Contaminant Type
Yellow	Organic vapors and acid gases
Green	Ammonia, methylamine
Purple	High-efficiency particulate air (HEPA) filter for asbestos
White	Sulfur dioxide and other acid gases (acids produced by combining human tissue and water)
Black	Hydrocarbons and other organic vapors

Due to the hazards that come with H₂S (obliterated sense of smell, uncertain concentration levels, uncertain presence of H₂S), air purifying respirators must not be used as protection against H₂S.

Air purifying cartridges need to be certified by NIOSH and must include an end of service life (ESLI) indicator, If there is no ESLI indicator, canisters and cartridges should have a cartridge/canister change schedule implemented if conditions are appropriate for such actions. This cartridge/canister change schedule should be based on objective information or data that will make sure canisters and cartridges are not used after their ESLI.

Selecting equipment

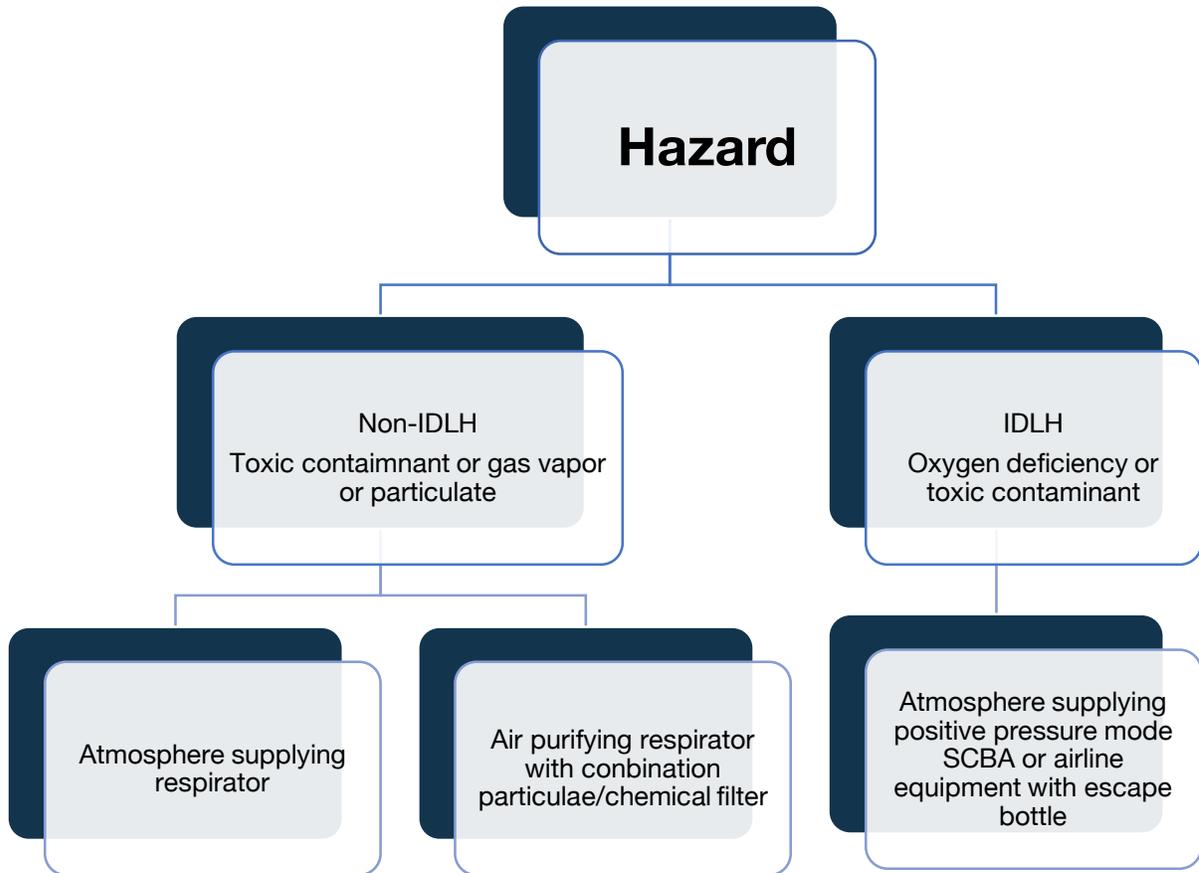
Respiratory protective equipment must be selected based on respiratory hazards, such as the type/toxicity of particulate matter and the size of the particulates. All employees, all supervisors, and anyone entering an atmosphere where respiratory hazards could exist should identify potential hazards and choose the right NIOSH-certified respirators and cartridges.

When evaluating the type of respiratory device to be used, LDI must consider these criteria:

- Need for emergency escape
- Nature of any contaminants in the atmosphere

- Concentration or likely concentration of any airborne contaminants
- Worker's likely duration or duration of exposure
- Toxicity of the contaminants
- Concentration of oxygen
- Warning properties of the contaminants

Full facepiece SABAs, SCBAs, or cartridge-type respirators must be used if any suspected atmospheric hazard may affect the eyes.



Hazard	Minimum Respiratory Protection Equipment Required
19.5% oxygen or less (oxygen-deficient)	An SABA with auxiliary air supply or an SCBA positive-pressure, 30-minute with alarms is required
H2S greater than 15 ppm	An SABA with auxiliary air supply or an SCBA positive-pressure, 30-minute with alarms is required
Natural gas (ethane, propane, methane) above 1,000 ppm – Sweet	An SABA with auxiliary air supply or an SCBA positive pressure, 30-minute with alarms is required.
Other hydrocarbons	See the SDS for type of respirator requirements for each other hydrocarbon and additional information.
Paint vapors	A half face mask with an organic vapor cartridge with a mechanical pre-filter is required.
Asbestos	A half face mask with a HEPA (high-efficiency particulate air filter) is required.
Welding fumes	A half face mask with a filter capable of removing metal fumes is required.
Sand blasting	An SABA with an egress bottle is required.
Nuisance dusts	A MSHA- or NIOSH-approved particulate filter is required.
Solvent vapor behaviors	Check SDS for permissible exposure limit (PEL).
PEL to 10x PEL	A half face mask with an organic vapor cartridge is required.
10x PEL to 50x PEL	A full face mask with an organic vapor cartridge is required.
50x PEL or greater	An SABA or an SCBA is required.

Atmospheric testing

Only trained, designated personnel using proper procedures and approved equipment are allowed to perform **atmospheric (gas) testing**.

Any worksite, building, or area suspected of containing oxygen-deficient, contaminated, or toxic atmospheres must be atmospherically tested before work starts.

Maximum use concentration (MUC)

The employee can expect to be protected while wearing a respirator if requirements fall under the **maximum use concentration (MUC)** of the hazardous substance.

The MUC is determined by the exposure limit of the hazardous substance and the class of respirators/assigned protection factor (APF) of the respirators. It can be mathematically determined by multiplying the APF by the ceiling limit, short-term exposure limit, or the permissible exposure limit required by OSHA.

When measured outside of the respirator, the employee's exposure to contaminants must remain at or below the MUC. The company is responsible for providing respirators and equipment that meet this criterion. If the calculated MUC is greater than the performance limits of the canister or cartridge, or if the MUC value exceeds the IDHL level for a hazardous substance, the maximum MUC should be set at the lower limit.

Care of respiratory protective equipment

LDI is responsible for maintaining all respiratory protective equipment. The equipment should be stored in a place readily accessible to workers where it won't be contaminated. It should be clearly marked.

Respiratory protective equipment needs to be used and serviced according to its manufacturer's specifications.

Equipment cleaning

The company requires that respirators are properly cleaned and stored after each use. All respiratory facepieces should be sanitized—either with alcohol-free cleaning wipes or warm water/dishwashing detergent and a soft, clean cloth to dry.

Who takes care of cleaning? Generally, whoever uses the equipment. Cleaning should be a part of employee training (see *Training* section).

Employees who find resistance or breakthrough in cartridges shouldn't clean them; they should instead replace them as needed.

Equipment inspection

LDI requires that respirators are inspected before use. Before donning equipment and before exposure to the hazardous atmosphere, all equipment must be field-inspected by the user.

On top of that, emergency respiratory protective equipment should be inspected monthly. Respiratory protective equipment used for escape only should be tested before taken into the workplace.

These inspections should be documented, records need to be kept on the worksite. Documentation should contain the date of the inspection and the name of the

inspector. A trained worker must be designated to complete these inspections by the supervisor who is in charge of the worksite.

Equipment storage

Respirators should be stored safely, with these protective factors:

- Away from damaging chemicals
- Out of direct sunlight
- Out of extreme temperatures
- Away from excessive moisture
- Away from any area where respirators will be exposed to contamination, dust, or damage
- In a way that prevents deformation of the exhalation valve and or facepiece

Cylinder integrity & breathing air quality

As explained in ANSI/Compressed Gas Association Commodity Specification for Air (G-7.2-1989), air quality must conform to Grade D breathing air. All air at the outlet of the air compressor should be analyzed in 6-month time periods. Breathing air should not contain any substance in concentrations greater than 10 percent of its PEL.

LDI will use a carbon monoxide alarm, a high-temperature alarm, or both to monitor carbon monoxide levels if using oil-lubricated compressors. The company will make sure carbon monoxide levels stay under 10 ppm in the case of non-oil-lubricated compressors. To prevent carbon monoxide in the breathable air from exceeding 10 ppm, air supplies must be monitored at acceptable intervals if only high temperature alarms are being used.

Air cylinders, bottles, and cartridges must be rotated to make sure the air is fresh and not more than six months old.

Recertification and hydrostatic testing must be performed:

- **Kevlar breathing air cylinders** must be recertified and tested every 3 years.
- **Aluminum and steel bottles** must be recertified and tested every 5 years
- **Fiberglass-wrapped aluminum breathing air cylinders** must be recertified and tested every 3 years

All bottles and cylinders must be tested and maintained according to the Shipping Container Specification Regulations of the Department of Transportation (see 49 CFR Part 178 and 173).

Availability of SCBAs

For emergency purposes, all relevant worksites must have one SCBA unit available for each full-time operated position. This is specifically a requirement on worksites where H₂S may be present.

For emergencies at larger complexes that have full-time maintenance workers on site, there should be one SCBA for every 4-hour operating position to support all employees who need respiratory protection.

An SCBA with auxiliary air supply, as well as appropriate retrieval equipment, must be available. These are mandatory in IDLH areas.

SCBA access locations

SCBAs need to be kept in easily accessible, nonhazardous areas:

- Away from toxic atmospheres, potential fire hazards, etc.
- In a dry place not exposed to temperatures above 86°F or below 32°F¹
- Away from any kind of vibration, which could affect the equipment's accuracy

SCBA storage areas should be clearly labeled and available throughout the building or worksite. To help workers to quickly put equipment on (“don the equipment”) in an emergency, SCBAs must be mounted and, if possible, be complete with a protective covering.

SABA

An SABA mask, complete with an egress bottle and attached to a central source of approved breathing air, may be a more economic and efficient way to protect workers during routine work tasks that require respiratory protective equipment. (Routine tasks might include changing valves in a sour gas compressor or changing hydrocarbon filters.) In these cases, there must be enough SABA and airlines in the building/worksite to provide for these normal tasks.

Evacuation & rescue

An employee must leave the area if a vapor/gas breakthrough, changes in breathing resistance, and/or leakage of the facepiece occur. And in certain situations, it's necessary to have a competent safety standby person available to execute a prompt rescue. Examples:

- Atmospheres where conditions could turn hazardous at any time
- Any unknown atmosphere
- Any atmosphere where conditions may be IDLH
- Any area where a worker's ability to evacuate is limited

Extra SCBA cylinders/bottles

To make sure workers don't run out of fully charged SCBA air cylinders in an emergency, LDI requires that for every 2 respiratory units at the worksite, a fully charged spare SCBA bottle is regularly in stock.

¹ Storing units above or below these temperatures will affect the operation of the equipment and the comfort of the user.

Site-specific safe operating procedures

For each building or worksite, the safety department must conduct a hazard assessment, taking a look at the tasks to be completed and determining the site's requirements for respiratory protective equipment. The tasks requiring respiratory protective equipment should be included in the site-specific safe operating procedures and be addressed in a daily **job safety analysis (JSA)**.

Fit testing

General

Users of respiratory protective equipment must be fit tested. Fit test protocol has been outlined in OSHA Standard 1910.134 Appendix A, although most manufacturers include instructions for fit testing too.

Employees are required to pass a **quantitative fit test (QNFT)** or a **qualitative fit test (QLFT)** before using a respirator. A QNFT/QLFT should be performed again annually and whenever the respirator being used is changed.

Field fit testing

It's extremely important to have close-fitting respiratory equipment—so prior to each use, employees must test the respirator's facepiece-to-face seal and make sure their device fits properly. Each time a face seal dependent respiratory equipment is worn, field fit test checks must be performed.

Testing procedure for a SABA or SCBA:

1. Disconnect the air supply hose.
2. Cup the open palm of the hand over the air supply inlet.
3. Breathe in.

Testing procedure for a cartridge-type respirator:

1. Cover the inlet surface of the respirator cartridge.
2. Breathe in.

Until the palm of the hand is removed from the cartridge surface or the air supply hose inlet end, the facepiece should be pulled against the face by the vacuum effect created in the facepiece and should stay this way.

Facial hair

Excessive facial hair, skin interruptions, missing dentures, scars, mustaches, unusual face contours, and eyeglasses can all interfere with effective facial seal of respiratory protective equipment. Eyeglasses, facial hair, or any other obstruction that may interfere with the seal against the face is not allowed when using respiratory protective equipment.

All contactors, visitors, and employees of LDI who set foot on a site with a potentially hazardous atmosphere must be clean-shaven where the facepiece or mask seals to the face.

Hiring clients may have their own policies about facial hair on top of ours. If a client requires all contractors to clean-shaven, LDI employees working for that client will comply.

Employees are not to wear tight fitting respirators if they have facial hair that interferes with the valve function or comes between the face and the sealing surface of the facepiece (see image below).



Figure 3: Mustaches that are trimmed at or above the edge of the lips, and soul patches, are acceptable also.

Protocol requirements for fit testing

The technician responsible for conducting fit tests must be:

- Trained in the fit testing protocol.
- Trained in the application of the fit testing protocol for the specific pieces of equipment being tested.

Fit testing should be done annually. Records documenting test results, sizes, brands of facepieces/masks must be kept for a 3-year period, at minimum.

During fit tests, workers will be given training in the use and care of the respiratory equipment, as well as the limitations of face seal-dependent respirators.

Training

General

All affected LDI employees are provided training on respiratory protection. Topics will include:

- General respirator knowledge and types of equipment, including its imitations
- Selecting the equipment
- Safely using the equipment

- Wearing and proper fitting of the equipment, including facepiece-to-piece tests
- Importance of shaving
- Maintenance, cleaning, and storage of the equipment
- Reporting damaged equipment
- Emergency situations and vacating procedures
- General requirements of the OSHA standard
- Medical signs and symptoms of respiratory injuries/illnesses

All training needs to be conducted before employees are asked to use any respiratory equipment. Affected employees will get the training when they're first hired and will be retrained every year after that.

All employees working at an H2S ("sour") site need to be certified in the **H2S Alive Certificate Program** or equivalent.

Employees in training should be asked if they feel okay and have enough air supplies while wearing their devices. Anxious or concerned employees might need additional one-on-one training before being allowed to wear their devices on the job.

Onsite refresher training

Additional refresher training will be given on site as well, typically in the form of demonstrations or drills. This training needs to refresh employees on:

- How to use, wear, and handle an SABA, a cartridge-type respirator, or an SCBA. Everyone being trained needs to practice this alongside the demonstrator.
- How to conduct a facepiece-to-face field test of all respiratory devices they might be required to use.

Program administration

A program administrator has been designated to be a point-person for the respiratory protection program and evaluate its effectiveness. The administrator should be well-educated about respiratory equipment will evaluate employees' views on the program, identifying any problems it might have.

Any problems identified during the assessment process will be corrected right away.

Medical evaluation & surveillance

A medical evaluation must be completed before an employee can use a respirator. Unless found physically able to perform work while wearing respirators, employees must not be assigned tasks that require respirators.

To determine employees' physical ability to wear respirators, evaluations will be performed using the OSHA's **Respirator Medical Evaluation Questionnaire**. The

questionnaire is found in Standard 1910.134 or online here:

<https://www.osha.gov/Publications/OSHA3789info.pdf>

The medical evaluation should take place before the employee is fit tested or asked to use a respirator. It should be administered during normal working hours at a time, place, and manner convenient for the employee, and it must be kept confidential. Employees should be assured that they can discuss their results with a licensed health care practitioner or physician if they want.

In order to assess physiological changes in employees who wear respirators, relevant medical tests should be performed to establish data and make a proper assessment.

Additional medical evaluations might be required if:

- An employee reports medical symptoms or signs that may affect their ability to use a respirator.
- LDI is informed by the program administrator, the supervisor, or a medical practitioner that the employee should be re-evaluated.
- Changes happen in daily work environment/tasks that could result in a bigger physiological burden on the employees. Examples include:
 - Change in temperature
 - Use of protective clothing
 - Change in physical work effort
- Observations made during program evaluation or fit testing show that employees should be re-evaluated.

Employees who are psychologically or physically unable to wear respirators should be screened out using a **Pre-Placement Medical Examination**.

Recordkeeping

LDI will keep administrative records on:

- Worker fit testing for respirator facepieces
- Employee training on respiratory protection
- Each breathing air bottle (cylinder/cartridge)
- Inspections of respiratory protective equipment
- Repair work done on respiratory protective equipment
- Modifications made to respiratory protective equipment
- Each SABA/SCBA unit

Additional reading

- OSHA Standard 1910.134 – Respiratory Protection:
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=12716
- OSHA Technical Manual – Respiratory Protection:
http://www.osha.gov/dts/osta/otm/otm_viii/otm_viii_2.html
- OSHA Health and Safety Topics – Respiratory Protection:
<http://www.osha.gov/SLTC/respiratoryprotection/index.html>

SECTION 24

Risk Assessment (Identification of Hazards)

Purpose

- To **establish** a formal process for identifying potential risks/hazards and define when the risk/hazard identification process is used.
- To **outline** methods to ensure identified risks/hazards are addressed and mitigated.

Scope

LDI is dedicated to the protection of its employees and subcontractors from hazards that might arise as they go about their jobs. These hazards may be caused by the **equipment** used to perform tasks, the **actions** needed to perform tasks, or the **environment** the tasks are performed in. Both employees and subcontractors are actively involved in the risk/hazard identification process.

The information gathered from these **job safety analyses (JSAs)** might also be used in:

- Employee training
- Determining reasonable accommodations under the Americans with Disabilities Act (ADA)
- Writing job descriptions and procedures
- Return-to-work programs and safety audits
- Safety meetings

JSAs give employees safe and efficient procedures to follow during their tasks. Hazards can change with every job process change, so we perform daily JSAs on all projects—paying special attention when job processes change and before employees initially perform the job.

This program educates LDI employees on the plan's purpose, administrative duties, job selection, and the separation of jobs into steps, hazard identification and risk assessments, and the development of JSAs.

Company responsibilities

The division safety coordinators or another designee is the administrator of the plan and has overall responsibility for it. Responsibilities include:

- Choosing who will conduct job safety analyses
- Choosing jobs for analysis
- Documenting the steps of each selected job
- Identifying hazards
- Minimizing or eliminating the hazards
- Generating job safety analyses
- Managing the JSA information
- Recordkeeping
- Updating JSA procedures

Job safety analysis (JSA) process

Choosing participants

JSAs are done with the involvement of people who have valuable input. Others may be involved as well, depending upon the job being analyzed.

Choosing jobs

All projects will perform JSAs for routine and non-routine activities as well as new processes and changes in operation, products, or services as applicable.

Separating jobs into steps

When a JSA is taking place, the chosen job is broken into steps. The job steps should be natural parts of the task, and the work is clearly advanced upon completion of each step.

JSAs usually involve **observing a worker** while they're doing a task, interviewing the worker about the task, and recording the steps—including any movements—taken to complete the task.

For jobs that aren't analyzed through direct observation, we use the following method of obtaining information for a JSA:

- Employee input
- Scope of work
- Type of work being performed

After the task is done, the information is reviewed and revised as needed. The steps are listed on the JSA form. A rule of thumb: **most jobs will separate into 10 to 15 basic steps**. But regardless, the important thing is that the breakdowns have enough steps to accurately describe the work.

Identifying hazards

After the basic steps of the job have been determined, each step is carefully examined to identify hazards or potential hazards. There are a number of questions that can help you identify hazards.

After identification, risks/hazards are classified and/or ranked based on severity, with the most severe hazards being given priority. A **risk analysis matrix** showing the severity and probability of occurrence should be developed.

Hazard control

Once hazards are identified and ranked for each job step, they're reviewed with the employee(s) performing the tasks so that **solutions** can be developed. For every known hazard associated with a job step, there should be a solution written down to help offset it—taking into account effectiveness, timeliness, and employee acceptance. The most serious hazards should be the first ones to have solutions developed.

Effectiveness of hazard controls can be evaluated on a scale. Before implementing a solution, we evaluate/test it to make sure it's effective and to find ways to improve it.

Review

When JSAs are complete, a **follow-up evaluation** should be conducted to make sure the solutions have successfully controlled the hazards and didn't create new ones.

JSA forms

With all the information that goes into the performance of a JSA, there are a number of forms that may be used. These forms may include workers' compensation claims loss analysis summaries, cost worksheets, costs of accidents, employee input forms, job hazards checklists, and finally, JSA forms (attached in this section).

The information gathered from identifying the job, those involved, the hazards, and the solutions is compiled and recorded on our JSA forms.

Training

The company requires that employees are trained in the risk/hazard identification process, including the use/care of proper PPE and the value of being actively involved in the daily JSA program.

CREW SIGNATURES					
1. _____	2. _____	3. _____			
<i>Name</i>	<i>Signature</i>	<i>Name</i>	<i>Signature</i>	<i>Name</i>	<i>Signature</i>
4. _____	5. _____	6. _____			
<i>Name</i>	<i>Signature</i>	<i>Name</i>	<i>Signature</i>	<i>Name</i>	<i>Signature</i>
7. _____	8. _____	9. _____			
<i>Name</i>	<i>Signature</i>	<i>Name</i>	<i>Signature</i>	<i>Name</i>	<i>Signature</i>
10. _____	11. _____	12. _____			
<i>Name</i>	<i>Signature</i>	<i>Name</i>	<i>Signature</i>	<i>Name</i>	<i>Signature</i>

EMERGENCY EVACUATION PLAN
<p>1. Turn equipment off.</p> <p>2. All personnel gather at the muster area designated at the front of this form.</p> <p>3. Everyone must be accounted for and sign the JSA.</p> <p>4. Report emergency immediately to supervisor / client representative.</p>

Nearest hospital:

Directions to nearest hospital:

Emergency numbers:

Muster point sign-in:

1. _____	6. _____	11. _____	16. _____
2. _____	7. _____	12. _____	17. _____
3. _____	8. _____	13. _____	18. _____
4. _____	9. _____	14. _____	19. _____
5. _____	10. _____	15. _____	20. _____

SECTION 25

Scaffolds

Purpose

- To **establish** rules for using, inspecting, and constructing scaffolding and other temporary work platforms.

Scope

Oil, gas, and construction companies use elevated work platforms regularly. This scaffolding program applies to any work site owned or operated by LDI on which workers use work platforms, scaffolds, aerial lifts, or any other supporting structure to get access to elevated areas.

About scaffolds

Types

There are many different types of scaffolds: clamp, tube, frame-set, wood, modular, etc. Because most scaffold-related incidents happen when constructing or dismantling scaffolds, workers need to be aware of the specific type they're using.

Regulatory standards & design

LDI is responsible for making sure all scaffolds in use comply with ANSI A10.8-2011. The table below shows specific rules for scaffold placement and specs:

PLACEMENT	SPECS
<ul style="list-style-type: none"> • Properly braced to avoid sideways movement • Anchored by one tie-in for every 21 feet of horizontal interval and every 15 feet of vertical interval • Anchored by one tie-in for every 10 feet of horizontal and/or vertical interval if the scaffold is hoarded • When height of the scaffold is 3 or more times greater than the smallest 	<ul style="list-style-type: none"> • Toe boards at least 4 inches tall installed at all open sides of the scaffold (if the scaffold is to be more than 10 feet above the ground) • Mid-rails made of 1 x 4-inch lumber or equivalent and guardrails made of 2 x 4-inch lumber at minimum; never use cross braces as substitutes for handrails or mid-rails.

PLACEMENT	SPECS
<p>width of the base, secure it to the building or structure at every other lift and every 30 feet horizontally</p> <ul style="list-style-type: none"> • Set precisely on a jackscrew, base plate, or other load-dispersing device on top of a stable surface • Guardrails placed no shorter than 36 inches and no higher than 42 inches • Scaffold planks secured from movement using #9 wire or equivalent 	<ul style="list-style-type: none"> • Anchorage that is rigid, sound, and able to carry the maximum load without displacement or settlement • Platforms completely decked with safety planks, manufactured scaffold decking, or laminated wooden planks • Platform at least 2 planks wide; no employee may work from a single plank • Access ladders present for each scaffold

Safe work practices

General

Scaffolds should be kept clear of debris, work materials, equipment, and tools.

If scaffolds don't have complete handrails, guardrails, or decking, **fall arrest equipment** should be used. If working on a suspension scaffold, employees should wear a safety lifeline attached to a lifeline. All lifelines should be soundly attached to supportive pieces of the structure itself—not to the scaffold.

No workers should be allowed to work on scaffolds if:

- High winds or storms are present.
- The scaffolds are covered in snow or ice. In these cases, they should be cleared and sanded to prevent slips.

If employees are required to work or pass under a scaffold, a screen of 18-gauge, 1/2-inch wire mesh needs to be installed between the toe board and the guardrails. Be sure not to create a **tripping hazard** at the base of a scaffold. Horizontal scaffolds' poles at the base of a scaffold are tripping hazards. Cross braces or barricade tape should be installed to keep people from tripping on the poles or from walking underneath the scaffold.

Assembling, modifying, & dismantling scaffolds

Only trained workers under supervision of a competent person should erect, modify, or take apart scaffolds. Fall arrest systems should be used in all of these situations.

Note: If scaffolding is higher than 125 feet (38 meters), it needs to be designed by a certified professional engineer.

- **Before erecting and during dismantling, inspect all components.** Scaffold components shall be straight and free from bends, kinks, dents, and severe rusting. Immediately discard defective components.
- **Set scaffold legs on base plates placed on foundations or mudsills** that can properly support the maximum intended loads.
- **Install adjusting screws** only between the base plate and the vertical frame section. Never use adjusting screws together with casters. Do not extend adjustment screws beyond 12 inches.

Cribbage, boxes, kegs, and masonry blocks are not appropriate scaffold foundations or work platforms.

Rolling scaffolds

Remember: No one is allowed to ride rolling scaffolds.

All caster brakes must be locked when the scaffold is not in motion. When moving rolling scaffolds:

- Remove all loose materials and equipment from the deck beforehand.
- Get help from other personnel.
- Make sure that the path of travel is clear.
- Watch for holes and overhead obstructions.
- Re-level the scaffold after each move.

Suspended scaffolds

All suspended scaffolds or platforms need to have a separate vertical lifeline anchored independent of the scaffold system. Workers must tie off onto this lifeline.

Overhead protection

Overhead protection is required if employees working on scaffolds are exposed to overhead hazards. This protection must be a 2-inch plank or the equivalent.

Ladder use

Absolutely no objects, tools, or material are allowed to be carried in hands while ascending or descending ladders.

Scaffold users should be able to step off the scaffold access ladder directly onto the working platform. There should be entry gates for scaffolds so that workers don't have to climb over handrails. If scaffolds are incomplete, a handhold above the platform elevation should be provided to make the transition from ladder to platform safer. (Toe-boards don't satisfy this requirement.)

Climbing off the end frames isn't allowed unless they're equipped with an approved ladder. To allow access to the working platform, the ladder built into the end frames can be used if uniform rung spacing between frames is possible. Note that tube frames that don't provide uniform rung spacing must be equipped with offset ladders for platform access.

Extra fall protection—like ladder cages, retractable lifelines, rope grab systems, and fall breaks—should be provided on all fixed ladders¹ when work is being done at heights of 20 or more feet.²

Loading

Before beginning work on a scaffold, all workers need to be aware of its maximum loading capacities. Scaffolds should be built to carry loads at least 4 times heavier than what's actually going to be placed on them. The “total load” on a scaffold base is the sum of the weight of the workers, tools, equipment, and materials on a scaffold plus the weight of the scaffold itself.

Only a certified professional engineer may design scaffolds used for carrying an evenly distributed load of more than 367 kilograms per square meter (75 pounds per square foot). In these special cases, the scaffolding needs to be used, constructed, and maintained according to the certified specs.

Static vs. shock loading

In most cases, scaffolds and other temporary support structures are used only for loads that won't be moving (**static loading**). Known static load requirements should be followed when working on scaffolds and aerial lifts to make sure workers on/around the device are safe. OSHA regulations require that all platforms, aerial lifts, and scaffolding need have evenly distributed static loads.

It may sometimes be necessary to move heavy objects or workers on the scaffolding surface. In these cases, be aware that the platform could fail and cause serious injury or death if the object being moved is dropped or if the worker moves down onto the platform too heavily. This type of loading is also referred to as **shock loading** or **impact loading**. No system designed for static loads should ever be used for impact loading.

Inspection & tagging

Scaffolds are inspected by a competent person prior to use and after any situation that could have affected its integrity. The inspector should check for the following:

¹ Fixed ladders are ladders placed for repeated access/egress ((used more than once) to elevations.

² The 20-foot designation refers to the height of the working platform/ladder rung above a lower level or the position of the worker's feet above a lower level.

- Visible defects
- Stability of the foundation or mudsill
- Missing or damaged handrails, mid-rails, cross bracing, or steel tubing
- Cracks on weld zones on the scaffold frame
- Cracks or splits on the ends of tubing
- Loose bolts or rivet connections and bent, kinked, or dented frames on the manufactured decks
- Softening or peeling of plywood surfaces due to rot or wear
- Rot, cracks, cuts, and other external damage to safety planks
- Issues with tie rods or bolts and angle iron cleats
- Issues with cams, springs, threaded connections, toggle pins, or other quick-connecting devices
- Rough rolling surfaces, "sticky" swivels, and defective locking mechanisms on the casters
- Cups/rings/rosettes and swedge pins

Both the competent person inspection and the daily inspection should be documented by signing the back of the scaffold tag. Scaffold users are required to check the inspection tag for current shift signoff before they use the scaffold.

Color codes

Scaffolds are tagged when defective or unsafe conditions are found. They should be color-coded with a tag at each point of entry so that workers can easily identify the condition and status of the scaffold. All tags attached to scaffolds expire 21 days after their written date.

The color coding is as follows:

- **Green:** A green tag means the scaffold is built to meet regulations and is complete/safe for use. It should be labelled "SAFE FOR USE."
- **Yellow:** A yellow tag means the scaffold was not built to meet scaffolding standards may have an unusual or potential hazard. Fall protection is required. The tag should read "CAUTION: UNUSUAL OR POTENTIAL HAZARD EXISTS."
- **Red:** A red tag means the scaffold is incomplete or unsafe. It should be labelled "UNSAFE FOR USE."

Workers should never use scaffolds with a red tag, with an expired yellow/green tag, or with no tag.

Training

All employees are provided training on safe use of scaffolds. The topics employees are trained on include:

- Load capacity
- Planks
- Aerial lifts
- Scaffold use
- Fall protection
- Electrical safety
- Falling object protection

When re-training is required:

- Changes at the worksite have introduced new hazards that employees haven't been trained on.
- The types of equipment used—including falling object protection, scaffolds, and fall protection—have changed.
- An employee shows that they haven't retained information from their past trainings through a low quality of work.

Additional reading

- OSHA – Standard 1910.28 – Safety Requirements for Scaffolding.
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9720
- Managerial Technologies Corporation, Safety Library – Scaffolding and Work Platforms: <http://www.thesafetylibrary.com/sites/constscaff.php>

SECTION 26

Short Service Employees (SSE)

Purpose

- To **establish** a definition of a short service employee.
- To **explain** additional guidelines for supervising, training, and mentoring LDI's short service employees so that incidents are prevented during the first months of employment.

Scope

The short service employee program applies to all **non-qualified personnel** (employees, consultants, contractors, and subcontractors) working in the field for LDI. Employees are generally considered “short service” if they have less than 6 months of experience with their current employer or in their current job.

Definitions

Short service employee / Inexperienced employee: Any regular or contracted employee with less than 180 days of experience in the company or in their current job assignment. SSEs have limited knowledge of job function, company policies, and the inherent hazards associated with their site-specific responsibilities.

Inexperienced employee program: Short service employees are identified as being part of the program through a sticker on the employee's hardhat that reads “SSE.” Once the employee has shown competency and safety compliance, they can remove the high-visibility identifier.

Trainer: Any LDI employee that has at least 1 year in their current position, has a strong sense of their job tasks, shows a positive work ethic, and encourages safe work practices.

Basic SSE rules

Here are the basic guidelines of the SSE program (more details on them can be found in the next section, *Company responsibilities*):

- A short service employee may not work alone.

- The host facility must be notified when a short service employee will be working at their site.
- Short service employees must wear identifiers (stickers) on their hardhats.
- Employees with no industry experience must wear uniquely colored hardhats (green).
- Short service employees are monitored for compliance with HSE policies and procedures.
- Similarly, the company requires that a short service employee is mentored by an experienced/knowledgeable employee.
- Subcontractors must adhere to the requirements of the short service employee program as well.

Company responsibilities

Short service employees

- Informing their trainer if they're not sure of any part of a task that's new to them.
- Being open to feedback from trainer, even beyond the 6-month SSE period.
- Following all policies and procedures they were trained on and making sure their behavior is safe and environmentally conscious.

Experienced employees

- Being good role models for new employees.
- Taking advantage of training/coaching opportunities when they arise.

Health and safety manager or assignee

- Always being available to answer questions from SSEs.
- Making sure inexperienced employees are identified and given an SSE hardhat.
- Communicating the requirements of this program to employees and making sure the rules are followed.

Supervisors

- Making sure inexperienced employees are identified and given an SSE hardhat.
- Affirming after the 6-month period is over that the green hardhat is traded in for a standard hardhat.
- Making sure SSEs do not work alone. **A work crew smaller than 5 employees may not have more than one short service employee.**

- Pairing the SSE with an experienced employee with at least 2 years of experience in their current position.

Subcontractors

- Managing their short service employees in accordance with the requirements of the SSE program.

Trainers

- Demonstrating safe work habits by not taking short cuts or performing work in a way that is hazardous to health, safety, or the environment.
- Making sure that specific job requirements (skills and competencies) are clearly defined and that the SSE understands the scope of the work being performed.
- Reviewing known hazards of the work being performed and discussing safe work practices.
- Abiding by all federal, state, and county regulations.
- Coaching the SSE on how to fill out a job safety analysis (JSA).
- Observing SSE performing their work and coaching them with positive feedback and opportunities for improvement.
- Being readily available for questions or comments from SSEs.
- Completing documentation showing that the SSE has met all expected objectives and coordination skills inventory.

Completion

At the end of the 180-day SSE period, the supervisor will notify the trainer that the probationary period is over. The supervisor and trainer will conduct an SSE evaluation of the employee.

The completion date of the evaluation can be dependent on the employee's performance and can be extended if necessary.

Training

Before employees start work with LDI, they need to successfully complete the new employee orientation. During orientation, they'll be trained on the policies, roles, responsibilities, and requirements of the SSE program. Training will be documented.

The checklist at the end of this chapter outlines other specific training topics to help supervisors make sure SSEs are being briefed on all appropriate areas of workplace safety procedures.

Recordkeeping

SSE documentation will include SSE checklist and completion record (both attached). SSE documentation will be maintained in the personnel file.

Form 012 – Short Service Employee (SSE) Checklist

Name: _____ Employee #: _____

Job title: _____ Hire date: _____

Trainer or mentor: _____ Supervisor: _____

Type of employee: Short service employee More than 6 months of experience with company or industry, but new to job or new to company

TRAINING TOPIC	DATE	SSE	TRAINER
1. Applicable safety orientation (LDI-specific)	_____	_____	_____
2. Task-specific employee orientation (daily)	_____	_____	_____
3. Received copy of employee handbook	_____	_____	_____
4. Review employee’s safety responsibilities	_____	_____	_____
5. Review employee’s safety program participation	_____	_____	_____
6. Review employee’s authority to stop unsafe work	_____	_____	_____
7. Completed SafeLand accredited training	_____	_____	_____
8. Received personal protective equipment/training	_____	_____	_____
9. Accident reporting requirements	_____	_____	_____
10. Safety meeting procedures/requirements	_____	_____	_____
11. Job safety analysis (JSA) procedures	_____	_____	_____
12. Near-miss identification/documentation	_____	_____	_____
13. Able to identify/document hazard observations	_____	_____	_____
14. Read company standard operating procedures	_____	_____	_____
15. Drug/alcohol policy requirements	_____	_____	_____
16. Slip/trip/fall hazards	_____	_____	_____
17. Smoking policy/designated areas	_____	_____	_____
18. Pre-trip/post-job duties	_____	_____	_____
19. Proper truck/equipment operations	_____	_____	_____
20. Proper lifting: Manual/mechanical	_____	_____	_____
21. Required paperwork to complete/sign	_____	_____	_____
22. Proper fire extinguisher use/maintenance	_____	_____	_____
23. Hearing protection/equipment	_____	_____	_____
24. Emergency action plan	_____	_____	_____
25. Hot work permits	_____	_____	_____
26. Hazard communication (SDS)	_____	_____	_____
27. High-pressure understanding	_____	_____	_____

Employee signature: _____ Date: _____

Trainer signature: _____ Date: _____

Supervisor signature: _____ Date: _____

Form 013 – Short Service Employee (SSE) Completion Record

Employee name: _____

The employee has acquired and demonstrated a good working knowledge of LDI Energy Services LLC’s health and safety policies/procedures, has adhered to those policies, and has completed 90 days of service without a recordable incident.

The employee has successfully completed LDI Energy Services LLC’s short service employee program.

Date started SSE program: _____

Date finished SSE program: _____

Trainer signature: _____ Date: _____

Supervisor signature: _____ Date: _____

SECTION 27

Stop Work Authority (SWA)

Purpose

- To **explain** to LDI employees how, when, and why they may use stop work interventions.
- To **outline** the roles and responsibilities of employees and management during interventions.

Scope

Sometimes, an employee may be asked to perform tasks or use equipment, tools, or machinery that aren't a normal part of their job. This can be hazardous to the employee and other employees on the job site. The stop work authority (SWA) program was designed for when workers feel like they're in imminent danger in these situations.

Defining “imminent danger”

Imminent danger is a danger that exists in the workplace when employees are asked to do irregular/unusual tasks or tasks they weren't properly trained in.

Stop work authority procedures*Overview*

The steps of the stop work authority process include: **stop, notify, correct, and resume**. An additional **review** step is recommended as well so that patterns can be identified by management and future issues can be anticipated.

Stop

Employees have the obligation to stop any work that they're concerned could potentially be unsafe. No work will resume until all issues and concerns have been addressed.

If a worker reasonably believes that a task poses an imminent danger to them or others working on the job site, they should not complete the task. All employees have the authority to stop work when the control of the HSE risk is not clearly established or understood. Likewise, if a worker believes that certain equipment, appliances, or tools pose an imminent danger, they shouldn't use these objects.

When appropriate and necessary, workers are responsible for initiating a stop work intervention.

Notify

Any employee who refuses to perform tasks or use equipment because of imminent danger should **notify the employer** as soon as possible, giving their reason for refusal.

Correct

LDI will not ask any employee to work in a situation that puts them in imminent danger; this action is against the law. The company is committed to making sure no workers are assigned tasks or told to operate equipment that they're not properly trained for.

When notified of an imminent danger, LDI management will do the following:

- **Investigate** the hazard immediately.
- **Eliminate** the hazard.

A **stop work intervention** should be initiated following the investigation and report. The manager/supervisor should conduct an investigation in a positive way and is responsible for letting all affected employees know about the stop work issue. The manager/supervisor is then responsible for correcting the issue.

All stop work interventions will be documented by the supervisor/manager in charge. Any corrective measures and lessons learned should be included in this documentation. The employee who reported the hazard should receive a copy of documentation.

Temporary reassignment

If the hazard takes a while to resolve, LDI may choose to temporarily reassign the employee who refused the work to a different job task. The company will do so at no loss of pay to the employee.

Substitution of a more qualified employee

If LDI finds that the employee's lack of qualifications is what make the task unsafe, they might find a more qualified worker to finish the assignment. The company will let the new worker know that another employee refused the task, and the new worker will be given the right to refuse the work if they believe there is imminent danger as well.

Resume

Only after all concerns have been resolved is it safe to continue working. Work assignments should not continue until the stop work issue has been fully resolved.

Although additional investigations and corrective actions may be required to address or identify the root cause(s) of the hazard, most issues can and will be solved in a timely manner on the work site.

Review

In order to identify the quality of the stop work intervention and follow up, measure participation in the intervention, find opportunities for improvement, identify any common issues, and share findings of the intervention, stop work reports will be reviewed by a supervisor/manager.

Unresolved hazards

An employee may file a complaint with OSHA if they receive a record of documentation from the stop work intervention and believe the imminent danger still exists. When this happens, the officer receiving the complaint will write down the complaint, the findings of the investigation, and the actions taken. Both the employee and LDI should receive a copy of this documentation.

Disciplinary action

Management is responsible for creating a work culture in which the SWA may be used freely and issues are quickly addressed. Employees will not be reprimanded for issuing a stop work intervention—nor will the company dismiss them or take any other disciplinary action against them—if the employees were acting in good faith.

If they believe they've been wrongly disciplined for using SWA, workers can file a complaint with OSHA.

Training

LDI requires that employees are provided training on stop work authority before beginning job assignments. The training will be documented with the topic, date of training, and the employee's name, and it should be kept with other employee training records.

Additional reading

- OSHA Employee Workplace Rights:
<http://www.osha.gov/Publications/osha3021.pdf>

- OSHA Standard 1977.12 – Discrimination against Employees:
[https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=11340#1977.12\(b\)\(2\)](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=11340#1977.12(b)(2))

SECTION 28

Trenching, Shoring, & Excavations

Purpose

- To **explain** the general rules of excavation work.
- To **set up** a system for classifying and stabilizing soil.
- To **note** the duties/responsibilities of the competent person on excavation sites.

Scope

This program applies to all of LDI's facilities and operations. It covers all work involving ground disturbance.

Safe work practices

Signage, barricades, & due diligence before digging

All safety requirements are non-negotiable, but LDI especially wishes to highlight the following due diligence guidelines for employees involved in ground disturbance:

- **Safety fencing or barricades must be erected around the entire excavation/trenching operation** with 100% closure (e.g., orange snow fence, jersey barriers, post/chain, or other).
- **Signage must be placed at the entrance of the location** stating "CAUTION - EXCAVATION IN PROGRESS" and the same signage will be placed in a visible area at the excavation site
- **Safety fencing or barricades will be placed around doors of shacks** that are involved in the excavation area with 100% closure, and signage should be visible on the fencing/barricades reading "DANGER - DO NOT ENTER."
- **Excavation checklists must** be completed prior to the start of any digging and post digging to ensure that all fencing is in place and that the location is safe.

Site evaluation

1. **Call before you dig.** Give utility companies 48-hour notice of your excavation plans. Contact the appropriate state utility protection service.
2. Give them the right information: name, address, phone number of the contractor, starting date, the exact location of the work, whether explosives or blasting are going to be used, and how deep the excavation will go.
3. The contractor needs to obtain the location and description of all underground utilities. Buried utilities are located and/or marked before digging if permanent facility markers aren't already in place. The markers could be paint, flags, or stakes. See the chart on the next page for a color coding legend.
4. Make sure exposed utility lines are supported, protected, or removed.

Important: Failure to make a proper locate request is a violation of state law and may result in punitive damages of 3 times the actual damage.

Potential hazardous atmospheres

In hazardous atmospheres, workers could suffer the deadly effects of suffocation, poisoning, or explosions. Because of this, the atmosphere needs to be tested and regularly monitored before and during trenching.

When needed, certain equipment should be used to make sure employees have safe breathing levels. Examples:

- Supplied air respirators
- Air purifying respirators
- Ventilation equipment (fans, blowers)

APWA UNIFORM COLOR CODE	
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:	Sewer and Drain Lines
KNOW THE COLOR CODE!	

Figure 28-1: Color coding system for marking underground utilities.

Other

- How employees in or near an excavation are protected from **vehicular traffic**: Affected employees should wear warning vests/hard hats.
- The excavation/trench is inspected by a competent person¹ on a daily basis. These **inspections** should check for possible cave-ins, failures of protective systems and equipment, hazardous atmospheres, or other dangerous conditions. Inspections are also needed after any events that could heighten the risk—e.g., natural events (rain, snow) or manmade events (blasting). If issues are found, people should be immediately removed from the area.
- A **warning system** should be used to alert operators of the edge of an excavation.
- Protection from failing rock, soil, or other materials and equipment should be used. Employees should not work under **suspended loads** handled by lifting or digging equipment. Likewise, employees should not work on the faces of sloped or benched excavations above other employees unless the lower level employees are adequately protected.
- Excavated material and other objects should be at least 2 feet away from the edge of an excavation or be restrained as needed.
- While the excavation is open, underground installations should be protected, supported, or removed to safeguard employees. Adjacent structures should be supported to stop them from collapsing.
- Employees aren't allowed to work in excavations where **water** has accumulated unless the right precautions have been taken. Diversion ditches and dikes are how employees are protected from accumulation of water in an excavation/trench. These prevent surface water from entering an excavation and let the adjacent area drain.
- Before an employee enters an excavation deeper than 4 feet, **atmospheric testing** is performed by a competent person where oxygen deficiency or a hazardous atmosphere could exist. Emergency rescue equipment must be available and attended when potential hazardous atmospheres exist.
- All excavations deeper than 4 feet deep need to have safe **entrances and exits**—specifically, a safe means of access and egress (e.g. ladders, ramps, stairs, etc.) at a lateral distance less than 25 feet away from employees.
- **Guardrails** are installed for crossings and walkways to protect against falls, particularly if there are walkways or bridges crossing over an excavation 6 or more feet above lower levels. The guardrails need to comply with 1926.502(b).

¹ A competent person is someone who is capable of identifying existing and predictable hazards that are unsanitary, hazardous, or dangerous to employees—and who has the authority to act quickly to eliminate them.

- Excavations deeper than 20 feet need to be planned and designed by a qualified engineer.

Protective support systems (sloping, benching, shoring)

OSHA requires that every employee in an excavation is protected from cave-ins via a protective system. Examples of protective systems:

- Proper **sloping** or **benching** of the sides of the excavation
- Supporting the sides of the excavation with timber shoring or aluminum hydraulic shoring
- Placing a **shield** between the sides of the excavation and the work area

Banks more than 5 feet high should be shored, sloped, or shielded.

If the excavation is made entirely of stable rock—or if the excavation is less than 4 feet deep—no protective system is necessary as long as there’s no indication of a potential cave-in. Management will decide what type of design approach should be used on each site.

Sloping & benching

If sloping and benching are used as protection, there are four basic design options. The angle or slope is based on the following table:

Soil / Rock Type	Maximum Allowable Slope (H:V) For excavations less than 20 feet deep
Stable rock	Vertical (90 degrees)
Type A	3/4:1 (53 degrees)
Type B	1:1 (45 degrees)
Type C	1-1/2:1 (34 degrees)
<i>Note an exception: Excavations in Type A soil less than 12 feet deep and open less than 24 hours may have a maximum slope or bench of 63 degrees.</i>	

Shoring

Shoring provides a framework and supports excavation walls using swales, cross-braces, and uprights.

Don't forget: Remove shoring from the bottom up, pull sheeting out from above, and back-fill every excavation immediately after the support system is removed.

Shielding

Shielding is a structure providing both sheeting and shoring in one package. Shields used in trenches are trench boxes or trench shields.

Heavy equipment is always used to place shields into your excavation. Make sure shields of the vertical trench walls protect at least 18 inches above the lowest point where the excavation face begins to slope.

Don't forget: No one should enter the shield during installation or removal. If a trench needs shielding, it is not safe for you to enter until after the shielding is complete.

Soil classification

Each soil and rock deposit at an excavation site must be classified by a competent person as stable rock, Type A, Type B, or Type C soil before workers make their way into the excavation. There are two methods for classifying soil: visual tests and manual tests.

To run a **visual test**, perform an inspection of the entire worksite, watching for problems like fissured ground, layered soil, previously disturbed earth, seepage, vibration and poor drainage.

The standard permits several useful **manual tests** for soil conditions, plasticity, dry strength, thumb penetration, as well as tests using tools such as a pocket penetrometer and hand operated shear vane.

Don't forget: Inspect the soil often and after any condition changes—such as after rain or after any water has accumulated in the excavation.

Emergency situations

In the event of an emergency, immediately dial the site emergency number or 911. Give them this information:

- Your exact location
- Number of victims
- Trench measurements
- Any special hazards

Keep all life support and de-watering systems operating, and keep all workers away from the excavation. Shut down all heavy equipment and prepare yourself to meet and brief the rescue personnel when they arrive.

Do not panic. Do not try to dig out the victim with heavy equipment. Do not allow others in the trench.

SECTION 29

Welding, Cutting, & Hot Work

Purpose

- To **educate** employees on the specific hazards of welding, cutting, and hot work—and to present solutions that can reduce these hazards.

Scope

This program applies to all LDI employees who engage in hot work. Hot work is any work that involves burning, welding, or using fire- or spark-producing tools. Welding and cutting operations are common in drilling and servicing operations.

Potentially hazardous areas include—but are not limited to—well heads, fuel tanks, mud tanks, tank batteries, gas separators, oil treaters, or confined spaces where gases can accumulate.

Safe work practices

General

Hot work activities must not be performed if it is unsafe to do so. LDI requires that welders/cutters are provided hot work training so that they can recognize unsafe situations before they get out of control. Employees assigned to operate arc welding equipment must be properly instructed and qualified to operate their equipment, and they need to be familiar with OSHA 1910.254 and 1910.252(a)(b)(c).

Here are some general precautions:

- The company requires that a hot work permit is completed before performing hot work.
- All hot work is potentially hazardous, so a hazard assessment should be performed to determine where the hazards exist. Review the hot work permit if available.
- Perform hot work in a safe location with wire hazards removed or covered.
- Use **guards** to confine the heat, sparks, and slag and to protect the immovable fire hazards.

- Do not perform hot work where flammable vapors or combustible materials exist. The company requires that, if possible, combustible materials are moved out of the area where hot work is performed. Guards/shields are used if hot work activities cannot be separated from combustible materials.
- A fire extinguisher must be readily available while hot work is performed. Other fire extinguishing equipment should be available too—e.g., pails of water, buckets of sand, or a hose—along with first aid equipment.
- Defective hot work equipment must be removed from service. Repairs should be made only by qualified personnel.

Fire watch

In locations where anything more than a minor fire could start, additional personnel (**fire watch**) need to be assigned to guard against fires. A fire watch should be maintained for at least 30 minutes after hot work activities are completed.

The fire watch must:

- Be standing ready with fire extinguishing equipment.
- Be familiar with the facilities for sounding an alarm in the event of a fire.
- Watch for fires in all exposed areas. If one starts, the watch should try to extinguish it only when the available equipment is obviously enough to contain it. If the equipment doesn't seem adequate, the watch should sound the alarm.

When a fire watch is required:

1. Appreciable combustible material is closer than 35 feet to the work.
2. Appreciable combustibles are more than 35 feet away but would be easily ignited by sparks.
3. Wall or floor openings within a 35-foot radius expose combustible material in adjacent areas, including concealed spaces in walls or floors.
4. Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are likely to be ignited by conduction or radiation.

LDI requires that employees with fire watch duties are provided training.

Hazards & solutions

General injuries

Injuries and illnesses can be caused by welding fumes, UV light, sparks, noises, etc. So what can you do to reduce the risk of injury?

- **Inspect the work area** to confirm that all fuel and ignition sources are isolated by shielding, clearing the area, lockout/tagout, soaking flammable material with water. Inspect the welding/cutting equipment as well.

- **Wear the right PPE**, like a face shield, leather welder’s vest, and gauntlet gloves. Use cotton or denim clothing.
- **Report any equipment defect** or safety hazards and stop using the equipment until safety has been assured.
- **Provide UV shielding** for arc welding where practical.
- **Leak-test** gas torches, gauges, and hoses.
- **Ensure adequate ventilation** from toxic welding and cutting fumes.

Flash fires & explosions

Workers performing hot work are exposed to the risk of fires. Specifically, the danger is that flammable or combustible materials in the space—especially flammable gas like methane or hydrogen sulfide (H₂S) that’s leaked into the space from hot work equipment—will ignite.

Possible solutions: **Monitor the atmosphere** with a gas detector, testing for flammable gases in the work area before starting any hot work. If a flammable or combustible gas exceeds 10 percent of the lower explosive level (LEL), the work must be stopped. Identify the source of the gas and repair the leakage.

Accumulation of toxic gases

Ventilation and/or respiratory equipment is used when hazardous fumes/gases or dust may be present. Ventilate toxic metal fumes mechanically if entering a confined space (inside of a mud tank, water tank, oil tanks, hoppers, sump, pit, or cellar).

An atmosphere is considered **oxygen-deficient** if its atmospheric concentration is less than 19.5 percent. An atmosphere is **oxygen-enriched** if the concentration is higher than 23.5 percent.

In addition to this, a written permit system should be used to document authorization to enter, the work to be performed, and the results of the gas monitoring where there is a potential for a hazardous atmosphere. Both a hot work and confined entry permit may be required if you’re welding, cutting, or brazing in a confined space.

Workers in charge of oxygen or fuel-gas supply equipment (including distribution piping systems and generators) must be trained and judged competent.

Cylinder storage

With improper cylinder storage comes risk of falling or rolling injuries, broken valves, and—once again—fires/explosions.

Make sure cylinders are properly stored in an upright position and chained in separate racks. Store full and empty cylinders separately. To avoid causing cylinders’ valves to open or break off (exposing workers to fumes) always remove gauges and regulators and install protective valve caps before transporting.

To avoid fires, store cylinders in a dry, well-ventilated location away from flammable substances. Do not store cylinders of oxygen within 20 feet of cylinders containing flammable gases.

Grinding

Grinding can result in sparks, noise, and eye/skin injuries from flying metal filings, grinding wheel pieces, etc. There's also a danger of getting fingers or hands caught in the grinding wheel or being struck by portable grinder. Be sure to wear appropriate PPE and inspect grinding equipment before use.

Well site ignition sources

There are a number of potential sources of ignition for flammable gases and liquids on the drill site. Examples:

- Internal-combustion engine sparks
- Smoking
- Welding operations
- Electric power tools
- Two-way radios
- Vehicles with catalytic converters
- Portable generators
- Open flames from any source

How can you avoid unwanted ignition?

- Provide spark arrestors for internal-combustion engines.
- Post “No Smoking” signs wherever a flammable gas or vapor hazard exists.
- Put spark-producing equipment or facilities far away from potential hazard areas.
- Do not allow vehicles with catalytic converters in the rig's immediate area.
- Prohibit open flames from the vicinity of the rig.

