

Confined Space Plan



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Acronyms

CFR	Code of Federal Regulations
EHS	Environmental Health and Safety Office
IDLH	Immediately Dangerous to Life and Health
LOTO	Lockout/tagout
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PPE	Personal Protective Equipment
REL	Recommended Exposure Limit
SDS	Safety Data Sheet
VAC	Virginia Administrative Code
VOSH	Virginia Occupational Safety and Health

Foreword

George Mason University is required by U.S. Code of Federal Regulations (CFR) Section 29 1910.146 *Permit Required Confined Spaces* and Virginia Administrative Code (VAC) (16 VAC 25-70-10 and 16 VAC 25-140-10) to design a confined space program that establishes the mechanisms, methods, and administrative controls that George Mason University employees must use to safely enter and work in confined spaces.

This *Confined Space Plan* defines the structure of George Mason University's confined space Plan and describes specific procedures that must be followed to satisfy federal and Virginia Commonwealth safety requirements, and protect employees from injury. Components of the program include identification and inventory of permit required confined spaces, training, confined space entry permits, provisions for notifying contractors, air sampling, and emergency response procedure.

Document History

Version	Date	Comments
1	October, 2008	Initial <i>Confined Space Plan</i>
2	June, 2013	Revised <i>Confined Space Plan</i>
3	April, 2014	Revised <i>Confined Space Plan</i>
4	October, 2014	<i>Confined Space Plan</i> Routine Review

This *Confined Space Plan* is reviewed routinely and amended as necessary and when:

- Applicable regulations are revised;
- An employee is injured during a confined space project;
- A “near miss” accident occurs during a confined space project; or
- Property or the environment is negatively impacted as a result of a confined space project.

All revisions to this *Confined Space Plan* will be shared with the various parties identified in this document.

1.0 Introduction

The procedures and guidance provided within this Plan are designed to protect employees from injury when working in or around confined spaces. The Occupational Safety and Health Administration (OSHA) requires that specific activities and forms be completed prior to and during a confined space entry. George Mason University's Environmental Health and Safety Office (EHS) will provide or make available this *Confined Space Plan* to all employees, supervisors, and contractors who conduct activities subject to confined space regulations. This Plan provides guidance on training requirements, how to conduct a confined space entry, and emergency response procedures.

1.1 Purpose

The purpose of this document is to establish practices and procedures that can protect George Mason University employees from hazards associated with permit and nonpermit required confined space work. In addition to specific requirements for confined space entry, a complete confined space program incorporates other safety programs including, but not limited to, lockout/tagout (LOTO), hazard communication, hot work, and personal protective equipment (PPE).

1.2 Scope

George Mason University's *Confined Space Plan* applies to all university employees working on George Mason University property and leased spaces. Contractors must provide their own confined space plan for work in permit and non-permit required confined spaces on George Mason University property.

2.0 Roles and Responsibilities

All employees expected to perform confined space work or work around confined spaces are responsible for following the guidance provided within this document as well as instructions given by their supervisor. Additional title and employee responsibilities for entry into a confined space or permit required confined space are described in section 4.2.3. The following individuals, offices, and units are responsible for ensuring that the directives, components, and maintenance of the university's confined space program are achieved.

2.1 Environmental Health and Safety Office (EHS)

EHS is responsible for the design, implementation, and maintenance of George Mason University's *Confined Space Plan*. Specific responsibilities are to:

- Assist supervisors in implementing George Mason University's *Confined Space Plan*.
- Provide employee *Confined Space Awareness Training* and *Confined Space Entry Training* and maintain training records.
- Identify and maintain an inventory of all known non-permit and permit required confined spaces; and make it available to employees, supervisors, and contractors.
- Conduct confined space classification and reclassification assessments as needed.
- Approve all monitoring equipment, safety equipment, and work materials that will be used during a permit required confined space project.
- Conduct inspections of confined spaces, confined space signage, and review confined space entry permits to evaluate compliance, identify deficiencies, and improve safety.
- Maintain confined space inspection records.
- Post and maintain appropriate warning signage on confined space entrances.
- Provide *Confined Space Plan* documents and updates as necessary to departments, employees, supervisors, and contractors who fall under the guidance of this *Confined Space Plan*.
- Review confined space entry projects that involve a contractor and George Mason University employee both entering a confined space.
- Ensure that emergency responders are informed of all permit required confined spaces and have access to those spaces.
- Determine permit required confined spaces where standard retrieval systems may not be effective or would create additional hazards.
- Develop equipment-specific procedures for unique confined spaces and equipment within work area(s) in conjunction with Facilities supervisors.
- Update, revise, and edit this *Confined Space Plan* as necessary.

2.2 Supervisors

Supervisors are responsible for ensuring that George Mason University's *Confined Space Plan* is implemented and followed by employees under their supervision. Specific responsibilities are to:

- Be informed of the contents of this *Confined Space Plan* and how it applies to work areas under their responsibility and authority.

- Ensure employees comply with all aspects of this *Confined Space Plan*.
- Ensure that other university safety programs and procedures such as LOTO, hot work, and hazard communication are followed when relevant.
- Ensure that employees are provided with and use appropriate PPE.
- Assist EHS with identifying and inventorying confined spaces.
- Ensure that employees under their supervision receive appropriate confined space training commensurate with their duties.
- Approve and appoint employees to serve as entry supervisors, attendants, and entrants.
- Ensure that *Confined Space Entry Permits* are completed correctly.
- Post completed *Confined Space Entry Permits* at the entrance of the confined space while conducting operations.
- Develop equipment-specific procedures for unique confined spaces and equipment within their work area(s) in conjunction with EHS.
- Assist in the investigation of injuries and incidents involving confined spaces.
- Take prompt and corrective action when unsafe conditions or practices are observed.
- Notify EHS's *Alternate Entry Procedures* are to be used to enter a confined space.
- Notify EHS when tasks or locations are identified where no entry retrieval is not possible.

2.3 Employees

George Mason University employees who work in confined spaces are expected to comply with this *Confined Space Plan*. Employee responsibilities are:

- Attend *Confined Space Entry Training* if they are expected to be an entry supervisor, attendant, or entrant for confined space work.
- Attend *Confined Space Awareness Training* if they are expected to work around confined spaces.
- Follow the directives and guidance provided in this *Confined Space Plan*.
- Notify their supervisor and EHS if dangerous work conditions are observed, the *Confined Space Plan* is not followed, or an accident involving a confined space occurs.
- Complete *Confined Space Entry Permits* prior to beginning work in a confined space.
- Use appropriate PPE and follow all relevant university safety programs.

2.4 Project Managers

Facilities Management Project Managers are responsible for ensuring that contract personnel under their supervision are: capable of performing the work they are required to do; provide or have the appropriate level of training; and follow all relevant OSHA and Virginia Occupational Safety and Health (VOSH) health and safety regulations and standards. Specific responsibilities required by this *Confined Space Plan* are to:

- Inform contract personnel of the work area(s) that contain permit required confined spaces and that entry is allowed only through compliance with a permit required confined space program meeting the requirements of 29 CFR 1910.146.
- Notify contract personnel of the known hazards within or around a confined space and any precautions or procedures that George Mason University has implemented for the protection of employees.

- Coordinate entry operations with contract personnel when both George Mason University and contractor personnel will work in a confined space simultaneously.
- Debrief the contractor at the conclusion of entry operations regarding the hazards confronted or created during entry operations and communicate to EHS any new hazards that are created as a result of work within the confined space.

2.5 Contractors

When contract personnel are engaged in activities involving confined spaces, the contractor shall provide a written confined space program/plan to the George Mason University Facilities Management Project Manager. The contractor's written confined space program/plan must satisfy the requirements of OSHA standard 29 CFR 1910.146. Procedures used by the contractor to enter a permit required confined space must be discussed with the Project Manager prior to entry.

Contractors are responsible for ensuring that employees under their supervision are competent, trained, understand, and comply with the requirements of OSHA and applicable VOSH standards for confined spaces. Contractors must show proof of confined space training for their employees prior to entry. In addition, contractors are obligated by 29 CFR 1910.146 (c)(9) to:

- Obtain information regarding permit required confined space hazards and other safety procedures followed by employees from George Mason University.
- Coordinate entry operations with the appropriate George Mason University supervisor when both George Mason University employees and contract personnel will be working in a confined space simultaneously.
- Inform the Project Manager of any hazards confronted or created in permit spaces either through a debriefing or during the entry operation.
- Contractors must supply their own air monitoring and rescue/retrieval equipment.

3.0 Confined Spaces

A confined space is any space which meets the following criteria:

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

Confined spaces can either be classified as either non-permit or permit required confined spaces depending on hazards that are or have the potential to be present in the confined space.

3.1 Non-permit Confined Space

A non-permit confined space is a space that meets the definition of a confined space but does not possess or have the potential to possess any hazardous conditions. All non-permit confined spaces must be evaluated for hazards and documentation of the absence of hazardous conditions must be maintained so long as work is performed within the confined space.

3.1.1 Non-permit Confined Space Entry Procedures

Confined spaces that do not contain or have the potential to contain hazards, as determined by the entry supervisor or EHS, do not require a *Confined Space Entry Permit*, however, if the confined space has not been previously identified as a non-permit confined space, a permit must be completed by the entry supervisor and monitoring must be conducted to ensure a safe and hazard-free atmosphere.

All non-permit confined space work must be conducted in teams of two or more employees to ensure that at least one employee is able to request help should the entrant encounter unforeseen problems or suffer an injury which prevents them from exiting the space.

3.2 Permit Required Confined Space

A permit required confined space is one that meets all of the conditions of a confined space and has one or more of the following hazardous characteristics:

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

3.2.1 Hazardous Conditions

Entry supervisors or EHS shall evaluate all confined spaces to identify permit required confined spaces. Examples of hazards that elevate a confined space to a permit required confined space include but are not limited to:

- Gases or vapors which can displace oxygen;
- A potential for low or high levels of oxygen, 19.5% and below or 23.5% and above;
- Flammable gases at or above 10% of the lower explosive limit;
- The presence of hazardous chemicals at or above the permissible exposure limit (PEL), short-term exposure limit, ceiling, or recommended exposure limit (REL);
- Any condition that can be interpreted as immediately dangerous to life or health (IDLH);
- Temperatures that can contribute to heat stress;
- Liquids, steam, or flowable solids which can engulf an entrant;
- Sources of radiation;
- Bare, exposed, or ungrounded conductive parts of electrical equipment, machinery, wiring, fixtures, or installations;
- Sewer systems that have the potential to contain a hazardous atmosphere, low oxygen, or contain high pressure/temperature pipes; or
- Any other recognized hazard.

If a George Mason University employee must enter a sewer to perform work, prior review by EHS is required. If work is to be done in a sewer, EHS must be notified at least 48 hours in advance when possible. Employees are not permitted to enter a sewer unless EHS has evaluated the confined space, made recommendations, and are present during entry. These requirements are in addition to all other requirements of permit required confined space entry.

3.2.2 Signage

Permit required confined space must be identified by posted warning signage notifying all employees of the existence and location of the confined space. Signs may not be removed without approval from EHS. Posted signs shall be prominently displayed on the entrance to the permit required confined space and must contain the following text:

DANGER – PERMIT REQUIRED CONFINED SPACE - DO NOT ENTER

3.2.3 Permit Required Confined Spaces Entry Procedures

All entries into permit required confined spaces must be conducted by a minimum of two employees. Employees will be identified as the entry supervisor, attendant, or entrant. Respective responsibilities of each position are:

- **Entry Supervisor** – The trained individual with the responsibility to oversee the project and ensure that all provisions of this *Confined Space Plan* are met.
- **Attendant** – The trained individual stationed immediately outside the confined space who monitors entrants and records entry activities.
- **Entrant** – The trained individual(s) authorized by their supervisor who enters the confined space to conduct work.

3.2.3.1 Entry Supervisor

The entry supervisor has the primary role in evaluating and controlling access and activities within the permit required confined space. Specific procedures for this role are to:

1. Survey the confined space without entering, review the work to be performed, and identify existing or potential atmospheric, chemical, and physical hazards.
2. Determine the actions necessary prior to entry to eliminate or control the hazards, and record them on the *Confined Space Entry Permit*.
 - a. Eliminate engulfment and any other serious hazards by utilizing LOTO methods such as blanking, binding, double block and bleed, line braking, or other effective ways and means.
 - b. Control traffic, isolate the confined space from vehicular and pedestrian traffic, and only allow authorized individuals near the permit space.
 - c. Guard the opening of the confined space by installing guardrails or other temporary covers or barriers to prevent accidental falls through the opening and prevent foreign objects from entering the space and injuring the entrant(s).
3. Conduct atmospheric testing prior to entry in addition to the continuous monitoring being conducted by entrant.
 - a. Test for atmospheric hazards in the following order: oxygen content, combustible/flammable gases and vapors, carbon monoxide, and then any other potential toxic air contaminant(s).
 - b. Obtain and list the PEL and REL for each identified air contaminant.
 - c. Test for each identified or suspected air contaminant.
 - d. Determine if the atmospheric hazard can be eliminated or controlled by continuous forced-air ventilation. If the only hazard in a space is a hazardous atmosphere and alternate entry procedures (section 4.3) are acceptable, they may be used.
4. Determine and record the required PPE, extraction, and work equipment necessary for entry.
 - a. PPE must be used to protect against health and/or physical hazards that cannot be effectively eliminated or controlled. All employees expected to wear respiratory protection must be enrolled in George Mason University's *Respiratory Protection Program*.
 - b. Monitoring equipment must be available and used to test oxygen, flammable gases, and carbon monoxide.
 - c. Monitoring equipment designed to test levels of identified airborne contaminants shall be required where airborne contaminants are suspected or have been identified.
 - d. Other permits, training, procedures necessary to safely enter and work within the confined space must be in place or completed prior to beginning work.
 - e. Emergency equipment necessary to summon rescue assistance must be available.
 - f. Equipment such as ladders required for safe ingress and egress must be utilized whenever possible.

- g. Mechanical retrieval devices shall be used for vertical entries into spaces deeper than 5 feet. Wristlets may be used where body harnesses are not feasible.
 - h. Communication equipment is required when the entrant(s) will be out of voice range of the attendant. Communication equipment must be intrinsically safe dependent upon the conditions existing in the space.
 - i. Provide other equipment, PPE, and safety equipment, as necessary.
5. Identify the attendant and at least one entrant and record their names on the *Confined Space Entry Permit*.
 6. Verify that entry conditions are acceptable before signing the permit and allowing entry.
 7. Sign and issue the *Confined Space Entry Permit*, effective upon the date issued and expiring on the date indicated on the permit. A permit may not be issued for a period longer than 24 hours. The permit may be extended up to 24 hours upon recertification of conditions. Upon a change in shifts, the entry supervisor shall brief the incoming supervisor and/or shift on potential hazards, equipment, PPE, rescue, LOTO, and safe work procedures in the space.
 8. Post the *Confined Space Entry Permit* at the entrance to the confined space.
 9. Terminate the entry and cancel the permit when entry operations are finished or if a prohibited condition arises.
 10. Keep the permit on file for one year.

3.2.3.2 Attendants

1. Understand the hazards associated with the space and review the posted *Confined Space Entry Permit*.
2. Be stationed outside the permitted space at the opening and remain in place throughout the duration of the entry or until relieved by another authorized attendant.
3. Perform no other duties beyond those stated for attendants.
4. Maintain the identity and an accurate count of entrants within and outside of the space on the *Confined Space Entry Permit*.
5. Assist with atmospheric monitoring of spaces containing hazardous atmospheres, and record results on the *Confined Space Entry Permit*.
6. Periodically communicate with the entrant(s) to assure that all is well or relay information.
7. Monitor activities inside and outside of the confined space and order an immediate evacuation of the space whenever;
 - a. A prohibited condition is identified;
 - b. An entrant exhibits behavior effects of exposure to chemicals, physical hazards, or a hazardous atmosphere;
 - c. A situation outside of the confined space endangers the entrant(s); or
 - d. The attendant is unable to complete all attendant responsibilities.
8. Perform nonentry rescues or summon rescue services if needed.
9. Warn unauthorized persons to stay out of confined spaces and contact University Police if persons do not respond to warnings.

3.2.3.3 Entrants

1. Understand the hazards associated with a confined space and review the posted *Confined Space Permit Entry*.
2. Enter the space and perform the assigned work as expediently and as safely as possible.
3. Wear and use all PPE required by the permit.
4. Notify the attendant periodically or upon request of work progress and entrant safety.
5. Immediately alert the attendant and evacuate the space whenever any of the following occurs:
 - a. The development of a condition not in compliance with the documented conditions in the *Confined Space Entry Permit* or *Alternate Entry Procedure Certification Form*;
 - b. The development of a sign or symptom of exposure or injury to any employee involved with the entry;
 - c. Failure of any required safety or work equipment; or
 - d. The attendant or entry supervisor orders an evacuation.

3.2.3.4 Entry Completion or Termination

1. The attendant shall assure that the entrant(s) have exited the confined space following an evacuation or completed project.
2. If the confined space was evacuated prior to the completion of work, the entry supervisor or shall:
 - a. Immediately terminate the permit by checking the appropriate box and describe the reasons for evacuation on the permit;
 - b. Immediately notify EHS of any employee injuries or exposures; and
 - c. Determine if reentry is required to complete work, eliminate a hazard, or return the confined space to normal operation.
3. If reentry is required:
 - a. The confined space must be investigated to determine the cause of the evacuation.
 - b. A new *Confined Space Entry Permit*, which includes the elimination or control of the hazard causing the evacuation, must be completed.
4. If the entry was successfully completed, the attendant shall:
 - a. Oversee the completion of post-entry actions indicated on the permit.
 - b. Add any pertinent information concerning the entry on the permit.
 - c. Return the completed permit to the entry supervisor.
5. The entry supervisor will terminate the *Confined Space Entry Permit* with their signature and retain a copy of the permit for a period of at least one year.

3.3 Alternate Entry Procedures

Alternate entry procedures may be used to enter confined spaces in which the only hazard is atmospheric and where continuous forced air ventilation alone will eliminate the hazardous condition(s) and maintain a safe atmosphere. Only EHS can determine that a confined space may be entered using an alternate entry procedures. Similar to permit required confined spaces, the alternate entry space must be clearly posted on the confined space signage. In order to implement alternate entry procedures the entry supervisor must observe the following;

- Work with EHS to demonstrate that continuous forced-air ventilation alone is sufficient to maintain a safe atmosphere and provide monitoring or inspection data to support alternate entry procedures.
- Complete an *Alternate Entry Procedure Certification Form* prior to conducting an entry using alternate entry procedures and maintain a copy on file with the *Confined Space Entry Permit*.
- The entry supervisor must be able to demonstrate that the only hazard posed by the confined space is an actual or potential hazardous atmosphere and is free from all other health or physical hazards.
- If entry is required to collect data or conduct an inspection to determine if alternate entry procedures can be followed, a permit required confined space entry will be conducted and a *Confined Space Entry Permit* must be completed prior to entering.

The completed *Alternate Entry Procedure Certification Form* must be posted at the entry point in addition to the *Confined Space Entry Permit* and be available for review for the duration of the confined space project. The following steps must be observed:

1. The entry supervisor shall identify any conditions making it unsafe to remove an entrance cover and identify any steps required to eliminate or mitigate the hazardous atmosphere before the entrance cover is removed.
2. The atmosphere must be tested with a calibrated direct-reading instrument for oxygen content (19.5-23.5%), flammable gases and vapors, and potential toxic air contaminants in this order, and results must be recorded on the *Confined Space Entry Permit*.
3. Any entrant expected to enter the confined space must be provided the opportunity to observe preentry testing and results.
4. If forced-air ventilation is used, it must be:
 - a. Set up prior to entering the confined space and capable of eliminating the hazardous atmosphere;
 - b. Directed so as to ventilate the immediate area where an employee(s) is or will be present and continue operating throughout the duration of the entry;
 - c. The air supplied by forced-air ventilation must be from a clean source and cannot increase the hazard(s) within the confined space; and
 - d. All air ventilation equipment, vents, power, and auxiliary systems must be provided with a failsafe or backup system to protect employees in the event of a mechanical or power failure.
5. Testing must be continuous to ensure that a hazardous atmosphere does not exist or form. Test results must be recorded on the *Confined Space Entry Permit* periodically.
6. If a hazardous atmosphere is detected during entry:
 - a. All entrants shall evacuate the space immediately.
 - b. The space must be reevaluated to determine how the hazardous atmosphere developed. This reevaluation must involve EHS.
 - c. Measures shall be implemented to protect employees from the hazards before any subsequent entry takes place. Reentry is not permitted until EHS has conducted its evaluation and approved new procedures to mitigate the hazardous atmosphere.

3.4 Confined Space Reclassification

A confined space may be reclassified as a non-permit, alternate entry, or permit required confined space whenever the condition, design, or environment of a confined space changes. Entry supervisors have the ultimate responsibility for ensuring that the correct entry procedure is followed based upon the configuration of the space, hazards, and testing results. A permit required confined space may be reclassified by EHS as a non-permit confined space whenever the permit required confined space:

- Poses no actual or potential atmospheric hazards and if all the hazards within the space are eliminated without entry into the space; or
- Testing and inspection are conducted to verify that hazards have been eliminated.

If it is necessary to enter the space to eliminate the hazards that make it a permit required confined space, entry must be made using permit required confined space entry procedures.

4.0 Monitoring

Monitoring must be conducted prior to entering a confined space, continuously during entry operations, and any time a confined space is reclassified. Monitoring may require multiple instruments, specialized equipment, and specific training. All monitoring equipment used to evaluate confined spaces must be calibrated and used as directed by the manufacturer's user's manual. This requirement only applies to George Mason University employees; contract personnel may choose to use an alternate monitoring method so long as it is consistent with 29 CFR 1910.146.

4.1 Toxic Air Contaminants

If a potential or actual toxic air contaminant exists in a confined space, EHS must be notified prior to beginning work to coordinate testing and evaluation. EHS will conduct initial monitoring and determine the appropriate equipment, PPE, and periodic testing schedule. EHS will then conduct, oversee, or instruct employees on how to conduct periodic monitoring depending upon the circumstances, employee training, and identified toxic air contaminants.

4.2 Monitoring Procedures

The following procedures have been adopted from 29 CFR 1910.146 Appendix B and are appropriate for confined spaces and sewers. Testing conducted during the course of a routine confined space project must be completed by a competent and trained entry supervisor, entrant or attendant.

Evaluation testing: The atmosphere of a confined space must be analyzed using equipment of sufficient sensitivity and specificity to identify and evaluate hazardous atmospheres that may exist or arise so that appropriate entry procedures can be developed for the space. Evaluation and development of the entry procedure should be done or reviewed by a technically-qualified professional based on the evaluation of all serious hazards.

Verification testing: A permit required confined space that contains a hazardous atmosphere must be tested for residues of all identified contaminants to determine that residual concentrations at the time of testing and entry are within the range of permissible exposure limits. Results of testing must be recorded on the *Confined Space Entry Permit*.

Duration of testing: Testing must be conducted continuously for the duration of the entry.

Testing stratified atmospheres: Entry involving a descent into atmospheres that may be stratified requires testing at a distance of approximately 4-feet in the direction of travel and 4-feet to each side. If a sampling probe is used, the entrant's rate of progress should be slowed to accommodate the sampling speed and detector response. Testing should be done at 2-foot increments when testing the air by lowering a meter or probe vertically into a confined space.

Order of testing:

1. Oxygen must be performed first because most combustible gas meters are oxygen-dependent and will not provide reliable readings in an oxygen-deficient atmosphere.
2. Combustible gases are tested next because the threat of fire or explosion is both more immediate and more life threatening, in most cases, than exposure to toxic gases and vapors.
3. Toxic gases and vapors are performed last. Equipment used by George Mason University employees often test for these hazardous air conditions simultaneously, however a multigas meter may not detect all toxic gases and additional air monitoring equipment may be required.

5.0 Training

Confined space training is required for two types of employees; those working around confined spaces and those working within confined spaces entry either as an attendant, entrant, or entry supervisor.

5.1 Confined Space Awareness Training

All employees expected to work around or above confined spaces are required to attend *Confined Space Awareness Training*. Awareness training provides a cursory understanding of what constitutes a confined space, associated hazards, confined space entry procedures, and precautions that should be observed when working around confined spaces. *Confined Space Awareness Training* is required once. This training is currently provided as part of the EHS *Safety Refresher Training*.

5.2 Confined Space Entry Training

Confined Space Entry Training shall be provided to employees before they are assigned duties which require confined space entry. EHS *Confined Space Entry Training* is required prior to entry. Training provides employees with the knowledge to:

- Retrieve and review George Mason University's *Confined Space Plan*.
- Identify a confined space and be able to determine if a confined space is a non-permit or permit required confined space.
- Calibrate, use, care, and clean monitoring equipment used during entry operations.
- Understand monitoring requirements and monitoring results.
- Set up retrieval equipment.
- Understand the duties and responsibilities of the entry supervisor, attendant, and entrant.
- Select and attend additional safety training as assessed and required to perform confined space work, including but not limited to *Respiratory Protection*, *Hazard Communication*, and *Lockout/Tagout Training*.
- Identify signs and symptoms of exposure, injury, and hazardous conditions.
- Understand emergency exit and rescue procedures.

5.3 Retraining

Supervisors are responsible for ensuring that employees attend *Confined Space Entry Training* once every three years and whenever one of the following situations occurs:

- There is a change in permit required space operations that presents a hazard in which an employee has not been previously trained; or
- A supervisor has reason to believe that an employee's knowledge of use of these procedures and plan is inadequate.

6.0 Rescue and Emergency Services

Retrieval systems or rescue services must be employed for all permit required confined space entry projects. Nonentry rescue (i.e., use of equipment that does not require additional personnel to enter the confined space) is the preferred method of rescue and should be utilized whenever possible. Nonpermit required confined spaces do not require retrieval or rescue services, however; retrieval systems should be utilized whenever possible

6.1 Non-permit Required Confined Space

Work in nonpermit confined spaces does not require retrieval systems or rescue services to be on site. If an accident or emergency occurs within a non-permit required confined space, any employee may enter a no-permit space to respond to an emergency but only after notifying emergency services (University Police, 703-993-2810 or 911) and determining no other hazards are present. If a non-permit required confined space rescue is necessary, the employee is responsible for the following:

- Summoning emergency responders;
- Attempting to rescue entrants using nonentry rescue procedures;
- If nonentry rescue procedures are not available, enter the space and attempt to retrieve the victim(s); and
- Monitoring the emergency and informing responders about the location, number of victims, their condition, and the hazards in the space.

6.2 Permit Required Confine Space with Retrieval System

A retrieval system must be available to retrieve entrants from vertical permit required confined spaces that are more than 5 feet deep. The retrieval system must be used to rescue an entrant unless the equipment would increase the entrant's risk of injury. Each authorized entrant must use a properly-attached full-body harness. Entrants may use wristlets if full-body harnesses put them at a greater risk of injury in an emergency. The other end of the retrieval line must be attached to a retrieval system outside the permit space so that rescue can begin immediately. If an entrant can be exposed to a hazardous substance a safety data sheet (SDS) is required to be kept so that it is available to the medical facility that treats the entrant.

George Mason University does not possess horizontal retrieval systems. If horizontal nonentry rescue is required for a permit required confined space, onsite rescued services are required.

6.3 Permit Required Confined Space without Retrieval System

For any permit required confined spaces where non-entry retrieval systems cannot be utilized, a third-party emergency rescue service shall be on site. Supervisors must notify EHS for further assessment for all confined spaces that require entry for rescue. Rescue services shall be available on site where the confined space has been found to have an IDLH atmosphere, a hazardous atmosphere or the potential for engulfment or non-entry rescue cannot be performed. Emergency rescue service contact information must appear on all permit required *Confined Space Entry Permits* and must be provided to all entry supervisors, attendants, and entrants

during confined space operations. EHS will assist employees in finding an offsite emergency rescue contractor that can be present to perform entry rescue if needed. Calling 911 is not an appropriate means of emergency rescue due to the fact that an adequate response time cannot be guaranteed.

7.0 Recordkeeping

The following confined space records must be maintained by supervisors for a period of one year and must be available to employees, EHS, regulatory inspectors, and their authorized representatives:

- *Confined Space Entry Permits*; and
- *Alternate Entry Procedure Certification Forms*.

EHS is responsible for maintaining the following records in accordance with this plan:

- An inventory of all permit required confined spaces;
- Inspections or reviews of confined space activities;
- Reports of accidents involving confined spaces; and
- A list of all George Mason University employees who receive *Confined Space Entry Training* and *Confined Space Awareness Training*.

Appendix A Confined Space Entry Permit

GEORGE MASON UNIVERSITY CONFINED SPACE ENTRY PERMIT	
Space to be Entered:	Purpose of Entry:
Location/Building:	Authorized Duration of Permit – Date(s):
Description of Work to be Performed:	

Section 1: Personnel

		First Name		Last Name		
Entry Supervisor						
	First Name	Last Name	Time On Duty	Time Off Duty	Time On Duty	Time Off Duty
Attendant 1						
Attendant 2						
	First Name	Last Name	Entry Time 1	Exit Time 1	Entry Time 2	Exit Time 2
Entrant 1						
Entrant 2						
Entrant 3						
Entrant 4						
Prepared By:				Date:		
Entry Supervisor:				Date:		

Section 2: Atmospheric Hazards – Toxic Air Contaminants

Identify the potential toxic air contaminants	1.	2.	3.	4.	N/A
Permissible Exposure Limit (PEL) in ppm					
Actual results based on testing (ppm)					
Time testing was conducted					
Meter Used:	Meter Model:	Calibration Date:	Tester's Name:	Tester's Signature:	

Section 3: Atmospheric Hazards - Oxygen

	Area 1	Area 2	Area 3	Area 4
Oxygen Percentage (must be between 19.5 – 23.5%)				
Time testing was conducted				
Meter Used:	Meter Model:	Calibration Date:	Tester's Name:	Tester's Signature:

Section 4: Atmospheric Hazards – Flammable/Combustible Gasses

Potential Flammable/Combustible Gasses	1. aca	2.	3.	4.	N/A
Chemical Name					
Chemical LEL as provided by safety documents (SDS)					
Actual results based on testing					
Time testing was conducted					
Meter Used:	Meter Model:	Calibration Date:	Tester's Name:	Tester's Signature:	

Section 5: Procedures

	Yes	No	N/A
Lockout/Tagout (LOTO) procedures have been followed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Employees have received appropriate LOTO training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Employees have the appropriate PPE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monitoring equipment is present and operating correctly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Equipment necessary to summon rescue services are present	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communication equipment to reach entrants is present	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tools and equipment are appropriate for work to be completed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Respiratory protection is required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Employees are enrolled in the respiratory protection program	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Affected personnel have been notified of confined space work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section 6: Unique Hazards - Identify any unique hazards associated with this confined space

Section 7: PPE/Equipment

Section 8: Rescue Services:

Contact Number for Local Emergency Rescue Services:	
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Section 9: Rescue Procedures - Describe specific steps that must be taken in the event of an injury or exposure based on existing hazards

Section 10: Periodic Atmospheric Monitoring

Oxygen	Time	Results	Oxygen	Time	Results
1			5		
2			6		
3			7		
4			8		

Flammables	Time	Results	Flammables	Time	Results
1			5		
2			6		
3			7		
4			8		

Toxics	Time	Results	Toxics	Time	Results
1			5		
2			6		
3			7		
4			8		

**Appendix B
Alternate Entry Procedure Certification Form**

Building: _____ **Location:** _____ **Confined Space Description:** _____

Entry Supervisor Name: _____ **Date:** _____

Section 1. Conditions

<i>All of the following conditions must be satisfied to use alternate entry procedures.</i>	Yes	No
The only hazard within the confined space is atmospheric. No other hazards exist.	<input type="checkbox"/>	<input type="checkbox"/>
Continuous forced-air ventilation alone is sufficient to eliminate the atmospheric hazard.	<input type="checkbox"/>	<input type="checkbox"/>
Monitoring and inspections verify that no other hazardous conditions exist.	<input type="checkbox"/>	<input type="checkbox"/>
Conditions that make it unsafe to remove entrance covers have been eliminated prior to removing the cover.	<input type="checkbox"/>	<input type="checkbox"/>
Entrances and openings are guarded to protect employees from falls and foreign objects.	<input type="checkbox"/>	<input type="checkbox"/>

If entry is required to conduct tests or inspections to determine the presence of hazards, permit required confined spaced procedures must be followed

Section 2. Confined Space Monitoring Results	Percent Oxygen	Carbon Monoxide	10% of Lower Explosive Limit	Toxic (Name)	Toxic Permissible Exposure Limit (PEL)
Monitoring results prior to forced-air ventilation					
Monitoring results with forced-air ventilation					

Entry Supervisor Signature _____

EHS Representative Signature _____