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Section 14

Confined Spaces

14.1 Purpose and Scope

This section establishes requirements for confined and permit required spaces. It specifically discusses the general and program requirements for permit required confined spaces; training requirements; and the duties of entrants, attendants, and the entry supervisor.

Underground construction activities must also comply with the requirements of tunnel and shaft construction. Tunnels are classified as confined spaces and usually permit-required confined spaces. Entry into tunnels must be conducted in accordance with the requirements of the confined space program, and address the specific hazards associated with distance, communication, physical demands, and emergency rescue, in addition to all other requirements.

The determination of whether a space is a permit-required confined space is contingent upon two factors. The first factor is solely based on physical characteristics of the space itself. A "confined space" must be large enough and so configured that an employee can bodily enter and perform assigned work, have limited or restricted means for entry or exit, and not be designed for continuous employee occupancy. If the space is so configured, then the second factor is whether the space contains or the activities introduce any hazard capable of causing death or serious physical harm. A space would be classified as a "permit-required" confined space if it either contained, or has a potential to contain, a hazardous atmosphere, a material which has the potential to engulf an entrant, an internal configuration such that an entrant could be trapped or asphyxiated, or contains any other recognized serious safety or health hazard.

14.2 Applicable Definitions

The following definitions apply to this discussion of confined spaces.

Confined Space	A space large enough for an employee to enter, but with limited means of entry and egress, and which is not designed for continuous human occupancy.
Permit Required Confined Space	A confined space in which one or more of the following: potential hazards or existing conditions: (a) the space contains, or may contain, an atmospheric hazard; (b) the space contains a potential

engulfment hazard (i.e., water or other flowable material which may engulf an entrant); (c) the space has a configuration which may trap or asphyxiate an entrant; (d) the space has any other serious safety or health hazard. A serious safety or health hazard for purposes of this standard means a hazard which may render an entrant incapable of self-rescue.

Entrant	A person trained and authorized to enter confined spaces under conditions documented in the local confined space permit.
Attendant	A person trained and authorized to perform attending duties as prescribed in the confined space program.
Confined Space Supervisor	A person trained and authorized to conduct, approve, and oversee entries into confined spaces.
Confined Space Program	A site-specific program that establishes the procedures for permit-required confined spaces, identifies the persons authorized to perform the various duties, and includes the emergency procedures, equipment, and communication.
Prohibited Conditions	A condition within a confined space that indicates that a control measure specified in the permit has become ineffective or that a hazard exists within the space that was not anticipated and for which no control measure is in place.

Other definitions applicable to confined spaces can be found in OSHA 1910.146 (b) or on the Internet at the following website address: <http://www.osha.gov/>

14.3 Requirements for Confined Spaces

14.3.1 Maintain an inventory of permit-required confined spaces and the active and closed permits at each facility. The inventory must identify the space and its associated hazards that must be controlled before entry.

14.3.2 Do not enter permit required confined spaces until a program for managing such entries is in place and all of the requirements of that program have been met.

14.3.3 Place a danger sign at each entrance to each permit required confined space. The danger sign must identify the space as a permit required confined space and have additional instructions such as "authorized entrants only", or "entry prohibited."

14.3.4 Every employee whose assigned duties require entry into a permit required confined space must be trained in the requirements of this standard, the hazards of confined spaces, the measures used to control or eliminate those hazards, and the specific duties assigned.

Each document developed for confined space entries, including the program, the inventory, the closed entry permits, analysis for reclassification, written hazard analysis and determination for alternative entry procedures, rescue procedures, and training verification for participating

14.3.5 Personnel must be maintained in the facility files and be made available for review.

14.4 Program Requirements for Confined Spaces

14.4.1 The confined space program must establish the procedures for issuing and canceling permits, testing and preparing the space prior to entry, the communications required between entrants and attendants, the acceptable entry conditions, the rescue procedures, and the program documentation and review required. As a minimum, it shall provide for the following:

a. Program Coordinator. Identifying a program coordinator who is knowledgeable and responsible for implementing the confined space entry program at the site. This coordinator will be delegated sufficient authority to implement the program.

b. Confined Spaces. Before removing any cover to a confined space, determine that it is safe to do so. Immediately upon removing the cover, erect a barrier to prevent unauthorized entry into the space. If the opening into the space is a floor opening, the barrier must meet the requirements for a standard guardrail.

c. Permit. Before entry, complete a permit that contains the following information:

- The identification of the space to be entered.
- The purpose of the entry.
- The time of entry and the expected duration.
- The names of the entrants, attendants, and the entry supervisor.
- Results of any atmospheric testing for oxygen content, lower explosive limit, and toxic air contaminants, including the name of the qualified person conducting the testing.
- The control measures in place to control the hazards that caused the space to be classified as a permit-required confined space.
- A description of the hazards that may be introduced by the work to be performed in the space, and the measures in place to control those hazards.
- A description of the communications equipment and methods to be used to maintain communications between the entrants and the attendant(s).
- A list of the equipment to be used to conduct a safe entry and work in the space, including personal protective equipment that must be worn.
- A list of the prohibited conditions that would require an immediate evacuation of the space.
- A written rescue plan that identifies the rescue service and the means for contacting the rescue services. Coordination with local contracted agencies or in-house personnel must be established and verified prior to entry.
- The signature of the confined space entry supervisor, certifying that the space is safe to enter, and authorizing entry.

d. Additional Documents. Documents required by other standards such as switching procedures, clearances, hazardous energy control document, or hot work permits related to the work in the confined space must be attached to the confined space permit and be retained in the confined space files.

e. Air Testing Requirements. If atmospheric hazards or potential atmospheric hazards are identified for a particular confined space, the air inside the space shall be tested for oxygen content, flammable atmosphere, or toxic contaminants by a qualified person using a properly calibrated direct reading instrument prior to entry, and periodically, preferably continuously, during an entry, and while performing work in the permit

required confined space. If testing is done using separate instruments, the order of testing shall be oxygen first, then flammability, then toxic contaminants. Employees or representatives of employees must be afforded an opportunity to observe any testing and results. Continuous air monitoring is highly advised, where practicable.

f. Control or Elimination of Hazards. Each hazard that caused the confined space to be classified as a permit-required confined space or will be introduced into the space as a result of the work to be performed must be controlled to the extent possible, or eliminated before entering the space.

g. Re-evaluation of Confined Space. The program must provide for a re-evaluation of all confined spaces whenever condition in those spaces change.

h. Communication Between Entrant(s) and Attendant(s).

Communication between entrants and attendants are required for the duration of the permit required confined space work. Loss of communication is a prohibited condition requiring evacuation of the space and termination of the entry until communication can be restored. Communication may be by voice, land-line, radio, signaling system, or other reliable method.

i. Permit. In the permit, list all equipment necessary for safe entry into confined spaces, including monitoring equipment, ventilation equipment, rescue equipment, lighting equipment, personal protective equipment, and other equipment such as ladders and railings.

j. Provisions for Rescue. For every permitted entry into a confined space, the permit must include a plan for rescuing the entrants. The adequacy of the rescue plan must be verified before entry into the space. The selected rescue service's response time and rescue capability should be evaluated. Any one of the following three rescue procedures, generally in order of preference, are adequate:

1. Rescue Without Entry. Make provision for rescuing entrants without entry by rescue team members, whenever possible. To facilitate such rescue without entry, entrants must wear a full body harness attached to a lifeline. The other end of the lifeline must be attached to a hoisting device to permit the attendant to begin rescue immediately if a prohibited condition arises in the space. If the full body harness presents a greater hazard, other rescue provisions must be used in lieu of the full body harness.

2. Employee Rescue. A designated group of employees trained and equipped to enter the confined space to rescue an incapacitated entrant. The designated rescue team must have practiced rescue from the space entered (or a similar space) within the last year. Before entry, the confined space entry supervisor must verify that an adequate number of rescue team members are available to make a timely response to an emergency, and must verify that the rescue team members have current training. The procedure for summoning the response must be established, and the attendant must have the means to issue the summons.

3. Outside Rescue Service. A commercial ambulance service or local fire department may be able to perform a rescue from a confined space, provided that there is an agreement and members have appropriate training and equipment. Reliance on a general emergency phone number available to the general public is not adequate without the written agreement. It is the responsibility of the entry supervisor to verify that the selected rescue service is qualified to perform a rescue, has current training, and is available at the time of the entry. The adequacy of the response time must be considered in selecting an outside rescue service. If the rescue service cannot make a timely response to a summons, they may be required to standby in the area of the access to the confined space. The attendant must have the means and be trained in the procedure for summoning the outside rescue squad. The outside rescue service must notify the attendant if some other emergency compromises their response capability. The attendant must then terminate the entry.

k. Alternative Entry Procedure. The program may provide for entry into permit-required confined spaces under carefully controlled conditions. If such alternative procedures are provided for in the program, the following conditions must be met:

1. No hazards, such as potential engulfment or serious safety hazards, other than actual or potential atmospheric hazards exist in the space.
2. The atmospheric hazards can be (are) controlled by continuous mechanical ventilation. Employees are not allowed to enter the space until forced air ventilation has eliminated the hazardous atmosphere.
3. Air testing is conducted before and after application of the ventilation and periodically, preferably continuously, for the duration of the entry. Employees or representatives of employees are provided an opportunity to observe the air testing and results.

4. The entrants are trained and qualified confined space entrants.
5. An alternative entry certificate is created and signed by a qualified confined space supervisor certifying that the above conditions have been met, and identifying the space, the purpose of the entry, the time of entry, and the entrants. Post the certificate at the point of entry into the space for the duration of the entry and file it in the confined space program files after termination of the entry.

l. Temporary Declassification of a Space. When no actual or potential atmospheric hazards are present, and the other hazards that caused the space to be considered a permit required confined space can be eliminated without entry into the space, a confined space can be temporarily identified as a non-permit confined space. Any such declassification must be approved by the qualified confined space supervisor on a certificate of declassification which identifies the space, the actions taken to eliminate the hazards, and the time for which the declassification is valid. The certificate will be posted at the point of entry for the period of validity, which will not exceed one shift, and filed in the confined space program files at expiration.

m. Contractors and Outside Entities. If confined spaces are to be entered by contractors or other outside entities who do not normally work in that facility, either alone, or in conjunction with the facility staff, the program must describe the coordination and controls which will be applied to such outside entity to assure a safe entry into a confined space.

n. Program Review. The program must be reviewed by the confined space program coordinator at least annually, and more frequently if necessary. Any prohibited condition or near-miss incident arising in a confined space will be investigated immediately.

14.5 Training Requirements

Each person who will be assigned duties in a confined space program shall be trained to perform those duties safely and competently. The training instructor must sign the certificate and include on it the date of training, the individuals trained, and the qualifications of persons trained.

14.5.1 Retraining. Retraining prior to assignment of additional confined space duties is required under any of the follow conditions:

- a. The individual fails to perform the duties assigned in accordance with the program.
- b. The individual has not performed any confined space work for a period of 1 year.

- c. Changes are made in the program.
- d. Individual or supervisory request.
- e. The individual has been involved in an accident or near-miss accident.

14.6 Duties of Entrants

14.6.1 Entrants must know the hazards that may be encountered during the entry and be able to recognize when those hazards are present.

14.6.2 Entrants must properly use the equipment provided for entry into the confined space.

14.6.3 Entrants must maintain communication with the attendant.

14.6.4 Entrants must tell the attendant whenever: (a) the entrant recognizes any warning sign, or symptom of exposure to a dangerous situation, or (b) a prohibited condition is detected.

14.6.5 Entrants must immediately exit the permit space whenever (a) an order to evacuate is given, (b) a warning sign or symptom of exposure is recognized, (c) a prohibited condition is detected, or (d) an evacuation alarm is sounded.

14.7 Duties of Attendants

14.7.1 Attendants must know the hazards that may be encountered in the confined space they are attending.

14.7.2 Attendants must be able to recognize the behavioral effects that exposure to a hazardous condition may have on entrants.

14.7.3 Attendants must know at all times the number and identity of the entrants inside the attended space.

14.7.4 The attendant must remain outside the attended space unless relieved by another authorized attendant. Attendants may not enter the space unless relieved by another attendant who is trained, equipped, and authorized to perform attendant duties at that location.

14.7.5 Attendants must maintain communications with entrants to monitor their condition and to order an evacuation when necessary.

14.7.6 Attendants must order an evacuation of the permit space if: (a) the attendant detects a prohibited condition or is notified of a prohibited condition by an entrant (b) the attendant detects entrant behaviors indicating potential

exposure to a hazardous situation, (c) the attendant detects a condition outside the space which may endanger the entrants, or (d) the attendant is unable to safely perform all of the duties.

14.7.7 The attendant must summon the rescue service as soon as it appears that the authorized entrants may need assistance to escape from hazards within the space.

14.7.8 The attendant must prevent unauthorized persons from entering the confined space and notify the entry supervisor and the entrants if an unauthorized person enters the space.

14.7.9 The attendant may perform nonentry rescue if specified on the Entry Permit.

14.7.10 The attendant may not be assigned any other duties that will interfere with his/her primary duty to monitor and protect the entrants.

14.8 Duties of the Entry Supervisor

14.8.1 The entry supervisor must know the hazards that may be encountered during the entry and be able to recognize the behavioral effects that exposure to a hazardous condition may have on entrants.

14.8.2 The entry supervisor must verify that appropriate steps have been taken to make the space safe for entry and record this before allowing entry.

14.8.3 The entry supervisor must hold a meeting with entrants and attendants before entry. At the meeting, the entry supervisor must review the hazards associated with the space to be entered, the control measures in place to mitigate the hazards, the results of air monitoring within the space, and prohibited conditions that would require an evacuation of the space. He/she must also verify that the entrants and attendants are trained and understand their duties associated with the entry and work in the confined space.

14.8.4 The entry supervisor must terminate the entry and cancel the permit when (1) the work is completed, (2) a prohibited condition arises in the space, or (3) an evacuation of the space is ordered. If the permit is terminated, the space must be re-evaluated before issuing a new permit to complete the work.

14.8.5 The entry supervisor must remove unauthorized individuals who attempt to enter the permitted space.

14.8.6 The entry supervisor must verify the capability and availability of rescue services and the means for summoning them prior to authorizing entry into a confined space.

14.8.7 When responsibility for a permit space entry is transferred to a new entry supervisor, the entry supervisor accepting the responsibility for the space must verify that the operations within the space are consistent with the permit.