

**UNIVERSITY OF CONNECTICUT HEALTH CENTER  
POLICY AND PROCEDURES  
PERMIT-REQUIRED CONFINED SPACES  
(10/2000)**

**SCOPE AND APPLICATION:**

This policy outlines requirements and procedures that must be followed so that the Health Center complies with OSHA's Final Rule, Permit-Required Confined Spaces (29CFR1910.146) and protects employees from hazards associated with entry and work within permit-required confined spaces (e.g. sewers, tanks, etc.) All Health Center activities will comply with OSHA's 29CFR.1910.146 (attached). This policy is applicable to all Health Center functions on the Farmington Campus.

**DEFINITIONS:**

The definitions in 29CFR1910.146 (attached) are adopted as part of this policy and should be consulted. Abbreviated definitions of some terms follow:

- Attendant means an individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned.
- Authorized entrant means an employee who is authorized by the employer to enter a permit-required confined space.
- Confined space means a space that:
  - (1) Is large enough and so configured that an employee can bodily enter and perform assigned work; and
  - (2) Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and
  - (3) Is not designed for continuous employee occupancy.
- Emergency means any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit-required confined space that could endanger entrants.
- Engulfment means the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.
- Entry means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

- Entry permit (permit) means the written or printed document that is provided by the employer to allow and control entry into a permit-required confined space and that contains the information specified in paragraph (f) of 29CFR1910.146.
- Entry supervisor means the person (such as the employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit-required confined space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by 29CFR1910.146.

**Note:** An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

- Hazardous atmosphere means an 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 causes:

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

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

- (3) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;
- (4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, **Occupational Health and Environmental Control**, or in Subpart Z, **Toxic and Hazardous Substances**, of 29CFR1910. and which could result in employee exposure in excess of its dose or permissible exposure limit;

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

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

**Note:** For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as Material Safety Data Sheets that comply with the Hazard Communication Standard, 29CFR1910.1200, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

- Hot work permit means the employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition. Such work in a confined space will be approved on the confined space permit by the Health Center's Deputy Fire Chief or UCHC Fire Service.
- Immediately dangerous to life or health (IDLH) means 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.

- Non-permit confined space means a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.
- Oxygen deficient atmosphere means an atmosphere containing less than 19.5 percent oxygen by volume.
- Oxygen enriched atmosphere means an atmosphere containing more than 23.5 percent oxygen by volume.
- Permit-required confined space (permit space) means a confined space that has one or more of the following characteristics:
  - (1) Contains or has a potential to contain a hazardous atmosphere;
  - (2) Contains a material that has the potential for engulfing an entrant;
  - (3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
  - (4) Contains any other recognized serious safety or health hazard.
- Permit-required confined space program (permit space program) means the employer's overall program for controlling, and, where appropriate, for protecting employees from, permit space hazards and for regulating employee entry into permit spaces.
- Permit system means the employer's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.
- Prohibited condition means any condition in a permit space that is not allowed by the permit during the period when entry is authorized.
- Rescue service means the personnel designated to rescue employees from permit spaces.
- Retrieval system means the equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.
- Testing means the process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

## **IDENTIFICATION OF PERMIT-REQUIRED CONFINED SPACES:**

A survey at the Farmington Campus of the University of Connecticut Health Center has resulted in the determination that the following areas are permit-required confined spaces, unless the specific activity and area has been exempted in writing by the Environmental Health and Safety Office or by this Policy. Specifically, permit required confined spaces include:

- (1) Manholes, both storm and sanitary sewer;
- (2) Electrical vaults open fully at the top to the outside in order to take advantage of natural ventilation through a protective open grating;
- (3) Any tank, vessel, storage bin, hopper, pit, vault, UCHC Sewage Lift station, pipe that has limited or restricted means for entry and one or more of the following characteristics: 1) contains or has the potential to contain a hazardous atmosphere; 2) contains a material that has the potential for engulfing an entrant; 3) has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or 4) contains any other recognized hazard. These include:
  - \* Sewage Lift Station by Firehouse
  - \* All Central Vacuum System Receivers
  - \* All Oral Suction Receivers
  - \* All Sump Pump Pits
  - \* All Incinerator Chambers Including Crematorium
  - \* Main Electrical Distribution Cable Trenches (CG008 and AB037)
  - \* Incinerator Stack, Ash Removal Pit
  - \* All Domestic Hot Water Heaters Large Enough for Entry
  - \* Baltimore Air Coil System
  - \* Blazer Tower System
  - \* Cryogenic Storage Vessels
  - \* Cooling Tower Sump Pit
  - \* Manhole entry-way to underground storage tank
  - \* Trane Chillers/Absorbers
- (4) Any other area(s) a worker has a concern with will, prior to entry, be brought to the attention of the Director, Environmental Health and Safety or Asst. Vice Chancellor of Facilities Management. These individuals will determine if permit-required confined space and/or other safety requirements (e.g., lockout/tagout, respiratory protection, etc.) apply.

Determinations have also been made that the following areas are not permit-required confined spaces.

- (1) Acid neutralization tank maintenance with local exhaust with task(s) accomplished from the floor level.
- (2) An electrical transformer vault open at the top to the outside via a grating without any transformer and having an interior entrance with standard size door.

Entry means the action by which a person passes through an opening into a permit required confined space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space. After testing and prior to entry, the Environmental Health Office (qualified

entry supervisor) may reclassify the space as non-permit required for a specific time period and task.

## **RESPONSIBILITIES:**

Supervisors shall by training inform all their Health Center exposed employees of the existence, location and dangers of all specific permit-required confined spaces identified above. By April 15, 1993 existing exposed employees in Facilities Operations (e.g. trades), Clinical Engineering, Telecommunications, Bioengineering, Fire Department, and Environmental Health and Safety will be trained. Newly assigned personnel in these areas will be trained prior to assignment of any tasks with such exposure potential. When signs are used to supplement such training and to further identify permit-required confined spaces the sign will read "Danger, Permit-Required Confined Space, Do Not Enter" or other similar language.

Project Managers and others arranging to have employees of another employer (contractor) perform work that involves permit-required confined space entry shall: (1) Inform the contractor that the workplace contains permit spaces and that permit space entry is allowed only through compliance with a permit space program meeting the requirements of 29CFR1910.146; (2) Apprise the contractor of the elements, including the hazards identified and the experience with the space, that make the space in question a permit space; (3) Apprise the contractor of any precautions or procedures that the Health Center has implemented for the protection of employees in or near permit spaces where contractor personnel will be working; (4) Coordinate entry operations with the contractor, when both Health Center personnel and contractor personnel will be working in or near permit spaces, as required by paragraph (d)(11) of 29CFR1910.146; (5) Coordinate such entries in advance with Environmental Health and Safety and the Fire Department; and (6) Debrief the contractor at the conclusion of the entry operations regarding the permit space program followed and regarding any hazards confronted or created in permit spaces during entry operations. Project Managers, such as those in Facilities Management, will verify that all their contractor managers are trained in their responsibilities to assure compliance with this Policy and 29CFR1910.146.

Facilities Management will train their exposed employees on the location, identification and hazards of permit-required confined spaces and implement measures to prohibit all such entries unless accomplished in accordance with this Health Center policy. Manholes (e.g. sanitary sewer) are permit-spaces that employees by training must recognize as a permit space. Signs are not feasible. Those permit spaces identified in this policy and preceded by an asterisk will be marked "DANGER, PERMIT REQUIRED CONFINED SPACE, DO NOT ENTER" or other similar language. Employee questions will be referred to the Asst. Vice Chancellor of Facilities Management and/or Director of the Environmental Health and Safety Office. For permit required space entries Facilities Management will isolate the permit space; accomplish purging, inerting, flushing or ventilation of the permit space as necessary to eliminate or control atmospheric hazards; and, as necessary, provide (1) a portable explosion proof air blower/hose; (2) at least two worker harnesses and two retrieval lines; (3) two explosion proof battery operated lights approved by the Deputy Fire Chief; (4) a portable radio to summon help (to be maintained outside the confined space by the attendant); (5) pedestrian, vehicle, or other barriers as necessary to protect entrants and other personnel from external hazards; (6) equipment, such as ladders for safe ingress and egress by authorized entrants; (7) a mechanical (hand) retrieval device for any permit entry with vertical depth more than 5 ft. deep; (8) any other equipment necessary for safe entry into and rescue from permit spaces that is not the responsibility of others; and (9) as appropriate, suitable disposable protective suits, boots, gloves, face shields/goggles for such entries. Facilities Management is responsible for providing a supervisor and the attendant needed to monitor their people during any such entry. Facilities Management will identify to contractors the location and hazard of any permit-required confined spaces, coordinate any such work as outlined in the Project Manager's paragraph above, and require, in writing, the contractor to strictly follow 29CFR1910.146.

Director, Environmental Health and Safety Office (EHSO) or individual(s) designated by the Director are the confined space permit authorizing official(s). They will identify and evaluate the hazards of permit spaces prior to entry, specifying acceptable entry conditions and procedures to verify that conditions in the permit space remain acceptable throughout the duration of the entry. Hot work, if allowed, will be approved by the UCHC's Deputy Fire Chief or Fire Officer in charge. Only the Director, EHSO or individual designated by the Director may reclassify a permit-required confined space to non-permit confined space 29CFR1910.146. The EHSO will maintain: (1) a portable oxygen meter; (2) a combustible gas meter; (3) detector tubes including those for hydrogen sulfide; and (4) the permit forms for such entries. The EHSO will verify prior to entry that proper training has been completed or provide prior to entry into UCHC permit space such training to entrants, attendants, and supervisors. Line operated electrical equipment will not normally be allowed in the permit space during entry. Other potential hazards identified in the confined space will routinely be de-energized and locked out and/or tagged out, as appropriate. The EHSO will maintain the original permit in its file for at least one year and review the permits as required by 29CFR1910.146(d)(14).

The Deputy Fire Chief/Senior Fire Official on duty will approve and monitor any emergency permit required confined space entries when the Environmental Health and Safety Office representative is not available. Training on the location of atmospheric test equipment and entry procedures will be provided to Fire Department personnel by the Environmental Health and Safety Office. The UCHC Fire Department will also be the rescue/emergency service on site and will comply with the 29CFR1910.146(k) requirements including the requirement for each member of the rescue unit to practice a permit space rescue once every 12 months. This may be done as part of an actual permit space entry procedure.

## **PROCEDURES:**

Pre-entry Actions by the permit approval authority will follow the flow chart in the attached OSHA Standard and result in completion of the Permit (attachment 2). An activity, typically Facilities Management, anticipating the need for a permit required confined space entry must contact the Environmental Health and Safety Office and receive a completed written permit prior to such an entry. The Environmental Health and Safety Office, with the assistance of the requestor, will complete and approve the permit and verify that equipment, monitoring, training and other safety procedures (e.g., lockout/tagout) are adequate for safe entry and work tasks in accordance with 29CFR1910.146(c)(7). The permit approval authority, when appropriate, may also with adequate documentation reclassify a permit space as a non-permit space as allowed by 29CFR1910.146 and the Permit Form. In an emergency when such an entry cannot be scheduled in advance and Environmental Health and Safety is not available, the activity needing to make such an entry will verify that the trained entrant(s) and attendant(s) are available for the work and contact the Health Center's Fire Department. The senior Fire Department official will be the permitting authority and monitor the entry for conformance to this policy. Prior to entry the permit approval authority will complete the actions required by the permit and verify that the entrant, attendant, and entry supervisor are aware of the following:

- (1) Their responsibilities;
- (2) The hazards outside the permit space (e.g. traffic, opening, etc.);
- (3) The hazards of the permit space;
- (4) The measures for isolation of the permit space;
- (5) The measures (such as lockout/tagout, equipment and procedures for purging, inerting,

ventilating and flushing, etc.) used to remove or control potential hazards;

- (6) Acceptable environmental conditions, quantified with regard to the hazards identified in the permit space, which must be maintained during entry;
- (7) Testing and monitoring equipment and procedures by which the employer will verify that acceptable environmental conditions are being maintained during entry;
- (8) The rescue and other services which would be summoned in case of emergency and the means of communication with those services;
- (9) Rescue equipment to be provided on-site, if necessary;
- (10) The communication procedures and equipment used by authorized entrants and attendants to maintain contact and signal an order to evacuate;
- (11) The personal protective equipment provided in order to ensure employee safety (Respirator use will be in accordance with the UCHC Respirator Policy);
- (12) The fact that the person authorizing the permit (i.e., Senior Fire Official, Environmental Health and Safety representative) will, after the permit has been issued, likely assign to the attendant the following responsibilities: (1) supervise the entry activity; (2) terminate entry and cancel the entry operations upon completion of duties or a condition that is not allowed under the entry permit arises in or near the permit space; (3) inform the permit authorizing individual and authorized entrants if unauthorized persons have entered the permit area or when unanticipated problems occur; and (4) supervise securing of the entry point promptly upon completion of the job or prior to leaving the area unattended.

**ATTACHMENTS:**

1. 29CFR1910.146
2. Permit Space Entry Form
3. Verification/Demonstration of Training Form

**Approved:**

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Director, Office of Research Safety

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Deputy Chief, UCHC Fire Department

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Asst. Vice President, Facilities Management