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1.0 Introduction

1.1 Purpose

The purpose of this program is to provide guidance in the protection of all employees from hazards associated with entry into permit-required confined spaces as prescribed by the Occupational Safety and Health Administration's (OSHA's) Permit-Required Confined Space Standard – 29 CFR 1910.146 and Confined Spaces in Construction Standard - 29 CFR 1926.1201. While some entities and/or divisions of Emory may have additional or more stringent guidelines, the guidelines outlined in this document shall serve as the minimum requirements for all.

1.2 Scope

This program is inclusive of all Emory employees, including healthcare, faculty, staff, students, and student employees.

1.3 Definitions

Attendant. Personnel that must remain outside of the permit-required confined space during the entire entry process unless relieved by another person.

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

Combustible gas. A flammable gas or vapor in excess of 10% of its lower explosive limit (LEL) yet remaining below the upper explosive limit (UEL).

Confined space. A space that:

- Is large enough, and so configured, that an employee can enter it;
- Has limited or restricted means for entry and exit (i.e. tanks, pits, manholes, boilers, etc.); and
- Is not designed for continuous employee occupancy.

Construction. Making alterations or improvements. Replacing structures and their components.

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.

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, or suffocation.

Entrant. Personnel authorized by the entry supervisor to enter a permit-required confined space. Authorized entrants must be provided the opportunity to observe any monitoring or testing data collected.

Entry employer. The employer who decides that an employee it directs will enter a

permit space.

Entry supervisor. The lead person for the permit-required confined space entry who has overall responsibility to oversee that entry operations were performed correctly.

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:

- Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL);
- Airborne dust concentration that meets or exceeds its LFL;
- Atmospheric oxygen concentration below 19.5 percent or above 23.6 percent
- Atmospheric concentration of any substance for which there is a dose or permissible exposure limit is published by OSHA;
- Any other atmospheric condition that is immediately dangerous to life or health.

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

Inert/Inerting. Displacing the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible.

Lower Explosive Limit (LEL). The lowest concentration at which a gas can ignite. Concentrations below this limit are too lean to burn.

Oxygen deficient. An atmospheric oxygen concentration below 19.5%.

Oxygen enriched. An atmospheric oxygen concentration above 23.5%.

Permit-required confined spaces. A confined space that has one or more of the following characteristics:

- Contains or has the potential to contain a hazardous atmosphere;
- Contains a material that has the potential to engulfing an entrant, such as a;
- 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 serious safety or health hazard.

1.4 Responsibilities

Environmental Health and Safety Office (EHSO) and applicable Hospital and Clinic Safety Management

- Evaluate confined spaces to determine which spaces are permit-required confined spaces;
- Assist supervisors with the development of specific confined space entry procedures;
- Review, evaluate, and update the overall effectiveness of the Confined Space Program;
- Develop and implement the Confined Space Training Program;
- Ensure that training is provided to all Emory employees required to work in

permit-required confined spaces;
- Ensure that emergency rescue services are apprised of the possible hazards in permit spaces at Emory; and
- Ensure that emergency rescue services are provided with the opportunity to use Emory confined spaces in order to practice making confined space rescues.

Directors, Supervisors, and Managers

- Enforce compliance with the Confined Space Program in their areas;
- Ensure that authorized entrants, attendants, and entry supervisors complete required training;
- Provide appropriate air monitoring instruments and all other safety equipment needed for confined space entry;
- Ensure or require their designee or controlling contractor to ensure that all outside contractors hired to perform work in a permit-required confined space have an OSHA-compliant Permit-Required Confined Space Program in place;
- Inform or ensure that their designee or controlling contractor informs all outside contractors hired to perform work in a permit-required confined spaces of:
    - The location of each known permit space;
    - The hazards and potential hazards in each space or the reason it is a permit space; and
    - Any precautions that that were implemented for employees or that previous contractors have implemented for the protection of workers in the permit space;
- Ensure that any problem encountered during an entry operation is noted on the respective entry permit and that it is reviewed by EHSO or appropriate Hospital and Clinic Safety Management personnel, as appropriate;
- Inform EHSO or the applicable Hospital and Clinic Safety Management personnel, as appropriate:
    - When a new employee is assigned to work in confined spaces;
    - Whenever a potential permit-required confined space is introduced into the work area so an assessment can be conducted;
- Ensure that personnel retain all cancelled permits for at least one (1) year.

Contractors

- Whenever a contractor performs work in an Emory Permit-Required Confined Space, the Emory representative responsible for the project will:
    - Inform the contractor that access to the permit-space is allowed only through compliance with a Permit-Required Confined Space Program that meets the requirements of both OSHA and Emory;
    - Apprise the contractor of the elements of the Emory confined space entry procedures;
    - Inform the contractor of any precautions that Emory or previous contractors implemented for the protection of workers in the permit spaces; and
    - Debrief with the contractor at the end of the entry operations regarding the permit-required confined space program followed and any hazards confronted or created in permit spaces.
- Any contractor that hires sub-contractors to perform work in a permit-required confined space at Emory is responsible for complying with the OSHA Standard – Confined Spaces in Construction (29 CFR 1926.1201).

Entry Supervisors

- Participate in all required training;
- Understand the hazards that may be faced during entry, including mode, signs or symptoms and consequences of the exposure;
- Implement the measures necessary to prevent unauthorized entry;
- Develop and implement the means, procedures, and practices necessary for safe entry operations, including:
    - Specifying acceptable entry conditions;
    - Providing each authorized entrant or that employee's authorized representative with the opportunity to observe any monitoring or testing of permit-required confined spaces;
    - Isolating the permit space and physical hazard(s) within the space;
    - Purging, inerting, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards;

  NOTE: If the Lower Flammability Limit (LFL) cannot be reduced to less than 10 percent, entry is only allowed if the space has been inerted to render the atmosphere non-combustible, and the employees use personal protective equipment (PPE) to address any other atmospheric hazards (such as oxygen deficiency), and all physical hazards in the space have been eliminated or isolated.
- Determine that, in the event the ventilation system stops working, the monitoring procedures will detect an increase in atmospheric hazard levels in sufficient time for the entrants to safely exit the permit space;
- Ensure the necessary equipment for confined space entry, including testing and monitoring equipment, ventilating equipment, communications equipment, lighting, barriers and shields, ladders, and rescue and emergency equipment (except to the extent the equipment is provided by rescue services) is available;
- Provide pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards;
- Verify the following before endorsing the permit and allowing entry to begin:
    - All tests specified by the permit have been conducted;
    - All procedures and equipment specified by the permit are in place;
    - Rescue services are available and that the means for summoning them are operable;
- Ensure that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry;
- Remove unauthorized individuals who enter or who attempt to enter the permit space during entry operations;
- Prevent unauthorized personnel from attempting a rescue;
- Terminate entry and take the following actions when any of the following apply:
    - Cancel the entry permit when the entry operations covered by the permit have been completed;
    - Suspend or cancel the permit and reassess the space if a hazardous condition that is temporary in nature develops in or near the space; and
    - Cancel the entry permit when a condition that is not allowed under the entry permit arises in or near the permit space.
- Note any problems encountered during an entry operation so that appropriate revisions to the program can be made.

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

Attendants

- Participate in all required training;
- Ensure that only authorized entrants enter the permit space;
- Know the hazards that may be faced during a confined space entry;
- Recognize the possible behavioral effects of exposure to confined space hazards in authorized entrants;
- Continuously maintain an accurate count of authorized entrants in the space;
- Know how to use all required equipment properly;
- Remain outside the permit space during entry operations until relieved by another attendant;
- Communicate with authorized entrants as necessary to monitor entrant status;
- Monitor the activities both inside and outside of the confined space;
- Order authorized entrants to evacuate the space if:
    - A prohibited condition is detected;
    - Any warning sign or symptom of exposure to a dangerous situation is apparent;
    - There is a situation outside of the space that could endanger the entrants; or
    - The attendant cannot effectively and safely perform all the duties required.
- Perform non-entry rescue and summon the rescue team and emergency personnel (911), as soon as the attendant determines the entrant may need assistance to escape from permit space hazards; and
- Warn unauthorized persons to stay away from permit spaces;
- Inform the authorized entrant and entry supervisor if unauthorized persons have entered the permit space; and
- Perform no duties that will interfere with the attendant's primary duty to assess and protect the entrants.

Entrants

- Participate in all required training;
- Understand the hazards that may be faced during entry into a permit-required confined space;
- Recognize the possible behavioral effects of exposure to permit-required confined space hazards;
- Use all required equipment properly;
- Communicate with the attendant as necessary to enable the attendant to monitor entrant status;
- Alert the attendant whenever:
    - The entrant recognizes any warning sign or symptom of exposure to a dangerous situation; or
    - The entrant detects a prohibited condition.
- Exit the space whenever:
    - An order to evacuate has been given by the attendant or entry supervisor;

- The entrant recognizes any warning sign or symptom of exposure to a dangerous situation;
- The entrant detects a prohibited condition; or
- An evacuation alarm is activated.

1.5 Training Requirements

- Training must be provided in both a language and vocabulary that the employee can understand;
- Training is given upon initial assignment and annually thereafter;
- Additional training is conducted:
  - Before there is a change in assigned duties;
  - When there is a change in the permit-space operations that presents a hazard which an employee has not previously been trained;
  - When there is reason to believe that there are deviations from the permit-space entry procedures required under OSHA; and
  - When there are inadequacies in the employee's knowledge or use of the procedures.
- The training includes the following:
  - Hazards associated with permit-required confined spaces and the signs and symptoms of exposure;
  - Methods used to isolate, control and protect employees from permit space hazards;
  - Responsibilities of Entrants, Attendants, and Entry Supervisors;
  - Demonstration of how to use Confined Space Equipment; and
  - The dangers of attempting entry rescue when not authorized to do so.

1.6 Recordkeeping Requirements

- Documentation of trainings conducted by EHSO will include the employee's name, the names of the trainers, and the dates of the training and will be maintained in the Emory Learning Management System (ELMS).
- Training records are retained for the period of time the employee is employed.
- Cancelled confined space permits are retained for one year and reviewed by the area supervisor or their designee.
- All records of monitoring and calibrations conducted by EHSO are retained by EHSO indefinitely. All other monitoring and calibration records are retained by the area supervisor or their designee, indefinitely.
- Records may be retained electronically.
- All documents required to be retained by the Confined Space Standard will be made available to the Secretary of Labor or the Secretary's designee on request.

1.7 References

- OSHA Standard – Permit-Required Confined Spaces (29 CFR 1910.146).
- OSHA Standard – Confined Spaces in Construction (29 CFR 1926.1201).

2.0 Types of Confined Spaces

- Non-Permit Required Confined Spaces
- Alternate Procedures Confined Spaces
- Permit-Required Confined Spaces

2.1 Non-Permit Required Confined Spaces

- A non-permit confined space is a confined space that does not contain or, with the respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.
- A permit-required space may be reclassified as non-permit if:
  - The space poses no actual or potential atmospheric hazard; and
  - All physical hazards within the space are eliminated without entry into the space.

  NOTE: Control of atmospheric hazards through forced air ventilation does not constitute elimination of hazards.
- If it is necessary to enter the space to eliminate the hazards, the permit procedures are applied until the hazards have been eliminated;
- If hazards arise within the space or there are changes in the use or configuration of the space:
  - Each employee in the space must evacuate immediately;
  - The supervisor contacts EHSO to re-evaluate the space to determine how the hazardous atmosphere developed; and
  - Measures must be implemented to protect employees from the hazardous atmosphere before subsequent entry takes place.
- The ***Non-Permit Confined Space Reclassification Form*** is used to reclassify a Permit-Required Confined Space to a “non-permit” status.

2.2 Alternate Procedures Confined Spaces

- Alternate procedures may be used to enter a space if all of following conditions are met:
  - All physical hazards in the space are eliminated or isolated through engineering controls so that the only hazard posed by the permit-space is an actual or potential hazardous atmosphere;
  - Continuous forced air ventilation alone is sufficient to maintain that space safe for entry and if the ventilation system stops working, entrants can exit the space safely;
  - The air supply for the forced air ventilation is from a clean source that does not increase the hazards in the space;
  - Forced air ventilation is directed to ventilate the immediate areas where an employee is or will be present within the space and continues until all employees have left the space.
  - There is documented monitoring and inspection data that supports allowing the space to be entered using alternate procedures and this data is available to each employee who enters the space;

  NOTE: Employees will not enter until forced air ventilation eliminates the atmospheric hazard.
- The following requirements apply to entry into permit spaces using Alternate Procedures:
  - Any entry to obtain initial data that is required to allow the permit space to be entered using Alternate Procedures must be done in full compliance with the Permit-Required Confined Space Requirements;
  - Any conditions making it unsafe to remove an entrance cover must be eliminated prior to entry;
  - When entrance covers are removed, immediately guard the opening with railing, or temporary barrier;

- A safe means for entering and exiting the space must be provided;
- Prior to entry into the space, test the internal atmosphere using a calibrated direct-reading instrument to test for oxygen content, flammable gases and vapors, and potential toxic air contaminants; and
- The entry team must document the results of the atmospheric testing within the space every thirty minutes to ensure continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere.
- If a hazardous atmosphere is detected during entry:
  - Each employee evacuates the space immediately;
  - The supervisor contacts the appropriate health and safety office to re-evaluate the space to determine how the hazardous atmosphere developed; and
  - Measures are implemented to protect employees from the hazardous atmosphere before subsequent entries take place.
- The ***Alternative Procedures Confined Space Atmospheric Testing Form*** is used for entry into confined spaces when following Alternate Procedures.

2.3 Permit-Required Confined Spaces

- Entry Permit
  - The ***Confined Space Permit for Heat Stress*** is required when entering confined spaces where heat stress is possible;
  - The ***Confined Space Permit*** is required for all other entries into permit-required confined spaces where heat stress has not been identified as a potential hazard;
  - Before entry begins, the entry supervisor identified on the permit must sign the permit to authorize entry;
  - The completed permit is made available at the time of entry to all authorized entrants;
  - The duration of the permit will not exceed the time required to complete the assigned task/job;
- Entry Requirements
  - The following are the general requirements that must be followed to enter a permit space:
    - Identify and evaluate the potential hazards of the permit space before entry;
    - Obtain and use the equipment that is necessary for safe entry into the space, including testing, ventilating, lighting, monitoring, communication, barriers, and personal protective equipment;
    - Eliminate/control engulfment hazards by blanking, blinding, double block and bleed, or other methods;
    - Ensure authorized entrants have barriers, shields, and equipment, such as ladders, for safe ingress and egress;
    - Prior to entry and making changes to the space's natural ventilation, conduct atmospheric testing using an intrinsically safe, properly calibrated, direct reading instrument to determine if acceptable entry conditions exist;
    - Continuously monitor the internal atmosphere with the direct reading instrument as long as entrants are within the space;
    - Provide an early-warning system that continuously monitors for isolated engulfment hazards such as would be found in sewers.

The system must alert authorized entrants and attendants in sufficient time for the authorized entrants to safely exit the space.
        - If entering a confined space where heat stress is a potential hazard, use the heat stress meter to document the Wet Bulb Globe Temperature (WBGT).
        - Ensure that at least one attendant is stationed outside each permit space during entry operations.
    - If a hazardous atmosphere is detected during entry:
        - Each employee evacuates the space immediately;
        - The supervisor contacts the appropriate health and safety office to re-evaluate the space to determine how the hazardous atmosphere developed; and
        - Measures are implemented to protect employees from the hazardous atmosphere before subsequent entries take place.

3.0 Permit-Required Confined Space Rescue

- Self-Rescue
    - Self-rescue is simple, fast, provides individuals with the ability to alert fellow workers, and does not require anyone else to enter the space, thereby avoiding the endangerment of more people;
    - Entrants must safely stop whatever they are doing and exit the space in the most expedient and safest manner possible;
    - Self-rescue must immediately be implemented:
        - Whenever an entrant or attendant recognizes the presence of a hazardous atmosphere, any signs or symptoms of over-exposure, or any other serious space hazards.
        - In the event of forced air ventilation system failure.

NOTE: Self-rescue is unsuited for entrants who are unconscious, physically immobile, or who have suffered serious exposure or injury.

- Non-entry Rescue
    - Non-entry rescue equipment typically consists of a body harness, non-conductive cable or rope, winch, and tripod that can be operated from outside of the confined space by the attendant.
    - When self-rescue is not possible due to unconsciousness or incapacitation of an entrant, initiate non-entry rescue (where possible) by using mechanical equipment to physically extract, lift, pull, or otherwise remove entrants from the confined space without requiring any additional persons to enter into the space.
    - Non-entry rescue is most effective on simple vertical or clear horizontal spaces.

NOTE: Mechanical retrieval of unconscious or incapacitated entrants from complex, convoluted spaces can cause serious injuries from entanglement, strangulation, and blunt force impacts.

- Entry Rescue
    - Entry rescue may only be attempted by appropriately trained individuals possessing active certification in and knowledge of first aid/CPR, self-contained breathing apparatus, rescue/retrieval equipment, and rescue training.
    - An entry rescue plan must be developed prior to implementing this level

of rescue responsibility;
- An entry rescue plan must be implemented for any permit-required confined space where non-entry rescue is infeasible, including:
  - Spaces where entrants cannot or do not remain tied off to non-entry rescue equipment (e.g., tripod);
  - Spaces where a straight vertical rescue with non-entry rescue equipment is not possible due to the configuration of the space or obstructions within the space; and
  - Any spaces where the non-entry rescue equipment is not used for any reason.
- Entry rescue plans must include the following elements:
  - Barricades for crowd/traffic control,
  - Controls for any other potential hazards (e.g., cave-ins, fire),
  - Protective clothing and equipment,
  - Explosion-proof lighting equipment,
  - Redundant methods of communication,
  - Rescue team,
  - Victim removal procedures and devices,
- If rescue from within the permit space requires entry, the attendant will alert the entry rescue team. While the team performs the rescue, the attendant will:
  - Immediately summon emergency services by calling 911;
  - Inform the operator that a person is trapped in a confined space and emergency services are needed;
  - Provide emergency services with the location, the type of confined space, and the hazards associated with the space.

4.0 Hazards and Safe Work Practices

- Excess Pressure Hazards
  - The build-up of pressure inside a space can create a serious physical hazard during cover/hatch opening. Pressure build-up could occur because of internal reactions inside the space, or from a very tightly sealed space that has not off-gassed.
  - Prior to removing an entry manhole cover or hatch, visually inspect the area for any obvious discoloration, deterioration, or deformation.
  - Prior to physically touching the cover, hold your hand above the cover to determine if it is excessively warm.
  - If no vent or hook holes are present, open the cover gradually to release any residual pressure that may be present. The presence of vent or hook holes may prevent pressurization of the space.
  - After removing the cover/hatch, install safety railings with an access chain to prevent an accidental fall into the space.
- Atmospheric Hazards
  - The atmosphere inside a confined space is considered hazardous if it contains dangerous concentrations of certain contaminants, is deficient or overly enriched with oxygen, or contains sufficient flammable vapors or gas to be potentially explosive.
  - Use a calibrated, direct reading multi-gas monitor that has been bump tested to test the internal atmosphere of the confined spaces prior to entry to determine whether an oxygen deficient, flammable, or toxic

atmosphere exists. Acceptable atmospheric levels are:

Table 1.0 – Acceptable Atmospheric Levels

Gas	Allowable Concentration
Oxygen	19.5% - 23.5%
Flammability (%LFL)	<10%
Carbon monoxide	<35 ppm
Hydrogen sulfide	<10 ppm

  - Employees may only enter a confined space after initial testing indicates that no atmospheric hazards exist;
  - Continuously monitor the confined space while it is occupied;
  - Workers must immediately leave the space if any of the alarm set points on the gas monitor are reached;
  - Workers may not return into the space until forced ventilation has been completed and the gas detector indicates that it is safe to re-enter.
- Electrical Hazards
  - Do not enter a confined space if an electrical shock hazard is identified unless proper protection is in place.
  - Underground electrical vaults and manholes must be entered using a ladder or other climbing device if the manhole or vault is 4 feet or more in depth.
  - Underground electrical vaults and manholes may be entered by qualified workers without the use of rescue equipment if:
    - It can be demonstrated that the employees will be protected from all electrical hazards; and
    - The work to be performed is non-invasive, low hazard activities such as inspection, meter or dial reading, housekeeping, or other similar work.
  - Entries into electrical vaults and manholes containing energized electric equipment for any other purpose than non-invasive, low hazard activities may only occur under a Permit-Required Entry Procedure, using the appropriate entry permit, attendant, rescue equipment, and rescue plan.
    - An employee with first-aid training must be on stand-by in the immediate vicinity of the manhole or vault entrance to render emergency assistance.
- Engulfment Hazards
  - Before an entry is performed, visually inspect confined spaces for potential engulfment hazards;
  - Pump out any accumulated water from the space before entry is made;
  - If there is a potential for flooding from an incoming feed pipe or valve, an appropriate lock-out/tag-out must be applied to prevent inadvertent filling.
- Entrant Generated Hazards
  - Certain maintenance and repair operations performed in confined spaces have the potential to generate their own hazards. Examples include:

  - The use of volatile cleaning, stripping, or coating chemicals that can pose toxicity, flammability, or oxygen displacement hazards;
  - Introduction of flames and other ignition sources through welding or cutting work; and
  - High potential exposures to silica and metal during sandblasting operations.
- Prior to making any confined space entry, the authorized entrant(s) and their supervisors must review the anticipated purpose of the entry and any planned work activities. Special attention must be given to evaluating and controlling hazards from in-space work activities (e.g., additional local exhaust or supply ventilation, changing chemical products to lower hazard materials, etc).

5.0 List of Associated Documents

- Non-Permit Confined Space Reclassification
- Alternative Procedures Confined Space Atmospheric Testing Form
- Confined Space Permit
- Confined Space Permit for Heat Stress

Appendix A: Procedures for Atmospheric Testing and Monitoring

Atmospheric testing is required for two distinct purposes:

1. Evaluation of hazards of the permit-required confined space; and
2. Verification that acceptable entry conditions for entry into the space exist.

Evaluation Testing
The atmosphere of a confined space must be analyzed using a calibrated multi-gas monitor before personnel are permitted to enter the space. The monitoring equipment must be of sufficient sensitivity and specificity to identify and evaluate any hazardous atmospheres that may exist or arise, so that appropriate entry procedures can be developed and acceptable entry conditions are stipulated for that space. A minimum of three tests must be performed to identify atmospheric hazards in confined spaces. These tests must be performed in the following sequence:

- Oxygen Content
- Flammability
- Toxicity

Verification Testing
The atmosphere of a permit space, which may contain a hazardous atmosphere, must be tested for residues of all contaminants identified by evaluation testing using permit specified equipment to determine that residual concentrations at the time of testing and entry are within the range of acceptable entry conditions. Results of the testing (i.e., actual concentration, etc.) must be recorded on the permit.

Duration of Testing
Measurement of values for each atmospheric parameter should be made for at least the minimum response time of the test instrument specified by the manufacturer.

Testing Stratified Atmospheres
When monitoring for entries involving a descent into atmospheres that may be stratified, the atmospheric envelope should be tested a distance of approximately 4 feet in the direction of travel and to each side. If a sampling probe is used, the entrant's rate of progress must be slowed to accommodate the sampling speed and detector response.

Equipment Calibration
To ensure that the atmospheric testing equipment is functioning properly, prior to using the equipment to enter a confined space, inspect the equipment and perform a function test/ bump test. If the equipment fails the bump test, a full calibration is required. A full calibration is also required to be performed every 6 months.

Note: All operations should be performed according to specific manufacturer's instructions.

Appendix B: Non-Permit Required Confined Space Entry Procedures

Step	Person	Action
1.	Entrant/Worker	Evaluate the confined space to determine that it qualifies as non-permit required and that no hazardous work[1] will be performed in the space. To have a permit-required confined space reclassified as non-permit required, complete a Non-Permit Confined Space Reclassification Form and submit to the appropriate safety office. Address any concerns with your supervisor.
2.	Entrant/Worker	Take precautions, as necessary. Precautions may include: • Install barriers/controls as needed; • Have a second worker positioned outside of the space as needed; • Post warning signs as necessary at the work location; • Take measures to prevent hazards from developing near the confined space; • Don any required personal protective equipment for the task.
3.	Entrant/Worker	• Ensure communication devices are operable such as two-way radio or cellular phone. • Perform authorized work

[1] Hazardous work includes painting, cleaning with acids or solvents, welding, brazing, torch cutting, sanding with power tools, sandblasting, breaking utility lines, using cryogenic gases, conducting work that involves reduction-oxidation reactions, or operating valves capable of releasing material, such as water or gas, in a quantity sufficient to engulf a person or create a hazardous atmosphere

Appendix C: Alternate Entry Procedures

Step	Person	Action
1.	Entrant/Attendant	Evaluate the confined space to determine that it qualifies for the use of alternate entry procedures. Address concerns with your supervisor.
2.	Entry supervisor	Confirm that entry conditions qualify for the selected entry method and ensure completion of the appropriate Alternate Entry Confined Space Procedures Form
3.	Entry supervisor	Ensure the atmospheric hazards and controls are understood by the entrant(s) and attendant
4.	Entrant/attendant	Secure the work site • Install barriers, control vehicular and pedestrian traffic as needed • Post warning signs as necessary at the work location • Take measures to prevent hazards near the confined space
5.	Entrant / attendant	• Ensure hazards are controlled before entry • Ensure atmospheric testing is conducted as necessary to determine that entry conditions remain acceptable • Ensure positive forced air ventilation is in place • Don any required personal protective equipment
6.	Entrant	Perform work as long as hazards are controlled as specified on the form • Any changes that introduce hazards require that the space be vacated. • New hazards must be re-assessed and a new entry method may apply. Re-entry is only allowed once all hazards are eliminated.
7.	Entrant / attendant	• Provide completed form to department supervisor once work is completed.
8.	Department supervisor / manager	Review form and keep on file for a minimum of one year.

Appendix D: Permit-Required Confined Space Entry Procedures

Step	Person	Action
1.	Controlling contractor, entry employer, and entry supervisor	Conduct pre-entry briefing: review hazards, procedures and precautions.
2.	Controlling contractor, entry employer, and entry supervisor	Determine if non-entry rescue can be performed. If it cannot, ensure an entry rescue plan and team are in place.
3.	Entry supervisor	Determine control measures for hazards associated with confined space entry.
4.	Entry supervisor	Verify that all required equipment, attendants, and entrants are available. At a minimum, equipment will include ventilation equipment, barriers and warning signs, and a gas monitor capable of measuring concentrations of oxygen, flammable gases, hydrogen sulfide, and carbon monoxide.
5.	Entry supervisor	Ensure the pre-entry process is documented on the Permit-Required Confined Space Permit or Permit-Required Confined Space Permit with Heat Stress (where applicable).
6.	Entry supervisor	Ensure that the atmosphere is ventilated as necessary and tested prior to entry using properly calibrated monitoring equipment that has been bump tested. Results for the following must be recorded on the permit: • Oxygen content • Flammability • Hydrogen sulfide • Carbon monoxide • Any other suspected or known atmospheric hazard When monitoring for entries involving a descent into atmospheres that may be stratified, test the atmospheric envelope a distance of approximately 4 feet (1.22 m) in the direction of travel and to each side. If a sampling probe is used, the entrant's rate of progress is slowed to accommodate the sampling speed and detector response. If at any time the oxygen concentration or other monitored components in the atmosphere fall out of their designated ranges, the cause must be determined and controls must be in place before entry is allowed.
7.	Entry supervisor	Secure the worksite as appropriate. • Eliminate any unsafe condition before the access door or cover is opened. • Installs barriers and/or controls for vehicular and pedestrian traffic as needed;

Step	Person	Action
		• Posts warning signs and any required permits at the work location; • Takes measures to prevent hazards near the space.
8.	Entry supervisor	Conduct pre-entry briefing for all personnel involved in the entry that includes at minimum these topics: • Work to be performed; • Anticipated hazards, including signs, symptoms and consequence of exposure; • Hazard control measures • Prohibited conditions (specified in the permit) • Rescue procedures.
9.	Entry supervisor	Verify that: • All control measures, procedures, equipment specified by the permit are in place; • Entry conditions are acceptable
10.	Entry supervisor	Sign the pre-entry certification section of the permit
11.	Entrant	Don any required personal protective equipment (PPE). Enter the permit space only if: • Listed on the permit; • Entry conditions are acceptable • All control measures and specified rescue provisions are implemented
12.	Entry supervisor	Verify acceptable entry conditions are maintained and that entry operations remain consistent with terms of the permit and the hazards associated with planned work.
13.	Attendant	• Maintain communication with the entrant(s) and performs no other duties that might interfere with his or her ability to observe and protect the entrant(s); • Control entry by remaining at the worksite and keeping an accurate accounting of entrants listed on the permit; • Continuously conduct atmospheric testing as long as entrants are within the space; • Do not become an entrant unless he/she has been trained in the duties of an entrant, is listed as an entrant and has been replaced by a qualified attendant.
14.	Entrant	Maintain communication with the attendant. Maintain readiness to exit if ordered by attendant.
15.	Attendant	Order entrant(s) to evacuate the space if one or more of the following occurs: • Detects a prohibited condition; • Observes any behavioral effects of exposure to any hazard;

Step	Person	Action
		• Identifies a nearby situation that may endanger the entrant(s); • Becomes unable to effectively and safely perform all required duties.
16.	Entry supervisor	Close or suspend the permit: • At the completion of the job • At the end of the work shift • When changes occur in the work conditions or methods that require additional controls • When changes occur that affect acceptable entry conditions
17.	Entry employer, entry supervisor and controlling contractor	Conduct a post-entry debriefing with entrants and attendants
18.	Entry employer, entry supervisor and controlling contractor	Document any of the following: • Hazards encountered and the means and methods used to control the hazards • Lessons learned Notify all affected employees that the space has been returned to operation (i.e. complete LOTO return to operation)
19.	Department supervisor / manager	Keep permit on file for a minimum of one year to facilitate review.