Subject: Confined Spaces

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Issuing Authority: Jeffrey Hescock, Executive Director of Environmental Health and Safety and Emergency Management

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Table of Contents

1.0 PURPOSE and APPLICABILITY

1.1 The purpose of these guidelines is to establish the procedures used by UMass personnel and contractors for entry into confined spaces. This document provides the written Confined Space Program as required in 29 CFR §1910.146 (General Industry) and 29 CFR §1926.1200 (Construction Industry) of the Occupational Safety and Health Administration (OSHA) Regulations. This program is intended to protect the health and safety of all UMass employees, contractors, subcontractors, and guests. These guidelines in no way replace the need for contractors to have their own written program or their responsibility to comply with OSHA regulations.

1.2 The UMass Confined Space Entry Program applies to all UMass employees at all locations, including offices, travel, and outside office, or field work.

2.0 DEFINITIONS

2.1 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.

2.2 Attendant- An individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program.

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

2.4 Blanking or blinding- The absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that can withstand the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

2.5 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.

2.6 Confined space- A space that meets all of the following:

2.6.1 Is large enough and so configured that an employee can bodily enter and perform assigned work; and

2.6.2 Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and

2.6.3 Is not designed for continuous employee occupancy.

2.7 Double block and bleed- The closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves

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

2.9 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.

2.10 Entry- The action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

2.11 Entry permit (permit) - The written or printed document that is provided by the employer to allow and control entry into a permit space.

2.12 Entry supervisor- The person (such as the employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section.

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

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

2.13.1 Flammable gas, vapor, or mist more than 10 percent of its lower flammable limit (LFL);

2.13.2 Airborne combustible dust at a concentration that meets or exceeds its LFL;

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

2.13.3 Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;

2.13.4 Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published by OSHA and which could result in employee exposure in excess of its dose or permissible exposure limit;

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

2.13.5 Any other atmospheric condition that is immediately dangerous to life or health.

2.13.5.1 For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as Safety Data Sheets, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

2.14 Host employer- The employer who owns or manages the property where the construction or work is taking place.

2.15 Hot work permit- The employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

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

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

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

2.17.1 This procedure produces an IDLH oxygen-deficient atmosphere.

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

2.19 Line breaking- 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.

2.20 Lower explosive limit (LEL) or lower flammable limit (LFL)- The lowest concentration (percentage) of a gas or a vapor in air capable of producing a flash of fire in presence of an ignition source (arc, flame, heat).

2.21 Non-permit confined space- A confined space that meets the definition of a confined space but does not meet the requirements for a permit-required confined space, as defined in 2.24.

2.22 Oxygen deficient atmosphere- An atmosphere containing less than 19.5 percent oxygen by volume.

2.23 Oxygen enriched atmosphere- An atmosphere containing more than 23.5 percent oxygen by volume.

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

2.24.1 Contains or has a potential to contain a hazardous atmosphere;
2.24.2 Contains a material that has the potential for engulfing an entrant;
2.24.3 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
2.24.4 Contains any other recognized serious safety or health hazard.

2.25 Permit-required confined space program (permit space program)- The employer's overall program for controlling, and, where appropriate, for protecting employees from, permit space hazards and for regulating employee entry into permit spaces.

2.26 Permit system- The employer's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

2.27 Qualified person- A person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems relating to the subject matter, the work, or the project.

2.28 Prohibited condition- Any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

2.29 Rescue service- The personnel designated to rescue employees from permit spaces.

2.30 Retrieval system- The equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

2.31 Serious Safety Hazard- Hazards in a confined space which are immediately dangerous to life or health or would impair the entrant’s ability to perform a self-rescue.

2.32 Testing- The process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

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

3.0 ROLES and RESPONSIBILITIES

3.1 The University of Massachusetts Amherst (UMass Amherst)

3.1.1 Provide resources to implement the UMass Confined Space Entry Program to ensure a safe work environment for all UMass employees and to meet applicable client expectations and government regulations/standards.

3.2 Environmental Health, and Safety

3.2.1 Maintain, review, and update (as needed) the Confined Space Entry Program at least annually, and whenever necessary to include new or modified job classifications, tasks, hazards, and procedures.

3.2.2 Make the written Confined Space Entry Program available to all employees.

3.2.3 Coordinate training and documentation of training to ensure employees understand the Confined Space Entry Program.

3.2.4 If a Project Manager requests to have an employee enter a confined space under a client, contractor, or sub-contractor's confined space entry program, review the contractor's program and provide approval (or denial) prior to entry.

3.3 UMass Employees

3.3.1 Employees required to enter confined spaces or serve in any other function related to confined space entry, must comply with the procedures and work practices outlined in this Program.

3.4 Department Managers/Supervisors

3.4.1 Identify and assess the confined space hazards in each project for which you are managing. If you are not trained or comfortable with conducting a confined space assessment or confined space entry, contact the UMass EHS Department prior to the start of work.

3.4.2 Ensure the UMass employees have the necessary procedures, PPE, training, and rescue plan to safely enter confined spaces.

3.4.3 Monitor your employee's conformance to assigned Confined Space Entry Program training. Enforce conformance as necessary.

4.0 PROCEDURE

4.1 Confined Space Survey/Hazard Evaluation

4.1.1 Before a planned entry into a space which may be considered a confined space, the space must be evaluated by a qualified person to identify the hazards and protective measures to be employed to comply with this Confined Space Entry program.

4.1.1.1 A flowchart to assist in the assessment and classification of confined spaces can be found in Appendix B of this program.

4.1.1.2 Obtain and fully complete a Confined Space Entry – Hazard Survey Form (Appendix C) prior to entry. This form has been created to assist in the hazard assessment and classification process for entry.

4.1.2 Any hazards identified in the Survey must be addressed before entry into the confined space. Hazards shall be addressed using the hierarchy of controls:

4.1.2.1 Elimination – Hazard is removed before entry (e.g. double block and bleed a steam line)

4.1.2.2 Substitution – Replace source of hazard with something non-hazardous or less hazardous (e.g. replace an organic solvent with a water-based solution)

4.1.2.3 Engineering controls – Mitigate the hazard by making a physical change to the work environment (e.g. using ventilation to provide fresh air to confined space)

4.1.2.4 Administrative controls – Training, procedure or policy to protect the employee from hazard (e.g. limiting time spent in a hot space to prevent heat stress)

4.1.2.5 Personal Protective Equipment – Protective gear worn by an employee to protect from hazard (e.g. safety glasses, hard hat, respirators)

4.1.3 Rescue planning must be assessed before entry is made into any PRCS.

4.1.3.1 Self-rescue, the process of an entrant removing themselves from a hazardous situation, shall be prioritized as the first means of rescue.

4.1.3.2 Non-entry rescue (e.g. attendant uses tripod to remove victim) shall be utilized if self-rescue is not feasible.

4.1.3.3 When self-rescue or non-entry rescue is not feasible, the department supervisor is responsible for coordinating a rescue service capable of

performing the needed rescue service within a timeframe appropriate for the hazard within the PRCS.

4.1.4 Confined Spaces may be entered under one of the following procedures, as detailed in the Confined Space Entry – Hazard Survey Form (Appendix C):

4.1.4.1 Space not meeting the definition of a permit required confined space (non-permit confined space)

4.1.4.2 Permit Required Confined Space reclassified as a non-Permit Required Confined Space **(NPRCS)**

4.1.4.3 Confined Space entered under the Alternate Entry Procedure (See Appendix D for additional details and specific procedures)

4.1.4.4 Permit Required Confined Space (See Appendix E for additional details and specific procedures)

4.1.5 Hazard re-evalutaions are required to be performed when downgrading a permit required confined space to a non-permit required confined space due to elimination of hazards. A hazard re-evaluation must also be performed for a non-permit required confined space if work being performed in the space introduces a potential hazard. This evaluation must be documented using the Hazard Evaluation form (Appendix C).

4.1.5.1 When the need for such re-evaluation is determined, a qualified person shall conduct the hazard evaluation and hazard identification process.

4.1.5.2 When evaluating or re-evaluating a confined space atmosphere, the following shall be incorporated:

4.1.5.2.1 All sources of ignition shall be kept to a minimum of twenty-five (25) feet away from the opening, until the space has been tested and found to be free of explosive/flammable gases.

4.1.5.2.2 Any manufacturer's recommendations regarding pre-testing and calibration of air monitors to be used shall be followed.

4.1.5.2.3 Testing shall be done at the opening or cover first, prior to opening, if possible. If no dangerous condition is identified or detected, the cover or door can be partially opened. (Use caution to avoid sparks).

4.1.5.2.4 Testing/continuous evaluation shall be performed, first just inside the opening and then into other areas of the confined space, unless a dangerous condition has been identified.

4.1.5.2.5 Test or monitor the permit space as necessary to determine if acceptable entry conditions are being maintained during entry operations.

4.1.5.2.6 If any confined space is vacated for any period, the atmosphere of the confined space should be re-evaluated before entry is again permitted.

4.1.5.2.7 If isolation of the space is infeasible because the space is large or is part of a continuous system (such as a sewer), pre-entry testing shall be performed to the extent feasible before entry is authorized. If entry is authorized, entry conditions shall be continuously monitored in the area where authorized entrants are working.

4.2 Identification/Recognition

4.2.1 During work activities performed by UMass employees, confined spaces may be encountered and required to be entered. All UMass campus locations that are **permit required confined spaces (PRCS)** shall be identified as specifically as possible. Including area or room, the building, and its specific address. Entry into these spaces (including, but not limited to placing of head or face into the opening of a confined space) shall be subject to the provisions of this program.

4.2.2 Signage shall be posted near each PRCS. The sign shall have, at a minimum, the information included in the sign in Appendix F

4.2.2.1 (PRCS that cannot be labeled, because of adverse area or weather conditions shall be identified in these guidelines.)

4.2.3 The following locations on University property shall be considered Permit Required Confined Spaces

4.2.3.1 Sewers shall be considered **PRCS**:

4.2.3.1.1 They cannot be completely isolated.

4.2.3.1.2 Because the atmosphere can suddenly change without adequate warning, placing all entrants in danger.

4.2.3.2 Electrical Pits shall be considered **PRCS** *unless* all internal hazards can be eliminated before entry.

4.2.3.3 Steam Pits shall be considered **PRCS** *unless* all internal hazards can be eliminated before entry.

4.2.3.4 Elevator overhead and limited access pits

4.2.3.5 Sump pump pits

4.2.3.6 The 10 pits in Lederle Graduate Research Center (High and Low-rise)

4.2.3.7 Campus Center Garage exhaust fans

4.2.3.8 Underground water stream from Visitor's Center to Lot 25 by Mullins

4.2.3.9 Conte Polymer Penthouse HVAC and sump pump pits

4.2.3.10 Tanks that personnel can enter for cleaning and maintenance

4.2.3.11 Any space meeting the definition of confined space that has not yet been evaluated for hazards by a competent person.

4.2.4 If entrance into an identified **PRCS** will never be necessary, access to the space will be prohibited. Appropriate warning signage shall be posted or some other means to prevent access shall be provided.

4.3 NOTIFICATION OF ENTRY

4.3.1 Prior to entry of a **PRCS**, the attendant or entrant shall notify his/her central office of the planned entry.

4.3.2 Notification to the central office can be accomplished via two-way radio or cellular phone.

4.3.3 Notification to the central office shall include exact location of the space, name of the caller, and estimated duration of entry.

4.3.4 Upon completion of the work, the attendant or entrant shall notify the central office of completion of the work in the confined space.

4.3.5 A copy of the actual permits must then be sent to the appropriate departments for recordkeeping purposes and annual review of the Confined Spaced Program.

4.3.6 In cases involving joint entry to a PRCS between a contractor and UMass Amherst employees, University employees must complete a University Confined Space Permit and use a University owned and maintained gas meter. The contractor and University employee may utilize a common tripod and ladder provided they are in working order.

4.4 ENTRY PROCEDURE

4.4.1 Prior to entry into a PRCS the following must be in place;

4.4.1.1 Clear communication of responsibilities (Entrant, Attendant, Entry Supervisor)

4.4.1.2 Hazard Survey (Appendix C) - Conducted by qualified person

4.4.1.3 Filled Confined Space Entry Permit (Appendix A) - Completed by qualified person

4.4.1.4 All identified hazards have been addressed

4.4.1.5 Atmospheric testing and monitoring equipment with acceptable readings

4.4.1.6 Communication equipment

4.4.1.7 Barriers to protect from unauthorized or accidental entry

4.4.1.8 Rescue and emergency equipment

4.4.1.9 Ventilation equipment if necessary

4.4.1.10 Lighting

4.4.1.11 Appropriate personal protective equipment

4.4.2 The Entry Supervisor shall:

4.4.2.1 Ensure that the necessary equipment has been made available and is on site before work has begun;

4.4.2.2 Ensure that each confined space to be entered shall have been properly asses by a qualified person before entry is permitted. If the qualified person finds the confined space unacceptable, the Entry Supervisor shall make sure that no one enters the confined space until corrective measures have been made, and the qualified person has then permitted entry;

4.4.2.3 Ensure that the attendants and entrants have monitoring equipment in the confined space at all times when necessary, and that the attendants and entrants know what to do in case of alarm(s);

4.4.2.4 Ensure that the appropriate two-way communication equipment is made available to the attendant/entrants, the attendant is equipped with communication equipment in case of emergency, and the appropriate central office is notified of entry;

4.4.2.5 Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

4.4.2.6 Verify that the appropriate permit entries have been conducted and that all procedures and equipment specified by the permit 0allowing entry to begin;

4.4.2.7 Select the appropriate retrieval system and ensure entrant/attendant know proper use of same;

4.4.2.8 Verify that rescue services are available and that the means of summoning them are operable;

4.4.2.9 Determine, whenever responsibility for a permit space entry operation is transferred, that entry operations remain consistent

with terms of the entry permit and that acceptable entry conditions are maintained.

4.4.3 The Authorized Entrant shall:

4.4.3.1 Know the hazards that may be faced during entry, including information on the mode, signs, and symptoms, and consequences of exposure to the hazards;

4.4.3.2 Know how to use the equipment properly;

4.4.3.3 Communicate with the attendant as necessary to enable the attendant to monitor the entrant(s)' status, and enable the attendant to alert entrant(s) of the need to evacuate the space;

4.4.3.4 Alert the attendant whenever:

4.4.3.4.1 The entrant recognized any warning sign or symptom of exposure to a dangerous situation;

4.4.3.4.2 Detects a hazardous atmosphere or condition;

4.4.3.5 Exit the permit space as quickly as possible whenever:

4.4.3.5.1 The order is given by the attendant or entry supervisor;

4.4.3.5.2 The entrant detects a hazardous atmosphere or condition;

4.4.3.5.3 An evacuation alarm is activated

4.4.3.6 Make sure that the qualified person has evaluated/inspected the confined space, and that it was determined safe for entry;

4.4.3.7 Make sure, before entry, that all potential hazards have been identified and that serious hazards have been isolated;

4.4.3.8 Wear appropriate PPE;

4.4.3.9 Don retrieval system harness if appropriate.

4.4.4 The Authorized Attendant shall:

4.4.4.1 Know the hazards that may be faced during entry, including information on the mode, signs and symptoms, and consequences of the exposure;

4.4.4.2 Be aware of the possible behavior effects of hazard exposure in authorized entrants;

4.4.4.3 Assist the entrants entering the space, but **shall not, at any point, enter the confined space**;

4.4.4.4 Remain outside the permit's space during entry operation until relieved by another authorized attendant;

4.4.4.5 Continuously maintain an accurate count of authorized entrants in the permit space and ensure that the permit accurately identifies who is in the permit space.

4.4.4.6 Communicate with the authorized entrant(s) as necessary to monitor entrant status and to alert entrant(s) of the need to evacuate the space;

4.4.4.7 Verify that the means to summon rescue services is operable;

4.4.4.8 Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and order the authorized entrants to evacuate the permit space immediately under the following conditions;

4.4.4.8.1 If the attendant detects a prohibited condition;

4.4.4.8.2 If the attendant detect the behavioral effects of hazard exposure in an authorized entrant;

4.4.4.8.3 If the attendant detects a situation outside the space that could endanger the authorized entrant; and

4.4.4.8.4 If the attendant cannot effectively and safely perform all their duties.

4.4.4.9 Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from the space;

4.4.4.10 Takes the following actions when unauthorized persons approach or enter a permit space while entry is under way:

4.4.4.10.1 Warn the unauthorized persons that they must stay away from the permit space;

4.4.4.10.2 Advise the unauthorized persons that they must exit immediately if they have entered the permit space; and,

4.4.4.10.3 Inform the authorized entrants.

4.5 ATMOSPHERIC LIMITS

4.5.1 Atmospheric levels shall be evaluated before entry and continuously during entry into a PRCS with a calibrated instrument capable of detecting Oxygen, Carbon Monoxide, Lower Explosive Limit, and Hydrogen Sulfide at a minimum. If any other atmospheric hazards will be present it shall be monitored to ensure it is below the recognized exposure limit.

4.5.2 Acceptable atmospheric limits

4.5.2.1 Oxygen – between 19.5% - 23.5%

4.5.2.2 Lower Explosive Limit – 10% of the Lower Explosive Limit

4.5.2.3 Carbon Monoxide – less than 35 ppm

4.5.2.4 Hydrogen Sulfide – Less than 10 ppm

4.5.2.5 Other Toxicity – Less than the recognized exposure limit

4.5.2.6 Airborne Combustible Dusts – airborne combustible dust greater than 10% of its Lower Explosive Limit (may be approximated as a condition in which vision is obscured at 5 feet or less).

4.5.3 Unsafe Atmospheric/Unacceptable Limits

4.5.3.1 No employee/contractor shall enter any confined space in which a hazardous atmosphere has been detected. Whenever testing of the atmosphere indicates that levels of oxygen, flammability, or toxicity are not within acceptable limits, entry shall be prohibited until the cause has been identified and corrective measures taken.

4.5.4 If, during entry, a hazardous atmosphere is detected:

4.5.4.1 All employees shall leave the confined space immediately;

4.5.4.2 Then notify Environmental Health & Safety of the incident;

4.5.4.3 The space shall be evaluated by a qualified person to determine how the hazardous atmosphere developed. All necessary steps, including corrective action, continuous forced ventilation and atmospheric monitoring shall be taken to protect employees prior to re-entry.

4.6 EMERGENCY RESPONSE

4.6.1 Important: A confined space attendant shall not enter the confined space for rescue, unless he/she is qualified for such rescue, a qualified attendant is present to take their place, and all conditions are safe to do so.

4.6.2 As soon as the attendant determines that the entrants may need assistance to escape from the permit space hazards, the attendant shall do the following in the order given:

4.6.2.1 Immediately summon University of Massachusetts Police Department by calling the central office via radio, or by calling Emergency Services at (413) 545-3111 or 911 by cell phone. Identify the site as accurately as possible.

4.6.2.2 If possible, attempt a <u>non-entry</u> rescue while rescue/emergency services are en route.

4.6.2.2.1 Using lifeline/mechanical retrieval device(s), extricate the entrant(s) using care to prevent injury or entanglement of the entrants or lifeline within the space.

4.6.2.2.2 If extrication is successful, begin first aid (if trained) as required until relieved by First Responders.

4.6.2.3 Upon their arrival, inform First Responders of any known hazards within the space and make available any Safety Data Sheets pertinent to the rescue.

4.7 ALTERNATE ENTRY PROCEDURE

4.7.1 If the only hazard in a confined space is an actual or potential hazardous atmosphere that can be eliminated by continuous forced air ventilation, the space may be entered utilizing an Alternate Entry Certification procedure, detailed in Appendix D. This procedure complies with the Alternate Entry standards contained in OSHA's General Industry (29 CFR Part 1910) and Construction (29 CFR Part 1926) regulations.

4.7.2 Prior to entry under the Alternate Entry procedure, a new, Alternate Entry Certification Form (Appendix E) must be obtained and completed in its entirety to ensure the safety of all Entrants. Previously-issued forms may not be "re-activated".

5.0 TRAINING

5.1 All employees whose work is regulated by this program, shall receive training:

5.1.1 Before the assignment to the first duties affected by this program

5.1.2 Before there is a change in assigned duties

5.1.3 Whenever this is a change in permit space operations that presents a new hazard

5.1.4 Whenever this is reason to believe that there are deviations from the proper procedures or there are inadequacies in the employee's knowledge of the procedures

5.1.5 When an employee indicates a need for refresher training to improve their understanding of the appropriate means to meet the standards of this program

5.1.6 Training shall be documented, including the following:

5.1.6.1 Employee's name

5.1.6.2 Signature of trainers

5.1.6.3 The dates of the training

5.1.7 Authorized Entrant, Attendants, and Entry Supervisors shall be trained in accordance with the requirements set forth in 29 CFR 1910.146 (General Industry) and 29 CFR 1926.1203 (Construction Industry).

6.0 RECORDKEEPING

6.1 The following records related to this Confined Space Entry program are retained on the UMass EHS website, allowing access to all UMass employees:

6.1.1 A current copy of this Confined Space Entry program and associated Appendices

6.2 The EHS Director maintains the following records:

6.2.1 The Confined Space Entry program training records, maintained for a minimum of five years.

6.2.2 Copies of all expired Classification forms (Appendix C), Alternate Entry Certifications (Appendix E) and Confined Space Entry Permits (Appendix E), maintained for a minimum of 1 year.

7.0 REFERENCES

7.1 29 CFR 1910.146 (General Industry)

7.2 29 CFR 1926.1203 (Construction Industry)

7.3 UMass Amherst Personal Protective Equipment Policy

8.0 APPENDICEES

A. Appendix A – Permit Required Confined Space Permit
B. Appendix B – Confined Space Classification Flowchart
C. Appendix C – Confined Space Entry – Hazard Survey Form
D. Appendix D – Alternate Entry Procedure
E. Appendix E – Alternate Entry Form
F. Appendix F – Permit Required Confined Space Sign Example

Appendix A – Permit Required Confined Space Permit

UMassAmherst

Confined Space Entry Permit

Location and Description of Confined Space:		Permit No. Confined Space #
Purpose of Entry		Date/Time of Issuance**
Department	Work Order No.	Date/Time Completion

1. Supervisor/Project Manager 2. Qualified Person/Confined Space Monitor	Attendant(s)	Authorized Entrants/Occupants
1.	1.	1.
2.	2.	2.

Special Precautions	YES	NO	Special Precautions	YES	NO
Lockout/Tagout Completed			Full Body Harness		
Lines Broken/Capped or Blanked			Tripod Emergency Escape Unit		
Portable Radio/Cellular Phone			Safety Line		
Ventilation (explosion proof when required)			Fire Extinguishers (4-A:60-BC or greater)		
Secure Area w/cones, barricades and/or staff			Lighting (explosion proof when required)		
Appropriate Personal Protective Equipment			Hot Works Permit (remove combustibles/sparks)		
Notification to a Central Office			Ground Fault Circuit Interrupters		

Tests Required Prior/During (Valid for duration of Task)	Initial Test Time:	Test #1 Time:	Test #2 Time:	Test #3 Time:	Entry prohibited if any of the following conditions exist
% Oxygen					O2 = <19.5% or >23.5%
% of Lower Explosive Limit					LEL= >10%
Carbon Monoxide					H_2S = >10ppm
Hydrogen Sulfide					CO = >35ppm
Other Tests:					

UNUSUAL CONDITIONS	ADDITIONAL PRECAUTIONS

Monitoring Equipment Used: (Name/Model) Calibration Current Y / N

Any questions contact Physical Plant Safety Office (5-4192) OR EH&S (5-2682)

PERMIT SHALL BE POSTED AT JOB SITE UNTIL JOB IS COMPLETE

***Permit (with adequate monitoring and hazard evaluation) valid for up to one (1) working shift.*

In case of FIRE or MEDICAL EMERGENCY:

Radio your central office or call UMPD: 413-545-3111

****Note*** Cell phone calls to 911 are answered by the State Police Dispatch Center ***Note****

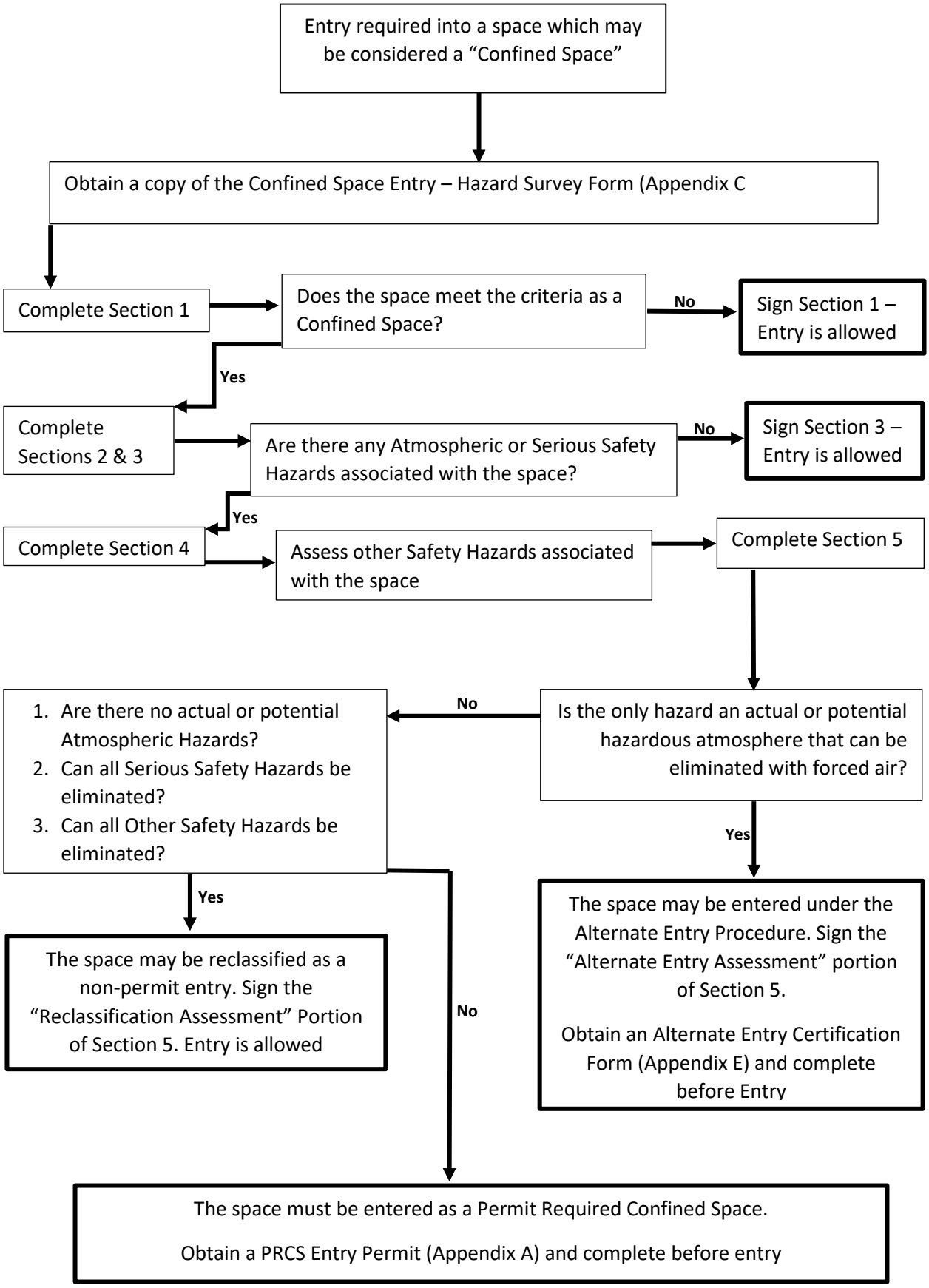
Signature Supervisor/Project Manager

Signature of Entrant/Occupant

Provide copy of permit to EHS after cancellation

Revised 12/17/2017

Appendix B – Confined Space Classification Flowchart



Appendix C – Hazard Survey Form

CONFINED SPACE ENTRY – Hazard Survey Form

SECTION 1: Confined Space Determination

Location/Description of Space:	

If needing to enter an enclosed space, indicate which of the following apply:	**Yes**	**No**
1. Is the space large enough and so configured that you can bodily enter and perform work?		
2. Does the space have limited or restricted means for entry or exit? (Would it be difficult to exit the space through a standard door, ramp, or OSHA-compliant stairs?)		
3. Is the space intended for continuous employee occupancy? (Is the space equipped with HVAC, desk, phone, lighting, or other typical comforts of continuous occupancy)		

If you have checked ANY of the highlighted boxes, you DO NOT have a confined space. Sign below, stop completing this form, and you may enter without a permit. Otherwise, you have a Confined Space. Sign below and continue completing this form.

Does this space meet the definition of a Confined Space?	*Circle One:*	*Yes / No*
Signature of person completing form:	*Date:*	
	Time:	

SECTION 2: Assessment of Atmospheric Hazards

Atmospheric Hazard	**Actual or Potential Hazard?**		**Can it be Eliminated?**		**Means to Eliminate Atmospheric Hazard**
	Y	**N**	**Y**	**N**	
Oxygen Deficiency					
Flammable Gas or Vapor					
H_2S (Hydrogen sulfide)					
CO (Carbon Monoxide)					
Other Toxic Gas (Specify below):					

SECTION 3: Assessment of Serious Safety Hazards

Hazards which are immediately dangerous to life or health or would impair your ability to perform a self-rescue

Serious Safety Hazards	**Actual or Potential Hazard?**		**Serious Safety Hazards**	**Actual or Potential Hazard?**	
	Y	**N**		**Y**	**N**
Engulfment hazard			Other Serious Safety Hazard		
Trapping Hazard			Moving Parts or Agitator		
Converging walls			Steam or extreme heat		
Tapered floor			Shock or Electrocution		
Sloping floor			Other (Specify):		

If you have ONLY checked shaded boxes in Section 2 and Section 3, you do not have a permit required confined space. Sign below, stop completing this form, and you may enter without a permit. Otherwise, sign below and continue completing this form.

NOTE: *If actions are required to eliminate an actual or potential atmospheric hazard, this must still be considered an actual or potential Atmospheric Hazard.*

Does this space meet the criteria for a non-Permit Confined Space?	*Circle One:*	*Yes / No*
Signature of person completing form:	*Date:*	
	Time:	

CONFINED SPACE ENTRY – Hazard Survey Form

SECTION 4: Assessment of Other Safety Hazards

Other Safety Hazards	Actual or Potential Hazard?		Can it be Eliminated?		Means to Eliminate Safety Hazard
	Y	N	Y	N	
Eye / Skin Hazard					
Mechanical Hazard					
Heat Stress					
Hot surfaces					
Space configuration					
Difficult Egress / Access					
Slippery Surfaces					
Elevated work (Falls)					
Other (Specify):					

SECTION 5: Entry Classification

Reclassification Assessment	Yes	No
1. Is there an actual or potential atmospheric hazard (Section 2) – Even if controlled?		
2. Can all Serious Safety Hazards (Section 3) be eliminated without entry?		
3. Can all Other Safety Hazards (Section 4) be eliminated without entry?		

If you have checked ONLY shaded boxes, you can reclassify the space as a non-permit required confined space. Sign below, stop completing this form, and you may enter without a permit. Otherwise, sign below and continue completing this form.

Can this space be reclassified to a non-Permit Confined Space?		*Circle One:*	*Yes / No*
Signature of person completing form:		*Date:*	
		Time:	

Alternate Entry Assessment	Yes	No
1. Is there an actual or potential atmospheric hazard (Section 2)?		
2. Can the actual or potential atmospheric hazard be eliminated with forced air?		
3. Is there any Serious Safety Hazard (Section 3) – Which cannot be eliminated?		
4. Is there any Other Safety Hazards (Section 4) – Which cannot be eliminated?		

If you have checked ONLY shaded boxes, the space may be entered under an "Alternate Entry Permit" Procedure. Sign below and complete an Alternate Entry Permit (Appendix E of the Confined Space Entry program).

Otherwise, the space must be entered as a Permit Required Confined Space. Sign below and complete a Confined Space Entry Permit (Appendix E of the UMass Confined Space Entry program).

Can this space be entered under the Alternate Procedure?		*Circle One:*	*Yes / No*
Signature of person completing form:		*Date:*	
		Time:	

Once completed, submit this form to EHS

Appendix D – Alternate Entry Procedure

ALTERNATE ENTRY PROCEDURE

If the only hazard in a confined space is an actual or potential hazardous atmosphere that can be eliminated by continuous forced air ventilation, the space may be entered utilizing an Alternate Entry Certification procedure. This procedure complies with the Alternate Entry standards contained in OSHA's General Industry (29 CFR Part 1910) and Construction (29 CFR Part 1926) regulations.

Prior to entry under the Alternate Entry procedure, a new, Alternate Entry Certification form (Appendix E) must be obtained and completed fully to ensure the safety of all Entrants. Previously-issued forms may not be "re-activated".

The procedure for completing an Alternate Entry Certification form is provided below.

PROCEDURE

Each section of the Alternate Entry Certification form must be fully completed prior to entering the confined space.

The following Alternate Entry Certification procedure must be followed:

I. Confined Space – Alternate Entry Certification – Section 1:

A. Complete section 1 of the certification to identify details of the confined space and entry team.

B. The following persons involved in the confined space entry must be aware of the confined space hazards as well as their assigned duties and responsibilities during entry: Authorized Entrants, Authorized Attendants, and Entry Supervisors.

II. Confined Space – Alternate Entry Certification – Section 2:

A. Prior to entry, obtain a blank Confined Space Entry – Hazard Survey form (Appendix C).

1. Using the form in Appendix C, evaluate and assess the confined space and identify the actual and potential hazards.

2. Document the actual and potential hazards on the Confined Space Entry – Hazard Survey form.

3. The Hazard Survey form provides the basis for using the Alternate Entry procedure. Retain a copy of the Classification form as part of the Alternate Entry Certification.

III. Confined Space – Alternate Entry Certification – Section 3:

A. Prior to entry, fully complete Section 4 of the Alternate Entry Certification to document initial (pre-entry) and all follow-up atmospheric testing results.

B. Initial and follow-up atmospheric testing must demonstrate that atmospheric conditions are all within the acceptable levels indicated on the form.

C. The atmosphere shall comply with the following parameters prior to and throughout the entry.

NOTE: The testing shall be performed in the order shown on the form.

NOTE: If air quality is unacceptable, do not enter or remain in the space; stop work immediately and exit the space. Do not re-enter until air quality meets acceptance criteria.

1. Oxygen: Meter reading must be at least 19.5% and not more than 23.5% by volume.
2. Flammability / Explosivity: Combustible gas meter reading must be less than 10% of the Lower Explosive Limit (LEL).

   NOTE: Always test oxygen content prior to testing LEL levels. Combustible gas meters will only work in oxygen-containing atmospheres.

3. Toxic Substances: Levels of any other identified toxic substance must be at or below the OSHA permissible exposure levels (PEL) or appropriate safe standards.

IV. Confined Space – Alternate Entry Certification – Section 4:

A. Continuous ventilation shall be established and eliminate any hazard before entry.

B. Forced air ventilation shall continue until all employees have left the space.

C. Ensure that fresh air intake is in an area that is free of air contaminants (i.e., vehicle exhaust). The atmosphere within the space shall be periodically tested to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere.

D. OSHA does not specify a minimum number of air exchanges for confined spaces. For cleaner environments, minimum air exchanges noted below may be acceptable. For more hazardous atmospheres, more conservative air exchanges should be completed.

E. Common rule of thumb air exchange standards:

1. Prior to entry: Complete 5 air exchanges.
2. During entry: Complete 20 air exchanges per hour or one air exchange every 3 minutes.

V. Confined Space – Alternate Entry Certification – Section 5:

A. When all other sections of the form have been completed, the Entry Supervisor must sign the form to certify that there are no hazards present in the confined space and that any pre-existing hazards have been eliminated.

B. The Entry Supervisor is responsible for reviewing the Confined Space Entry – Hazard Survey form and the Alternate Entry Certification to verify all hazards have been identified, documented and controlled.

a. If the Entry Supervisor is satisfied with the preparations for entry, the Entry Supervisor may sign the certification, authorizing the entry.

b. If, in the opinion of the Entry Supervisor, hazards have not been adequately addressed, or the space is not fully prepared for entry, the Entry Supervisor will not sign the permit and will not authorize entry.

Appendix E – Alternate Entry Permit

CONFINED SPACE – Alternate Entry Certification

SECTION 1: Confined Space and Entry Team Information

Issue Date:		Planned Entry Duration:	
Location:			
Description of Space:			
Purpose of Entry:			
Special Work Activities (e.g. Hot Work, Painting)			
Authorized Entrants:			
Authorized Attendants:			

SECTION 2: Actual and Potential Hazards

Prior to entry, actual and potential hazards must be evaluated and documented. The form used to document hazards is Appendix C of the UMass Confined Space Entry program. Prior to entry under the Alternate Entry process, Appendix C must be completed and attached to this Certification form.

SECTION 3: Atmospheric Testing

Hazard	Acceptable Level	Pre-Ventilation	Results with Ventilation		
		Time:	Time:	Time:	Time:
		Initials:	Initials:	Initials:	Initials:
Oxygen	≥19.5% & ≤23.5%				
LFL	≥ 10%				
H_2S	≥ 10 ppm				
CO	≥ 25 ppm				

Planned work activity which may introduce an atmospheric hazard (Specify below):

Toxic Gas which may be introduced by work activity (Specify): _____

Acceptable PPM					

Section 4: Ventilation System

1. The volume of the confined space being entered (1 Gal = 7.48 cubic feet):		Cubic Feet
2. The capacity of the blower being used (in cubic feet per minute):		CFM

Pre-Entry Minutes = (5 X Space Volume / Blower CFM)	*During Entry: (Space Volume / 3) Must be ≤ Blower CFM*

3. Describe the configuration of the ventilation system (push / pull, duct hose length, etc.)

Section 5: Certification

1. Any potential atmospheric hazards can be controlled through ventilation:	
2. There are no serious, non-atmospheric safety hazards in the confined space:	
3. Hazards have been identified in an attached Appendix C form:	
4. Section 3 is complete to demonstrate ventilation has removed the atmospheric hazard:	

I have confirmed the above noted statements and required precautions have been taken for a safe entry. All personnel have been properly trained, hazards have been reviewed with each and all equipment needed for a safe entry and work within this confined space are in place.

Entry Supervisor Name:		Date:	
Entry Supervisor Signature:		Time:	

Appendix F – Permit Required Confined Space Sign Example