TUFTS UNIVERSITY

Confined Space Program

Approved By: [Signature]
Date: 8/29/2013
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I. Purpose

Tufts University has established this written program in accordance with Occupational Safety and Health Administration (OSHA) requirements as outlined in 29 CFR 1910.146. The program’s primary purpose 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 University employees shall be performed as outlined in this program.

Contractors and their employee(s) who plan to enter a University owned or controlled confined space, are responsible for compliance with all OSHA requirements as outlined in 29 CFR 1910.146 and this written program.

III. Maintenance and Administration

The maintenance and administration of a successful Confined Space Program requires participation from various University groups and departments. Tufts Environmental Health and Safety (TEHS) is the “program administrator” and will assure the program is reviewed on an annual basis or when circumstances dictate otherwise.

Directors or Supervisors of Departments which perform entries and/or who contract with employees not employed by the University are responsible for the on-site administration of the Confined Space Program. Departments that could reasonably be expected to perform confined space entries include but are not limited to DTRR, Telecom and Facilities Services.

IV. Contractors

When a contractor and their employee(s) plan to enter a University owned or controlled confined space, the

A. Tufts University’s representative shall:

1. Advise of permit spaces. Tufts must advise contractors of any permit spaces on the premises that the contractor’s employees may have reason to enter.
2. Compel compliance. Tufts University shall compel compliance by informing contractors that permit spaces can only be entered under the auspices of a written program that meets the requirements of 29 CFR 1910.146(d). Tufts University and the contractor must also agree as to exactly what program will be followed.
3. Request documentation of the contractor’s confined space program and training records for each employee participating in the permit-required confined space entry.
4. Inform of hazards. Tufts University shall inform the contractor of any known hazards and inform of any previous experience with the space that make the space a permit space.

5. Inform of precautions. Tufts University 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 University shall coordinate operations with the contractor when host and contractor employees will be working in or near permit spaces.

7. Conduct debriefing. At the conclusion of the entry, the contractor must debrief Tufts University regarding the permit program and any hazards confronted in the space during entry operations.

B. Contractor’s representative shall: In addition to complying with all of the other requirements governing confined space entry

1. Obtain any available information regarding permit space hazards and entry operations from Tufts University’s representative.

2. Inform the Tufts University’s representative of the provisions of the contractor's written permit program if it is agreed that the contractor's program will be followed rather than Tufts University’s Permit Confined Space Program.

3. Provide documentation of the contractor’s confined space program and training records for each employee participating in the permit-required confined space entry.

4. Coordinate entry operations when Tufts University’s and the contractor's employees will be working in or near permit spaces; and

5. Report hazards confronted or created during the entry to the host, either at the debriefing session or when they occur.

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.

Attached Entry – A confined space entry completed with all entrants continuously attached to an approved fall protection and retrieval system.

Attendant – An employee stationed outside one (1) or more confined spaces who monitors the authorized entrant and who performs all attendant’s duties assigned in the University’s permit-required confined space program further described herein.

Authorized Entrant – An employee who is authorized by the University to enter a permit-required confined space and who performs all authorized entrant’s duties assigned in the University’s permit-required confined space program further described herein.
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.

Contractor – A person or business which provides goods or services to Tufts University 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 Permit – The written or printed document that is provided by Tufts to allow and control entry into a permit-required confined space and contains all of the information specified further herein.

Entry Supervisor – An attendant who remains at the confined space site, (i.e., supervisor, foreman, crew leader, etc.) who has the authority to direct or control other employees. Responsibilities include determining if acceptable entry conditions are present at a permit-required confined space where entry is planned, authorizing entry and overseeing entry operations, and performing all authorized entry supervisor’s duties assigned in Tufts’ permit-required confined space program further described herein.

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 percent or above 23.5 percent;
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.

**Hot Work Permit** – Is the University’s 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.

**Inerting** – Is the displacement of the atmosphere in a permit-required confined space by a non-combustible gas (i.e. nitrogen), to such an extent that the resulting atmosphere is noncombustible. (Note: This procedure produces an IDLH oxygen-deficient atmosphere.)

**Isolation** – The process by which a permit-required confined space is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lock or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

**Line-breaking** – Is the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

**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.

**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 Issuer** – The University designated person who authorizes the confined space entry work but is not necessarily present at the confined space work site.

**Permit-Required Confined Space** – A confined space that has one (1) or more of the flowing 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 University’s overall program for controlling, and where appropriate, for protecting employees from permit space hazards and for regulating employee entry into permit spaces.

**Permit System** – The University’s 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.

**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. Testing includes specifying the tests that are to be performed in the permit-required confined space

**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, walk-in coolers and freezer, attics and crawl spaces.

Each confined space shall be evaluated and classified as either a non-permit required confined space or permit required confined space. Once classified, all permit-required confined spaces shall be prominently posted. The **Inventory of Permit-Required Confined Spaces (Appendix A)** 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 **Non-Permit Required Confined Space** is a space that:

- Does not contain an atmospheric hazards; and
- Does not have the potential to contain any hazard capable of causing death or serious physical harm.

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. The University shall also take effective measures to prevent unauthorized entry into these spaces.

**VI. 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 to determine that a hazard is not present. Contact your supervisor for guidance.

**VII. 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 (Appendix D)* shall be performed.

**Duties and Responsibilities**

**Tufts Environmental Health and Safety (TEHS)** is an in-house resource on safety matters that is available to University personnel. TEHS shall:

- Review the Confined Space Program at least annually, or whenever circumstances dictate.
• Review cancelled entry permits to facilitate potential changes to the program.
• Provide technical guidance to the Entry Supervisor or other personnel regarding permit-required confined space.
• Offer annual confined space training.
• File employee training records for a period of three (3) years.
• Perform routine audits of equipment needed for entry and rescue operations.

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.
• 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 safety entry to the permit space.
• 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 space during entry operations.
• Amend or terminate permits if 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 by the University 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 safety entry to the permit space.
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 safety entry to the permit space.
- Assure unauthorized individuals do not enter the permit space during entry operations.
- Remain outside the permit space during entry operations until relieved by another attendant.
- Maintain an accurate count of authorized entrants in the permit spaces in order to accurately identify who is in the permit 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 space and orders the authorized entrants to evacuate the permit space 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 University’s 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 documents compliance with safe work practices and authorizes entry into permit-required confined space. The University’s Entry Permit (Appendix B) shall be used. The permit identifies the following:

- The name and number of the emergency contact.
- The location and a description of the permit space.
- The purpose of the entry and work to be performed.
- The date, time, and the duration of the entry.
- The name of the Entry Supervisor/Permit Issuer authorizing the confined space work.
- The name(s) of Authorized Entrant(s).
- The name(s) of the Attendants.
- The results of initial and periodic tests performed (i.e., atmospheric testing) accompanied by the name of the tester(s).
- The requirements needed to eliminate or control permit space hazards before entry (this can include the lockout or tagging of equipment, procedures for purging, ventilating, and flushing, and personal protective equipment.
- The communication procedures used by Authorized Entrants and Attendants during the entry.
- Any other comments/remarks pertaining to the permit space or procedures, in order to ensure employee safety (hazards, specialized equipment, additional permits such as a hot work permit, and rescue team members).

The completed Entry 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 Entry Permit have been completed; or
- A condition that is not allowed under the entry permit arises in or near the permit space.

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

Pre-entry Procedures

The following describes the procedures to be adhered to by all University 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.

   Be sure all safety-related equipment is placed in close proximity to the permit 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.

3. Complete a thorough pre-entry evaluation of the 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. If needed, introduce positively-forced, continuous mechanical air ventilation to control any worker-created airborne hazards inside the space, (i.e., painting, drilling).

5. 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.

6. If needed, set up the appropriate fall protection and retrieval system.

7. Coordinate entry operations and rescue procedures to assure Rescue Team members are available.

8. If needed, make arrangements with Tufts Police for crowd control and/or traffic detail.

9. Complete the Entry Permit (Appendix B). The permit must be approved by the Entry Supervisor.

Entry Procedures

The following describes the procedures for all University personnel entering permit-required confined spaces:
1. Notify the Tufts Communication Dispatch Center. 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 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 lifecycle 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 confined space entry.

6. Assure Authorized Entrants must 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 space with extreme caution. All Authorized Entrants must descend into a confined space 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 carried on in confined spaces must be done with extreme caution.
   - A hot-work permit should be obtained.
   - Gas cylinders and welding machines must be sagely secured outside the 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 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 an Entry Permit be changed without approval form the Entry Supervisor.

15. Notify the Tufts Communication Dispatch Center 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

1. Confirm personnel, tools and equipment has been removed from 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 as 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 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 ongoing communication with Tufts Communication Dispatch Center and Tufts Director of Emergency Management.

The in-house Rescue Team consists of trained in-house personnel that can be summoned 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. 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.

VIII. Training

The University shall offer training to University personnel whose work is regulated under this Confined Space Program. The objective of the training is for personnel to
understand, and develop the knowledge and skills necessary to safely perform duties outlined under this program.

**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 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 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 will be offered by TEHS no less than annually. However, it is the responsibility of individual departments to assure that Entry Supervisors, Authorized Entrants and Attendants successfully complete training.

**IX. 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.

**X. 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.
## APPENDIX A

### Permit Required Confined Space Inventory *- Boston

<table>
<thead>
<tr>
<th>Building</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRPH-Arnold</td>
<td>Basement-Two pH Neutralization Tanks</td>
</tr>
<tr>
<td>BRPH-MV</td>
<td>Basement Room 014-One Sewer Ejector Pit</td>
</tr>
<tr>
<td>Chiller Plant</td>
<td>Condenser Water Tank</td>
</tr>
<tr>
<td>HNRC</td>
<td>Basement-Two Pump Tanks</td>
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<tr>
<td>HNRC</td>
<td>Tenth Floor-Boilers 1 &amp; 2</td>
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<tr>
<td>HNRC</td>
<td>Tenth Floor-Boiler 3</td>
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<td>HNRC</td>
<td>Tenth Floor-Two Deaerators</td>
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<tr>
<td>Jaharis</td>
<td>Basement Room 001-Two pH Neutralization Tanks</td>
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<tr>
<td>Jaharis</td>
<td>Basement Room 001-Three Sewer Ejector Pits</td>
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<tr>
<td>Posner</td>
<td>Mechanical Room Crawl Space</td>
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<tr>
<td>Sackler</td>
<td>Basement-Three Sewer Ejector Pits</td>
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</tbody>
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### Permit Required Confined Space Inventory *- Grafton

<table>
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<tr>
<th>Building</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Peabody Bldg #22</td>
<td>Subbasement Tunnel</td>
</tr>
<tr>
<td>All Silos</td>
<td>N/A</td>
</tr>
<tr>
<td>Manure Pit</td>
<td>N/A</td>
</tr>
<tr>
<td>Swine Pit</td>
<td>N/A</td>
</tr>
<tr>
<td>Manholes</td>
<td>Between Administration Bldg 1 and Loew Center Bldg. 2</td>
</tr>
<tr>
<td></td>
<td>Near Central Service Bldg 15 and Route 30</td>
</tr>
<tr>
<td></td>
<td>Between Central Services Bldg 15 and Building #16</td>
</tr>
<tr>
<td></td>
<td>Near Building #17 (Northeast)</td>
</tr>
<tr>
<td></td>
<td>Near Flight Cage Building #38 (North)</td>
</tr>
<tr>
<td></td>
<td>Between Building #21 and #18</td>
</tr>
<tr>
<td></td>
<td>Middle of Building # 19, #20, #21</td>
</tr>
<tr>
<td></td>
<td>South of Route 30 Near Building LAH Bldg 35 and #40</td>
</tr>
<tr>
<td></td>
<td>East of LAH Bldg 35 (West of Willard Rd.)</td>
</tr>
<tr>
<td></td>
<td>South of Alpha Psi Bldg 8</td>
</tr>
<tr>
<td></td>
<td>Front of Building #3</td>
</tr>
<tr>
<td></td>
<td>Front of Building #10</td>
</tr>
</tbody>
</table>
**Permit Required Confined Space Inventory *- Medford/Somerville**

<table>
<thead>
<tr>
<th>Building</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson Hall</td>
<td>Exterior Steam Vault</td>
</tr>
<tr>
<td>Barnum Hall</td>
<td>(3) Underground Steam Tunnel</td>
</tr>
<tr>
<td>Braker Hall</td>
<td>Exterior Steam Vault</td>
</tr>
<tr>
<td>Bunker-Latin Way</td>
<td>Steam Pits</td>
</tr>
<tr>
<td>Cabot Center</td>
<td>Exterior Steam Vault</td>
</tr>
<tr>
<td>Carmichael Hall</td>
<td>Exterior Steam Vault</td>
</tr>
<tr>
<td>Carmichael Hall</td>
<td>Exterior Steam Vault</td>
</tr>
<tr>
<td>Carmichael Hall</td>
<td>Steam Pipe Tunnel-Basement</td>
</tr>
<tr>
<td>Central Heating</td>
<td>Boilers</td>
</tr>
<tr>
<td>Central Heating</td>
<td>Compactors</td>
</tr>
<tr>
<td>Cousins Gym</td>
<td>(2) Boilers</td>
</tr>
<tr>
<td>Eaton Hall</td>
<td>(2) Exterior Steam Vault</td>
</tr>
<tr>
<td>Gifford House</td>
<td>Steam Pipe-Underground</td>
</tr>
<tr>
<td>Goddard Chapel</td>
<td>Exterior Steam Vault</td>
</tr>
<tr>
<td>Jackson Gym</td>
<td>(2) Boilers</td>
</tr>
<tr>
<td>Lewis Hall</td>
<td>Exterior Steam Vault</td>
</tr>
<tr>
<td>Mayer Center</td>
<td>Exterior Steam Area</td>
</tr>
<tr>
<td>Mayer Center</td>
<td>Exterior Steam Vaults</td>
</tr>
<tr>
<td>Miller Hall</td>
<td>Exterior Steam Vaults</td>
</tr>
<tr>
<td>Miner Hall</td>
<td>Exterior Steam Vaults</td>
</tr>
<tr>
<td>Packard Hall</td>
<td>Exterior Steam Vaults</td>
</tr>
<tr>
<td>Pearson Labs</td>
<td>Obsolete Exterior Vault</td>
</tr>
<tr>
<td>Tilton Hall</td>
<td>(2) Boilers</td>
</tr>
<tr>
<td>West Hall</td>
<td>Exterior Steam Vault</td>
</tr>
</tbody>
</table>

* 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.
# Appendix B

## Confined Space Entry Permit

<table>
<thead>
<tr>
<th>1A. Name of Emergency Contact</th>
<th>1B. Telephone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Specific Location of Space</td>
<td></td>
</tr>
<tr>
<td>3. Description of Space</td>
<td></td>
</tr>
<tr>
<td>4. Purpose of Entry</td>
<td></td>
</tr>
<tr>
<td>5. Entry A. Date B. Time</td>
<td></td>
</tr>
<tr>
<td>6. Exit A. Date B. Time</td>
<td></td>
</tr>
<tr>
<td>7A. Name of Supervisor in Charge of Work</td>
<td>7B. Telephone Number</td>
</tr>
<tr>
<td>9. Name of Attendant</td>
<td>10. Name of Confined Space Tester</td>
</tr>
<tr>
<td>11. Welding or Hot Work Required</td>
<td>YES NO</td>
</tr>
<tr>
<td>12. Confined Space Test Data</td>
<td></td>
</tr>
<tr>
<td>A. Substance Tested</td>
<td>B. Permissible Level C. Reading D. Date E. Time</td>
</tr>
<tr>
<td>OXYGEN (%)</td>
<td>&gt;19.5</td>
</tr>
<tr>
<td>% of Lower Explosive Limit</td>
<td>10%</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>36 ppm</td>
</tr>
<tr>
<td>13A. Name of Instrument(s)</td>
<td>13B. Type(s) of Instruments</td>
</tr>
<tr>
<td>13C. Identification Number(s)</td>
<td>13D. When Last Calibrated</td>
</tr>
<tr>
<td>14. Special Requirements (Explain each &quot;No&quot; answer in Item 18)</td>
<td></td>
</tr>
<tr>
<td>YES NO ITEM YES NO ITEM</td>
<td></td>
</tr>
<tr>
<td>A. Lockout - De-Energize (Employee retains key)</td>
<td>I. Fire Extinguisher</td>
</tr>
<tr>
<td>B. Space Purged</td>
<td>J. Lighting</td>
</tr>
<tr>
<td>C. Ventilation</td>
<td>K. Emergency Tripod</td>
</tr>
<tr>
<td>D. Area Secured</td>
<td>L. Protective Clothing</td>
</tr>
<tr>
<td>E. Breathing Apparatus</td>
<td>M. Line Capped or Blanked</td>
</tr>
<tr>
<td>F. Resuscitator/Respirator</td>
<td>N. Respirator</td>
</tr>
<tr>
<td>G. Escape Harness</td>
<td>O.</td>
</tr>
<tr>
<td>H. Lifeline</td>
<td>P.</td>
</tr>
<tr>
<td>15. Other Special Requirements (List each and status)</td>
<td></td>
</tr>
<tr>
<td>16A. Specific Protective Clothing and Equipment Required</td>
<td>10B. Respirator</td>
</tr>
<tr>
<td>17. Communication Procedures During Entry</td>
<td></td>
</tr>
<tr>
<td>18. Additional Comments/Remarks</td>
<td></td>
</tr>
<tr>
<td>19. Reserved for Regional EHS Division/Branch</td>
<td></td>
</tr>
</tbody>
</table>

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

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

Tufts University Environmental Health and Safety (517) 636-3955
CONFINED SPACE ENTRY PERMIT

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.

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item No.</td>
</tr>
<tr>
<td>1:</td>
</tr>
<tr>
<td>2:</td>
</tr>
<tr>
<td>3:</td>
</tr>
<tr>
<td>4:</td>
</tr>
<tr>
<td>5:</td>
</tr>
<tr>
<td>6:</td>
</tr>
<tr>
<td>7A:</td>
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<tr>
<td>7B:</td>
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<td>12:</td>
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<tr>
<td>13A:</td>
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<td>14:</td>
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<td>15:</td>
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<td>18A-18B:</td>
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<tr>
<td>17:</td>
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<tr>
<td>18:</td>
</tr>
<tr>
<td>19:</td>
</tr>
<tr>
<td>20:</td>
</tr>
<tr>
<td>21:</td>
</tr>
</tbody>
</table>
SAFETY GUIDELINES FOR 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.
APPENDIX D

Permit-Required Confined Space Decision Flow Chart

1. Does the workplace contain permit-required confined spaces as defined by §1910.146(b)?
   - NO: Consult other applicable OSHA standards, STOP
   - YES: Inform employees as required by §1910.146(c)(2).

2. Will permit spaces be entered?
   - NO: Prevent employee entry as required by §1910.146(c)(3). Do task from outside of space.
   - YES: Will contractors enter?

3. Will contractors enter?
   - NO: Task will be done by contractors’ employees. Inform contractor as required by §1910.146(c)(9)(i), (ii), and (iii). Contractor obtains information required by §1910.146(c)(9)(i), (ii), and (iii) from host.
   - YES: Will host employees enter to perform entry tasks?

4. Will host employees enter to perform entry tasks?
   - NO: Both contractors and host employees will enter the space?
   - YES: Does space have known or potential hazards?

5. Does space have known or potential hazards?
   - NO: Not a permit-required confined space. §1910.146 does not apply. Consult other OSHA standards, STOP.
   - YES: Can the hazards be eliminated?

6. Can the hazards be eliminated?
   - NO: Can the space be maintained in a condition safe to enter by continuous forced air ventilation only?
   - YES: Prepare for entry via permit procedures.

7. Prepare for entry via permit procedures.
   - NO: Verify acceptable entry conditions (test results recorded, space isolated if needed, rescuers’ means to summon available, entrants properly equipped, etc.).
   - YES: Permit issued by authorizing signature. Acceptable entry conditions maintained throughout entry.

8. Permit issued by authorizing signature. Acceptable entry conditions maintained throughout entry.
   - NO: Entry tasks completed. Permit returned and canceled.
   - YES: Audit permit program and permit based on evaluation of entry by entrants, attendants, testers and preparers, etc.