



MINNESOTA STATE
Northeast Higher Education District

CONFINED SPACE PROGRAM

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Confined Space Program

Section 1. Introduction

The OSHA standard for Permit-required Confined Spaces, 29 CFR 1910.146, addresses the requirements for practices and procedures to protect employees from the hazards of entry into permit-required confined spaces.

A **confined space** means that a space:

1. Is large enough and so configured that an employee can bodily enter.
2. Has limited or restricted means for entry or exit, such as tanks, vessels, silos, storage bins, hoppers, vaults, pits, etc.
3. Is not designed for continuous employee occupancy.

A **permit-required confined space** has one or more of the following characteristics:

1. Contains or has the potential to contain a hazardous atmosphere.
2. Contains a material that has the potential for engulfing an entrant.
3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.
4. Contains any other recognized serious safety or health hazard.

Appendix A of this program is the Permit-required Confined Space Decision Flowchart from 29 CFR 1910.146 and is to be used for determination of permit-required confined spaces on NHED campuses.

The standard also addresses requirements for atmospheric testing of permit-required confined spaces and confined space entry permits.

Section 2. Purpose

The purpose of this Confined Space Entry program is to ensure safe work practices, safe entry, and safe working conditions in confined spaces and permit-required confined spaces for designated employees performing routine tasks associated with their employment.

Both permit-required confined spaces and non-permit confined spaces are to be identified on a master list for each campus.

In addition, signage such as, “**Danger – Permit Required Confined Space – Do Not Enter**”, are to be utilized to identify confined spaces, when needed.

Section 3. Definitions

Attendant: An individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program.

Authorized Entrant: An employee that is authorized by the employer to enter a permit-required confined space.

Entry: The action when a person passes through an opening into a permit-required confined space. Entry is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space prior to or actually doing work activities in that space.

Entry Permit: The written or printed document that is provided by the employer to allow and control entry into a permit-required confined space.

Entry Supervisor: The person responsible for determining if acceptable entry conditions are present at a permit-required confined space when entry is planned, for authorizing entry, overseeing entry operations, and for terminating entry as required.

Hazardous Atmosphere: An atmosphere that may expose employees to the risk of incapacitation, impairment of ability to self-rescue, injury, or acute illness.

Immediately Dangerous to Life or Health (IDLH): Any condition that poses an immediate or delayed threat to life, could cause irreversible adverse health effects, or could interfere with an individual's ability to escape unaided from a confined space.

Hazards:

1. Flammable gas, vapor, or mist in excess of 10% of its lower flammable limit (LFL).
2. Airborne combustible dust at a concentration that meets or exceeds its LFL.

Note: This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 ft (1.52 m) or less.

3. Atmospheric oxygen concentration below 19.5% or above 23.5%.
4. Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control or in Subpart Z, Toxic and Hazardous Substances, of Part 1910 and which could result in employee exposure in excess of its dose or permissible exposure limit.

Note: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.

5. Any other atmospheric condition that is immediately dangerous to life or health.

6. Toxic substances that are known to have poisonous physiological effects. The most common toxic gases encountered are carbon monoxide and hydrogen sulfide.
 - a. Carbon dioxide is a by-product of fermentation that displaces oxygen.
 - b. Carbon monoxide is created by incomplete combustion of various fuels. It can inhibit the blood's capacity to carry oxygen causing unconsciousness and death.
 - c. Sulfur dioxide has a sharp pungent smell that is toxic in small amounts.
 - d. Hydrogen sulfide is part of many industrial processes that can cut off breathing once it enters the body. With continuous low-level exposure, or at high concentrations, a person loses their ability to smell the gas even though it is still present (*olfactory fatigue*).
 - e. Oxygen concentrations at or below 19.5% are considered hazardous. An oxygen deficient atmosphere contains less than 19.5% oxygen content. This may not be enough oxygen to supply the employee's respiratory needs when performing physical work. Atmospheres that are lower than 19.5% are considered immediately dangerous to life and health. Oxygen concentrations above 23.5% have the potential to be an explosive atmosphere. Oxygen deficiencies could be caused by fire or explosion, welding, or displacement by asphyxiant gases.
7. Other hazards may include:
 - a. Engulfment which is caused by finely divided flowable solids, such as grain that can collapse around a person, filling or plugging the respiratory system, causing death by strangulation, constriction, or crushing.
 - b. Poor space design. The odd shapes such as sloping sides, a floor that tapers to a small section, or a confusing internal shape could cause a person to become trapped and possibly cause suffocation.
 - c. Combustibility. Deadly fires and explosions in many confined spaces are caused by build-up of flammable vapors or gases which can be ignited by sparks from grinding/welding, unapproved electrical equipment, metal friction, smoking, or static electricity.
 - d. Heat can build up quickly in a confined space and cause heat related stresses.
 - e. Slips, trips, and falls in a confined space can be fatal. A person can easily become trapped in an area with low oxygen levels, toxic gases, or other hazardous conditions.
 - f. Noise may intensify in a confined space. Even if a person's hearing is temporarily affected, they may not be able to hear important directions or warnings. Over time, this could develop into permanent hearing problems.
 - g. Mechanical hazards. Valves and pipes not disabled may explode, drown, poison, or burn a person. Moving parts in confined spaces are dangerous. This equipment must be isolated and de-energized through lockout/tagout before entering.

Rescue Service: The personnel designated to rescue employees from permit-required confined spaces.

Section 4. Roles and Responsibilities

Specific responsibilities for carrying out this program are identified by position below.

Provosts:

- Support and provide resources for the overall program.

Campus Safety Officers:

- Review the written program annually and recommend necessary updates.
- Assist with evaluating the overall effectiveness of the program.
- Ensure that a list of confined spaces is maintained for the campus.
- Assist the NHED Safety Administrator in ensuring program elements are implemented across the campus.

NHED Safety Administrator:

- Ensure annual review, evaluation, and necessary updates to the program.
- Ensure that employee training records and required records are maintained.
- Work in conjunction with the supervisors and campus Safety Officer to evaluate the rescue service's ability to function while rescuing entrants from permit-required confined spaces.

Deans/Supervisors:

- Oversee the program for their departments/work areas.
- Oversee employee training.
- Ensure that the Confined Space Entry program is followed.
- Assist with evaluating the overall effectiveness of the program.
- Provide resources for testing, monitoring, equipment, and personal protective equipment (PPE) required for the program.

Department Heads or Supervisors (Facilities/Maintenance):

- Act as or appoint the entry supervisor.
- Assign the authorized entrant(s).
- Assign the attendant(s).
- Ensure that the entry permit is completed for permit-required confined spaces.
- Ensure testing is conducted, if required, prior to the entrant being allowed to enter confined spaces and that monitoring is conducted during entry and work in spaces.
- Notify contractors of the campus permit-required confined spaces and that entry is allowed only if in compliance with regulatory requirements.
- Evaluate the campus rescue service's ability to rescue entrants from permit-required confined spaces.
- Ensure that a list of confined spaces is maintained.

Employees:

- Comply with the requirements of this program.
- Complete required documentation prior to entering permit-required confined spaces.

- Understand the hazards and safe work practices that relate to the program.
- Use PPE necessary to perform tasks safely.
- Attend required training sessions.

Section 5. Testing and Monitoring

The atmosphere within a confined space, if necessary, must be tested prior to entrance using equipment that is designed for detecting dangerous air contamination and/or oxygen deficiency. Testing is completed to:

1. Determine if and at what levels possible hazardous atmospheric conditions are present in the confined space.
2. Identify what steps are to be followed and what conditions are to be met to ensure that atmospheric conditions are safe for a worker to enter the confined space.

Section 6. Procedure for Entry into a Permit-required Confined Space

1. **Complete the Confined Entry Permit:** This permit is good for a maximum of 8 hours. Upon completion of entry, the permit must be kept on file for a minimum of 1 year. Before entry begins, the entry supervisor identified on the permit must sign the entry permit to authorize entry. This permit must be available to all authorized entrants by posting at portal or other effective means.
2. The atmosphere within the authorized entrant's immediate area must be monitored before and during entry. It must be monitored for oxygen, flammable gases or vapors, and toxic contaminants, in that order. Also, the space must be monitored for any other hazardous substance that there is reason to believe may be present in the confined space. Signals/alarms sounding from a monitoring device immediately indicate when the tested atmosphere falls outside acceptable air quality limits. Should this occur, the authorized entrant(s) must immediately exit the confined space. Before re-entry, the space **must be** re-evaluated and all hazardous condition corrected and controlled

Note: Ventilation **may not** be used in place of monitoring.

3. An employee may not enter the space until forced ventilation has eliminated any hazardous atmosphere. The forced air ventilation must be:
 - a. Directed to ventilate the immediate areas.
 - b. Continued until all employees have left the confined space.
 - c. From a clean source and may not increase the hazards in the confined space.
4. Lockout/tagout procedures must be followed before entry is made, if necessary.
5. Each campus must provide at least one attendant outside the permit-required confined space during an authorized entry. An employee is to **never** enter a permit-required confined space without at least one attendant.
6. When entry into a confined space is by means of a manhole or a top opening, the opening must be guarded to prevent an accidental fall.
7. While in the confined space, an entrant is to maintain voice or other means of communication with an attendant at all times.

Section 7. Rescue Procedure

Each campus is required to evaluate and designate a campus rescue service. The rescue service must be evaluated to ensure that:

1. They have the ability to rescue entrants from the permit-required confined space(s).
2. They can reach the victim(s) within a time frame appropriate for the permit-required confined space(s).
3. They are equipped for and proficient in performing the rescue.
4. They have equipment available to perform the rescue, such as self-contained breathing apparatus, lifelines, harnesses, hoisting devices, etc.

The campus rescue procedure is as follows:

1. The attendant(s) must contact emergency help via phone by dialing 911.
2. The rescue service must be notified as to the location of the confined space.
3. The entry supervisor or designee must meet the rescue service.
4. The entry supervisor must:
 - a. Provide the confined space entry permit to the rescue service for review prior to entering the permit-required confined space.
 - b. Inform the rescue service of any hazards prior to entry.
5. The rescue service is to assign an attendant trained in CPR to monitor the authorized entrant(s) and entry to the confined space.

Section 8. Training

All affected employees covered under this program are to receive training prior to being assigned applicable duties, when changes occur, and as an annual refresher training.

The training of authorized entrants includes:

1. Identification of space hazards, including information on potential exposures.
2. Use of lockout and tagout devices to protect against accidental startup of equipment while occupying the confined space.
3. Wearing respirators, retrieval lines and harnesses, and assigned protective clothing, when necessary.
4. Ventilation of confined spaces and permit-required confined spaces, as required.
5. Monitoring the space for oxygen, flammable gases or vapors, and toxic contaminants before and during entry into the confined space.
6. Preparation for and control of physical hazards.
7. Designating and verifying escape route(s).
8. Use of safe, grounded, explosion-proof equipment.
9. Needing to communicate regularly with attendant(s).
10. Exiting from a permit-required confined space immediately when:
 - a. Ordered by an authorized person, such as an attendant.
 - b. The entrant(s) recognizes the existence of warning signs or symptoms of exposure.

- c. A prohibited condition exists or when an automatic alarm is activated.
11. Alerting the attendant(s) when a prohibited condition exists or when warning signs or symptoms of exposure exist.

The training of attendants includes:

1. Knowing emergency reporting procedures and who to call for help.
2. Maintaining constant communication with the entrant(s) in the space.
3. Understanding what the hazards of the space are and what symptoms to look for.
4. Being prepared to order an evacuation.
1. Being aware of the number of entrant(s) in a space at all times.
2. Being prepared to properly perform rescue duties from outside the permit-required space, such as the use of retrieval lines.
3. Remaining outside the permit-required confined space until relieved by another attendant.

Records of training are to be documented and retained for a minimum of 3 years.

Training documentation includes:

1. Date and location of training.
2. Names of employees attending and their signatures.
3. Name and title of person conducting the training.
4. Brief summary of material covered.

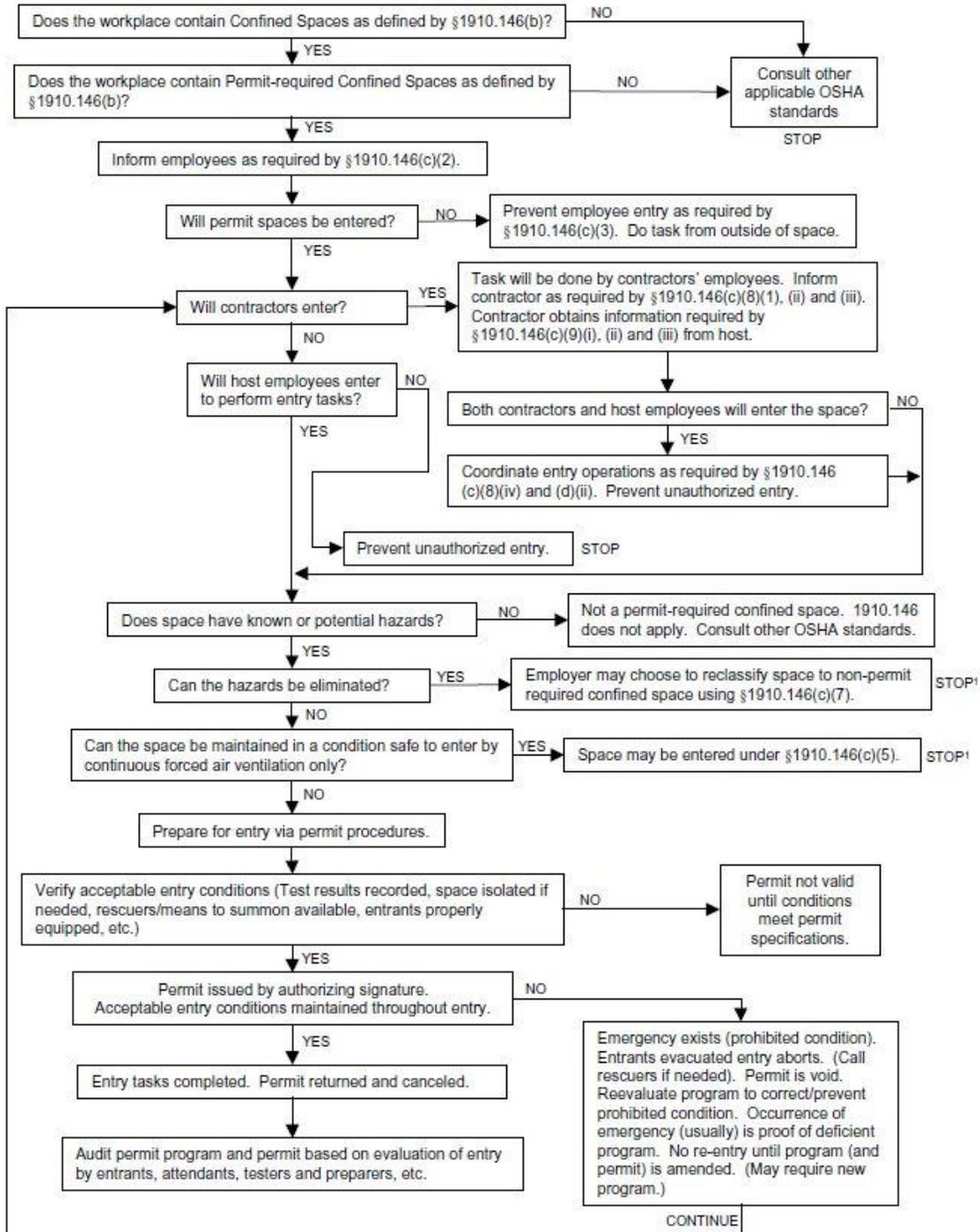
Confined space entry permits are to be retained for a minimum of one year.

Section 10. Program Review

Annual reviews of the Confined Space Entry program are to be conducted and documented, including a review of the previous year's entry permits and any changes or additions to the program or other related documents.

Appendix A: 29 CFR 1910.146, Permit-required confined spaces standard

Appendix A, Permit-required Confined Space Decision Flow Chart



¹Spaces may have to be evacuated and re-evaluated if hazards arise during entry