



Confined Space Program

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I. Purpose

Tufts University (Tufts) has established this Confined Space Program (program) in accordance with Occupational Safety and Health Administration (OSHA) requirements as outlined in 29 CFR 1910.146 and 29 CFR 1926 Subpart AA. The primary purpose of the program is to protect the safety and health of all personnel who enter confined spaces. This is accomplished by establishing procedures that ensure hazards are eliminated or minimized and that employees involved with confined space entry have knowledge of these procedures.

II. Scope

All confined space entries conducted by Tufts employees shall be performed as outlined in this program. Failure could result in disciplinary actions.

Contractors and their employees who plan to enter a Tufts owned or controlled confined space are responsible for compliance with all OSHA requirements as outlined in 29 CFR 1910.146, 29 CFR 1926 Subpart AA and this program. Failure to comply could result in the contractor being removed from campus.

III. Maintenance and Administration

The maintenance and administration of a successful program requires participation from various groups and departments.

Tufts Environmental Health and Safety (TEHS) is the “program administrator” and will assure the program is reviewed and maintained on an annual basis or when circumstances dictate otherwise.

Directors or Supervisors of Departments which perform entries and/or who hire contractors are responsible for the on-site administration of the program.

IV. Duties and Responsibilities

Tufts Environmental Health and Safety (TEHS) shall:

1. Review the program at least annually or whenever circumstances dictate.
2. Review cancelled Entry Permits to facilitate potential changes to the program.
3. Provide technical guidance regarding the program upon request.
4. Advise on confined space training.
5. File employee training records for a period of three (3) years.
6. Perform routine audits of equipment needed for entry and rescue operations.

Directors or Supervisors shall:

1. Identify confined spaces and entry requirements.
2. Supply necessary equipment to ensure safety and compliance.
3. Provide training to all personnel involved in confined space entry.
4. Ensure this program is available to employees and/or contractors.
5. Restrict non-trained employees from entering confined spaces.
6. Inform contractors that a workplace contains a permit-required confined space and that entry is allowed only through compliance with this program.

Employees shall:

1. Have a full understanding of the program.
2. Maintain safe distances from confined spaces unless authorized to enter them.

Contracting Services

When a contractor and their employees plan to enter a Tufts owned or controlled confined space, the

Tufts Representative (Host Employer) shall:

1. Advise of permit-required confined spaces. Tufts must advise contractors of any permit-required confined spaces on the premises that the contractor's employees may have reason to enter.
2. Compel compliance. Tufts shall compel compliance by informing contractors that permit-required confined spaces can only be entered under the auspices of a written program that meets the requirements of 29 CFR 1910 and 29 CFR 1926. Tufts and the contractor must also confirm what program will be followed.
3. Request documentation of the contractor's program and training records for each employee participating in the permit-required confined space entry.
4. Inform of hazards. Tufts shall inform the contractor of any known hazards and inform of any previous experience with the space that make the space a permit-required confined space.
5. Inform of precautions. Tufts shall inform contractors of any entry precautions that have been implemented such as draining, flushing and rinsing a space; isolating the space by disconnecting lines, blanking or providing a double block-and-bleed system; locking out mechanical equipment; flagging or barricading the work area; de-energizing electrical equipment; providing temporary lighting; purging and ventilating the space; and performing initial atmospheric testing.
6. Coordinate entry. Tufts shall coordinate operations with the contractor when host and contractor employees will be working in or near permit-required confined spaces.
7. Conduct debriefing. At the conclusion of the entry, the contractor must debrief Tufts on any hazards confronted during entry.

Contractor's Representative (Controlling Contractor and/or Entry Employer) shall:

1. Obtain any available information regarding hazards and entry operations from the Tufts representative.
2. Inform the Tufts representative of the provisions of the contractor's program if it is agreed that the contractor's program will be followed rather than this program.
3. Provide documentation of the contractor's program and training records for each employee participating in the permit-required confined space entry.
4. Coordinate entry operations when Tufts and the contractor's employees will be working in or near permit-required confined spaces.
5. Report hazards confronted or created during the entry to the Tufts representative, either at the debriefing session or when they occur.
6. Comply with all of the other requirements governing confined space entry.

V. Definitions

Acceptable Entry Conditions – The conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

Attendant – An individual stationed outside one or more permit spaces who monitors the authorized entrant and who performs all attendant’s duties assigned in permit-required confined space program.

Authorized Entrant – An individual who is authorized to enter a permit-required confined space.

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.

Confined Space – A space that:

1. Is large enough and so configured that an employee can bodily enter and perform assigned work; and
2. Has limited restricted means of entry or exit, (i.e. tank, vessels, storage bins, and spaces that may have limited means of entry or exit); and
3. Is not designed for continuous employee occupancy.

Controlling Contractor – Is the employer that has overall responsibility for construction at the worksite.

Contractor – A person or business which provides goods or services under terms specified in a contract.

Emergency – 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 – 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 – The action by which a person passes through an opening into a permit-required confined space. Includes ensuing work activities 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 Employer – Any employer who decides that an employee it directs will enter a permit space.

Entry Permit – The written or printed document that is provided to allow and control entry into a permit-required confined space.

Entry Supervisor – An individual who remains at the confined space site that is responsible for determining if acceptable entry conditions are present.

Hazardous Atmosphere – An atmosphere that may expose employees to the risk of death, disability, impairment of ability to self-rescue, (i.e., escape unaided from a permit space) injury, or acute illness from one (1) or more of the following causes:

1. Flammable gas, vapor, or mist in excess of 10 percent of its lower explosive limit (“LEL”);
2. Airborne combustible dust at a concentration that meets or exceeds its LEL;

3. Atmospheric oxygen concentration below 19.5% (oxygen deficient) or above 23.5% (oxygen enriched);
4. Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in OSHA 29 CFR 1910, Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, and which could result in employee exposure in excess of its dose or permissible exposure limit; and
5. Any other atmospheric condition that is immediately dangerous to life or health.

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

Hot Work Permit – The written authorization to perform operations (i.e., 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.

Lower Flammable Limit/Lower Explosive Limit (LEL) – The minimum concentration of a substance in air needed for an ignition source to cause a flame or explosion.

Non-Entry Rescue – When a rescue service, usually the attendant, retrieves employees in a permit space without entering the permit space.

Non-Permit Required Confined Space – 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.

Permit-Required Confined Space – A confined space that has one (1) 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 – The overall program for controlling, and where appropriated, for protecting employees from permit space hazards and for regulating employee entry into permit spaces.

Permit System – The written procedure for preparing and issuing permits for entry and for returning the permit 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.

Qualified Person – One who is by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

Rescue Service (Rescue Team) – The personnel designated to rescue employees from permit-required confined spaces.

Retrieval System – the equipment used for non-entry rescue of employees from permit-required confined spaces, including a retrieval line, chest or full-body harness, wristlets, and a lifting device or anchor.

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

VI. Types of Confined Spaces

A **Confined Space** is a space that:

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

Such spaces include, but are not limited to pipe systems, manholes, tanks/containers, silos, utility systems, attics and crawl spaces.

Each confined space shall be evaluated and classified by a competent and qualified person as either a non-permit required confined space or permit-required confined space using the **Evaluation Form (Attachment 1)**. Once classified, all permit-required confined spaces shall be prominently posted. The **Inventory of Permit-Required Confined Spaces (Attachment 2)** shall be reviewed no less than annually.

Note: all confined spaces shall be considered permit-required confined spaces until an evaluation is performed and determines otherwise.

A **Permit-Required Confined Space** is a space that:

- Contains or has the potential to contain a hazardous atmosphere; and/or
- Contains a material that has the potential for engulfing an entrant; and/or
- 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 smaller cross-section; and/or
- Contains any other recognized serious safety of health hazard.

A permit-required confined space shall contain a prominently displayed sign reading “DANGER PERMIT REQUIRED CONFINED SPACE DO NOT ENTER UNLESS AUTHORIZED BY PERMIT” or other similar language.

VII. Non-Permit Required Confined Space

Though non-permit confined spaces do not present the level of hazards that a permit-required confined space may, special precautions shall be taken prior to entry. If a confined space has not been thoroughly evaluated it shall be considered to be a permit-required confined space until deemed otherwise.

Specific requirements for non-permit confined space entry include:

- Complete a thorough evaluation of the space using the **Evaluation Form (Attachment 1)** to determine that a hazard is not present. Contact your supervisor for guidance.

VIII. Permit-Required Confined Space

Permit-required confined space entry presents the greatest risk for injury or death. Extreme caution shall be taken prior to entry. All requirements must be thoroughly understood and followed. In addition, review of the **OSHA Permit-Required Confined Space Entry Decision Flow Chart (Attachment 3)** shall be performed.

Roles for Permit-Required Confined Space Entry

An **Entry Supervisor** oversees the confined space entry, (i.e., director, supervisor, foreman, crew leader, etc.) and who has the authority to direct or control other employees. Entry Supervisors shall:

- Notify TEHS when a permit-required confined space entry is planned.
- Consult TEHS for technical guidance regarding permit-required confined space.
- Know the hazards that may be faced during entry, including information on the signs, symptoms, and consequences of the exposure.
- Verify that the Rescue Team is available and that the means for calling them are operable.
- Assure all tests specified by the Entry 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.
- Authorize/issue permits by providing signature and date when acceptable entry conditions are present.
- Be trained in the uses and know how to properly use all equipment such as personal protective equipment, testing equipment, and rescue equipment for safe entry/exit.
- Conduct an entry meeting outlining procedures to be taken throughout the life-cycle of the entry. Procedures will include hazards/potential hazards and the means to mitigate such hazards. Review of safe entry/exit, neutralization of energy sources, use of protective tools, personal protective equipment (ppe) and protocols for rescue shall be reviewed.
- Assure unauthorized individuals do not enter the permit-required confined space during entry operations.
- Amend or terminate permits if the scope of work and time of work will exceed that in which is described on the permit.
- Cancel permits at the conclusion of entry.
- File all permits for a period of no less than 5 years.

An **Authorized Entrant** is an employee who is authorized to enter a permit-required confined space. Authorized Entrants shall:

- Know the hazards that may be faced during entry, including information of the signs, symptoms, and consequences of the exposure.
- Be trained in the uses and know how to properly use all equipment such as personal protective equipment, testing equipment, and rescue equipment to be provided for safe entry/exit.

- Communicate with the attendant as necessary to enable the attendant to monitor the entrant's status and to enable the attendant to alert entrants of the need to evacuate the space if hazardous conditions exist or develop.
- Alert the attendant whenever the entrant recognizes any warning sign or symptom of exposures to a dangerous situation, or whenever the entrant detects a prohibited condition.
- Exit from the permit space as quickly as possible whenever an order to evacuate is given by the authorized attendant or entry supervisor, the entrant recognizes any warning sign or symptom of exposure to a dangerous situation; the entrant detects a prohibited condition; or an evacuation alarms is activated.

An **Attendant** is an employee stationed outside a permit-required confined space who monitors the authorized entrants. Attendants shall:

- Know the hazards that may be faced during entry, including information on the signs symptoms and consequences of the exposures.
- Be trained in the uses and know how to properly use all equipment such as personal protective equipment, testing equipment, and rescue equipment to be provided for safe entry/exit.
- Assure unauthorized individuals do not enter the permit-required confined space during entry operations.
- Remain outside the permit-required confined space during entry operations until relieved by another attendant.
- Maintain an accurate count of authorized entrants in the permit-required confined space.
- Communicate with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space.
- Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the permit-required confined space. Order the authorized entrants to evacuate immediately under any of the following conditions:
 - If the attendant detects a prohibited condition;
 - 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; or
 - If the attendant cannot effectively and safely perform all the duties required of his/her position.
- Be aware of behavioral effects resulting from hazard exposure.
- Perform non-entry rescues as specified by the rescue procedure as soon as an authorized entrant may need assistance to escape.
- Summon Rescue Team when non-entry rescues are not feasible.
- Brief Rescue Team of details surrounding emergency.
- Contact Tufts Police in order to request Emergency Medical Technician (EMT) support and to notify TEHS.

Entry Permit/Permit System

The Entry Permit (permit) documents compliance with safe work practices and authorizes entry into permit-required confined space. The **Entry Permit (Attachment 4)** shall be used.

The completed permit shall be onsite at the time of entry and be available to all Authorized Entrants.

The duration of the permit may not exceed the time required to complete the assigned tasks or job as identified on the permit. The Entry Supervisor shall terminate entry and cancel the Entry Permit when:

- The entry operations covered by the permit have been completed; or
- A condition that is not allowed under the permit arises in or near the permit-required confined space.

TEHS shall be provided canceled Entry Permits to facilitate the regulatory review of the program. Any problems encountered during an entry operation shall be noted on the permit so that appropriate revisions can be made.

Pre-entry Procedures

The following describes the procedures to be adhered to by personnel before entering any permit-required confined space:

1. Assemble a Permit-Required Confined Space Entry Team. The team should consist of authorized personnel and include the role of Entry Supervisor, at least two Authorized Entrants and at least two Attendants.
2. Locate safety equipment (i.e., fire extinguisher, lighting, first aid kit) and monitoring devices needed for entry. Special attention shall be paid to assure equipment such as ventilation devices, retrieval equipment and personal protective equipment (ppe) are in working condition and that monitoring devices have been calibrated.
3. Be sure all safety-related equipment is placed in close proximity to the permit-required confined space but no closer than two (2) feet from the spaces edge. Portable equipment mounted on wheels must be securely locked to prevent accidental movement.
4. Complete a thorough pre-entry evaluation of the permit-required confined space to identify any physical and health hazards. Evaluation should include testing for oxygen level, flammable gas and toxics as well the identification of heat, noise, slip/trip, vibration and energized equipment hazards.
Atmospheric testing shall be performed using a calibrated gas detection monitor. Monitor shall be set to monitor for the following:
 - Oxygen Level: The oxygen level shall be between 19.5% and 23.5%.
 - Flammable Gas: The level of flammable gas should be below 10% of the Lower Explosive Limit (LEL).
 - Toxic Gas: Toxic gas such as carbon monoxide shall not exceed OSHA Permissible Exposure Limits.
5. If needed, introduce positively-forced, continuous mechanical air ventilation to control any worker-created airborne hazards inside the space, (i.e., painting, drilling).
6. If needed, isolate and protect against the release of all potential sources of energy and materials into the space by physically disabling or deactivating equipment and/or systems. The means of reactivation must remain in the possession of one of the authorized entrants at all times.
Note: If hazardous atmospheric conditions cannot be eliminated, the Entry Supervisor must cancel the permit and immediately notify TEHS of the hazardous atmospheric conditions.
7. If needed, set up the appropriate fall protection and retrieval system. Note: A mechanical device shall be readily available to retrieve personnel from vertical spaces more than 5 feet deep.

8. Coordinate entry operations and rescue procedures to assure Rescue Team members are available. Complete the **Rescue Plan (Attachment 6)** prior to entering the space.
9. If needed, make arrangements with Tufts Police for crowd control and/or traffic detail.
10. Complete the **Entry Permit (Attachment 4)**. The permit must be approved by the Entry Supervisor.

Entry Procedures

The following describes the procedures for all personnel entering permit-required confined spaces:

1. Notify the Facilities Services main number. Notification shall include the location, start time of entry and the approximate length of time required to complete the job.
2. Restrict access to and around the work area to authorized members of the Permit-Required Confined Space Entry Team. Contact Tufts Police for assistance with crowd control and/or traffic detail.
3. Complete a second evaluation of the permit-required confined space to identify any physical and health hazards. Evaluation should include testing for oxygen level, flammable gas and toxics as well the identification of heat, noise, slip/trip, vibration and energized equipment hazards.
Atmospheric testing shall be performed using a calibrated gas detection monitor. Monitor shall be set to monitor for the following:
 - Oxygen Level: The oxygen level shall be between 19.5% and 23.5%.
 - Flammable Gas: The level of flammable gas should be below 10% of the Lower Explosive Limit (LEL).
 - Toxic Gas: Toxic gas such as carbon monoxide shall not exceed OSHA Permissible Exposure Limits.
4. Conduct an entry meeting outlining procedures to be taken throughout the life-cycle of the entry. Procedures will include hazards/potential hazards and the means to mitigate such hazards. Review of safe entry/exit, neutralization of energy sources, use of protective equipment and protocols for emergency rescue shall be reviewed. The entry meeting will be overseen by the Entry Supervisor.
5. Confirm that all personnel power off music players, cell phones, pagers and other electronic devices not relevant to the entry.
6. Assure Authorized Entrants wear full body harness with attached lifeline, hardhat, and safety shoes. Protective clothing, gloves, respiratory protection, and eyewear must be used if determined to be necessary to protect against identified or potential hazards.
7. Enter permit-required confined space with extreme caution. All Authorized Entrants must descend securely attached to a tripod/winch system, rescue positioning device, safety block or other approved fall protection and retrieval device.
 - Detachment from the mechanical retrieval system is prohibited unless a pre-approved contingency plan is in effect for rescue.
 - Slack on the retrieval line must be avoided whenever entrants use a ladder or built-in rungs as the primary work platform.
 - The retrieval system must be monitored by an attendant continuously throughout the occupancy period.
8. Assure the scope of work and time of work shall not exceed that in which is described on the permit. If a situation dictates the need to amend a permit, approval of the Entry Supervisor is needed PRIOR to performing work.
9. Perform continuous atmospheric testing with a gas monitor throughout the occupancy period.

- If the gas monitor cannot be worn by entrants in close proximity to their breathing zones, (i.e., clipped to full body harness chest strap), it must be affixed close to the work zone with the sample pump drawing air from the breathing zone of the entrant.
 - If a hazardous atmosphere develops during occupancy and the gas monitor alarms, all entrants must leave immediately.
- Note: certain work activities, (i.e., opening a valve, cleaning debris from within a pipe or agitating water), can activate sudden, life-threatening oxygen deficient or toxic atmospheres. A gas monitor alarm shall not be relied upon to provide sufficient warning time for self-rescue. It is possible for a worker to become immediately incapacitated and unable to move the moment a sudden life-threatening atmosphere develops. It is also possible that a gas monitor cannot detect the unexpected toxins in the confined space that are causing the life-threatening situation.**
10. If applicable, assure that all welding and cutting operations are performed with extreme caution.
 - A hot-work permit should be obtained.
 - Gas cylinders and welding machines must be secured outside the permit-required confined space in a vertical position.
 - A portable, closed local exhaust ventilation system with freely moveable hood shall be used to control the accumulation of toxic materials or possible oxygen deficiency.
 - If it is impossible to provide local exhaust ventilation, appropriate respiratory protection must be used.
 - Fuel gas and oxygen gas flows to the torch must be able to be positively shut-off at some point outside the confined space when not in use for an extended period of time.
 11. Assure that two (2) Attendants remain present outside a permit-required confined space during entry.
 12. Assure the Attendants have radio communication readily available for the purpose of summoning the Rescue Team. Whenever a work crew is not in close proximity to a vehicle mobile radio they must have a portable radio.
 13. Assure the Attendants and Authorized Entrants remain in continuous contact with each other throughout the duration of the confined space entry. If visual contact cannot be maintained, effective communication must be maintained by portable radios or some other reliable, pre-approved means.
 14. Assure that under no circumstances, can the scope of work of a permit be changed without approval from the Entry Supervisor.
 15. Notify the Facilities Services main number when Authorized Entrants have vacated the space. Notification shall include the location, end time of the entry and the time in which the entry is completed.

Post-entry Procedures

The following describes the procedures for all personnel after exiting permit-required confined spaces:

1. Confirm personnel, tools and equipment has been removed from the permit-required confined space prior to re-activation energy sources and other utilities.
2. Assure equipment and tools are appropriately cleaned, repaired, discarded and stored.
3. Secure access to unauthorized areas such a mechanical shafts and manholes prior to allowing general access to the surrounding work area.

4. Cancel Entry Permit. The Entry Supervisor shall cancel the permit by signing and dating the document. Filing of the permit shall be kept by the Entry Supervisor for a period of no less than 5 years.

Rescue Procedures

In the event of illness, injury or other situation resulting in an Authorized Entrant(s) being unable to safely exit a space under their own power and rescue requires entry into a permit-required confined space, rescue procedures shall be immediately initiated by requesting the support of an in-house Rescue Team or outside approved contractor that is onsite and available during the entry.

The in-house Rescue Team or outside contractor shall be responsible for the following:

- Respond to incident immediately.
- Understand aspects of the permit pertaining to hazards.
- Review with Attendant and/or Entry Supervisor hazards or potential hazards.
- Review with Attendant and/or Entry Supervisor injury, illness or other reason for Authorized Entrants inability to exit space.
- Utilize appropriate ppe and other emergency rescue tools such as retrieval lines, flat-board and first-aid supplies.
- Oversee the safe exit of personnel, as well all members of Rescue Team.
- Assist with care of personnel until the services of EMTs are on site.
- Provide Safety Data Sheet (SDS) to the EMTs in the event of a chemical exposure.
- Provide ongoing communication with Tuft Police.

The in-house Rescue Team consists of trained in-house personnel that can be summonsed at all times through the use of company issued paging equipment. At no time shall there be less than 6 members employed that are trained to participate in rescue. At no time shall there be less than 4 members present on campus, who can respond within 5-minutes and that are trained to participate in rescue.

The outside approved contractor has been approved by TEHS using the **Rescue Team Evaluation Form (Attachment 5)**. Outside contractors consist of personnel that are onsite during entry. Contractors will participate in an Initial Evaluation be selected and approved based on among other things, availability, qualifications, and equipment inventory. Contractors will also participate in a Performance Evaluation to demonstrate its capabilities to provide rescue services. This includes the participation in on-site drills and walkthroughs.

IX. Training

Tufts shall offer training to Tufts personnel whose work is regulated under this program. The objective of the training is for personnel to understand, and develop the knowledge and skills necessary to safely perform duties in which they are asked to perform.

Confined Space Awareness Training: Facility Services personnel must successfully complete awareness training that provides a foundation for recognizing confined spaces and their potential hazards.

Confined Space Comprehensive Hands-on Training: Entry Supervisors, Entrants, and Attendants must successfully complete comprehensive hands-on training before the employee

assumes newly assigned duties; whenever there is a change in permit-required confined space operations that presents a hazard about which an employee has not been previously trained; whenever a supervisor identifies inadequacies in an employee's knowledge or use of these procedures and thereafter on an annual basis. This training provides personnel specific details of this plan and instruction on participating in permit entries.

Rescue Team Training: Rescue Team personnel must complete rescue team training and annual simulated exercises before first being assigned duties; before the employee assumes newly assigned duties; whenever there is a change in permit space operations that presents a hazard about which an employee has not been previously trained; whenever a supervisor identifies inadequacies in an employee's knowledge or use of these procedures and thereafter on an annual basis. This training provides personnel specific instruction on rescue activities.

All training courses shall be completed no less than annually. However, it is the responsibility of individual departments to assure that Entry Supervisors, Authorized Entrants and Attendants successfully complete training.

X. Recordkeeping

Employee training records shall be kept on file by TEHS for a period of three (3) years. Training records include time, date, location, training material, instructor's name, employee's name and employee's signature.

Cancelled Entry Permits shall be kept on file by the Entry Supervisor for a period of five (5) years. Entry Permits will also be provided to TEHS for review.

XI. Equipment Maintenance

TEHS will perform routine audits of equipment needed for entry and rescue operations. Such equipment will include but not be limited to tripods, gas detectors, and ventilators. The Facility Services Department will insure that a procedure is in place for the maintenance and repair of all equipment. All equipment will be maintained according to all applicable requirements and manufacturers specifications.



Environmental Health and Safety

Attachent 1: Confined Space Evaluation Form

Date: _____

Department: _____

Campus: _____

Area/Building: _____

Loc. _____ Floor _____ Room _____

Person performing evaluation:

PLEASE PRINT NAME

CONFINED SPACE		Y	N
1. Size	Is the space large enough or configured to permit bodily entry?		
2. Access/Egress	Are there limited or restricted means of access or egress?		
3. Occupancy	The space is not designed for continuous human occupancy.		
PERMIT REQUIRED CONFINED SPACE		Y	N
4. Hazard	a. Is there a potential or actual hazardous atmosphere? If yes, explain _____		
	b. Is there a potential for engulfment or entrapment?		
	c. Is the internal configuration such that an entrant may be trapped or asphyxiated?		
	d. Does the space contain any other safety or health hazard (e.g., mechanical, chemical, thermal, electrical, etc.)? If yes, identify _____		

Based on the answers to the above questions, define the type of confined space.

Type of space determined: 1. _____ Non-permit confined space (yes, checked for questions 1-3 only)

2. _____ Permit required (yes, checked for questions 1-4)

3. _____ Do Not Enter

Signed_____
Date

Attachent 2: Permit Required Confined Space Inventory

Permit Required Confined Space Inventory *- Boston

Building	Location
BRPH-Arnold	Basement - Two pH Neutralization Tanks
BRPH-MV	Basement Room 014 - One Sewer Ejector Pit
BRPH-Stearns	Sub-basement (Beneath Mailroom)
BRPH-Stearns	Basement Manhole (Outside Electrical Vault)
Chiller Plant	Condenser Water Tank
Dental	Loading Dock Ceiling Crawl Space
Dental	Second Floor Bank Ceiling Crawl Space
HNRC	Basement - Two Pump Tanks
HNRC	Tenth Floor - Boilers 1 & 2
HNRC	Tenth Floor - Boiler 3
HNRC	Tenth Floor - Two Deaerators
Jaharis	Basement Room 001 - Two pH Neutralization Tanks
Jaharis	Basement Room 001 - Three Sewer Ejector Pits
Jaharis	Basement Room 011 Crawl Space
Jaharis	Third - Ninth Floors - Warm & Cold Room Ceiling Crawl Space
Posner	Mechanical Room Crawl Space
Sackler	Basement - Three Sewer Ejector Pits
Sackler	First Floor - Auditorium Ceiling Crawl Space

Permit Required Confined Space Inventory *- Grafton

Building	Location
Bldg. 21	Sub-basement Tunnel
All Silos	N/A
Manure Pit	N/A
Swine Pit	N/A
Manholes	Between Administration Bldg. 1 and Loew Center Bldg. 2
	Near Central Service Bldg. 15 and Route 30
	Between Central Services Bldg. 15 and Bldg. 16
	Near Bldg. 17 (Northeast)
	Near Flight Cage Bldg. 38 (North)
	Between Bldg. 21 and 18
	Middle of Bldg. 19, 20 and 21
	South of Route 30 Near Building LAH Bldg. 35 and 40
	East of LAH Bldg. 35 (West of Willard Rd.)
	South of Alpha Psi Bldg. 8
	Front of Bldg. 3
	Front of Bldg. 10
	Parking lot of Bldg. 26

Permit Required Confined Space Inventory *- Medford/Somerville

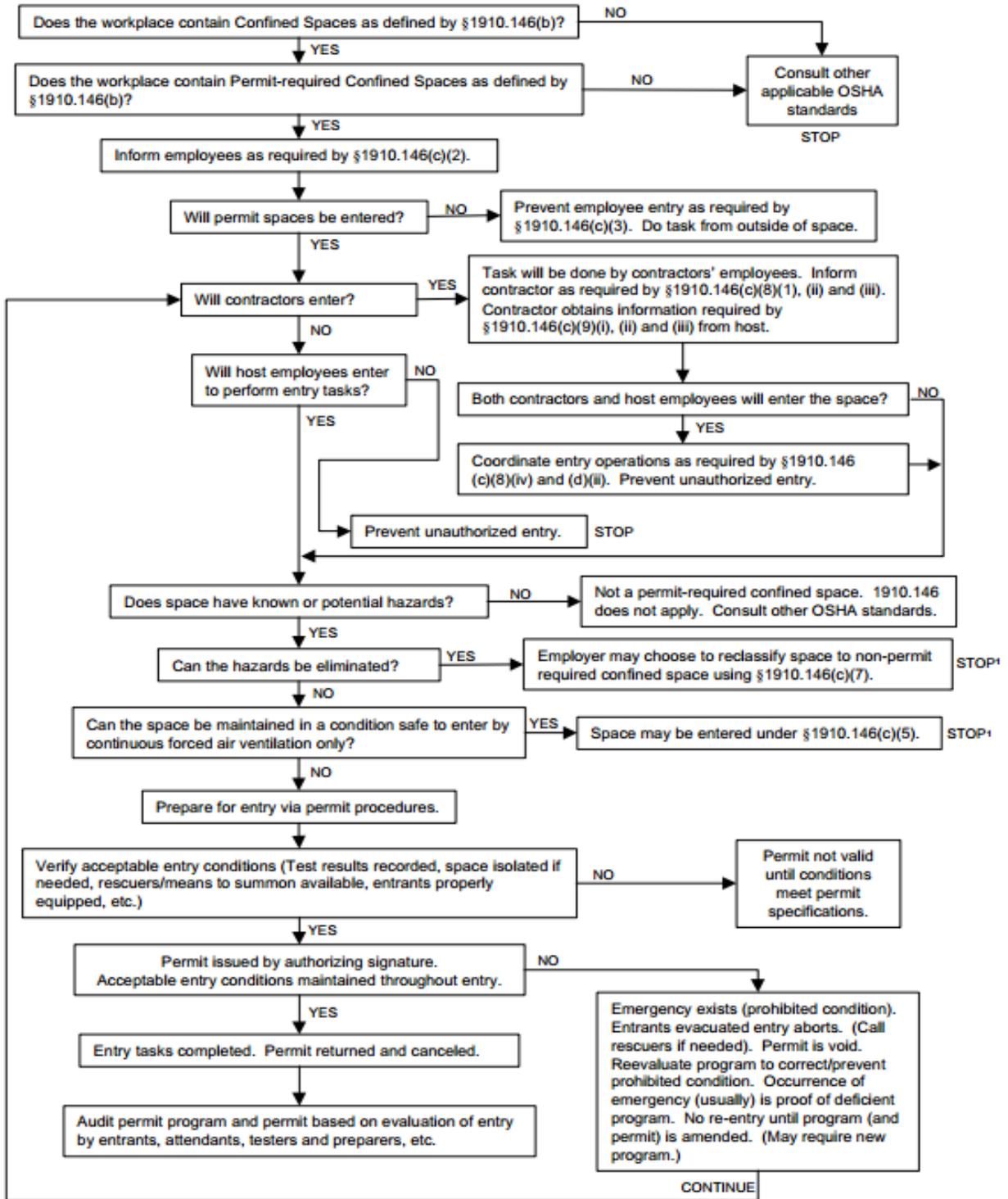
Building	Location
Anderson Hall	Exterior Steam Vault
Barnum Hall	Three Underground Steam Tunnel
Braker Hall	Exterior Steam Vault
Bromfield-Pearson	Basement - Crawl Space
Bunker-Latin Way	Steam Pits
Cabot Center	Exterior Steam Vault
Carmichael Hall	Exterior Steam Vault
Carmichael Hall	Exterior Steam Vault
Carmichael Hall	Basement - Steam Pipe Tunnel
Central Heating	Boilers
Central Heating	Compactors
Cousins Gym	Two Boilers
Eaton Hall	Two Exterior Steam Vault
Gifford House	Steam Pipe-Underground
Goddard Chapel	Exterior Steam Vault
Haskell Hall	Basement Steam Pipe Tunnel
Jackson Gym	Two Boilers
Lewis Hall	Exterior Steam Vault
Maver Center	Exterior Steam Area
Mayer Center	Exterior Steam Vaults
Miller Hall	Exterior Steam Vaults
Miner Hall	Exterior Steam Vaults
Packard Hall	Exterior Steam Vaults
Pearson Labs	Obsolete Exterior Vault
Tilton Hall	Two Boilers
West Hall	Exterior Steam Vault
Wren Hall	Basement - Steam Pipe Tunnel

* The permit-required confined space may be able to be reclassified to non-permit space status if the hazards affecting the space can be permanently eliminated. Please Contact TEHS for further guidance.

Annual Review

Date	Description of Change if any	Reviewed by

Attachent 3: Permit-Required Confined Space Division Flow Chart



¹Spaces may have to be evacuated and re-evaluated if hazards arise during entry

Source: 29 CFR 1910.146 Appendix A

Attachent 4:Entry Permit

CONFINED SPACE ENTRY PERMIT		1A. NAME OF EMERGENCY CONTACT		1B. TELEPHONE NUMBER	
		3. DESCRIPTION OF SPACE			
2. SPECIFIC LOCATION OF SPACE		4. PURPOSE OF ENTRY			
		5. ENTRY		A. DATE	
		6. EXIT		B. TIME	
7A. NAME OF SUPERVISOR IN CHARGE OF WORK		7B. TELEPHONE NUMBER		8. NAME OF ENTRANT(S)	
9. NAME OF ATTENDANT		10. NAME OF CONFINED SPACE TESTER		11. WELDING OR "HOT WORK" REQUIRED <input type="checkbox"/> YES <input type="checkbox"/> NO	

12. CONFINED SPACE TEST DATA
List specific tests made. Entry is prohibited if reading outside standard permissible entry level (PEL).

A. SUBSTANCE TESTED	B. PERMISSIBLE LEVEL	C. READING	D. DATE	E. TIME
OXYGEN (%)	>19.5 <22.0			
% OF LOWER EXPLOSIVE LIMIT	10%			
CARBON MONOXIDE	35 ppm			

13A. NAME OF INSTRUMENT(S)	13B. TYPE(S) OF INSTRUMENTS	13C. IDENTIFICATION NUMBER(S)	13D. WHEN LAST CALIBRATED
----------------------------	-----------------------------	-------------------------------	---------------------------

14. SPECIAL REQUIREMENTS (Explain each "No" answer in Item 15)

YES	NO	ITEM	YES	NO	ITEM
		A. LOCKOUT - DE-ENERGIZE (<i>Employee retains key</i>)			I. FIRE EXTINGUISHER
		B. SPACE PURGED			J. LIGHTING
		C. VENTILATION			K. EMERGENCY TRIPOD
		D. AREA SECURED			L. PROTECTIVE CLOTHING
		E. BREATHING APPARATUS			M. LINE CAPPED OR BLANKED
		F. RESUSCITATOR/INHALATOR			N. RESPIRATOR
		G. ESCAPE HARNESS			O.
		H. LIFELINE			P.

15. OTHER SPECIAL REQUIREMENTS (*List each and status*)

16A. SPECIFIC PROTECTIVE CLOTHING AND EQUIPMENT REQUIRED	16B. RESPIRATOR <input type="checkbox"/> NEG. PRESS. <input type="checkbox"/> SUPPLIED AIR <input type="checkbox"/> PAPR <input type="checkbox"/> SCBA
--	--

17. COMMUNICATION PROCEDURES DURING ENTRY

18. ADDITIONAL COMMENTS/REMARKS

19. RESERVED FOR REGIONAL S&EM DIVISION/BRANCH

20. I CERTIFY THAT I HAVE READ AND UNDERSTOOD ALL OF THE REQUIREMENTS OF THE TUFTS UNIVERSITY CONFINED SPACE ENTRY PROGRAM IMPLEMENTED BY THE FACILITY. FURTHERMORE, I WILL COMPLY WITH ALL OF THESE CRITERIA.

ENTRANT SIGN AND DATE HERE ▶	ATTENDANT SIGN AND DATE HERE ▶
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21. I CERTIFY THAT ALL OF THE ABOVE INFORMATION IS CORRECT AND THE SPACE ENTRANT AND ATTENDANT ARE FULLY COMPETENT TO PERFORM WORK DESCRIBED IN THE ABOVE CONFINED SPACE.

SUPERVISOR SIGN HERE ▶	DATE
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INSTRUCTIONS

NOTE 1: THE CONFINED SPACE ENTRY PERMIT IS NOT A PERMIT TO CONDUCT "HOT WORK" OPERATIONS THAT ARE COVERED UNDER THE PROVISIONS OF THE OSHA STANDARD 29 CFR 1910, SUBPART Q-WELDING, CUTTING AND BRAZING. FOR "HOT WORK" OPERATIONS, A SEPARATE PERMIT IS REQUIRED. IF "HOT WORK" WILL BE REQUIRED IN CONJUNCTION WITH THE CONFINED SPACE ENTRY TASK, BOTH PERMITS ARE REQUIRED.

NOTE 2: CONFINED SPACE ENTRY IS PROHIBITED IF TEST DATA INDICATES AN UNSAFE OR UNHEALTHFUL CONDITIONS IS PRESENT IN ANY FORM OR QUANTITY. IN SUCH CASES, CONTACT THE TUFTS UNIVERSITY ENVIRONMENTAL HEALTH AND SAFETY FOR INSTRUCTIONS.

Description

Item No.

- 1: List the EMERGENCY CONTACT (name and telephone number) **DO NOT USE 911 EMERGENCY SERVICES**
- 2: List the specific location of the confined space.
- 3: List the specific description of the confined space.
- 4: List the specific reason that entry into the confined space is necessary.
- 5: Show the date and the time entry into the confined space will be accomplished. If entry does not take place within 4 hours of schedule, breaks included, a new permit will be required. The permit shall be authorized for one-day entry only and for no more than 4 hours per day for each employee.
- 6: Show the date and the time the confined space work is to be completed. If the work is not completed within one hour of the time shown, the entrant will be required to leave the space and explain the circumstances. If the work is to take more than two hours over the time shown, a new permit is required.
- 7A: List the name of the supervisor in charge of the confined space. This individual must be available at all times while the confined space is occupied.
- 7B: List the telephone number of the person listed in Item 7A.
- 8: List the name of the person entering the confined space. If more than one entrant is authorized, each individual shall be listed.
- 9: List the name of the attendant.
- 10: List the name of the person conducting confined space tests. If the tester is a contractor, a business card or other identification, and a copy of the contract specifying the contractor's responsibility should be attached to the form.
- 11: If the response is "Yes", a completed copy of TU Hot Work form, Permit for Welding, Cutting or Brazing, must be posted next to the Confined Space Entry Permit, both of which must be in a conspicuous location outside the confined space.
- 12: List the specific tests made and the purpose. As minimum, testing of oxygen, lower explosive limits, and carbon monoxide, must be accomplished. For other contaminants, the OSHA permissible exposure limits shall be used as the permissible entry limits.
- 13A: List the instruments used for the tests. If more than one instrument is used, enter the required information on a separate sheet of paper and attach it to the form.
- 14: Place an "X" in the appropriate box. If the response is "NO" to any item, the supervisor shall indicate the reason in Item 18.
- 15: The supervisor shall list any additional requirements or precautions necessary for the confined space entry. An example would be if testing is required every 30 minutes; or if monitoring is required at all times during space occupancy. If there are no additional requirements, the entry will so state this fact.
- 16A-16B: List the specific protective clothing and equipment required for the task. Check the type of respiratory protective device: Neg. Press - negative pressure, PAPR - powered air purifying respirator, SCBA - self-contained breathing apparatus.
- 17: State precisely what the communication procedures will be between the entrant and attendant during the confined space entry period.
- 18: The supervisor shall list use this space to indicate any exceptions, negative responses in Item 14, and any other remarks necessary to ensure a safe and healthful confined space entry task is accomplished.
- 19: The TU EHS office shall use this space to note any deficiencies on the entry permit or any other aspect of the facility confined space entry program. Positive corrective measures are to be noted in this item and the facility manager required to respond to any unfavorable comment.
- 20: The entrant and attendant shall sign and date the form. They must sign on the date of entry into the confined space.
- 21: The supervisor must sign and date the authorization for the confined space entry. The supervisor must sign on the date of entry. The supervisor shall not sign the form unless all items are completed. There shall not be any blank items allowed for Items 1 through 17.

Attachent 5: Confined Space Rescue Team Evaluation Form

The purpose of this form is to evaluate outside confined space rescue providers. An evaluation must be completed for each provider considered. Mark each column yes or no, and provide notes as necessary. <i>If there are any "No" answers, this must be reviewed with TEHS before proceeding.</i>			
Provider:		Date:	
Contact Name:		Phone Number:	
Initial Evaluation			
Evaluation Item	Yes	No	
The rescue team can arrive in time as required by the hazards of the confined space			
Rescue service is available during the times that confined spaces will be entered			
Rescue teams meet the requirements of the confined space OSHA standard			
Confined space attendant has the communication means to easily contact the rescue team if needed			
If required, rescue team can perform rescue in hazardous atmospheric environments			
If necessary, rescue team can provide vertical entry and elevated rescue services			
Rescue team is trained in medical care and emergency response			
Rescue team has the necessary equipment to perform rescue, or is familiar with the company's equipment and hazards/risks			
Evaluation Performed By:		Date:	
Performance Evaluation			
A performance evaluation should be performed annually if the rescue service passes the initial evaluation.			
Training	Yes	No	
All rescuers are trained on Permit Required Confined Space entry			
All rescuers are trained and proficient on the use of personal protective equipment and rescue equipment			
Rescuers have advanced training in CPR and first aid			
All rescuers have documented at a minimum 24 hrs of rope rescue/retrieval training			
Rescue team can perform atmospheric testing and has documented trained on the equipment used			
Safety	Yes	No	
Rescue team performs safely and efficiently			
Rescue team can focus on personnel safety			
Knowledge	Yes	No	
Rescue team understands confined space permits and can obtain relevant information from them			
Rescue team understands hot work permits and can obtain relevant information from them			
Rescue team understands MSDSs/SDSs and can obtain relevant information from them			
The rescue team is familiar with hazards that may occur outside the space that may put them at risk			
Rescue	Yes	No	
If necessary, the rescue team can provide rescue from small space openings			
If necessary, the team can perform high angle rescue			
The rescue team has a rescue plan for each type of confined space they may enter			
The rescue team can practice their rescue plans in similar spaces			
The rescue team has practiced implementing this confined space rescue plan within the last 12 months with a simulated rescue operation			
Evaluation Performed By:		Date:	

Attachent 6: On-Site Rescue Plan

<u>On-Site Rescue Plan</u>		
Confined Space Name/Location:	Identification #:	Date:
Attendant:	Employer:	
Employer: _____	2) _____	
On-Site Rescue Personnel/Designation:	3) _____	
1) _____	4) _____	
Methods of Communication: Attendant to Rescue Personnel: <input type="checkbox"/> Phone <input type="checkbox"/> Audible Signal <input type="checkbox"/> Radio <input type="checkbox"/> Intercom Attendant to workers: <input type="checkbox"/> Phone <input type="checkbox"/> Radio <input type="checkbox"/> Intercom <input type="checkbox"/> Audible Signal <input type="checkbox"/> Visual Hand Signal <input type="checkbox"/> Rope Signal		
Methods of Rescue: <input type="checkbox"/> External (Retrieval) <input type="checkbox"/> Internal: _____ <input type="checkbox"/> Congested: _____ <input type="checkbox"/> Hauling System Required: _____ <input type="checkbox"/> Patient lowering system required/lowering area: _____ <input type="checkbox"/> Anchor overhead: _____ Anchorage: <input type="checkbox"/> Beam <input type="checkbox"/> Stairwell <input type="checkbox"/> Support Strut <input type="checkbox"/> Support Column <input type="checkbox"/> Other: _____ Pre-Rigging required? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Rescue Equipment Requirements (check <input type="checkbox"/> where applicable below and indicate quantity needed): <input type="checkbox"/> Hauling Systems: _____ <input type="checkbox"/> Carabiners: _____ <input type="checkbox"/> Pulleys: _____ <input type="checkbox"/> Shock absorbers/lanyards: _ <input type="checkbox"/> <input type="checkbox"/> Anchor Straps: _____ <input type="checkbox"/> Webbing: _____ <input type="checkbox"/> Ascenders: _____ <input type="checkbox"/> Body Harnesses: _____ <input type="checkbox"/> Rigging Plates: _____ <input type="checkbox"/> Safety Lines: _____ <input type="checkbox"/> Main Lines: _____ <input type="checkbox"/> Wrist/Ankle Harnesses: _____ <input type="checkbox"/> Fire Extinguishers: _____ <input type="checkbox"/>		
Rescue Equipment Inspections Identified rescue equipment inspected by competent worker: _____ Employer: _____ Record of inspection(s) attached <input type="checkbox"/> Yes		
Medical Equipment Requirements (check <input type="checkbox"/> where applicable below and indicate quantity needed): <input type="checkbox"/> First Aid Kit: _____ <input type="checkbox"/> Packaging Device: _____		
Additional PPE Requirements (Indicate what is needed): <input type="checkbox"/> High Visibility Vests <input type="checkbox"/> Hearing Protection <input type="checkbox"/> Safety Boots <input type="checkbox"/> Hard Hats <input type="checkbox"/> Safety Glasses/Goggles <input type="checkbox"/> Gloves <input type="checkbox"/> Face Shield <input type="checkbox"/> List Other _____		
Description of Space (include location of attendant): 		
Diagram of Space (Use Back of Page if needed): 		
Completed by: _____ <input type="checkbox"/> Entry Supervisor <input type="checkbox"/> Attendant <input type="checkbox"/> Other: _____ Date: _____		

On-Site Rescue Procedures

The attached On-Site Rescue Plan and these Procedures are part of the written plan for the confined space and are based on the assessment of hazards in this space.

Prior to entry and/or work in the confined space:

1. The entry supervisor will ensure that the attached “on-site rescue plan” for the confined space has been completed and that all the rescue equipment identified in the plan is available to affect a rescue in the confined space.
2. The entry supervisor will ensure that an adequate number of appropriately trained persons (as documented in the attached “on-site rescue plan”) are available for immediate implementation of these on-site rescue procedures that apply to the confined space.
3. The entry supervisor will review all emergency procedures, including procedures relating to emergencies outside the confined space with all entrants and other related personnel.
4. The attendant establishes communication with all workers, using the means described in the attached “on-site rescue plan”.

On entry and while working in the confined space:

1. The attendant who is stationed outside and near the entrance to the confined space as described in the attached “on-site rescue plan” remains in constant communication with all workers inside the confined space.
2. The attendant must be notified immediately if an entrant recognizes:
 - unusual action/ behavior
 - an unexpected hazard
 - an unsafe act or
 - detects a condition prohibited by the permit
3. Entrants must exit the confined space as quickly as possible, when:
 - an order to evacuate is given by the attendant or entry supervisor
 - an entrant recognizes a sign or symptom of over-exposure
 - an unacceptable condition arises or
 - an evacuation alarm is activated.

In the event of a confined space rescue:

1. The attendant does not enter the confined space but immediately summons a rescue response from the on-site rescue team, using the means of communication described in the attached “on-site rescue plan”.

Additional Comments:

Attachment 7: Safe Operating Procedures: Opening Manhole Covers with Vent Holes

The following safe operating procedures should be followed for all work crews whenever the manhole cover has a small vent opening in it (which has not been sealed over with concrete or asphalt).

- 1) If the opening is blocked by debris, clear the opening with a non-sparking tool made of non-ferrous beryllium, bronze, or copper based material, wood or plastic to avoid creating an ignition source.
- 2) The flammable gas/vapor concentration inside the space must be tested by connecting a short sampling hose to the monitor and inserting the hose 3 to 4 inches through the opening in the cover.
 - (a) If the LEL reading is 50% or less the cover can be removed.
 - (b) If the LEL reading is greater than 50% **DO NOT** remove the cover. Notify the Permit Issuer of the elevated LEL readings.
- 3) If the LEL readings range between 10% and 50%, the manhole cover must be removed with extreme caution. Only crew members removing the cover are to remain in close proximity to it.
- 4) **Danger:** Entry into a confined space is not permissible unless the confined space atmospheric LEL reading is 10% or less. If natural or mechanical ventilation does not lower an initial reading range between 11% and 50% LEL to 10% or lower within a reasonable time period, entry plans must be terminated.

The Permit Issuer must be notified.

It is important to understand that the potential for the creation of an ignition source will exist whenever a manhole cover is removed, (EVEN WITH A NON-FERROUS TOOL), as it is impossible to eliminate the friction of the cover and its rim during the removal process.