

**UNIVERSITY OF ROCHESTER
ENVIRONMENTAL HEALTH & SAFETY**

Policy No.: IH009	Approved by: John M. Coniglio
Title: Confined Space Program	Date: 6/14/2011
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Prepared by: Gregory J. Devlin	

I. PURPOSE:

The University of Rochester and its associated work places have confined spaces that, due to various chemical and physical properties, may cause death or serious injury to employees who may enter them. This Confined Space Entry Program is developed and established to identify, evaluate, and control such spaces, and more important, to detail procedures and responsibilities for entering and working within confined spaces.

Adherence to the policies and directives contained in this program is mandatory for all supervisors and employees of this company. Supervisors and employees failing to follow this program are subject to disciplinary action and/or dismissal.

The University's program is designed to protect employees required to enter hazardous confined spaces as part of their duties by preventing exposure to potentially hazardous atmospheres, asphyxiation, entrapment, engulfment, failure of lockout/tagout, etc. The Permit-required Confined Space Entry Program supports the University's overall safety program of minimizing workplace injuries and providing a healthy and safe workplace.

The University's written Confined Space Entry Program is designed as a working document that outlines the policies and procedures necessary for compliance with the OSHA standard. The program is divided into several sections that describe individual topics.

Elements of the permit-required confined space program are:

- Procedures for identify hazards associated with entry
- Procedures, methods and practices used to control confined space hazards
- A written permit system
- Specialized equipment, such as air sampling instruments, ventilation equipment, rescue gear, personal protective equipment, etc.
- Designation of employees who have an active role in the entry, e.g. authorized entrants, attendants, entry supervisor
- Provision for testing and evaluating the space to ensure that conditions are suitable foe entry
- Coordination of contractor responsibilities
- Emergency response procedures, including provision for rescue equipment
- Employee training and information
- Annual program review to assure continued effectiveness

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II. DEFINITIONS:

A. Confined Space - defined by OSHA as any space that:

- (1) Has limited or restricted means of entry or exit,
- (2) Is large enough for an employee to enter and perform assigned work, and
- (3) Is not designed for continuous occupancy by the employee.

There are several types of spaces at the University of Rochester that are classified as confined spaces. These spaces include, among others, boilers, tanks, large exhaust stacks, manholes, tunnels, certain utility chases, pits, and sumps. The majority of confined spaces are found in mechanical rooms, mechanical spaces, tunnels, and manholes.

As a requirement of the standard, all potential confined spaces must be assessed and evaluated according to the Permit-Required Confined Space Decision Flow Chart (see *Appendix A*). Members of various facilities departments and EH&S have conducted a survey of the University to determine the locations of confined spaces. The form found in *Appendix B* is used to document these spaces. The manager responsible for a given area must work with Environmental Health & Safety to determine whether or not a confined space requires a permit to enter.

B. Permit Required Confined Space - meets the definition of a confined space and has one or more of the following characteristics:

- (1) Contains or has the potential to contain a hazardous atmosphere,
- (2) Contains a material that has the potential for engulfing an entrant,
- (3) Has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross section, and/or
- (4) Contains any other recognized serious safety or health hazards (mechanical, electrical, etc.).

The University of Rochester Permit-required Confined Spaces Inventory, a list of the known permit-required confined spaces throughout the University, is included as part of this document. See *Appendix B*

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C. Hazardous Atmosphere - an atmosphere that may expose employees to the risk of death, incapacitation, impairment of the employee's ability to escape unaided from the space, injury, or acute illness from one or more of the following causes:

- (1) Flammable gas, vapor, or mist in excess of 10 percent of its lower 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;
- (4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in OSHA's Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, and which could result in employee exposure in excess of its dose or permissible exposure limit;
- (5) Any other atmospheric condition that is immediately dangerous to life or health.

Note: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of the ability to self-rescue, injury, or acute illness due to its health effects is not covered by this definition. For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information such as Material Safety Data Sheets, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

Be careful not to introduce additional hazards when inspecting a confined space. For example, dropping a hot light bulb into an untested confined space could result in an explosion. Check the oxygen content and LEL first.

Ensure that outside forces, such as chemical processes, painting, welding, vehicle exhaust, etc., do not introduce additional hazards.

D. Non-Permit Confined Space - a confined space that does not contain or have the potential to contain any hazard unique to the space capable of causing death or serious physical harm. Examples of non-permit required confined spaces are a dropped ceiling, mechanical equipment closet, and material bin, etc.

If a confined space requires entry to determine if hazards are present, such as atmospheric monitoring, inspection, etc., the space must be treated as a permit required confined space until it can be determined that it meets the definition of a non-permit required confined space.

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- E. Acceptable Entry Conditions** - the conditions that must exist in a permit space to allow entry and to ensure employees can safely enter into and safely work within a permit

- F. Entry** – action by which a person passes through an opening into a permit required confined space. Entry is considered to occur as soon as any part of the entrant's body breaks the plane of an opening into the space.

- G. Entry Permit** – written or printed document provided by the university to allow and control entry into a permit space.

- H. Entry Supervisor** - person 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.

III. RESPONSIBILITIES:

A. Managers

Managers are responsible for ensuring that all of their facilities have been surveyed and that all confined spaces are properly identified. Once identified, managers are responsible for making sure that the spaces have proper signage and that all work in them proceeds according to the requirements of the University's Confined Space Entry Program. This includes ensuring proper completion, signing, and supervisor approval of Confined Space Entry Permits (*Appendix C*). Managers shall be responsible for understanding the use of the permit. Managers are also responsible for ensuring that their employees are properly trained prior to performing required tasks in a confined space entry. Employees who have not been trained shall be barred from such duties.

If the Manager decides to contract confined space work to an outside contractor, the manager must meet the requirements in the Contract Work section of this document.

B. Entry Supervisor

The entry supervisor shall review and approve entry permits before authorizing a permit required confined space entry. This title does not imply that individuals in charge of the entry are necessarily management level employees, but rather that they have been vested by their employer with specific duties, responsibilities and

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authority to oversee and allow entry into the space after determining that conditions are suitable for entry

C. Environmental Health & Safety

EH&S is responsible for writing and updating the University's Written Confined Space Entry Program, helping to classify spaces as permit spaces, guiding the selection of personal protective equipment including respirators, performing training of employees, maintaining records, and performing annual reviews of this program to ensure compliance.

IV. PROCEDURES

A. Signage/Preventing Unauthorized Entry:

All potentially effected employees must be informed of the existence, location and danger of permit required confined spaces in their work area. This shall be accomplished through instruction and training in addition to posted signs. Although special equipment or hazards can be identified in the signs, the signs on permit-required confined spaces shall include the following, or equivalent, statement at a minimum:

DANGER- CONFINED SPACE- AUTHORIZED PERSONNEL ONLY
Signs shall be posted prominently on all permit-required confined spaces. All permit-required confined spaces must be secured and unauthorized employees are prohibited from entry. If spaces are found to be open or are considered to be unsecured, steps must be taken to secure them immediately. Typical sign used at the university:



B. TRAINING:

All employees required to enter and work in permit-required confined spaces must receive proper training and instruction prior to performing these duties.

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Employees who have not been trained shall not be allowed to enter permit-required confined spaces. This training shall include:

- Information on identifying confined spaces
- The University's Confined Space Entry Program
- The proper procedures and work practices to be followed
- Specific duties associated with the roles of authorized entrant, attendant, entry supervisor, and those who provide emergency or rescue procedures
- The hazards associated with confined spaces
- Information on the mode, signs, symptoms and consequences of exposure
- The necessary personal protective equipment
- The proper use and maintenance of required personal protective equipment

Additional training shall be required whenever employees must perform duties they have not previously been trained for or whenever there is evidence that there have been deviations from established procedures. The responsible managers shall ensure training. The Industrial Hygiene Group can be contacted at 275-3241 to provide assistance with the training. The supervising department shall maintain training records.

C. PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) is an important part of any work involving hazardous duties, hazardous materials, or hazardous locations. In order for PPE to be effective, its uses and limitations must be understood, it must be chosen properly, worn correctly, and be properly maintained.

PPE for a confined space entry could include, but is not limited to: eye protection, coveralls or tyvek suits, head covering or helmet, respirators*, gloves, footwear, hearing protection, full-body harness and wristlets. Protective equipment to be worn shall be specified and the employees' manager shall be responsible for providing and ensuring that proper equipment is worn. The choice of equipment shall be based on the area to be entered, potential hazards associated with the physical structure and contents of the space, and the tasks to be performed. It is important not to overlook the hazards created by tasks such as hot work, welding, painting, and cleaning, in addition to the existing hazards in the space. Industrial Hygiene will assist facility managers to properly select PPE upon request.

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More information about requiring and using PPE is contained in the University's *Personal Protective Equipment Plan*.

<http://www.safety.rochester.edu/ih/ppe.html>

***NOTE:** Respiratory protection shall be reviewed with EH&S prior to use. In addition to choosing the proper respirators, employees must be trained in their use, must be fit-tested, and must be medically evaluated prior to respirator use.

D. Permit System

1. Introduction

The confined space permit system requires that employees involved in a permit-required confined space entry meet certain requirements and follow proper procedures. The permit process alerts necessary staff to the entry and requires responsible individuals to sign off on the procedure. Section VII. *Permit System*, and Section XII. *Reclassification of Confined Spaces* deal with a permitted entry into confined spaces. Confined space entrants' managers must become familiar with the requirements of each section, and should decide which procedure is appropriate for a given confined space entry. Supervisors will provide guidance on the use of each procedure.

The permits shall include:

- Specific permit space identification
- Purpose and date of entry
- Duration of authorization
- Name of authorized entrants
- Name of authorized attendant(s) and supervisor
- Actual or potential hazards of the confined space, their control and/or isolation
- Acceptable entry conditions
- Results of initial and periodic atmospheric testing
- Rescue equipment
- Rescue/emergency services to be summoned if necessary
- Communication procedures with the entrants and attendant
- Other permits required (hotwork, etc.)
- Other pertinent information

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2. Standard Confined Space Permit System

The standard permit system is to be used for all permit-required confined spaces where reclassification of the space has not occurred or is not possible. A copy of the University's Permit-required Confined Space Entry Permit is found in *Appendix C*. A permit must be completed with all of the necessary information, signed by the responsible manager, prior to any entry into a permit-required confined space. The permits are to be issued for fixed periods of time and renewed every day, and shall be renewed if work is necessary beyond the expiration date of the permit. Copies of the completed permits shall be kept on file in the department generating the permit and sent to EH&S. Permits shall be kept for at least five years.

E. PERSONNEL AND SPECIFIC DUTIES

Employees participating in the permit-required confined space entry have specific duties associated with their roles as authorized entrants, attendants, entry supervisors and persons who monitor or test the atmosphere, rescue or emergency personnel. Employees acting in any of these capacities shall be instructed and trained to perform the functions that they are responsible for.

1. Authorized Entrants

Employees specifically trained to work in confined spaces and are authorized by the University to enter one. The responsibilities of authorized entrants are:

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- a) To know the hazards that may be faced during each entry including information on the mode, signs, symptoms, and consequences of exposure,
- b) To properly use equipment for: testing and monitoring the atmosphere, ventilating the space, communications, personal protective equipment, lighting, barriers and shields, ladders, rescue and emergency equipment,
- c) To communicate with the attendant as necessary to allow the attendant to monitor the activity of entrants and to enable the attendant to alert the entrants to any problem and/or need to evacuate,
- d) To alert the attendant about any changes, including warning signs and symptoms of dangerous situations or detection of a prohibited condition, and,
- e) To exit the space as quickly as possible whenever: an order to evacuate is given by the attendant or the entry supervisor, the entrant recognizes any warning signs or symptoms of exposure to a dangerous situation, the entrant detects a prohibited conditions or an evacuation alarm is activated such as from a monitoring instrument

2. Attendant

An employee stationed outside a space whose duties include:

- a) Ensuring that all authorized entrants know the hazards faced during entry and the mode, signs, symptoms, and consequences of exposure,
- b) Understanding the possible behavioral effects of exposures on authorized entrants,
- c) Continuously maintaining an accurate count of authorized entrants in the permit space and identifying them,
- d) Remaining outside the permit space at all times during entry operations until relieved by another attendant,
- e) Communicating with entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate,
- f) Monitoring activities inside and outside the permit space to determine if it is safe for entrants to remain in the space and to order entrants to evacuate immediately if the attendant detects a prohibited condition, if he/she detects behavioral effects of a hazardous exposure in an entrant, detects a situation outside the space which could endanger entrants, or if he/she cannot effectively continue to perform all duties,
- g) Summoning rescue and emergency services when the entrants may need assistance, or otherwise initiate the rescue plan. The attendant

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shall in no way enter the confined space in an attempt to rescue an entrant

- h) Prohibiting unauthorized employees from entering the space,
- i) Performing non-entry rescues in an emergency, and
- j) Performing no other duties that will interfere with the attendant's primary duty to monitor the permit-required confined space entry.

3. Entry Supervisor

The employer, foreman, or crew chief responsible for determining if acceptable entry conditions are present at a permit space, authorizing entry, and overseeing entry operations. The entry supervisor can also serve as an attendant or an authorized entrant as long as the individual is trained and qualified to perform both roles. The duties of the entry supervisor can be passed from one individual to another during the course of entry operations. The duties of the entry supervisor are:

- a) To know the hazards faced during entry, including information on the mode, signs, symptoms, and consequences of the exposure,
- b) To verify by checking that the permit has been properly completed, that all specified tests specified have been conducted, and that all procedures and equipment specified in the permit are in place, so that the permit can be signed and that entry can begin,
- c) To terminate the entry and cancel the permit when entry operations are completed or when a condition arises in or near the space which is not allowed under the entry permit,
- d) To verify that rescue services are available and that the means and equipment to summons them are operable,
- e) To remove unauthorized individuals who enter or attempt to enter the permit space during entry operations, and
- f) To determine and ensure that entry operations remain consistent with the terms of the permit and that acceptable entry conditions are maintained.

F. PERMIT REQUIRED CONFINED SPACE ENTRY PROCEDURES:

The following procedure is a detailed outline of the steps to be taken before entering a permit-required confined space. Telecommunications and electrical

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work may have additional requirements. Contact Facilities at 3-4567 for further information about these requirements.

Material Safety Data Sheets (MSDSs) are to be available at the worksite for all hazardous chemicals, gases, or other materials used or which may be found at the site.

1. ISOLATION

The confined space shall be isolated by protecting it from the accidental release of energy or material into the space. Isolation can be accomplished by such means as blanking or blinding; misaligning or removing sections of lines, pipe or ducts; double blocking and bleeding of the affected system; lockout/tagout of all sources of energy; or blocking and disconnecting all sources of energy. Isolation of the confined space shall be performed and verified prior to entry into the space. The University's Lockout/Tagout Policy (<http://www.safety.rochester.edu/ih/lockouttagout.html>) shall be followed and all sources of energy or materials into the space shall be controlled.

2. TESTING OF THE ATMOSPHERE

Prior to entry into a permit-required confined space, a qualified employee must test the internal atmosphere in the space with a calibrated direct reading instrument (such as an Impact 4 Gas Monitor manufactured by Honeywell/Zellweger Analytics). Atmospheric hazards can include:

- Oxygen deficiencies or enrichment.
- Flammable gases and vapors.
- Other potential air contaminants suspected of being present, including carbon monoxide and hydrogen sulfide.

Based on the testing results, employees shall not be allowed into the space if there is a hazardous atmosphere. The following levels must be maintained in the confined space:

- Oxygen - not less than 19.5% or greater than 23.5%
- Flammable - less than 10% of the lower explosive limit (LEL)
- Carbon Monoxide - less than 50 ppm (parts per million - OSHA PEL)

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- Hydrogen Sulfide - less than 10 ppm (OSHA PEL)

The following test procedure shall be followed during each confined space entry. The sequence of testing shall be oxygen first, then combustibles or flammables, then toxic materials.

- a) Testing is to be performed using a direct reading, calibrated (according to manufacturers guidelines) meter.
- b) Measurements are to be taken remotely prior to entering the space. This can be accomplished either by lowering the instrument in the space or by extending a probe or other device into the space. It is very important that the employee performing the test take enough samples (either squeezing a bulb enough times or allowing a pump enough time to draw a sample) to ensure that the contaminated atmosphere has reached the instrument's sensors, and then allowing enough time for the sensors to react. The remote sampling shall be taken in the space as close to the area of actual work as possible. Sampling shall also be performed at locations along the path to where the work is to be performed and at different heights.
- c) Measurements are to be recorded and compared with established guidelines (see the above criteria).
- d) If measurements reveal that the space does not contain a hazardous atmosphere, employees may enter.
- e) A direct reading instrument shall be used by one of the employees entering the space to continuously monitor the atmosphere and alert employees to any changes or potential problems in the space, or monitored by a qualified outside attendant.

Some gases are lighter than air, while others are the same or heavier. It is therefore required to always test the atmosphere near the top, middle and bottom of the confined space.

3. VENTILATION

Forced air ventilation shall be used as a primary means of clearing an area of airborne contaminants and maintaining safe conditions. Employees shall not enter confined spaces until ventilation has been used to eliminate any hazardous atmosphere. Ventilation shall continue to run while employees are occupying the confined space and until all employees have left the space.

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The air used to ventilate the confined space shall be from a clean source. The actual placement of fans and other air movers can be critical in ensuring good mixing and maintaining a hazard free environment. Exhaust ventilation draws contaminated air out of an area. Supply ventilation blows fresh air in. It is generally better to bring fresh air in, forcing contaminated air out, but not through the worker's breathing zone. This should be assessed, however, on a case-by-case basis.

Local exhaust provides a positive means of removing contaminants produced at a single point at their source. The use of both fresh air supply and local exhaust should be carefully designed so as not to compete with each other or short circuit one another.

Local exhaust doesn't work well when contaminants are widely dispersed. Keep the local exhaust intake close to the work. General ventilation should be used in such a case when contaminants are dispersed. When ventilating with supply air take care not to disperse contaminants unnecessarily.

Follow these guidelines for ventilating confined spaces:

- Begin ventilation in time to assure that the space is safe before entry.
- Test the atmosphere before entry to confirm that the ventilation system is working properly and that the space is safe.
- Continue ventilation as long as the space is occupied, or at least until the oxygen levels and hazardous concentrations are within safe limits.
- If work inside the space can make the air unsafe (e.g., hotwork, painting, using solvents, sandblasting, etc.) continue ventilation as long as the work is in progress

IMPORTANT:

Ventilation alone may not reduce some atmospheric hazards to safe levels. Never rely on ventilation alone to provide a safe atmosphere. Use atmospheric testing to confirm whether the ventilation system has been successful.

4. PROTECTION OF THE SPACE

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Vehicle, pedestrian, and other barriers shall be installed to protect the entry into the confined space and to protect the occupants of the confined space from falling objects or other hazards. Warning signs shall be posted to alert passers-by and other employees of the operation.

5. EVACUATION

If a hazardous atmosphere is detected at any point during an entry, all employees shall immediately leave the space. The space shall be evaluated to determine how the hazardous atmosphere developed and measures shall be taken to protect employees from the hazardous atmosphere before subsequent entry takes place.

6. FILLING OUT A PERMIT See *Appendix C*

Prior to entry, the Entry Supervisor is responsible for ensuring a permit is filled out correctly and completely signed by those involved in the entry. The permit shall be posted at the entrance to the confined space for viewing of entrants.

G. RESCUE AND EMERGENCY SERVICES

Unless conditions prohibit it, each Authorized Entrant in a permit space shall be wearing a chest or full body harness with a retrieval line attached at the center of the Entrant's back at shoulder level, or above the Entrant's head. Wristlets or anklets can be used in instances where a harness is infeasible or creates a greater hazard than using a harness. The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the space so that a rescue can begin quickly. A mechanical device such as a tripod shall be available to rescue individuals in permit spaces more than five feet deep. Rescue services shall be identified, and rescue plans determined and reviewed with all participants in advance of entering the confined space.

In the event of an emergency within a confined space the following procedure shall be followed:

1. The attendant shall attempt to communicate with all authorized entrants, informing them to leave the permit space immediately.

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2. If an entrant is trapped, unconscious or in some way impaired and cannot leave on his own, the attendant shall first summon help either by hand-held radio, or by contacting University Security at x13. Security shall be informed that there is a confined space emergency, the exact location and *that the local fire service must be contacted.*
3. All other confined space entries shall be stopped until the confined space emergency has been resolved.
4. Once emergency services are called, the attendant can attempt to rescue the entrant from *outside the space* with a mechanical device such as a tripod. *The Attendant shall not enter the confined space to attempt a rescue.* Any action by the attendant must be performed without endangering the attendant or putting any other employees at risk.
5. Employees and Security shall be posted at building entrances to direct the rescue services to the rescue site.
6. Once the rescue service is on site they shall be informed of any potential hazards in the space and rescue efforts shall be turned over to the fire service.
7. An employee with knowledge of the situation shall remain at the incident site for the duration of the incident and will act as a resource to the rescue service.

If the potential exists for the need of an entry rescue, the plan must be well defined and discussed with all confined space and rescue team members in advance of the entry.

A copy of this procedure shall be posted at each confined space entry.

Suggested rescue procedures can also be found in 1910.146(k) of the OSHA standard.

H. NON-PERMIT CONFINED SPACES:

Under the OSHA standard, there are confined spaces, which, by definition, do not contain the elements of a permit-required confined space. These spaces shall be treated as non-permit required confined spaces. Depending on the space and the

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circumstances involved there may be a need to adopt and follow specific procedures for working in these spaces.

A non-permit required confined space would meet the following criteria:

1. If the permit space poses no actual or potential atmospheric hazards, mechanical, electrical, or engulfment hazards, and if all hazards within the space are eliminated without entry into the space, the permit space may be reclassified as a non-permit confined space for as long as the non-atmospheric hazards remain eliminated.
2. If it is necessary to enter the permit space to eliminate hazards, such entry must be performed under the rules for a permit required confined space as stated in this policy. If testing and inspection during that entry demonstrate that the hazards within the permit space have been eliminated, the permit space may be reclassified as a non-permit confined space for as long as the hazards remain eliminated.
3. See RECLASSIFICATION OF CONFINED SPACES for the procedure to reclassify a confined space.
4. If hazards arise within a permit space that has been declassified to a non-permit space under 1910.146(c)(7), each employee in the space must exit the space. The employer must then reevaluate the space and determine whether it must be reclassified as a permit space, in accordance with other applicable provisions of this section.

I. RECLASSIFICATION OF CONFINED SPACES

The OSHA Standard under section (c)(7), **1910.146(c)(7)(ii)**, allows permit required confined spaces to be reclassified as a non-permit spaces if:

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1. The permit space poses no actual or potential atmospheric hazards, mechanical, electrical, or engulfment hazards, and if all hazards within the space are eliminated without entry into the space.

NOTE: Use of forced air ventilation to control atmospheric hazards does not constitute elimination of the hazards.

2. The basis for determining that all hazards have been eliminated has been documented through a certification, which includes the date, the location of the space, and the signature of the person making the determination.
3. If hazards arise while employees are in a reclassified space, the employees shall immediately exit the space and the space shall be re-evaluated to determine if the space shall revert to a permit-required space.

J. CONTRACT WORK:

1. When outside contractors are hired to perform tasks in permit-required confined spaces the University must:
 - a) Inform the contractor that a space is considered a permit-required confined space and that entry must be performed in accordance with OSHA's Permit-Required Confined Space Standard,
 - b) Inform the contractor of the hazards that have been identified and why the space is considered a permit-required confined space,
 - c) Inform the contractor of any precautions that will be taken by University employees in the area of the permit-required confined space, and
 - d) Ensure that entry operations are coordinated to prevent hazards to University personnel working near the permit-required confined space from the activities of the contractor, or vice versa.

While contractors may use this document for informational purposes, contractors must provide and follow their own written Permit-required Confined Space Program. The contractor's program must contain provisions for compliance with all the requirements of OSHA's Permit-Required Confined Space standard.

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ENVIRONMENTAL HEALTH & SAFETY**

Policy No.: IH009	Approved by: John M. Coniglio
Title: Confined Space Program	Date: 6/14/2011
Revision No.: 3	Page 18 of 18
Prepared by: Gregory J. Devlin	

2. When a contractor is hired to perform work in a PRCS, the project or area manager will:
 - a) Obtain from the contractor any information on the hazards (chemicals, equipment, tasks) the contractor's employees will introduce into the permit space.
 - b) Determine whether our employees will be working in or near a PRCS where they may be exposed to the contractor's hazards. Coordinate entry operations with a designated contractor representative.
 - c) Obtain from the contractor the PRCS entry program/procedures they will be utilizing.

Managers who hire outside contractors to perform confined space work shall keep records and document correspondence and other communications with the contractor. Following the contractor's work, the contractor shall be debriefed regarding the permit system followed in the space, as well as any hazards confronted or created in the confined space during entry operations.

V. APPENDICES

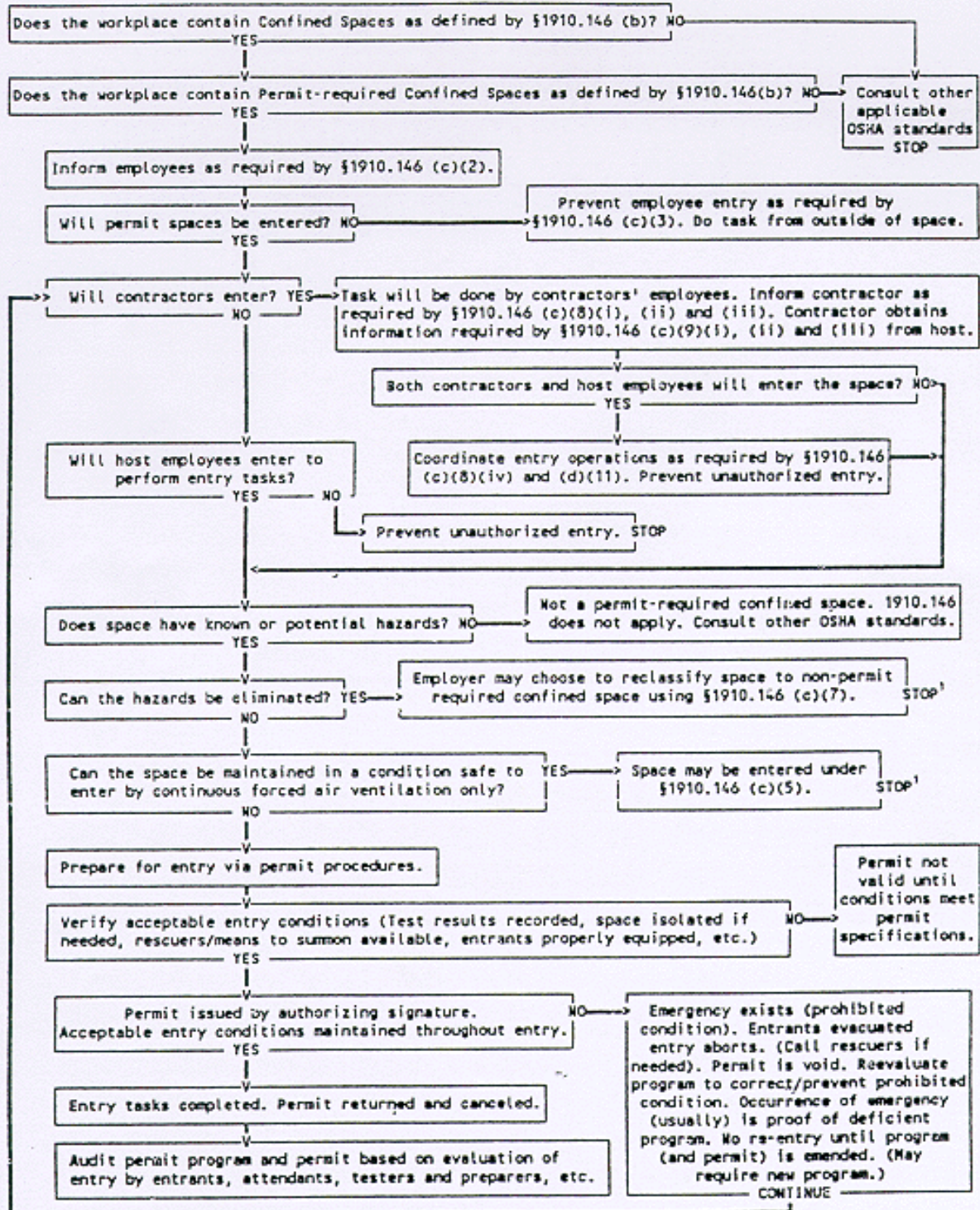
- A. Appendix A - Decision Flowchart
- B. Appendix B - Inventory of Permit-required Confined Spaces at the University of Rochester
- C. Appendix C - Confined Space Entry Permit, both sides.

VI. Revision History

Date	Revision No.	Description
8/4/2009	New	Established written procedure and policy
8/13/2010	1	Permit format changed
2/17/2011	2	Modifications made to inventory list
6/14/2011	3	Appendix B updated

Appendix A Decision Flowchart

APPENDIX A TO §1910.146—PERMIT-REQUIRED CONFINED SPACE DECISION FLOW CHART



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

**Appendix B,
Inventory of Permit-required Confined Spaces at the University of Rochester**

INVENTORY

Permit-Required Confined Spaces

Note: While every effort has been made to ensure that this inventory is as accurate and complete as possible, every confined space should be evaluated by a qualified person prior to entry.

Building	Location	Description of Confined Space
Central Utilities Plant	Medical Center River Campus South Campus	Manholes: 39 Steam 100+ Sanitary 12 Domestic 100+ Storm 2 Chilled Water
Central Utilities Plant	Medical Center River Campus South Campus	Electrical distribution manholes. Voltage of 11,500 V and 4,160 V 30 - 11,500 V 56 - 4,160 V
Central Utilities Plant	Chilled Water Basement	Hot splash tank. High pressure temperature tank. 12' long 6' diameter
Central Utilities Plant	Boiler Room Main Floor	Boiler mud drum & steam drum, round cylinder tanks. 5 boilers 5 steam 5 mud drums
Central Utilities Plant	Outdoors Adjacent to Boiler Room	Ash Silo
Central Utilities Plant		Coal Bunkers
Central Utilities Plant		Make up tanks - hold return water from heating systems and any city water that is needed to maintain sufficient amount of water for the boiler system.
Central Utilities Plant		De-aerator tanks - hold heated supply water for boilers.
Central Utilities Plant	Roof at CUP	Baghouse collectors and duct work to and from collectors
Central Utilities Plant	Boiler	Boiler fire side, including fire box, dust collector, ID fans, sifting hoppers, ash pits
Central Utilities Plant		De-Alkalizing Tank 7' high 48" diameter

Building	Location	Description of Confined Space
Central Utilities Plant	Near Coal Pile	Coal Hoppers
Central Utilities Plant	Near Coal Pile	Coal Pile runoff sump
Central Utilities Plant		Water Softener Tanks 7' high 36" diameter
Central Utilities Plant Pump House		Open pits underground to hold river water
Memorial Art Gallery	MAG Boiler Room	Cooling Tower
Eastman School Annex	Boiler Room 34 Swan Street	Hot Water Storage Tank
Eastman Student Living Center	Basement Mechanical Room	Sewage Ejector Pit 1
Eastman Student Living Center	Basement Mechanical Room	Sewage Ejector Pit 2
Medical Center	Roof-7400	Heat Exchange Void
Medical Center	Roof-7400	Baghouse
Medical Center	Basement-6800	Sewage Ejector
Medical Center	Basement-6800	Sump Pump/Domestic Water Tanks
Medical Center	Basement-6900	Sewage Ejector
Medical Center	Basement-8800	Sewage Ejectors
Medical Center	Basement-8800	Condensate Tanks
Medical Center	Basement-8800	Hot Water (Domestic) Condensate
Medical Center	7 th floor S&GG wings	Hot Water Tanks
Medical Center	7 th floor S&GG wings	Domestic Hot Water Tank
Medical Center	Ground-7499	Cross-Over Duct from Incinerator
Medical Center	Ground-7499	Incinerator Drum
Medical Center	Roof-6800	Condensate Tank
Medical Center Cancer Center	Sump Pit - Cancer Center	Sump Pit
Medical Research Building	Basement Catwalk	Equipment access corridor located in the ceiling above the Vivarium
Strong Memorial Hospital Psychiatric Wing	Basement-9220	Sewage Ejector Pit

Building	Location	Description of Confined Space
Strong Memorial Hospital Psychiatric Wing	Near Room Basement-9024	Abandoned Dumbwaiter Pit
Strong Memorial Hospital Psychiatric Wing	Basement-9000 Elevator	Elevator Pit
Strong Memorial Hospital Psychiatric Wing	Basement-9220	Domestic Hot Water Storage Tank
Strong Memorial Hospital Psychiatric Wing	Basement-9220	Sewage Ejector PM#2825
Strong Memorial Hospital Psychiatric Wing	Basement-9036	Domestic Hot Water Storage Tanks #1 & #2
Strong Memorial Hospital	Sub-Basement	Sewage Ejector Pit by #9 Elevator
Strong Memorial Hospital	Sub-Basement-2210	Steam Condensate Storage Tank
Strong Memorial Hospital	Sub-Basement-2500	Sewage Ejector Tanks #1 (two tanks)
Strong Memorial Hospital	Sub-Basement-2500	Sewage Ejector #1 Neutralizing Tank
Strong Memorial Hospital	Sub-Basement-2500	Sewage Ejector #2 (2 tanks)
Strong Memorial Hospital	Sub-Basement-2500	Sewage Ejector #2 Neutralizing Tank
Strong Memorial Hospital	Sub-Basement-2500	Sewage Ejector #3 Pit
Strong Memorial Hospital	Sub-Basement-2500	Sewage Ejector #5 (two tanks)
Strong Memorial Hospital	Sub-Basement-2500	Sewage Ejector #5 Neutralizing Tank
Strong Memorial Hospital	Sub-Basement-2500	Sewage Ejector #6 Pit (cart wash)
Strong Memorial Hospital	Sub-Basement-2500	Sump Pump #2 Pit

Building	Location	Description of Confined Space
Strong Memorial Hospital	Sub-Basement-2500	Sump Pump #4 Pit
Strong Memorial Hospital	Sub-Basement-2500	Sump Pump #5
Strong Memorial Hospital	Sub-Basement-2500	Sump Pump #6
Strong Memorial Hospital	Sub-Basement-1250	Steam Condensate Storage Tank
Strong Memorial Hospital	Sub-Basement-1250	Domestic Hot Water Storage Tanks #1 & #2
Strong Memorial Hospital	Sub-Basement-1250	Sewage Ejector Pit PM#094
Strong Memorial Hospital	Sub-Basement-3000	Sewage Pit
Strong Memorial Hospital	Sub-Basement-9220	600 V Switchgear Room leading to Generator Room Limited Entry
Hutchison Hall	On hillside between Hutchison Hall and Wilson Blvd.	Sewage Effluent Meter Pit
Hutchison Hall	Attic mechanical room	Distilled water tank
Hopeman Hall	Mechanical room	Sewage ejection pit Hot water tank
NSRL	Mechanical room	Sewage ejection pit
Meliora Hall	Mechanical room	Sewage ejection pit
Administration Building	Mechanical room	Sewage ejection pit
Gilbert Hall	Mechanical room	Sewage ejection pit Hot water tank
Wilder Hall	Mechanical room	Sewage ejection pit Hot water tank
Anderson Hall	Mechanical room	Sewage ejection pit Hot water tank
Lovejoy/Hoeing Halls	Mechanical room	Sewage ejection pit
Tiernan Hall	Mechanical room	Sewage ejection pit

Building	Location	Description of Confined Space
Wilson Commons	Mechanical room	Hot water tank
Spurrier Hall	Mechanical room	Hot water tank
Alumni Gymnasium	Mechanical room	Hot water tank
Susan B. Anthony Hall	Mechanical room	Hot water tank
Wilmot Hall	Mechanical room	Hot water tank
Fauver Stadium	Mechanical room	Hot water tank
Sage Arts Center	Mechanical room	Hot water tank
Chapel	Mechanical room	Hot water tank
Annex	2B-251	Domestic Tank

Non-Permit Required Confined Spaces
(Require Precautions)

Building	Location	Description
Tunnels		Steam Tunnel from Central Utilities to River Campus & Central Utilities to Medical Center
Memorial Art Gallery	Utility Tunnel Accessed in Carpenter Shop	4' wide by 5' high tunnel containing water, steam, telephone and electrical lines and HVAC equipment
Strong Memorial Hospital	Basement-1230	Generator Room
Zornow Sports Center	Swimming Pool Room	Mixing tank located under grill in the swimming pool room
Laboratory for Laser Energetics	Omega Target Bay	Omega Target Chamber - A 3.3 m diameter aluminum sphere that is normally under 1×10^{-6} torr vacuum. It has 60/beam ports and 32 diagnostic/misc ports
Medical Research Building	B-9905C	Lab Waste Sewage Ejector Pit
Medical Research Building	B-9905C	Sanitary Waste Sewage Ejector Pit
Medical Research Building	B-9905C	Storm drain Sewage Ejector Pit
Medical Research Building	B-9905C	Spare Sewage Ejector Pit.
SMH	B-1232 A	Diesel Fuel Storage Vault
Medical Research Building - Extension	B-11390 A	Sewage Ejector Pit
Medical Research Building – Extension	4-11200	Clean Steam Generator 1
Medical Research Building - Extension	4-11200	Clean Steam Generator 2

UNIVERSITY OF ROCHESTER CONFINED SPACE ENTRY PERMIT

Emergency Telephone Numbers	Job Site	Job Working Supervisor	Supervisor Telephone				
Confined Space Description		Confined Space Contents	Confined Space Last Contained				
Description of Work			Date of Entry				
Entry Team Leader (ETL)		Work to Begin Date Time	Work to End Date Time				
Requirements	Check All Items That Apply (ETL)		ETL Initials	Other Special Requirements or PPE	ETL Initials		
	1. Pipe Connections ___ Blanked ___ Tagged ___ Disconnected ___ Valve Closed, Vented & Locked						
	2. Electric ___ Fuses Pulled ___ Locked Off ___ Tagged ___ Disconnected ___ Breaker Locked						
	3. Access (Specify Means)						
	4. Space Cleaned ___ Steam ___ Water Wash ___ Solvent Wash ___ Other (Specify)						
	5. Ventilation ___ Ambient ___ Forced ___ Other (Specify)						
	6. Lights / Cords ___ Low Volt ___ Expl. Proof ___ Portable GFCI ___ Other (Specify)						
	7. Static Grounding ___ No ___ Yes (Specify)						
	8. Barricades ___ Pedestrian ___ Vehicular Specify Type						
	9. Assistance ___ Outside Attendant ___ Outside Observer						
	10. Rescue (who, how)						
	11. Rescue Equipment ___ Mechanical Extraction						
	12. Protective Equipment ___ Wristlets ___ Body Harness ___ Eye (type _____) ___ Gloves (Type _____) ___ Clothing (Type _____) ___ Boots ___ Rubbers ___ Hearing Protection RESPIRATOR: ___ ½ Face Mask ___ Full Face ___ Filter/Cartridge (Type _____) ___ Airline ___ Escape Pack ___ PAPR ___ Loose Fit ___ Welder's Helmet		ATMOSPHERE TEST INSTRUMENTS				
			Manufacturer	Model	Serial No.	Calib Date	Calib Due
			1.				
		2.					
13. Location Telephone			14. Location Eye Wash				
15. Location Fire Alarm			16. Location Emergency Shower				
Atmosphere Test Requirements	Element (any change in task requires new testing)	Field Checker Signature	Meter Reading	Time	Is Continuous Test Required?	Permissible Exposure Limit	
	Oxygen in Space (O ₂)		%		___ Yes ___ No	> 19.5 % - < 23 %	
	Hydrogen Sulfide (H ₂ S)		ppm		___ Yes ___ No	< 10 ppm	
	Carbon Monoxide (CO)		ppm		___ Yes ___ No	< 10 ppm	
	Flammability (LEL)		% LEL		___ Yes ___ No	< 10 %	
	Oxygen-Airline Respirator		%		___ Yes ___ No	> 19.5 % - < 21 %	
	Other Toxic Gas (specify)				___ Yes ___ No		

This permit is valid for the day of issue only. All checks and atmospheric tests are to be completed on day of entry, prior to entry. Atmospheric testing is required for any changes in the confined space or surrounding work environment (record interval checks on page 2 of permit). Post this permit on job site. Retain a department copy. Send one copy to EH&S upon completion. All entry team personnel have the right to observe atmospheric testing to their satisfaction.

I have reviewed the job setup and am satisfied that proper safety measures are being taken. I will abide by these safety requirements, and to bring to immediate attention any job hazards uncovered. I have been trained in confined space entry and the possible hazards associated with it; I've read the notes on page 2. My signature below signifies adherence to the conditions of the permit.

Entry Team Leader	Entry Team Attendant	Entrant	Entrant
Entrant	Entrant	Entrant	Entrant

UNIVERSITY OF ROCHESTER
CONFINED SPACE ENTRY PERMIT

Page 2 of 2

1. Ensure proper Lock Out / Tag Out; verify de-energization and dissipated energy
2. The outside observer must constantly be stationed outside the confined space near the entrance and maintain constant contact, visual and/or verbal, with those inside the confined space.
3. All entry team personnel must be informed of the nearest telephone, fire alarm, emergency shower and eyewash.
4. Do not enter the confined space unless all items on the front of this permit are satisfied.
5. All entry personnel must have received confined space training prior to entry. The signatures on the front of the permit signify this.
6. Record additional atmospheric testing below. Use another sheet if necessary.

Atmosphere Test Requirements	Element	Field Checker Signature	Meter Reading	Date/Time	Is Continuous Test Req'd ?	Permissible Exposure Limit (PEL)
	Oxygen in Space (O ₂)		%		__ Yes __ No	> 19.5 % - < 23 %
	Hydrogen Sulfide (H ₂ S)		ppm		__ Yes __ No	< 10 ppm
	Carbon Monoxide CO)		ppm		__ Yes __ No	< 10 ppm
	Flammability (LEL)		% LEL		__ Yes __ No	< 10 %
	Oxygen-Airline Respirator		%		__ Yes __ No	> 19.5 % - < 21 %
	Other Toxic Gas					

Atmosphere Test Requirements	Element	Field Checker Signature	Meter Reading	Date/Time	Is Continuous Test Req'd ?	Permissible Exposure Limit (PEL)
	Oxygen in Space (O ₂)		%		__ Yes __ No	> 19.5 % - < 23 %
	Hydrogen Sulfide (H ₂ S)		ppm		__ Yes __ No	< 10 ppm
	Carbon Monoxide CO)		ppm		__ Yes __ No	< 10 ppm
	Flammability (LEL)		% LEL		__ Yes __ No	< 10 %
	Oxygen-Airline Respirator		%		__ Yes __ No	> 19.5 % - < 21 %
	Other Toxic Gas				__ Yes __ No	

Atmosphere Test Requirements	Element	Field Checker Signature	Meter Reading	Date/Time	Is Continuous Test Req'd ?	Permissible Exposure Limit (PEL)
	Oxygen in Space (O ₂)		%		__ Yes __ No	> 19.5 % - < 23 %
	Hydrogen Sulfide (H ₂ S)		ppm		__ Yes __ No	< 10 ppm
	Carbon Monoxide CO)		ppm		__ Yes __ No	< 10 ppm
	Flammability (LEL)		% LEL		__ Yes __ No	< 10 %
	Oxygen-Airline Respirator		%		__ Yes __ No	> 19.5 % - < 21 %
	Other Toxic Gas				__ Yes __ No	

Atmosphere Test Requirements	Element	Field Checker Signature	Meter Reading	Date/Time	Is Continuous Test Req'd ?	Permissible Exposure Limit (PEL)
	Oxygen in Space (O ₂)		%		__ Yes __ No	> 19.5 % - < 23%
	Hydrogen Sulfide (H ₂ S)		ppm		__ Yes __ No	< 10 ppm
	Carbon Monoxide CO)		ppm		__ Yes __ No	< 10 ppm
	Flammability (LEL)		% LEL		__ Yes __ No	< 10 %
	Oxygen-Airline Respirator		%		__ Yes __ No	> 19.5 % - < 21 %
	Other Toxic Gas				__ Yes __ No	