Weber State University

Confined Space Program

OSHA's Standard for confined space is 29 CFR 1910.146

WEBER STATE UNIVERSITY
Environmental Health & Safety

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OBJECTIVE

Weber State University's Confined Space Program has been established to ensure that employees are protected from the potential hazards involved with confined spaces and/or permit-required confined spaces (PRCS) at a worksite with one or more confined spaces. Weber State University will comply with the OSHA permit-required confined space standard (29 CFR 1910.146). This program is subject to an annual audit by EHS.

DEFINITIONS

Attendant – An individual stationed outside one or more confined space/permit-required confined space(s) who monitor the authorized entrants and who performs all attendant's duties assigned by WSU and specified in 1910.146.

Authorized entrant – An employee authorized by an entry supervisor to enter a PRCS.

Competent person – An individual who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are related to entering and working in PRCS, which are unsanitary, hazardous, or dangerous to employees, and has authorization to take prompt corrective measures to eliminate them.

Confined space – A space that:

- Is large enough and so configured that an employee can bodily enter it
- Has limited or restricted means for entry and exit
- Is not designed for continuous employee occupancy

Entry permit – A written or printed document provided by WSU's Environmental Health and Safety (EHS) to allow and control entry into a PRCS. Contains information specified in 29 CFR 1910.146.

Entry supervisor – Qualified person (employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a PRCS where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this program.

Hazard – A physical hazard or hazardous atmosphere.

Hazardous atmosphere – Atmosphere that may expose employees to risk of death, incapacitation, impairment of ability to self-rescue (escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

- Flammable gas, vapor, or mist more than 10% of its lower explosive limit (LEL)
- Airborne combustible dust at a concentration that meets or exceeds its LEL
- Atmospheric oxygen concentration below 19.5 % or above 23.5 %
- Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in subpart D or subpart Z of 29 CFR 1926, which could result in employee exposure more than its dose or permissible exposure limit (PEL)
- Any other atmospheric condition that is immediately dangerous to life or health

Permit-required confined space (PRCS) – Space that has one or more of the following characteristics:

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

Physical hazard – Existing or potential hazard that can cause serious physical injury or death. Examples include, but are not limited to: explosives (as defined by paragraph [n] of 29 CFR 1910.146, definition of “explosive”); mechanical, electrical, hydraulic and pneumatic energy; radiation; temperature extremes; engulfment; noise; and inwardly converging surfaces. Physical hazards also include chemicals that can cause serious physical injury or death through skin or eye contact (rather than through inhalation).

Qualified person – One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems relating to the subject matter, work, or project. *29 CFR 1926.1202 defines terms that could be applicable to this standard.*
WSU should consult with their affected employees and their authorized representatives on the development and implementation of all aspects of the confined space program. All information about PRCSs should be available for each affected employee and their authorized representatives through Environmental Health and Safety

CONFINED SPACES IDENTIFICATION AND EVALUATION

Location examples where confined spaces may occur include, but are not limited to, the following; bins; boilers; pits (elevator, escalator, pump, valve, or other equipment); manholes (fuel, chemical, water, or other liquid, solid, or gas); incinerators; scrubbers; concrete pier columns; sewers; transformer vaults; heating, ventilation, and air-conditioning (HVAC) ducts; storm drains; water mains; precast concrete and other pre-formed manhole units; drilled shafts; enclosed beams; vessels; digesters; lift stations; cesspools; silos; air receivers; sludge gates; air preheaters; step-up transformers; turbines; chillers; bag houses; mixers/reactors; crawl spaces and attics.

An inspection of company premises/workplaces by a competent person has identified the confined spaces and/or PRCSs in Appendix A.

All PRCSs shall be marked with warning signs reading: "Danger - PRCS - authorized entrants only" or something similar. In addition, Weber State University must inform affected employees/contractors of the existence, location, and danger of each PRCS in a timely manner and in a manner other than posting signs.

Rescue and Emergency Services

WSU will use Ogden City Fire Department (OFD) Urban Search and Rescue Team (USAR) for rescues/emergencies. WSU will:

- Evaluate OFD's ability to respond to a rescue summons in timely manner, considering the identified hazards
- Evaluate OFD's proficiency with rescue-related tasks and equipment to function appropriately while rescuing entrants from permit spaces
- Require that OFD:
    - Has capability to reach a victim within an appropriate timeframe for the identified permit space hazards
    - Is equipped for, and proficient in, performing needed rescue services
    - Agrees to immediately notify WSU if rescue services become unavailable

WSU shall inform OFD about any potential hazard(s) it may confront when called on to perform rescue(s) on site. WSU shall provide OFD access to all PRCSs where rescue may be necessary so they can develop appropriate rescue plans and practice rescue operations.
If rescue becomes necessary, contact Weber Area Dispatch by dialing 911. Provide the location of the PRCS. Questions you'll be expected to answer will include:

- Does this involve the release of any hazardous materials?
- Is the person(s) still trapped?
- Obvious injuries?
- Exact location?
- Can the person(s) still be seen or heard?
- Above or below ground?
- Is the immediate area dangerous or hazardous?

To facilitate **non-entry** rescue, retrieval systems or methods should be used 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. Retrieval systems should meet the following requirements:

1. Each authorized entrant shall use a chest or full-body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, above the entrant's head, or at another point which the attendant can establish presenting a profile small enough for successful removal of the entrant. Wristlets may be used in lieu of a chest or full-body harness if the employer, employee, or supervisor can demonstrate that their use is not feasible or creates a greater hazard and that using wristlets is the safest and most effective alternative.
2. The other end of the retrieval line shall be attached to a mechanical device or fixed point outside of the PRCS so retrieval can begin as soon as a rescue becomes necessary. A mechanical device should be available to retrieve personnel from vertical type PRCSs more than five feet (1.52 meters) deep.
3. Unsuitable retrieval equipment should not be used, including retrieval lines that have a reasonable probability of becoming entangled with the retrieval lines used by other authorized entrants, retrieval lines that will not work due to the internal configuration of the PRCS, etc.

If an injured entrant is exposed to a substance for which a safety data sheet (SDS) or other similar written information is required to be kept at the worksite, that SDS or written information shall be made available to the medical facility treating the exposed entrant.

DUTIES

Entry Supervisor

- Determines if conditions are acceptable for entry and terminates entry if those conditions aren't met.
- Authorizes entry and oversees entry operations.
- Terminates entry procedures as required.
- Serves as an attendant if trained and equipped appropriately for that additional role.
- Before allowing entry, verifies that:
    - All entrants are in compliance with the permit
    - All required tests have been conducted
    - All procedures are being followed
    - Lockout/Tagout has been completed on all associated equipment
    - All equipment specified by the permit is in place
- Removes any unauthorized individuals who may enter or attempt to enter the PRCS during operation.
- Ensures transfer of responsibility as required by entry permit is done in a manner that maintains acceptable entry conditions.

Attendant

- Knowledgeable of and able to recognize potential PRCS hazards.
- Remains outside PRCSs during entry operations unless relieved by another attendant.
- Maintains an accurate count of all entrants in the PRCS and ensures all entrants are tracked in and out.
- Monitors activities in the immediate area to ensure safety of personnel.
- Maintains effective and continuous communication with personnel during the PRCS entry, work, and exit.
- Orders personnel to evacuate confined space if they:
    - Observe a condition that is not allowed on the entry permit
    - Notice entrants acting strangely, possibly because of exposure to hazardous substances
    - Notice a situation outside the confined space that could endanger personnel
    - Notice a hazard within the PRCS that has not been previously recognized or considered
    - Must leave their workstation
    - Must focus attention on the rescue of personnel in another PRCS they are monitoring
- Immediately notifies emergency services if rescue becomes necessary.
- Keeps unauthorized person(s) out of the PRCS, or notifies authorized entrants of an unauthorized entry.
- May act as attendant for more than one permit space if noted on the entry permit.

Authorized entrant

- Reads and observes entry permit requirements.
- Familiar with and understands potential hazards during entry, including information on the mode, signs or symptoms, and consequences of exposure.
- Remains alert to potential hazards while in the PRCS.
- Properly uses equipment required by the permit.
- Stays in contact with attendant.
- Immediately exits confined space when:
    - They are ordered to do so by an authorized/attendant person
    - They notice or recognize signs or symptoms of exposure
    - A prohibited condition exists
    - The evacuation alarm system sounds
    - The required task is completed.

Alert attendant(s) when:

- There is any warning sign or symptom of exposure to a dangerous situation
- The entrant detects a prohibited condition

TRAINING

WSU must provide training to each employee whose work is regulated by 29 CFR 1910.146 at no cost to the employee, and ensure that the employee possesses the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under the standard. Training must result in an understanding of the hazards in the PRCS and the method used to isolate, control, or protect employees from these hazards; for employees not authorized to perform entry rescues to be aware of the dangers of attempting such rescues; and that unauthorized employees are not to, under any circumstances, attempt such a rescue. Training should be completed:

- Before an employee is first assigned duties
- Before there is a change in assigned duties
- Whenever there is a change in the permit space operations that presents a hazard about which an employee has not previously been trained
- Whenever WSU has reason to believe either that deviations have occurred from the PRCS entry procedures or there are inadequacies in an employee's knowledge or performance of those procedures.

Employees shall receive a written certification following training to document that they have been properly trained in their respective duties and the hazards and safety precautions involved in PRCS entry. The training shall establish employee proficiency in the duties required in this program, and shall introduce new or revised procedures, as necessary, for compliance with the PRCS program.

Each department shall maintain training records to show the required training has been completed. Training records shall contain employee names, trainer names, and training dates.

These documents shall be available for inspection by employees and their authorized representatives for the duration they are employed by WSU.

GENERAL TRAINING

All employees who will enter PRCSs shall be trained in entry procedures. Personnel responsible for supervising, planning, entering, or participating in confined space entry and rescue shall be adequately trained in their duties prior to any confined space entry. Training shall include:

- Explanation of general hazards associated with PRCS
- Discussion of specific PRCS hazards associated with the facility, location, or operation.
- Reason for, proper use, and limitations of PPE and other safety equipment required for entry into PRCS.
- Explanation of permits and other procedural requirements for conducting a PRCS entry.
- A clear understanding of what conditions would prohibit entry.
- Procedures for responding to emergencies.
- Description of how to recognize symptoms of overexposure to probable air contaminants in themselves and coworkers, and methods for alerting an attendant.

Refresher training shall be conducted as needed to maintain employee competence in entry procedures and precautions.

Any WSU employee who has not been trained according to the WSU Confined Space Program shall not enter any PRCS. Training can be requested through EHS.

SPECIFIC TRAINING

Atmospheric monitoring personnel training shall include proper use of monitoring instruments (4-Gas Monitor), including instruction about:

- Proper use of equipment
- Equipment calibration
- Sampling strategies and techniques
- Exposure limits (PELs, TLVs, LELs, UELs, etc.)

Attendant training shall include:

- Procedures for summoning rescue or other emergency services
- Proper utilization of equipment used for communicating with entry and emergency/rescue personnel

VERIFICATION OF TRAINING

Periodic assessment of the effectiveness of employee training should be conducted by EHS. Training sessions should be repeated as often as necessary to maintain an acceptable level of personnel competence.

When entry into a PRCS is necessary, the entry supervisor **may** initiate entry procedures, including the completion of an entry permit. Entry into a PRCS shall follow the standard entry procedure below.

PRIOR TO ENTRY

The entire entry permit should be completed before a standard entry. Entry should be allowed only when all requirements of the permit are met, and it is reviewed and signed by an entry supervisor. The following conditions must be met prior to standard entry:

- Affected personnel are trained to establish proficiency in the duties that will be performed within the PRCS.
- The internal atmosphere within the PRCS is tested by the competent person with a calibrated 4-Gas Monitor.
- Personnel are provided with the necessary PPE as determined by the entry supervisor.
- Atmospheric monitoring happens during the entry. If a hazardous atmosphere is detected during entry:
    - Personnel within the PRCS should be evacuated by attendant(s) or entry supervisor until space can be evaluated by competent person to determined how the hazardous atmosphere developed
    - Controls should be put in place to protect employees before re-entry.

OPENING A PERMIT-REQUIRED CONFINED SPACE

Any conditions making it unsafe to remove an entrance cover should be eliminated before the cover is removed. When entrance covers are removed, the openings should be promptly guarded by a fall protection system that meets or exceeds 29 CFR 1926.502 (Fall Protection Systems Criteria and Practices) to prevent anyone from falling through. This barrier or cover should protect each employee from foreign objects entering the space. If the space is in a traffic area, adequate barriers should be erected.

ATMOSPHERIC TESTING

Atmospheric test data is required prior to entry into a confined space and is required to evaluate the PRCS hazards and verify that acceptable conditions exist for entry into that space. If a person must go into the space to obtain needed data, then standard PRCS entry procedures shall be followed. Before entry into a PRCS, the competent person shall conduct testing for hazardous atmospheres. The internal atmosphere shall be tested with a calibrated 4-Gas Monitor for oxygen, flammable gases and vapors, and potential toxic air contaminants (in that order).

Testing equipment used in specialty areas should be listed or approved for use in such areas by the competent person. A nationally recognized laboratory, such as Underwriters Laboratories or Factory Mutual Systems, must approve all testing equipment.

EVALUATION TESTING

The atmosphere of a PRCS should be analyzed using equipment of sufficient sensitivity and specificity. The analysis should identify and evaluate any hazardous atmospheres that may exist or arise so appropriate permit entry procedures can be developed, and acceptable entry conditions stipulated for that space. Data and development evaluation and interpretation of the

entry procedure should involve a technically qualified professional (consultant, certified industrial hygienist, registered safety engineer, certified safety professional).

VERIFICATION TESTING

A PRCS that may contain hazardous atmosphere should be tested for residues of all identified or suspected contaminants. The evaluation testing should be conducted with specified equipment to determine that residual concentrations at the time of testing and entry are within acceptable limits. The tester shall record results. The atmosphere should be periodically retested (frequency to be determined by the competent person) to verify that atmospheric conditions remain within acceptable entry parameters.

When there are changes in the use or configuration of a non-permit confined space that might increase the hazards to entrants, or some indication that the initial evaluation of the space may not have been adequate, a competent person shall re-evaluate that space.

ACCEPTABLE LIMITS

The atmosphere of the PRCS should be within acceptable limits when the following conditions are maintained:

- Oxygen – 19.5% to 23.5%
- Flammable gas, vapor, or mist – less than 10% of the lower explosive limit (LEL)
- Toxicity – less than the dose or permissible exposure limit as published in 29 CFR 1926 subpart D or subpart Z, which could result in employee exposure more than its dose or permissible exposure limit (PEL)
- Airborne combustible dusts – less than its lower explosive limit (LEL)
- Any other atmospheric condition that is immediately dangerous to life or health is controlled

ISOLATION AND LOCKOUT/TAGOUT SAFEGUARDS

All energy sources that are potentially hazardous to PRCS entrants should be secured, relieved, disconnected, and/or restrained before employees are permitted to enter. Equipment systems or processes should be locked and/or tagged out as required by the WS lockout/tagout program, which complies with OSHA's 29 CFR 1910.147 and American National Standards Institute (ANSI) Z244.1 (2016), prior to permitting entry into the PRCS. In PRCSs where complete isolation is not possible, the competent person shall evaluate the situation and make provisions for as rigorous an isolation as practical. Special precautions should be taken when entering double-walled, jacketed, or internally insulated PRCSs that may discharge hazardous material through the vessel's internal wall.

Where there's a need to test, position, or activate equipment by temporarily removing the lock or tag or both, a procedure shall be developed and implemented to control hazards to the occupants. Any removal of locks, tags, or other protective measures shall be done in accordance with WSU's lockout/tagout program.

INGRESS/EGRESS SAFEGUARDS

Means for safe entry and exit should be provided for confined spaces and PRCSs. Each entry and exit point should be evaluated by the competent person to determine the most effective methods and equipment to enable employees to safely enter and exit a PRCS.
Appropriate retrieval equipment or methods should be used whenever a person enters a confined space. Retrieval equipment use may be waived by the competent person if it increases the overall risks of entry or does not contribute to the rescue. A mechanical device should be available to retrieve personnel from vertical confined spaces greater than five feet deep.

ENTRY PERMITS

An entry permit is the most essential tool for assuring safety during entry in PRCS with known hazards, or with unknown or potentially hazardous atmospheres. The entry permit process guides the supervisor and workers through a systematic evaluation of the space to be entered. The permit should be used to establish appropriate conditions. Before each entry into a PRCS, an entry permit needs to be authorized by the entry supervisor. The entry supervisor shall then communicate the contents of the permit to EHS and all employees involved in the operation and post the permit conspicuously near the work location. A standard entry permit should be used for all entries. (See confined space forms.)

Entry permits should be posted at the entrance of a PRCS (see attached entry permit copy). Copies of all completed and/or canceled entry permits should be retained for one year after completing an entry. Forward permits to EHS upon completion of the work.

SAFETY EQUIPMENT

WSU will provide the following equipment, at no cost to the employee:

- Needed testing and monitoring equipment
- Needed ventilation equipment to obtain acceptable entry conditions
- Necessary communications equipment, including any electronic communication equipment for attendants monitoring entrant status in multiple spaces
- PPE as necessary
- Approved lighting equipment for ignitable or combustible properties of a specific gas, vapor, dust, or fiber that may be present, and to enable employees to see well enough to work safely, and to exit the space quickly in an emergency
- Barriers and shields
- Needed equipment for safe ingress and egress by authorized entrants (ladders, etc.)
- Rescue and emergency equipment not provided by rescue services
- Any other equipment necessary for safe entry, exit, and rescue from PRCSs

Supervisors will ensure that equipment is properly maintained, and employees are trained in their use.

SUBCONTRACTORS, VENDORS, OTHERS

WSU subcontractors, vendors, or outside employers should be required to submit written policies and procedures for entry into PRCSs that comply with 29 CFR 1910.146. Entry into PRCSs by these outside employers shall be coordinated with and approved by the entry supervisor in charge of the permit space.

Subcontractors are responsible for providing training, equipment, testing, personnel, emergency services, and permits for entry into PRCSs by their employees. They should notify outside employers about confined space hazards, entry requirements, and hazards history in the permit spaces involved.

In cases where employees and subcontractors may enter the same permit spaces or where operations of outside employers may impact the hazards involved in the PRCSs, the entry supervisor should coordinate efforts and protective measures of outside employers.

Before entry operations begin, WSU should provide the following information to the controlling contractor (if applicable):

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

Appendix A Confined and Permit Required Confined Spaces

Confined Spaces *(List all spaces that meet the definition of a confined space. Include locations.)*

Mechanical Rooms
Electrical Rooms
Elevator Rooms/Shafts
Tunnels (unless coupled with other hazardous work)
TY Lab exhaust filtration chamber

Permit-Required Confined Spaces (List all spaces that also meet the definition of a PRCS. Include locations.)

Reservoir
Boilers
Vaults
Manholes

APPENDIX B Confined Space Permit

CONFINED SPACE ENTRY PERMIT

Confined Space Location/Description/ID Number **Date:**

Purpose of Entry

Time In: _____ **Permit Canceled Time:** _____
Time Out: _____ **Reason Permit Canceled:** _____

Supervisor: _____

Rescue and Emergency Services-

Hazards of Confined Space	Yes	No	Special Requirements	Yes	No
Oxygen deficiency			Hot Work Permit Required		
Combustible gas/vapor			Lockout/Tagout		
Combustible dust			Lines broken, capped, or blanked		
Carbon Monoxide			Purge-flush and vent		
Hydrogen Sulfide			Secure Area-Post and Flag		
Toxic gas/vapor			Ventilation		
Toxic fumes			Other- List:		
Skin- chemical hazards			**Special Equipment**		
Electrical hazard			Breathing apparatus- respirator		
Mechanical hazard			Escape harness required		
Engulfment hazard			Tripod emergency escape unit		
Entrapment hazard			Lifelines		
Thermal hazard			Lighting (explosive proof/low voltage)		
Slip or fall hazard			PPE- goggles, gloves, clothing, etc.		
			Fire Extinguisher		

Communication Procedures:

DO NOT ENTER IF PERMISSABLE ENTRY LEVELS ARE EXCEEDED		**Test Start and Stop Time:** Start	Stop
	Permissable Entry Level		
% of Oxygen	19.5 % to 23.5 %		
% of LEL	Less than 10%		
Carbon Monoxide	35 PPM (8 hr.)		
Hydrogen Sulfide	10 PPM (8 hr.)		
Other			

Name(s) or Person(s) testing: _____

Test Instrument(s) used- Include Name, Model, Serial Number and Date Last Calibrated:

CFM-Ventilation	Size-Cubic Feet	Pre Entry Time	❑ Central Notified Before Entrance	Time Notified:
			❑ Central Notified After Entrance	Time Notified:

Authorized Entrants	Authorized Attendants
_____	_____
_____	_____
_____	_____

PERMIT AUTHORIZATION **I Certify that all actions and conditions necessary for safe entry have been performed.**	
Name-Print:	
Signature:	
Date:	Time:

Entry Procedure Checklist: Complete the following steps before, during, and after a confined space entry:

1- Obtain a PRCS entry permit from EHS website.
2- Notify the supervisor before the PRCS entry.
3- Contact EHS for 4-Gas Monitoring. After hours contact Heat Plant and they can obtain the pre-entry atmospheric levels for emergency work.
4- Verify 4-Gas Monitor has been calibrated and is working properly.
5- Verify Lockout/Tagout if needed.
6- Complete the top portion of the entry form.
7- Ensure all retrieval/rescue equipment (e.g. tripod, body-belt, lanyard, etc.) is in place prior to entry.
8- Monitor the PRCS with the 4-Gas Monitor prior to entry and record levels on permit under **"Start Time"**. All entrants and attendant names shall be documented on the permit. The Entry Supervisor signs the **"Permit Authorization**" section on the bottom of the permit to ensure all actions and conditions necessary for safe entry have been performed.
9- Employees entering the PRCS should wear a 4-Gas Monitor after the pre-atmosphere test. Employees should also have a full body harness and lanyard attached to the rescue tripod. Employees shall have a radio and any other necessary PPE.
10- Employees can enter the PRCS once Step 7 has been completed. The entrant and attendant should complete the "**Hazards of Confined Spaces**" & **"Special Requirements"** section of the permit once employees are within the PRCS.
11- The attendant should maintain constant communication with the entrant until the entrant has exited the confined space. The entrant should also gather the oxygen, explosive gases, carbon monoxide, and hydrogen sulfide readings at the completion of work and communicate them to the attendant to record on the permit under the **"Stop Time".**
12- The attendant should contact the supervisor once the entrant has exited the PRCS.
13- The PRCS form shall be given to EHS to file in the PRCS records.