

 <b>Portland Community College Health &amp; Safety Manual</b>	<b>Dept: Environmental Health and Safety (EH&amp;S)</b>	
	<b>Function: Facilities Management Services</b>	
	<b>Topic: Chapter 5 — Confined Space Entry &amp; Tunnel Safety Plan</b>	
	<b>Board Policy: B507</b>	<b>Revised Date: March 2021</b>

<b>Authority</b>	<b>PCC Board Policy—B507</b>
	<b>Portland Community College is committed to providing a safe and healthy work and educational environment for our employees, students and visitors.</b>

<b>Summary</b>	<b>This Plan incorporates OR-OSHA requirements to protect the health of employees and reduce accidental injury associated with entering, working in, and exiting from the College’s permit-required confined spaces. Additionally, this Plan includes the requirements for safe entry into and work within the utility tunnels located below grade at the Sylvania campus.</b>
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## I. PURPOSE

Portland Community College's Confined Space Entry & Tunnel Safety Plan (the Plan) is designed to provide employees with procedures that comply with the Oregon OSHA Confined Space Standard and protect them from hazards associated with confined spaces. The Plan also includes procedures that must be followed by all personnel entering into and working within the utility tunnel system located at the Sylvania campus. This Plan applies to any PCC employee or contractor that must enter into an area identified as a confined space or the tunnel system.

## II. AUTHORITY

PCC Board Policy B507  
OR OSHA Div 2/J  
OR OSHA 437-002-0146 Confined Spaces

## III. RESPONSIBILITY

### A. Department Managers:

- Ensuring only trained and authorized employees serve on authorized confined space entry teams and work within confined spaces
- Informing EH&S when new employees require training to enter confined spaces
- Notifying EH&S upon discovery or creation of a new confined space
- Notifying EH&S when a confined space entry will occur
- Retaining the completed *Form 2: Confined Space Entry Permit* forms on file for three years after cancellation with a copy sent to EH&S

### B. Authorized Employees on Confined Space Entry Teams:

- Understanding the procedures and controls outlined in this Plan
- Fulfilling the duties associated with the role(s) they assume on the confined space entry team, i.e., Attendant, Entrant, Supervisor as outlined in *Section IV. F. Duties*.

### C. Project Managers

- Following requirements in the *Health & Safety Manual (H&SM) Chapter 18 - Contractor Hazard Notification* and ensuring that Contractors' confined space plans are submitted at least 2 days prior to the planned entries for review.
- Informing Contractors of this Plan and the procedures related to the Contractor's entry into a College confined space.
- Informing Contractors when a permit-required confined space entry is involved in the work, and if chemicals are in the space per the requirements of *H&SM Chapter 7 - Hazard Communication*.
- Completing *Form 2: Confined Space Entry Permit* that includes informing the Contractor of the hazards the College has identified, historical precautions that College employees have taken to enter the space, and the experiences that College employees have had with the space.
- Coordinating any entry operation with Contractors if PCC employees will also be entering the space.

- Confirming that Contractors are trained in confined space entry requirements per OR-OSHA and ensuring that the Contractor issues their own Confined Space Entry Permit.
- Holding a debriefing with Contractors regarding any problems encountered in the confined space entry and documenting this information on *Form 2: Confined Space Entry Permit*.
- Supplying a copy of the completed *Form 2: Confined Space Entry Permit form* to the applicable FMS Associate Manager after completing work in a confined space.

#### **D. Environmental Health & Safety**

- Managing this Plan, including the maintenance of the *Appendix C: Confined Space Indices* of confined spaces at each campus/center.
- Providing assistance as needed to affected College departments (e.g., Facilities Management Services, Information Technology, Planning & Capital Construction) in evaluating compliance with this Plan.
- Conducting initial and refresher training, as needed, to employees who must perform duties as authorized entrants, attendants or rescuers related to confined space entries.
- Ensuring required maintenance and inspections are done on PCC Confined Space Entry equipment, including air monitor, blower, tripod, and winch (EH&S)
- Communicating updates to this Plan to all affected departments.
- Performing an annual audit on this Plan to ensure that affected departments have properly issued permits, made contractor notifications, and are following the procedure laid out in this Plan; and

#### **E. Contractors**

- Providing a copy of their confined space program to the Project Manager.
- Following their own confined space program as well as adhering to applicable procedures of this Plan.
- Completing relevant sections of *Form 2 – Confined Space Entry Permit*.
- Providing and completing their own confined space entry permit.

#### **F. Facilities Management Services**

- Providing and maintaining maps of confined space locations at PCC that graphically depict the locations of confined spaces indicated in *Appendix C: Confined Space Indices*.
- Providing and maintaining a detailed map of the Sylvania campus tunnel system, including emergency evacuation routes and exits.

## **IV. PROCEDURES**

Procedures to be followed for entry into a confined space are dependent upon the classification of the space and the hazards identified and/or anticipated to be present in the space.

## A. Evaluation of Spaces

Each confined space has a specific combination of potentially hazardous situations which must be evaluated before the space may be entered and work begun. It is extremely important that each space is properly assessed and classified for hazards. PCC's spaces can be categorized as either confined spaces, permit-required confined spaces or other. A current inventory of confined space types at PCC can be found in *Appendix B: Confined Space Summary*.

1. Confined Space - Any space which meets all of the following conditions:
  - It is large enough and so configured that a person can fully enter the space and perform work.
  - It has limited or restricted means for entry and/or exit
  - It is not designed for continuous human occupancy
2. Permit-Required Confined Space - A confined space that has one or more of the following characteristics:
  - It contains or has the potential to contain a hazardous atmosphere
  - It contains a material that has the potential of engulfing an entrant
  - It has an internal configuration such that the entrant could be trapped and/or asphyxiated by inwardly converging walls, or by a floor which slopes downward to a smaller cross-section
  - It contains any other recognized serious safety or health hazard
3. Other – Spaces that do not meet the definition of a confined space.

Special note regarding the Sylvania campus' Utility Tunnel System – The overwhelming majority of this system is not identified as a confined space; However, within the Utility Tunnel System, there are confined spaces which can be identified in *Appendix B: Confined Space Summary* and *Appendix C: Confined Space Indices*.

Should employees or contractors be required to enter and/or work in a space that is not identified in *Appendix B: Confined Space Summary* or *Appendix C: Confined Space Indices* yet appears to meet the definition of a confined space or a permit-required confined space, they must evaluate the space using by completing *Form 1: Confined Space Assessment*. EH&S is available to assist with these evaluations.

## B. General Safety Requirements

When an employee enters a confined space, they are subject to a wide variety of hazards which are unique to the space or are magnified by the conditions within the confined space. The primary hazard encountered in a permit-required confined space is a hazardous atmosphere. This means an atmosphere which exposes employees to a risk of death, incapacitation, injury or acute illness from one or more of the following causes:

- A flammable gas, vapor or mist in excess of 10 percent of its lower flammable limit.

- An airborne combustible dust at a concentration that obscures vision at a distance of five feet or less.
- An atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.
- An atmospheric concentration of any substance for which a permissible exposure limit (PEL) exists and could result in employee exposure in excess of its permissible limits.
- Any atmospheric condition recognized as immediately dangerous to life or health

Other hazards include loose rungs on fixed ladders in manholes, slippery surfaces due to liquids in tanks, sloping floors, noise exposure due to sound reflected off of walls within the space, improper use of personal protective equipment, or hazards associated with the specific work being performed in or near the confined space.

Work occurring in a confined space may require review and/or permits under other sections of the H&SM. These can include:

- The written authorization to perform operations that are a source of sparks, flame or excessive heat (e.g., welding, cutting, burning, etc.) These operations may require adherence to Chapter 16 of the H&SM - Hot Work Plan and may require the use of Form X – Hot Work Permit. For more information, refer to *H&SM Chapter 16 - Hot Work Plan*.
- The requirement to isolate sources of hazardous energy to prevent the release of such energy and/or material into the space. These requirements can be found in *H&SM Chapter 10 - Control of Hazardous Energy (Lockout/Tagout)*.
- Contact with electrical equipment or other sources of electrical energy inside a confined space. Please see *H&SM Chapter 6 - Electrical Safety*

**C. Entry Procedures** – An outline of basic confined space entry requirements follows:

1. Barricades & Signs - All openings to permit-required confined spaces shall be covered to prevent accidental entry and signs/labels/placards shall be prominently posted/affixed that contain wording such as what is shown in the example below:

**DANGER  
PERMIT REQUIRED  
CONFINED SPACE  
DO NOT ENTER**

All uncovered openings to permit-required confined spaces must be barricaded and signage will be posted to prevent unauthorized persons to enter. Barricades must be highly visible, at least 42 inches tall, and able to withstand 200 pounds of force.

2. Pre-Entry Requirements:

- The Entry Supervisor in charge of the confined space entry shall assess the possible hazards to determine if acceptable entry conditions are present prior to entry into the space, and must complete *Form 2: Confined Space Entry Permit* prior to allowing entry for any confined space.
- The Attendant shall review *Form 2: Confined Space Entry Permit* before the start of the job.

- The Attendant/Rescuer shall secure an atmosphere monitor and test the permit-required confined space prior to entry. The person taking the readings shall document the readings on *Form 2: Confined Space Entry Permit*.
- All pre-work procedures shall be completed before any work commences within the permit-required confined space. Pre-work procedures include, but are not limited to ensuring:
  - Proper ventilation is provided
  - Adequate lighting is provided
  - Rescue procedures are documented
  - An effective means of communication is utilized
  - The confined space entry team has and uses all required personal protective equipment (PPE)
  - Equipment with hazardous energy sources is locked/tagged out
  - Continuous atmospheric monitoring of the space occurs at various heights
- All persons on the confined space entry team must review and sign the completed *Form 2: Confined Space Entry Permit*
- Posting the completed *Form 2: Confined Space Entry Permit* at the entrance to the permit-required confined space

### 3. Working in the Confined Space:

- After initial atmospheric monitoring is completed, the monitor shall stay with the Attendant outside of the permit-required confined space so that he/she can perform continuous air monitoring of the space.
- Entry into a permit-required confined space shall be limited to the least number of employees required to complete a job.
- If entry into the permit-required confined space is available only from above, a single entrant may enter the space so long as they are wearing a fall protection harness and connected to the rescue tripod and winch via a lanyard.
- If an alarm is activated, the monitor malfunctions, ventilation or lighting discontinue or any other emergency condition is detected, all entrants will evacuate the permit-required confined space until the problem is resolved.
- After the problem has been resolved, the atmosphere in the permit-required confined space will be retested at various heights within the space before any re-entry is made.

### 4. Post Entry:

- After completion of work or end of the work shift, any entrants working in the permit-required confined space as well as the attendant/rescuer will sign out on the permit.
- The permit-required confined space will be closed and secured as it was before the entry began.
- The completed *Form 2: Confined Space Entry Permit* will be signed and delivered to the EH&S office along with the atmospheric monitor.

5. Emergencies - All permit-required confined space entries will have a documented emergency and rescue plan commensurate with the level of risk associated with the work to be performed. The Entry Supervisor, Attendant(s), Entrant(s), and additional relevant personnel will review and understand the rescue plan and procedures prior to entering the permit-required confined space.

Common emergencies during permit-required confined space entries include:

- Malfunction with the air blower ventilating to the space
- A new unforeseen hazard is introduced into the confined space
- An entrant suffers a medical emergency

In the event of any emergency, the Standby Attendant/Rescuer will:

- Ask any entrants capable of self-exit to do so.
- Determine if any entrants are physically incapable of exiting.
- Call the Public Safety Emergency line at 971-722-444 to summon either onsite and/or offsite emergency and rescue services if needed.
- Follow additional procedures outlined in *Section IV. F. and H.* of this program.

#### **D. Confined Space Entry Permit**

A completed *Form 2: Confined Space Permit* is required prior to entry into any permit-required confined space. The form must be fully completed prior to entry into the confined space. The original form is required to be maintained on the jobsite until the operation is complete

Upon termination of the entry covered by the Permit and after all entrants have exited the confined space, the individual authorizing the entry will close the Confined Space Permit. If the Entrant Supervisor is not at the jobsite the Attendant/Rescuer will close, date, and sign the *Form 2: Confined Space Entry Permit*.

#### **E. Confined Space Entry Equipment**

The safety equipment to be used in a permit-required confined space will be inspected, maintained and/or calibrated on a regular basis. Additionally, maintenance manuals will be kept for all specialized equipment used for confined space entry. These manuals will identify the operational safety requirements and required inspection frequency of each piece of equipment. The safety equipment includes, but is not limited to:

- Atmospheric monitor
- Powered ventilation system
- Rescue equipment – includes tripod and hoist
- Barriers
- Communication system
- Portable ladders
- PPE including hard hat, gloves, safety shoes/boots, and safety glasses

EH&S maintains the atmospheric monitor, the powered ventilator and the rescue equipment for PCC. Inspection and calibration information for this equipment can be found in *Appendix D: Multi-gas Detector Use & Calibration* and *Appendix E: Tripod Inspection*. Individual departments are responsible for the maintenance of other equipment used by their personnel including communications equipment, ladders, barriers and PPE.

## F. Confined Space Personnel Duties

1. Entrant - Prior to being eligible to obtain an enter a confined space, Entrants will be trained and will be required to perform the following duties:
  - Recognizing hazards which may be faced during an entry; This includes signs and symptoms of an exposure as well as an understanding of the consequences of that exposure.
  - Maintaining communication with and notifying the Attendant in the event the Entrant initiates evacuation. If an Entrant in a permit required confined space becomes aware that the Attendant is not present, they will immediately evacuate.
  - Using appropriate PPE as designated by the Entry Supervisor and/or Attendant. In cases when respiratory protection is required, the Authorized Entrant will be trained, fit-tested and medically qualified to use such PPE (refer to *H&SM Ch 17 - Respiratory Protection Plan*).
  - Alerting the Attendant to order an evacuation whenever:
    - Behavioral effects associated with exposure to hazardous substances are observed in any Entrant (self or other).
    - A prohibited condition is detected.
    - An Attendant is required, exit the space when one of following occurs:
      - Lockout/Tagout practices not followed.
      - When the Attendant orders an evacuation.
      - When an automatic alarm (e.g., gas meter, fire alarm) sounds.
      - When the Entrant perceives that they are in danger.
  - Exiting the Space whenever one of following occurs:
    - The Attendant/Rescuer orders an evacuation.
    - An alarm sounds (e.g., gas meter, fire alarm).
    - The Entrant perceives that they are in danger.

The only exception to the requirement that an Entrant follow an order to evacuate would occur when the Entrant is physically unable to evacuate on their own.

2. Attendant - Duties of the Attendant include the following:
  - Remaining outside of the permit-required confined space. Attendants will not enter the confined space to attempt a rescue of entrants.



Attendants that are part of a rescue team can only enter the space as a rescuer when at least one other member of the rescue team is at the scene and they are relinquished of their duties by another trained Attendant.

- At no time will the entry site be left without a designated Attendant.
  - Rescue equipment will be provided for Attendant to use without entering the space.
  - Monitoring only one permit-required confined space at a time.
  - Maintaining an accurate count of all Entrants in the space.
  - Monitoring activities inside and outside the space to determine if it is safe for Entrants to remain in the space.
  - Ensuring Entrants are provided with, and maintain an effective and continuous means of communication with, the Attendant during the entry. This may be through voice or radio communications.
  - Notifying the Public Safety Dispatcher when an evacuation is ordered.
  - Ordering the immediate evacuation of the space in the following conditions:
    - Whenever the Attendant observes a condition not allowed in the *Form 2: Confined Space Entry Permit*.
    - The Attendant detects behavioral changes in any entrant.
    - The Attendant detects a situation outside of the space which could endanger the entrants.
    - The Attendant detects an uncontrolled hazard within the space.
    - The Attendant must leave the entry area for any reason.
  - The Attendant will take the following actions as necessary when an unauthorized person approaches or enters a permit-required confined space while entry is underway:
    - Warn the unauthorized person to exit area or permit-required confined space immediately
    - Inform the all members of the Entry Team of such occurrence.
3. Entry Supervisor - The designated Entry Supervisor will perform the following duties:
- Using the *Form 2: Confined Space Entry Permit* and determining that all necessary procedures, practices and equipment for safe entry are noted on the form.
  - Checking at appropriate intervals that the entry operations remain consistent with the terms of the *Form 2: Confined Space Entry Permit*.
  - Terminating entry and cancelling the *Form 2: Confined Space Permit Entry Permit* whenever acceptable entry conditions are not present.
  - Ensuring that an entry is properly concluded when work in the space is completed (ex. all Entrants have exited, space is closed off, etc.).
  - Responding immediately to the scene of an ordered evacuation.

## **G. Contractors**

Contractors must follow applicable OR-OSHA regulations and all procedures outlined in this Plan and the Contractor's own confined space program.

A PCC Project Manager trained as an Entry Supervisor will complete sections of the *Form 2: Confined Space Entry Permit* allowing the contractors to proceed.

Contractors will provide and complete their own confined space permits in accordance with their own confined space program. Additionally, contractors will provide and use their own atmospheric monitoring devices, ventilation systems and rescue equipment.

When both Contractor and PCC employees make a joint entry, the entry will be coordinated by the PCC Entry Supervisor with both parties having individual entry permits.

If a Contractor is going to enter any part of the PCC Utility Tunnel System, the Contractor will follow all procedures outlined in the supplemental Utility Tunnel Safety Program attached in *Appendix F: Tunnel Safety*.

## **H. Rescue**

The only type of emergency rescue that an Attendant can carry out is a vertical rescue using the rescue tripod and hoist connected to a single entrant. All other rescues require the use of a rescue team and a rescue plan.

Emergency procedures including rescue and evacuation should be considered at the same time that work in a permit-required confined spaces is planned and should be reviewed prior to entry. Additionally, a means of emergency communication will be immediately available to the Attendant and the Attendant will be instructed how to summon emergency assistance. Prior to the authorized entry into the permit-required confined space the Entry Supervisor will notify Public Safety Dispatch at 971-722-4902 of the time that the entry is planned, and indicate that Public Safety Emergency 971-722-4444 will be called if there is immediate medical assistance needed.

- All employees entering permit-required confined spaces will be equipped with a body harness with lifeline.
- An Entrant is only allowed to enter a permit-required confined space that accommodates tripod rescue equipment if the space is 5 feet or deeper. The tripod rescue equipment is designed for a vertical space with a short horizontal range and allows for non-entry rescue by the Attendant.
- The Attendant is designated to use tripod rescue equipment and will receive initial training and annual refresher training on it and the Class II Fall Arrest Harness. The harness will be properly fitted and fully functional prior to its use.
- In the event of any potentially life-threatening emergency, contact Public Safety Emergency so they can call 911. In the event that external rescue resources (police or fire department, emergency medical personnel) are called to the scene, the Entry Supervisor or the Attendant will inform the responding emergency personnel that the space is classified as a permit-required confined space.

Procedures for emergencies in the non-confined space areas of the Sylvania Utility Tunnel System are provided in *Appendix F: Tunnel Safety*.

## **I. Alternate Entry**

Alternate entry is a method for entering a permit-required space without a written permit space program or an entry permit. Alternate entry cannot be used to enter a continuous system unless you can positively isolate the area to be entered from the rest of the space or can demonstrate and document that the conditions which caused the hazard no longer exist within the system during the entry

Workers may enter a permit-required confined space under alternate entry only after one of the following is done:

- All physical hazards and hazardous atmospheres in the space are eliminated so that conditions that caused the hazards no longer exist
- All physical hazards are eliminated and all hazardous atmospheres are controlled via continuous forced air ventilation
  - Note - OR OSHA states that if continuous forced air ventilation is used to control the hazardous atmosphere, no other measures must be needed to protect entrants. This means that any entries using ventilation but still requiring additional PPE or hazard control measures must have a permit and alternate entry cannot be used.
- Any work to be performed within the space must not introduce any new hazards - work with hazardous quantities of flammable or toxic substances and hot work are not permitted.
- If a space is evacuated while alternate entry was used, re-entry is not allowed until re-evaluation of the space is conducted.

**J. Tunnel Safety** – Entry into, and work performed in, the Utility Tunnel System at the Sylvania campus will be done in accordance with the procedures established in *Appendix F: Tunnel Safety*.

## V. TRAINING

All employees who enter confined spaces or the Sylvania Utility Tunnels will be trained in the procedures, requirements and equipment outlined in this Plan. EH&S provides training on the use of these procedures as well as the required training elements outlined in the OR OSHA Confined Space Standard.

Initial confined space training is provided to all authorized employees serving on entry teams regardless of their duties. Additional / refresher training must be provided:

- Whenever there is a change in the confined space program.
- For employees whose duties change to include work in areas with permit spaces.
- When an employee demonstrates lack of knowledge retention.
- When there is a change in a space, such as a hazard for which there was no prior training, or a previously unpermitted space becomes a permitted space.
- For appropriate use of all necessary and required equipment.

All training will be documented.

## VI. RECORDKEEPING

- A. Training Records – Employee training records will be maintained in PCC’s online learning management system, which can be found at MyCareer@PCC.
- B. Cancelled Permits – Management for the department overseeing a confined space entry whether performed by PCC employees or contractors or both, will maintain a copy of each cancelled permit for 3 years from the date of cancellation. A copy of each cancelled permit must be forwarded to EH&S for program review.
- C. Calibration Records – EH&S will maintain a copy of the calibration records for the multi-gas meters used to evaluate confined space atmospheres and document potential exposure to toxic substances.
- D. Equipment Inspection Records – EH&S will maintain a copy of the inspection records for the Rescue Tripod and Air Blower systems used to support confined space entry operations.

EH&S will keep all records associated with the confined space program in accordance with the Oregon State records retention requirements.