

Oregon State University

Confined Space Entry Program

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Policy and Responsibilities

Refer to section [209: Confined Space Entry](#) of the OSU [Safety \(SAF\) Manual](#).

Definitions

Acceptable entry conditions – The conditions that must exist in a permit-required confined space to allow safe entry and work.

Affected employee – An employee whose work operations are, or may be, in an area where permit-required confined spaces are present.

Alternate entry – An alternative process for entering a permit space under very specific conditions. The space remains a permit space even when entered using alternate entry. Alternate entry removes the requirement of having an attendant at the entrance for the duration of the entry.

Atmospheric hazard (see the definition of hazardous atmosphere).

Authorized – Approved by the employer or controlling contractor.

Attendant – An individual stationed outside one or more permit spaces to monitor the authorized entrants and who performs all attendants duties assigned in the employer's permit space program.

Note: the monitoring of more than one permit space must be approved by EH&S *prior to entry*.

Atmospheric testing – see “Testing”.

Authorized entrant – An employee who is authorized by the employer to enter a permit space.

Barrier – A physical obstruction that blocks or limits access.

Calibration – The checking of a direct-reading instrument (i.e. a multi-gas meter), per manufacturer's instructions, against an accurate standard (such as a calibration gas) to determine any deviation and correct for errors.

Cancel – Revoke or make void.

Confined space – A space that meets **all** of the following:

- Large enough and so configured that an employee can fully enter the space and perform work.
- Has limited or restricted means for entry and/or exit.
- Is not designed for continuous human occupancy.

Continuous system – A confined space that meets all of the following:

- Part of, and contiguous with, a larger confined space (for example, storm sewers, sanitary sewers, or steam tunnels).
- Cannot be isolated from the larger confined space.
- Subject to a potential release from the larger confined space that can overwhelm control measures and/or personal protective equipment, resulting in a hazard that is immediately dangerous to life and health (IDLH).

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Control – The action taken to reduce the level of any hazard inside a confined space using engineering methods (for example, by isolation or ventilation), and then using these methods to maintain the reduced hazard level. Control also refers to the engineering methods used for this purpose. Personal protective equipment (PPE) is not a control.

Controlling contractor – The employer that has overall responsibility for construction at a worksite.

Note: A controlling contractor who owns or manages a property is both a controlling contractor and a host employer.

Emergency – Any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.

Engulfment hazard – A physical hazard consisting of a liquid or flowable solid substance that can surround and capture an individual. Engulfment hazards may cause death or serious physical harm if:

- The individual inhales the engulfing substance into the respiratory system (drowning, for example);
- the substance exerts excessive force on the individual's body resulting in strangulation, constriction, or crushing;
- or the substance suffocates the individual.

Entrant (see the definition of authorized entrant).

Entrapment – An event in which a person is caught, trapped or entangled.

Entry – The action by which any part of an employee's body breaks the plane of an opening into a confined space. Entry (or entry operations) also refers to the period during which an employee occupies a confined space.

Entry permit – Written authorization from the employer, controlling contractor, or host employer to enter a permit-required confined space and perform work.

Note: Only the current revision of the OSU Confined Space Entry permit may be used during operations involving University employees.

Entry supervisor – The person (such as the employer, foreman, or crew chief, or any other designated employee) responsible for:

- Determining if acceptable entry conditions are present at a permit space where entry is planned; and
- Authorizing entry and overseeing entry operations; and
- Terminating entry as required.

Note: The entry supervisor can also be **either** the attendant **or** an entrant.

Feasible – Capable of being done with means at hand and circumstances as they are; workable.

Hazard – A physical hazard or hazardous atmosphere.

Hazard elimination – Means that conditions which caused the hazard no longer exist within the space.

Note: Continuous ventilation does not eliminate hazards, it only controls hazards.

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

- A flammable gas, vapor, or mist in excess of 10 percent of its Lower Explosive Limit (10% LEL).
- An airborne combustible dust at a concentration that meets or exceeds its LEL.

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

- An atmospheric oxygen (O₂) concentration below 19.5 percent (oxygen deficient) or above 23.5 percent (oxygen enriched).
- An airborne concentration of a substance that exceeds the dose or exposure limit specified by an Oregon Occupational Safety and Health Administration (OR-OSHA) requirement.

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.

- An atmosphere that presents an immediate danger to life or health (IDLH).

Host employer – An employer who owns or manages the property on which confined space work is taking place.

Hot Work Permit – Written authorization to perform operations which could provide a source of ignition.

Immediately dangerous to life or health (IDLH) – Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

Note: Some materials (hydrogen fluoride gas and cadmium vapor, for example) may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12 - 72 hours after exposure. The victim "feels normal" from recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

Inerting – The displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible.

Note: This procedure produces an IDLH oxygen-deficient atmosphere.

Isolation – The process by which a permit-required confined space is removed from service and completely protected against the release of energy and material into the space by such means as:

- Blanking or blinding.
- Misaligning or removing sections of lines, pipes, or ducts.
- A double block and bleed system.
- Lockout or tagout of all sources of energy.
- Blocking or disconnecting all mechanical linkages.

Monitor or monitoring – The process used to identify and evaluate the atmosphere in a permit space after an authorized entrant enters the space. This is a process of checking for changes in the atmospheric conditions within a permit space and is performed in a periodic or continuous manner after the completion of the initial testing of that space (See also "Testing").

Non-entry rescue – Retrieval of entrants from a permit space without entering the permit space.

OSU Point of Contact – A person or a department serving as the coordinator or focal point of an activity or project.

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

- Contains, or has a potential to contain, a hazardous atmosphere.
- Contains a material that has the potential to engulf an entrant.
- Has an internal configuration such that an entrant could become trapped or asphyxiated (not being able to breathe, choking, cutting off all oxygen) by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.
- Contains any other recognized serious safety or health hazard that can inhibit an entrant's ability to self-rescue.

Physical hazard – An existing or potential hazard that can cause death or serious physical harm in or near a confined space, or a hazard that has a reasonable probability of occurring in or near a confined space, and includes, but is not limited to:

- Explosives; mechanical, electrical, hydraulic, and pneumatic energy; radiation; temperature extremes; engulfment; noise; and inwardly converging surfaces; and
- Chemicals that can cause death or serious physical harm through skin or eye contact (rather than through inhalation).

Potential hazards – All reasonably anticipated conditions within the space and outside the space that can adversely affect conditions within the space.

Rescue – Retrieving employees who are unable to remove themselves from a permit space.

Rescue service – The onsite or offsite personnel who the employer designates to engage in non-entry and/or entry rescue of employees from a permit space.

Retrieval system – The equipment, including mechanical retrieval devices, used for non-entry rescue of authorized entrants from a permit space.

Self-rescue – Escape unaided from a permit-required confined space.

Serious physical harm – An impairment in which a body part is made functionally useless or is substantially reduced in efficiency. Such impairment may include loss of consciousness or disorientation, and may be permanent or temporary, or chronic or acute. Injuries involving such impairment would usually require treatment by a physician or other licensed health-care professional while an illness resulting in serious physical harm could shorten life or substantially reduce physical or mental efficiency by impairing a normal bodily function or body part.

Terminate – Bring to a close, end, or conclusion.

Testing – The process of identifying and evaluating the atmospheric hazards that entrants may be exposed to in a permit-required confined space. Testing includes specifying the initial tests that are to be performed in the permit space (See also "monitor or monitoring").

Note: Testing enables employers both to devise and implement adequate control measures for the protection of authorized entrants and to determine if acceptable entry conditions are present immediately prior to and during entry.

Ventilate or ventilation – Controlling a hazardous atmosphere using powered equipment, such as fans and blowers, to continuously move air.

Confined space identification, evaluation and inventory

Environmental Health & Safety (EH&S) is responsible for assisting entry supervisors in the identification, evaluation and labeling of confined spaces in facilities controlled by OSU.

Identification

Employees shall be provided training, and support materials, on how to identify the hazards associated with confined and permit spaces and shall not enter until fully evaluated.

Entry supervisors shall report to EH&S all locations in their work space that may be considered confined spaces so these areas can be evaluated.

Note: Where there are multiple permit spaces of the same type that have the same hazards, such as sewers, water vaults, or valve pits, the exact location of each space does not need to be identified so long as there is enough information so that employees can readily identify each type of space and its hazards at each location.

When feasible, permit spaces shall be labeled accordingly. However, the configuration of some confined spaces do not readily allow for the installation of a warning sign. For example, all sewer and storm drains that are entered through a manhole are to be considered permit required confined spaces, whether labeled as such or not. Employees must not rely solely on the existence of a warning sign.

In those instances where labeling a space is deemed necessary, the label shall include the words

- “Danger”, **and**
- “Confined Space”, **and**
- “Enter By Permit Only”, **or** “Entry Permit Required”, **or** “Permit Required”, **or** “Permit Required Prior To Entry” or similar.

Evaluation

The [Confined Space Evaluation Form](#) will be used to document the determination of whether or not a particular space has the characteristics of a confined or permit space. The completed survey will be forwarded to EH&S for review, verification, and maintenance.

When conditions within a confined or permit space change significantly (other than normally observed changes due to daily or seasonal variations), the space must be re-evaluated.

Affected employees, or their representatives, are encouraged to participate in space (re)evaluations.

Inventory

EH&S shall maintain, and provide upon request, an Inventory of Evaluated Spaces for this program.

Procedures for entering a permit space

If only workers of other employers (contract workers) will enter the space

If contract workers only will enter a permit space, the OSU Point of Contact will inform the contractor about this program, other relevant OSU programs and procedures, and all known or potential hazards in that space and the immediate surrounding area. The OSU Point of Contact will review and discuss each contracted job with the contractor before the work begins and upon its completion. The contractor will inform the OSU Point of Contact about the permit-space program that the contractor will follow as well as any hazards encountered or created.

If contract workers and OSU employees will enter the space

The OSU Point of Contact will coordinate entry operations with the contractor so that contract workers and OSU employees work together, following this program.

If OSU employees only will enter the space

1. Pre-Entry Procedures

- Confirm that all entry-related personnel (Entry Supervisor, Authorized Attendant, and Authorized Entrant) are trained, and current, as outlined in the **Employee training** section of this program.
- Obtain a [Confined Space Entry Permit](#).
The entry permit provides guidance to document, and communicate, that necessary precautions have been taken prior to and during entry.
- Provide authorized entrants with the opportunity to observe the initial testing of the space.
- Entry in to a permit space is prohibited until all Hazards are under Control (see definitions).
- Determine which, if any, hazards or potential hazards exist in the space.
- Ventilate the space with fresh air to eliminate or control atmospheric hazards.
 - Check out a direct-reading multi-gas meter from EH&S.
 - Verify and document that the direct-reading instrument is not indicating “calibration due”.
 - From *outside the space*, test the space to determine if the control measures are adequate. Unacceptable readings or alarms indicate an atmospheric hazard.

Note: If the % oxygen (O₂) *in the space* does not closely match the percentage *outside the space*, further evaluation is required to determine the cause. Contact EH&S.
- Continuous ventilation shall be maintained during the entry taking care to ensure that the expelled exhaust does not reenter the space.

Note: Purging/flushing may prove to be inadequate in maintaining control as sufficient amounts of residual contaminants may remain in pores and scale to recreate a hazardous atmosphere.
- Isolate the permit space from sources of hazardous energy as described in [SAF 208: Lock Out Tag Out - Energy Control Program](#) and EH&S Safety Instruction: [Lockout/Tagout \(Control of Hazardous Energy\)](#) .
- Implement and document measures taken to adequately control any remaining known or potential hazards. These measures may include elimination, substitution, engineering & administrative controls.

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- The entry supervisor or attendant shall notify OSU DPS that the entry operation is commencing.
- Ensure that entrants have the equipment they need to do their jobs (including rescue equipment) and they know how to use the equipment.
- Rescue equipment will be set up and readied for attendant use should the entrants be unable to self-rescue.
- Set up barriers, as necessary, to protect entrants from external hazards.
- Post a warning at the entrance to the space that satisfies the labeling requirements described in the “**Confined space identification, evaluation and documentation**” section of this program. If special equipment is required for entry, the appropriate information may be included on the signs; for example: **RESPIRATOR REQUIRED FOR ENTRY** or **LIFELINE REQUIRED FOR ENTRY**.
- The entry supervisor shall review the results of the pre-entry procedures and subsequently complete and sign the entry permit to authorize entry into the permit space.
- Display the completed entry permit at the time of entry so that authorized entrants can confirm that pre-entry preparations have been completed.
- If any exception to these procedures must be made, EH&S should be consulted to ensure adequate precautions are taken.

2. Entry operations and procedures

- All unauthorized persons must be kept away from the space.
- The authorized attendant will:
 - Remain immediately outside the entrance to the space.
 - Continuously monitor the entrant(s) and maintain direct communication.
 - Document the results of space monitoring communicated by the entrant(s).
 - Maintain the capacity to contact emergency response personnel.
- If entrants need a ladder to enter a permit space, the ladder must be secured and not removed during entry. When possible, the entry will be made from a side opening rather than from the top access.
- Authorized entrant(s) will:
 - Wear the multi-gas meter for the duration of the entry and continuously monitor the atmospheric space.
 - Report monitoring results to the attendant in intervals frequent enough to ensure that control is maintained.
- No sources of ignition, including smoking or welding, will be introduced into the confined space until a valid hot work permit is obtained. Attach Part 1A of the Hot Work Permit to the Confined Space Entry Permit.
 - Other than torches and hoses, no welding and burning equipment may be taken into the space. Gas cylinders or welding machines must remain outside the space.
 - Welding and burning equipment outside the space will be under the control of the attendant. When gas welding or cutting is suspended, the gas supply must be stopped at the cylinder and the torch removed from the confined space.
- Entrants must evacuate the permit space immediately when any of the following occurs:
 - An order to evacuate is given by the attendant or entry supervisor.
 - An entrant recognizes any warning sign or symptom of exposure.
 - An alarm is activated.
 - An entrant is unable to communicate with the attendant.
 - An entrant recognizes any other physical hazards that are unsafe.

Note: Once evacuated, re-entry is not allowed until a new permit is issued and the re-entry is treated and documented as a completely new entry.

- If entrants are injured or become ill, the attendant must contact the entry supervisor who will then follow those procedures outlined in the OSU EH&S Safety Instruction [Accident/Incident Reporting and Investigation](#).
- If any exception to these procedures must be made, EH&S should be consulted to ensure adequate precautions are taken.

3. Procedure following entry

- The entry supervisor shall terminate entry and cancel the entry permit when entry operations have been completed or an emergency occurs in or near the space.
- The entry supervisor or attendant shall notify OSU DPS that the entry operation is terminated.
- The entry supervisor will then forward the original cancelled permit in a timely manner to the proper department supervisor for subsequent review and maintenance.
- Return all direct-reading multi-gas meters to EH&S and document any necessary notes, concerns or considerations.
- Perform any necessary maintenance to all remaining equipment and return to its proper location.

Completing the entry permit

Before employees enter a permit space, the entry supervisor must complete and sign an entry permit that verifies the permit space is safe for employees to enter. The entry permit must be posted at the permit-space entry and include the following information:

- Identification of the permit space.
- Description of work to be performed.
- Entry date, start and stop times of the permit.
- Hazards in the space.
- Acceptable entry conditions.
- Time and results of initial testing data and periodic monitoring.
- How hazards will be controlled so that the space is safe to enter.
- Authorized entrants' names.
- Authorized attendants' names.
- Entry supervisor's name and signature.
- Communication procedures used by entrants and attendants.

Note: Communications may range from conventional voice and radio to any other means deemed appropriate and effective by the entry supervisor.

- A list of all equipment, including PPE, necessary to ensure entrants' safety.
- Other information needed for safety in the particular permit space.
- Rescue services available and how to contact them.
- A description of any other permits that entrants need to work in the space.

The procedure for completing an entry permit

- Obtain an entry permit before employees enter the space.
- Accomplish all pre-permit activities required for entering the space.
- Complete all items on the entry permit.
- Sign the permit. If any item on the permit is incomplete, **the permit must not be signed.**
- Attach a copy of the entry permit outside the confined space. Keep it there until the entry operations are terminated and the entry supervisor cancels it.

Duties of entrants, attendants, and entry supervisors

Authorized entrants, attendants, and entry supervisors have the following duties and responsibilities:

Duty & Responsibility	Entrant	Attendant	Supervisor
Inform supervisor of any departures from established procedures, duties, practices, or otherwise	X	X	
Keep unauthorized entrants away from the space.		X	X
Inform the entrants and the entry supervisor if unauthorized persons enter the permit space.		X	
Notify OSU DPS if an unauthorized entrant requires removal.		X	X
Communicate with entrants, monitor their status, and tell them when to evacuate.		X	
Communicate with the attendant regularly.	X		
Remain outside the space during entry operations until relieved by another attendant.		X	
Know the number and identity of authorized entrants.		X	
Use all equipment properly.	X	X	
Determine that acceptable entry conditions, procedures, practices, and equipment are in place prior to entry.			X
Determine that acceptable entry conditions are maintained.		X	
Verify at appropriate intervals that the entry conditions remain consistent with the original terms in the permit			X
Order entrants to evacuate the space in an emergency.		X	X
Exit from the permit space immediately upon an order to evacuate, an alarm sounds, or at the sign of a hazardous condition.	X		
Know permit-space hazards, including the mode, symptoms, and consequences of exposure.	X	X	X
Notify the attendant of any signs or symptoms of exposure to a hazardous condition	X		
Terminate the entry and/or cancel the permit when entry operations are finished or if a prohibited condition arises.			X
Verify that entry conditions are acceptable before signing the permit and allowing entry.			X
Perform non-entry rescues if necessary.		X	
Verify that rescue services are available and the means for summoning them are effective.			X
Request rescue and emergency services as necessary: Preferably, if a phone is available, Dial 9-1-1 for direct contact. Alternatively, request aid through OSU DPS via a radio or other means.		X	X
Respond immediately to an ordered evacuation	X		

Alternate procedure for entering a permit space

Following the directives outlined in the previous section “**Procedures for entering a permit space**”, permit spaces may be entered with the alternate procedure:

- All hazards have been eliminated; **or**
- All physical hazards, if any, have been eliminated **and** all atmospheric hazards are controlled.
Note: “hazard elimination” means that the conditions which caused the hazard no longer exist within the space.
Note: Continuous forced-air ventilation does not eliminate atmospheric hazards. It can only control the hazards.
- **Exception:** 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.
- If a space is evacuated, re-entry is not allowed until a new permit is issued and the re-entry is treated and documented as a completely new entry.

Employee training

Training records shall be forwarded to EH&S for inclusion in the safety training database system. Contact EH&S for information on how to view training records, either personal or of supervised team members, via the web.

Department supervisors shall ensure that all authorized entry supervisors, attendants, and entrants have the understanding, knowledge, and skills necessary to perform their jobs safely and in accordance with this program.

Training requirements

- Appropriate use of all necessary and required equipment.
Note: When respiratory protection is required, the entrant will have a current respirator medical evaluation and fit test. Refer to the OSU EH&S Safety Instruction [Respiratory Protection Program](#).
- Before an employee is assigned permit space duties.
- When there is a change in permit-space operations that presents a hazard for which the employee has not been trained.
- When the employee does not follow entry procedures.
- When there are changes to the permit program.
- OSU DPS employees shall be trained on the Call Handling Protocol when an entry is reported in addition to Awareness training.

Awareness training

Awareness training shall be provided to all employees who work in areas where permit spaces are present, when there is a revision in the written program, and when there are new or previously unidentified permit spaces.

Awareness training must explain:

- This written confined space program and any revisions.
- How to recognize a permit space in their work area.
- How entry is authorized by the entry permit.
- How entry is authorized by the alternate entry procedures.

Documentation

- Include the date of training,
- the employee's name and the responsibilities for which they were trained, and
- the name and signature of the trainer.

Training materials and delivery

Training materials used and mode of delivery (e.g. DVD, online, third-party vendor, and departmental) are at the discretion of the department supervisor. EH&S provides the following resources:

- OR-OSHA's [Confined Space Safety Instructor's Guide](#), [Confined Space Safety Workbook](#), and [Confined spaces and permit spaces \(2014\)](#), and the
- OSU EH&S Safety Instruction [Confined Spaces](#) for otherwise affected employees.

Rescue and emergency services

Non-entry rescue

Non-entry rescue is the preferred method for rescuing an entrant from a permit space. A retrieval system must be in place to retrieve entrants from vertical permit spaces that are more than five (5) feet deep. The retrieval system must be used to rescue an entrant unless the equipment would increase the entrant's risk of injury. Each authorized entrant must use a properly attached full-body harness. The other end of the retrieval line must be attached to a personnel retrieval system outside the permit space so that rescue can begin immediately.

If an entrant could be exposed to a substance for which a safety data sheet (SDS) is available, that SDS must be made available to the medical facility that treats the entrant.

Third-party entry rescue and emergency services

OSU has a contractual agreement with the City of Corvallis that meets the specifications of Oregon Administrative Rule (OAR) 437-002-0146 Confined Spaces, section (9) Rescue for entries at the OSU main campus. See EH&S for specifics.

Hatfield Marine Science Center confined spaces have been evaluated and determined to satisfy the requirements of being characterized as alternate entry spaces. Accordingly, per OAR 437-002-0146 (10) (c), an entry team is not required.

OSU Cascades campus does not have any permit or alternate entry confined spaces. Consequently, there is no requirement for an entry rescue team.

Requesting aid

In the event that rescue and emergency services are necessary, the requestor should:

- Dial 9-1-1 to invoke the response as quickly as possible by directly reaching Corvallis Dispatch.
- Request aid through OSU DPS via a handheld radio or other means if available.

OSU Department of Public Safety (DPS)

The OSU DPS shall maintain a Call Handling Protocol in their "Quick Dispatch Reference Book" that outlines the following minimum dispatch procedures.

- Upon notification of an entry, DPS will document:
 - Name of the person calling.
 - Location of the entry.
 - Number of entrants.
 - Name of the caller's department and supervisor.
 - Notification of entry to Corvallis Dispatch.
- Following a request for Rescue / Emergency Services, DPS will:
 - Verify and communicate to Corvallis Dispatch the following:
 - Number of entrants requiring rescue.
 - Location of the space.
 - Contact EH&S at 541-737-2273.
 - Contact the Department Supervisor.

- Upon notification of entry termination, DPS will document:
 - Termination of entry.
 - Notification of entry termination to Corvallis Dispatch.

Annual program review

Within one year of an entry operation, canceled entry permits shall be reviewed to identify program deficiencies.

Preferably, review should be conducted by the head of the department that conducted the entry operation as they have the most informed opinion on strategies for continuous improvement. However, review shall at least be conducted by an authorized entry supervisor that was not involved with the actual entry operation documented on the permit in review. The reviewer will then forward the original, a copy or scan of the cancelled permit in a timely manner to EH&S for further review and maintenance.

The permit review must be sooner than 1 year post-cancellation if there is reason to believe that the program does not adequately protect employees. Situations that require review include:

- Unauthorized entry of a permit space.
- A previously unrecognized hazard is discovered.
- A condition prohibited by the permit or permit program exists.
- An injury or near-miss occurs during entry.
- An employee reports concerns about the effectiveness of the program.
- Any other condition that affects employee safety or health.

When revising the permit program to correct hazard-related deficiencies, permit-required confined space entries are prohibited in those spaces that are affected by the revision until the revision is complete.

Actions to correct deficiencies must be documented and affected employees must be retrained.