

# **Confined Space Entry—6100-3.2**

## **Associated OHS General Industry and Process : Construction Safety**

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## 1. Summary

### 1.1 Objective

This Confined Space Program provides policies and procedures to protect University of Virginia (UVA) Facilities Management (FM) employees to comply with all regulations while working in non-permit and permit-required confined spaces (PRCS).

### 1.2 Scope

This program covers all UVA FM employees while performing work at the university, and other workers that may be involved in permit and non-permit required confined space entry.

## 2. Regulations & Other Requirements

### 2.1 Occupational Safety & Health Administration

This Confined Space Entry Program complies with all regulations that pertain to non-permit and permit-required confined spaces including OSHA 29 CFR1910.146, *Permit-Required Confined Spaces (General Industry)* and OSHA 29 CFR1926, Subpart AA, *Confined Spaces in Construction*.

### 2.2 University of Virginia

This Confined Space Entry Program complies with UVA-FM requirements.

## 3. Roles and Responsibilities

### 3.1 Facilities Management Occupational Health & Safety

Specific responsibilities of FM-OHS related to confined space entry:

- a) Provide guidance with the assessment of confined spaces.
- b) Develop curriculum and facilitate training for FM Employees that may be required to enter confined spaces.
- c) Assist with air monitoring equipment selection.
- d) Review and audit program elements annually and revise as necessary.

### 3.2 Facilities Management Supervisors, Zone Managers and Project Teams

Specific responsibilities of FM Supervisors, zone managers and project teams related to confined space entry:

- a) Shall ensure that a thorough assessment of UVA property has been conducted by competent / qualified persons to identify and document locations of confined spaces. Subsequent assessments shall be conducted as new construction and renovation is completed.
- b) Shall ensure that all permit-required confined space permits are labeled "DANGER – CONFINED SPACE – ENTER BY PERMIT ONLY".
- c) Shall ensure that all employees performing work in confined spaces have been trained and fully understand the requirements of this program.
- d) Shall provide the necessary equipment to comply with these requirements and ensure that all employees are trained on its use.
- e) Shall ensure that provisions and procedures are in place for the protection of employees from external hazards—including but not limited to pedestrians and vehicles by means of barriers.
- f) Verify that conditions in the confined space are acceptable for entry during its duration.
- g) Shall ensure that all closed permits are maintained in each department for review and kept on file for at least one year.

### 3.3 Facilities Management Employees

Specific responsibilities of FM employees related to confined space entry:

- a) Shall attend Confined Space Training, whether it is for awareness only or for safe work entry implementation. Level of training will be determined by what is appropriate for their tasks related to confined space.
- b) Shall comply with all aspects of this program
- c) Authorized Entrants, Attendants and Entry Supervisors may be any UVA employee authorized by management to work in a permit-required or non-permit required confined space setting and that has been trained and is proficient in the understanding of program requirements

### 3.4 Entry Supervisor

#### 3.4.1 Permit and Non-permit required

- a) Attend confined space training prior to assuming Entry Supervisor duties.
- b) Shall evaluate all confined spaces prior to entry to determine if they meet the definition of a permit-required space and to identify all hazards to entrants. Particular attention shall be given to hazards located inside and outside the space, atmospheric hazards, introduced hazards, engulfment hazards and others.
- c) Knows and understands the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- d) Address all known hazards by elimination or controlling physical and atmospheric hazards prior to entry.
- e) Shall have a pre-work safety meeting with all workers to be involved in the confined space entry and review the job to be performed and determine what safety concerns may be present
- f) Shall confirm that all isolation, lockouts, and tagouts have been completed prior to entry into confined space.
- g) Shall ensure that the requirements of this program are followed and maintained.
- h) Assure that all employees entering the confined space have been trained.
- i) Responsible for ensuring that air-monitoring equipment is in the proper working order and functioning according to manufacturer specifications.
- j) If there is a potential for atmospheric hazards in the confined space, shall test atmosphere conditions prior to entry and determine if a permit is required.
- k) The Entry Supervisor must provide and erect adequate signage/barricades to protect site workers from fall hazards and to ensure that persons not involved with the PRCS entry are not exposed to hazards.

#### 3.4.2 Permit Required

In addition to the requirements in 3.4.1, Entry Supervisor must also:

- a) Verify that rescue services are available and that the means for summoning them are operable, and that the employer will be notified as soon as the services become unavailable.
- b) When a confined space has been classified as permit required, shall complete and maintain the permit-required confined space permit form, and have it accessible for review on the job site at all times.
- c) As necessary, shall provide for early-warning system means to alert authorized Entrants and Attendants that an engulfment hazard may be developing from rain runoff or other hazards. Examples of early-warning systems include, but are not limited to: alarms activated by remote sensors or

persons strategically stationed as lookouts with equipment for immediately communicating with the authorized Entrants and Attendants.

- d) Verifies that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.
- e) Terminates the entry and cancels the permit when the operations covered by permit have been completed or a condition that is not allowed under entry permit arises in or near the permit space.
- f) Determines whenever responsibility for permit entry is transferred and at intervals dictated by the hazards within the space, that the terms of the entry permit and acceptable entry conditions are maintained.
- g) Removes unauthorized individuals who enter or attempt to enter the permit space during operations.
- h) Shall ensure that a physical copy of all required SDS's will be on site in the event that the SDS's can't be accessed digitally.

### 3.5 Attendant – Permit Required

- a) Attend confined space training prior to assuming Attendant duties.
- b) Must remain outside the permit-required confined space during entry operations until relieved by another Attendant.
- c) Performs no duties that might interfere with attendant's primary duty to communicate with and protect the authorized entrants.
- d) Knows and understands the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- e) Is aware of possible behavioral effects of hazard exposure in authorized Entrants.
- f) Monitors activities inside and outside the permit-required confined space to determine if it is safe for Entrants to remain in the space and orders the authorized Entrants to evacuate the permit-required confined space immediately under any of the following conditions:
  - If the Attendant detects a prohibited condition, including unacceptable air-quality
  - If the Attendant detects the behavioral effects of hazard exposure in an authorized Entrant
  - If the Attendant detects a situation outside the space that could endanger the authorized Entrants
  - If the Attendant cannot effectively and safely perform all the duties required
- g) Continuously maintains an accurate count of authorized Entrants in the permit-required confined space.
- h) Continuously maintains verbal or electronic means of communication. If communication is lost, all Entrants should exit the confined space until communication can be restored.
- i) Summon rescue and other emergency services as soon as the Attendant determines that authorized Entrants may need assistance to escape from permit-required confined space hazards.
- j) Ensure that unauthorized persons do not approach or enter a permit-required confined space.
- k) Allow no one to interfere with the Attendant's primary duty to monitor and ensure the safety of authorized Entrants.
- l) Authorized Attendants shall not monitor more than one PRCS at a time.
- m) Summon rescue services if necessary and performs **non-entry rescue only** if they have been trained.

### 3.6 Authorized Entrant

#### 3.6.1 Permit and Non-permit Required

- a) Attend confined space training prior to assuming authorized entrant duties.

- b) Knows and understands the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure
- c) Uses appropriate personal protective equipment properly, e.g., face and eye protection, and other forms of barrier protection such as gloves aprons, coveralls, and breathing equipment
- d) Is aware of possible behavioral effects of hazard exposure in authorized entrants
- e) When initial air monitoring is required, shall witness and verify calibrated air monitoring data and if approved, sign off, before entry.
- f) May request additional monitoring at any time.

### 3.6.2 Permit Required

- a) Maintain communication with the Attendants to enable the Attendant to monitor the Entrants status as well as to alert the Entrant to evacuate if needed.
- b) Alert attendant whenever they recognize any warning sign or symptom of exposure to a dangerous situation.
- c) Exit from permit-required confined spaces as soon as possible when ordered by an Attendant or Entry Supervisor, when the Entrant recognizes the warning signs or symptoms of an exposure exists, when a prohibited condition exists, or when an alarm is activated.

### 3.7 Contractors

- a) Must have their own written Confined Space Program
- b) Must use and complete their own Permit.

## 4. Confined Space Entry

### 4.1 Types of Confined Spaces

#### 4.1.1 Non-Permit Required

- a) Non-Permit Confined Spaces do not present atmospheric hazards, potential for engulfment, entrapment or any other serious hazard that cannot be eliminated. Labeling of non-permit confined spaces is not required.
- b) Conditions inside a non-permit required confined space can change given the activities that are undertaken (i.e. welding, grinding, drilling, cutting or the use of pesticides, paints, chemicals or any other toxic, flammable or combustible substance).
- c) In cases where additional hazards are introduced into a confined space or changes in the use or configuration of a non-permit, confined space that might increase the hazards to entrants the employer shall reevaluate the space and, if necessary reclassify the space, as a permit required confined space.

#### 4.1.2 Permit Required

A PRCS (Permit Required Confined Space) is a confined space that has one or more of the following characteristics:

- a) Contains or has a potential to contain a hazardous atmosphere.
- b) Contains a material that has the potential for engulfing an entrant;
- c) 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
- d) Contains any other recognized serious safety or health hazard.

## 4.2 Classification of Confined Spaces

- a) Spaces should be evaluated to determine if they are permit required. UVA FM employees should be aware of these locations and the dangers they pose. This should be done by posting signs such as “DANGER-Permit Required Confined Space-Authorized Entrants Only” or equally effective signage.
- b) Hazards can be introduced into confined spaces that may result in a change of status to “permit-required confined space.” Welding, use of chemical and gases, or any other recognized serious safety or health hazard may result in space reclassification.
- c) The Entry Supervisor/Competent Person will determine whether or not the space will be reclassified based on any introduced hazards. Spaces reclassified as permit-required confined spaces will be entered using the procedures contained in this program.
- d) Permit Required Spaces may also be reclassified as non-permit spaces under the following conditions:
  - If the permit space poses no actual or potential atmospheric hazards and if all hazards within the space have been eliminated without entry into the space, the space is reclassified as a non-permit required confined space as long as the non-atmospheric and all other hazards remain eliminated.
  - If testing and inspection demonstrate that all hazards have been eliminated, the space may be reclassified as a non-permit required confined space for the time period the hazards remain eliminated.
  - If, during entry, hazards arise within a space that has been reclassified as a non-permit required confined space, all employees in the space shall exit immediately. The space is re-evaluated and a determination made on classification.
  - All confined spaces should be considered permit required until proven otherwise.

**NOTE: Control of atmospheric hazards through forced air ventilation does not constitute elimination of hazards.**

## 4.3 Permit Required Confined Space Entry

- a) A PRCS may ONLY be entered if the space is properly isolated and results of air-monitoring are acceptable. (Forced-air ventilation must be used continuously at all times if the permit designation is due to the presence of atmospheric hazards)
- b) Three roles are required to be filled for PRCS entry: The Entry Supervisor, an Attendant, and an Entrant. Depending on the situation, the Entry Supervisor may assign multiple Attendants and Entrants. The Entry Supervisor may also serve as the Attendant or Entrant.
- c) At least one trained Attendant must always be stationed outside the PRCS to monitor the authorized Entrants for the duration of the entry operation.
- d) If a hazardous atmosphere is detected during an entry, personnel must immediately evacuate the space.

### 4.3.1 Entry Permit

The Entry Permit must be initialed and dated by the Entry Supervisor only when all pre-entry requirements have been satisfied. The permit must be available at the time of entry to all authorized entrants. The entry permit, either a physical or electronic copy must be kept near the entrance to the PRCS.

The Confined Space Permit includes:

- Identification of the space.
- Purpose of entry.
- Date.
- Length of the permit.
- Names and signatures of authorized entrants and the attendant



- Name and signature of supervisor who authorized the entry.
- Hazards of the permit space to be entered.
- Results of atmospheric monitoring.
- Acceptable entry conditions.
- Hazard Elimination and Control.
- Rescue procedures.
- Communication procedures.
- PPE to be used.
- Any other information.

The permit must be terminated when the entry operations are complete or when permit conditions change (i.e., hazardous air monitoring results are noted, unsafe behaviors are observed, etc.).

#### 4.3.2 Termination and Closing or Canceling of Permits

- a) The Entry Supervisor shall terminate the confined-space permit at the end of the job operation, at the end of the shift, or when the Entry Supervisor determines that conditions in or near the confined space have changed and are hazardous to the Entrants.
- b) The entry permit shall be immediately cancelled in the event of any unauthorized entry, identified hazards not covered by the permit, or the occurrence of an injury or near miss. A review shall be conducted by the Entry Supervisor and the entry plan revised accordingly to provide employee protection prior to authorizing subsequent entries.
- c) The Entry Supervisor shall, at the conclusion of entry operation, close out the permit and retain the original in a department file for at least 12 months.

#### 4.4 Alternative PRCS Entry

When the Alternative Entry Procedure can be used, the amount of personnel, equipment, and resources traditionally used to enter permit-required confined spaces can be reduced. Contact FM-OHS prior to making the determination that Alternative Entry can be used.

##### 4.4.1 Conditions for Use

- a) Alternative entry procedures may only be used when all of the following conditions are met:
  - 1) The only hazard posed by the space is an actual or potential hazardous atmosphere
  - 2) Forced-air ventilation is used continuously and is sufficient to maintain the space safe for entry
  - 3) Continuous air-monitoring and inspection data confirms that ventilation alone ensures acceptable entry conditions
- b) If an initial entry of the permit space is necessary to effectively sample for acceptable entry conditions, the entry must be performed as per the standard permit-required confined space entry procedure.

##### 4.4.2 Alternative Entry

To use the alternative entry, perform all of the following in this order:

- 1) Ensure that the ONLY hazard posed by the space is an actual or potential atmospheric hazard; there can be no engulfment, entrapment by inwardly converging walls or other serious recognized hazards present
- 2) Notify supervision of the intent to enter a PRCS using alternative entry procedures; include estimated time of work to commence and to end
- 3) Open the access to the space and guard it effectively with a portable barrier to prevent others from falling into the space and to prevent objects from falling into the space

- 4) Arrange and direct continuous forced-air ventilation into the space where the work will be taking place
- 5) Conduct remote air-monitoring to ensure acceptable entry conditions and allow the air-monitoring equipment to run continuously throughout the course of the work. Entrants may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere.
- 6) Share air-sampling results with all Attendants and Entrants
- 7) Fill out the entry permit and leave it near the entrance of the permit-required confined space
- 8) Each Entrant must carry personal air-monitoring equipment to alert him/her to hazardous air quality
- 9) Enter space, perform work
- 10) Upon completion of work, close out entry permit and send to supervision and safety for recordkeeping
- 11) Notify supervision that permit-required confined space operations are complete

#### 4.4.3 Continuous Air Monitoring

Air quality inside the permit confined space must be continuously monitored due to the potential for changing atmospheric conditions. These results are to be recorded on the entry permit. To meet this requirement a four-gas meter is used to continuously monitor the atmosphere inside the space. The preceding shall be done by using one of the following methods:

- a) Place the monitor inside with the worker.
- b) Place the monitor inside, set up a remote alarm outside with the attendant.
- c) Set up the remote sampling tube with the worker and set up the monitor outside with the attendant.

**If unacceptable levels are measured, the space must be vacated immediately. The space must be re-tested and determined that it is safe to re-enter the space.**

#### 4.4.4 Calibrating and Maintaining Air Monitoring Equipment

- d) All monitoring equipment must be properly calibrated and maintained in good working condition by the Zone or shop that has purchased an air monitoring unit for their use.
- e) All calibrations shall be done according to the manufacturer's specifications.
- f) Calibration logs for each instrument shall be kept up-to-date and inspected regularly to ensure their accuracy.

#### 4.5 Equipment

All work equipment shall be checked to ensure that it has the proper safety features, is approved for the locations where it will be used, and is in good working condition. The Entry Supervisor shall ensure that all equipment is properly maintained in a safe condition and that Entrants use the equipment properly.

The following equipment must be considered and may be required:

##### 4.5.1 Permit and Non-permit Required

- a) **Atmospheric testing and monitoring equipment - REQUIRED**
- b) **Personal Protective Equipment.** During the initial entry assessment, the Entry Supervisor must determine what personal protective equipment may be needed to protect workers from hazards. Ensure that personnel are trained to wear the required personal protective equipment.
- c) **Entry and Exit Equipment.** Provide a ladder, if needed, for safe entry and exit.
- d) **Lighting Equipment.** Lighting equipment used in the permit-required confined space must be safe for the location. Lighting may be needed for safe entry, work within the space, and exit.

#### 4.5.2 Permit Required

- a) **Ventilation Equipment.** Forced-air movers may be used to obtain acceptable atmospheric entry conditions. If used, the ventilation equipment must be configured to provide forced air at all times. An additional exhaust system may be used to rid a space of welding fumes.
- b) **Personal Air-Monitoring equipment - REQUIRED for each Entrant to be worn for the duration of the entry**
- c) **Signs and Barricades.** Post signs and barricades outside the permit-required confined space to notify personnel that a PRCS entry is in progress and unauthorized entry is prohibited.
- d) **Portable barricade.** Erect the portable barricade around the opening to provide fall protection for attendants and others.
- e) **Communications Equipment.** If necessary, use a communication system that will enable the Attendant to remain in constant, direct communication with the Entrant(s) working in the permit-required confined space. Only use intrinsically safe equipment in areas where a hazardous atmosphere may exist. Also, use a communication system that allows the Attendant to summon help from rescue or emergency service.
- f) **Rescue and Emergency Equipment.** An emergency retrieval system with tripod and full-body harnesses will be provided and used whenever a vertical space must be entered, unless the retrieval system would increase the overall risk of entry or would not contribute to the rescue of the entrant.
- g) **Other.** Any other equipment deemed necessary for safe entry into and rescue from permit-required confined spaces

#### 4.6 Multiple Employer

As the Host Employer, UVA must communicate the location of known permit required spaces and the hazards or potential hazards in that space to contractors.

- a) In addition to complying with OSHA permit-required confined space requirements, each contractor who is retained to perform permit space entry operations shall:
  - 1) Obtain any available information regarding permit-required confined space hazards and entry operations from the UVA Project Team
  - 2) Inform UVA of the permit-required confined space program that the contractor will follow and of any hazards confronted or created in the permit-required confined space, either through a debriefing or during the entry operation

#### 4.7 Rescue and Emergency Services

##### 4.7.1 Non-Entry Rescue – PRCS

- a) In the event of emergency, it is preferable for Entrants to be quickly extracted from the permit-required confined space by the Attendant through use of a tripod-mounted retrieval winch system. Attendants are **NEVER** to enter permit-required confined spaces for any purpose, especially to attempt rescue of Entrants.
- b) Non-entry means of rescue in the form of a tripod-mounted retrieval winch system is required to be used for all vertical permit-required confined space entries unless physical restrictions do not allow space for proper setup.
- c) Unless the attendant has the capability to retrieve an entrant without entry into the permit-required confined space, the Charlottesville Fire Department will perform all rescue services. Arrangements shall be made with the Charlottesville Fire Department to notify onsite personnel in the event rescue services are unavailable. No onsite PRCS entries can be conducted without access to rescue services or non-entry retrieval equipment.

##### 4.7.2 Non-Entry Rescue Preparation

- a) Rescue means are required for all vertical permit-required confined space entries where there is room for a tripod-mounted retrieval winch to be properly used.
- b) To facilitate non-entry rescue, an Entrant must be attached to a retrieval system whenever he/she enters a vertical-entry permit-required confined space.
- c) The retrieval equipment is not required if it will increase the overall risk of the entry, e.g., creating an entanglement hazard, or will not contribute to the rescue of the Entrant. Only one Entrant may be attached to the retrieval equipment at one time.
- d) Each Entrant shall use a full body harness equipped with a "D" ring located between the shoulders or above the head.
- e) The retrieval line must be attached to the "D" ring on the full body harness located on the worker's back, between the shoulder blades. The other end of the retrieval line attached to a retrieval device located outside the space so that rescue can begin as soon as the rescuer becomes aware that rescue is necessary.
- f) All authorized permit-required confined space entry personnel must receive training on proper setup and use of the retrieval system with annual hands-on exercises.

#### 4.7.3 Emergency Services Response

If the Attendant becomes aware of the need for emergency rescue and retrieval equipment has not been used, the Attendant shall immediately

- a) Ensure that force-air ventilation is being directed to where the Entrant is located
- b) Call 911 and request emergency rescue
- c) Alert others by phone or radio without leaving scene
- d) Instruct others to guide emergency services to the jobsite
- e) Prevent unauthorized personnel from attempting a rescue
- f) Notify the Entry Supervisor of the emergency
- g) Once onsite, the rescue service must be:
  - Provided access to the permit-required confined space
  - Informed of the hazards that they may confront during a rescue

#### 4.8 Training

Training shall be provided so that all employees whose work is regulated by this program acquire the understanding, knowledge, and skills necessary for the safe performance of the duties assigned to them.

- a) Training shall be provided to each affected employee before the employee is first assigned duties under this program, if a new hazard has been created, and before there is a change in assigned duties that would require an employee to operate under this program.
- b) The employee shall be retrained:
  - 1) Whenever there is a change in confined space operations that presents a hazard about which an employee has not previously been trained
  - 2) Whenever the supervisor has reason to believe either that there are deviations from the permit-required confined space entry procedures required by this section or inadequacies in the employee's knowledge.
- c) The training shall establish employee proficiency in the duties required by this program and shall introduce new or revised procedures, as necessary.
- d) The supervisor shall certify that the training required by this program has been accomplished.

- The certification shall contain each employee's name, the name and signatures of the trainers, and the dates of training.

The certification shall be available for inspection by employees, their authorized representatives, management, clients, and the safety department.

## 5. Review and Recordkeeping

### 5.1 Program Review

This Confined Space Entry Program shall be reviewed and updated at least annually and whenever necessary to reflect new or modified procedures, technology, or equipment to protect participating workers from hazards.

### 5.2 Program Recordkeeping

Records of this Permit-required Confined Space Entry Program will be considered obsolete when the new version is issued. Obsolete versions will be destroyed after three years.

## Appendix A: Definitions

**Acceptable Entry Conditions** - the conditions that must exist in a confined space to allow entry and to ensure that employees involved in permit-required confined space entry can safely enter into and work within the space. Acceptable entry conditions are defined as:

- a) oxygen level measurements between 19.5% and 23.5%
- b) combustible vapors less than 10% of the lower explosive limit
- c) toxics less than acceptable established exposure limits

UVA personnel shall not enter permit-required confined spaces without acceptable entry conditions for any period of time nor any purpose!

**Air Monitoring** - the act of determining air-quality through the use of direct reading instruments. Continuous air-monitoring shall be maintained throughout the duration of permit-required confined space entry.

**Attendant** - an authorized individual stationed outside the PRCS who monitors the authorized Entrants and who performs all Attendant's duties assigned in the UVA Confined Spaces Program. Attendants must have sufficiently completed and fully understand the PRCS training.

**Blanking or Blinding** - the absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

**Competent Person** - one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them. For purposes of this program, the title “competent person” shall be synonymous with “Entry Supervisor”.

**Confined Space** means

- a) A space that is large enough and so configured that an employee can bodily enter and perform assigned work; and
- b) Has limited or restricted means for entry or exit (for example, tanks, vessels, coolers, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and
- c) Is not designed for continuous occupancy

**Construction Work** - work for construction, alteration, and/or repair, including painting and decorating.

**Double Block and Bleed** - the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

**Emergency** - any occurrence (including any failure of hazard control or monitoring equipment) or an event internal or external to the permit-required confined space that could endanger Entrants.

#### Appendix A (Continued)

**Engulfment** - the surrounding and effective capture of a person by a liquid or finely divided (flow able) 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. Examples can include flash flooding in storm sewers from rain runoff.

**Entrant** - an authorized individual who is trained to safely enter PRCS to perform work.

**Entry** - 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** - the written or printed document that is provided by UVA to allow and control entry into a permit-required confined space that contains the information specified in this program.

**Entry Supervisor** - the person 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 this section. For purposes of this program, the title “competent person” shall be synonymous with “Entry Supervisor.”

- a) An Entry Supervisor must have sufficiently completed and fully understand the permit-required confined Space training and be approved by the HSE Manager to work in a permit-required confined space.
- b) An Entry Supervisor may also serve as an Attendant or as an authorized Entrant, as long as that person is trained and equipped as required by this section 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.
- c) The Entry Supervisor is responsible for testing and monitoring the atmosphere conditions.

**Hazardous Atmosphere** - an atmosphere that may expose employees to the risk of death, incapacitation, and impairment of ability to self-rescue (that is, escape unaided from a permit-required confined space), 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 (LFL), (0% is normal)
- b) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent, (20.9 % is normal)
- c) Any other atmospheric condition that is immediately dangerous to life or health. (Ex.-H2S 10%, 0% is normal)

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

**Host Employer** – the employer that owns or manages the property where the construction is taking place.

**Hot-Work Permit** - the written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing 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-required confined 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."

**Isolation** means 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/tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

**Oxygen-Deficient Atmosphere** - an atmosphere containing less than 19.5 percent oxygen by volume.

**Oxygen-Enriched Atmosphere** - an atmosphere containing more than 23.5 percent oxygen by volume.

**Permit-Required Confined Space (PRCS)** - a confined space that has one or more of the following characteristics:

- a) Contains or has a potential to contain a hazardous atmosphere
- b) Contains a material that has the potential for engulfing an Entrant
- c) 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
- d) Contains any other recognized serious safety or health hazard

**Permit System** - the employer's written procedure for preparing and issuing permits for entry and for returning the permit-required confined space to service following termination of entry.

**Prohibited Condition** - any condition in a permit-required confined space that is not allowed by the permit during the period when entry is authorized.

**Rescue Service** - the personnel designated to rescue employees from Permit-Required Confined Spaces.

**Retrieval System** - 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 confined spaces.

**Testing** - the process by which the hazards that may confront Entrants of a permit-required confined space are identified and evaluated.



**Appendix B: Acronyms**

FM: Facilities Management

IDLH: Immediately Dangerous to Life or Health

OHS: Occupational Health and Safety

PRCS: Permit-Required Confined Space

UVA: University of Virginia

**Appendix C: Confined Space Entry Permit**

<b>Space to be entered</b> Date:		<b>Work to be performed</b>					
Location/Building		Authorized duration of permit From: _____ To: _____					
<b>PERMIT SPACE HAZARDS</b> (check all that apply) <input type="checkbox"/> Oxygen deficiency <input type="checkbox"/> Oxygen Enrichment <input type="checkbox"/> Flammable gases or vapors <input type="checkbox"/> Airborne combustible dust <input type="checkbox"/> Toxic gases or vapors <input type="checkbox"/> Mechanical hazards <input type="checkbox"/> Electric shock <input type="checkbox"/> Materials harmful to skin <input type="checkbox"/> Engulfment <input type="checkbox"/> Other: _____ (List controls on back)		<b>EQUIPMENT AND PPE REQUIRED FOR ENTRY</b> Continuous Forced-Air Ventilation <b>MANDATORY</b> Continuous Air-Monitoring <b>MANDATORY</b> Gloves <input type="checkbox"/> yes <input type="checkbox"/> no Protective eyewear <input type="checkbox"/> yes <input type="checkbox"/> no Protective clothing <input type="checkbox"/> yes <input type="checkbox"/> no Respirator (air purifying) <input type="checkbox"/> yes <input type="checkbox"/> no Tripod/Fall Protection <input type="checkbox"/> yes <input type="checkbox"/> no Powered Communication <input type="checkbox"/> yes <input type="checkbox"/> no Other: ADD line for personal air-monitoring device for each entrant					
<b>ADDITIONAL PERMITS REQUIRED</b> <input type="checkbox"/> LINEBREAKING <input type="checkbox"/> HOTWORK <input type="checkbox"/> Lock Out/Tag Out <input type="checkbox"/> OTHER: _____		<b>PERSONAL AWARENESS</b> <input type="checkbox"/> Pre-entry briefing on specific hazards/controls <input type="checkbox"/> All personnel completed task specific training <input type="checkbox"/> All required SDS have been reviewed					
<b>ATMOSPHERIC TESTING RESULTS</b>		Witnessed and signed by Authorized entrant: _____					
<i>Record continuous monitoring results at least every 2 hours (record additional test data on back of form)</i>							
	<b>Acceptable Values</b>	<b>Pre-entry*</b> Time: Results	Break Time: Results	Break Time: Results	Break Time: Results	Break Time: Results	Break Time: Results
<b>Oxygen % O2</b>	19.5% min - 23.0%						
<b>Flammability % LFL</b>	< 10%						
<b>Hydrogen Sulfide H2S</b>	< 10 ppm						
<b>Carbon Monoxide CO</b>	< 35 ppm						
Gas Monitor Make/Model: _____			*pre-entry measurements recorded by Entry Supervisor				
<b><i>Determination of unacceptable conditions requires immediate notification of FM Safety and/or EHS IH</i></b>							
Authorized Attendant(s) (list by name): _____ _____							
Authorized Entrant(s) (list by name):							
	<i>Time in</i>	<i>Time out</i>	<i>Time in</i>	<i>Time out</i>	<i>Time in</i>	<i>Time out</i>	<i>Time in</i>
<b>AUTHORIZATION BY ENTRY SUPERVISOR</b>							
I certify that all required precautions have been taken and necessary equipment is provided for safe entry and work in this confined space. This permit is not valid until all appropriate items are completed and it is signed.							
SIGNATURE: _____				PRINT NAME: _____			
<b>FOR EMERGENCY RESCUE 911</b>							

**Appendix D: Confined Space Non Permit Pre Entry Checklist****Non-permit Required Confined Space Pre-entry Hazard Evaluation Form**

Prior to entering a non-permit required confined space, the space must be evaluated to determine that it continues to qualify as non-permit required and that no hazardous work will be performed in the space. The following checklist assists in this evaluation

Evaluate if new hazards will be created by the planned work (check if true statement) ...

Note: Hazardous work includes painting, cleaning with acids or solvents, welding, brazing, torch cutting, sanding with power tools, sandblasting, breaking utility lines, using cryogenic gases, or operating valves capable of releasing material, such as water or gas, in a quantity sufficient to engulf a person or cause a hazardous atmosphere.

- No activities will be conducted that could create a hazard inside the confined space (such as welding or breaking a line)
- No chemicals will be brought into the space that could create a hazard (such as solvents or adhesives)
- No conditions exist around this space that could adversely affect anyone within the space

Verify that no atmospheric hazards exist (check if true statement) ...

- Air monitor has been calibrated within the last 12 months
- Air sampling conducted on the top, middle and bottom of the space are within the following parameters:
  - Oxygen – between 19.5 and 23.5%
  - LEL or LFL less than 10%
  - Hydrogen sulfide less than 10 ppm
  - Carbon monoxide less than 35 ppm

Previous assessments have failed to identify hazards within this space. Verify that no new hazards have been introduced into the space (check if true statement) ...

- The space does not contain:
  - a material that could engulf an entrant (such as water)
  - exposed/unprotected mechanical equipment
  - exposed/unprotected electrical conductors
  - extreme high or low temperature (greater than 110°F or less than 25°F)

Once a non-permit required confined space has been evaluated and confirmed that it qualifies for a non-permit entry (all items above can be checked), proceed with entry following the procedures for non-permit confined space entry.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Print: \_\_\_\_\_

## Non-permit Required Confined Space Pre-entry Hazard Evaluation Form

Prior to entering a non-permit required confined space, the space must be evaluated to determine that it continues to qualify as non-permit required and that no hazardous work will be performed in the space. The following checklist assists in this evaluation

Evaluate if new hazards will be created by the planned work (check if true statement) ...

Note: Hazardous work includes painting, cleaning with acids or solvents, welding, brazing, torch cutting, sanding with power tools, sandblasting, breaking utility lines, using cryogenic gases, or operating valves capable of releasing material, such as water or gas, in a quantity sufficient to engulf a person or cause a hazardous atmosphere.

- No activities will be conducted that could create a hazard inside the confined space (such as welding or breaking a line)
- No chemicals will be brought into the space that could create a hazard (such as solvents or adhesives)
- No conditions exist around this space that could adversely affect anyone within the space

Verify that no atmospheric hazards exist (check if true statement) ...

- Air monitor has been calibrated within the last 12 months
- Air sampling conducted on the top, middle and bottom of the space are within the following parameters:
  - Oxygen – between 19.5 and 23.5%
  - LEL or LFL less than 10%
  - Hydrogen sulfide less than 10 ppm
  - Carbon monoxide less than 35 ppm

Previous assessments have failed to identify hazards within this space. Verify that no new hazards have been introduced into the space (check if true statement) ...

- The space does not contain:
  - a material that could engulf an entrant (such as water)
  - exposed/unprotected mechanical equipment
  - exposed/unprotected electrical conductors
  - exposed/unprotected fall hazards
  - extreme high or low temperature (greater than 110°F or less than 25°F)
  - friable asbestos containing material

Once a non-permit required confined space has been evaluated and confirmed that it qualifies for a non-permit entry (all items above can be checked), proceed with entry following the procedures for non-permit confined space entry.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Print: \_\_\_\_\_