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1. PURPOSE

The purpose of this program is to protect University of Pennsylvania (Penn) workers against the hazards involved in confined spaces. Further, this procedure establishes the controls and responsibilities for entering, working in, and exiting confined spaces while complying with OSHA CFR 1910.146.

2. SCOPE

This program covers all Penn employees on the main campus who are required to enter confined spaces such as manholes, ducts, tanks, etc., which may potentially contain hazardous atmospheres and/or conditions. The Morris Arboretum and New Bolton Center Campuses are covered under their own programs.

3. REFERENCES

- 3.1. 29 CFR 1910.146 Permit Required Confined Spaces
- 3.2. Penn's Lockout/Tagout Program
- 3.3. Penn's Hot Work Program
- 3.4. ACGIH TLVs & BEIs 2012

4. DEFINITIONS

Attendant - a Qualified Employee stationed outside of the Permit-Required Confined Space who monitors the authorized entrant(s).

Confined Space - a space which:

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

Has limited or restricted means for entry or exit (some examples are tanks, boilers, manholes)

Is not designed for continuous employee occupancy.

Entrant or Authorized Entrant - a Qualified Employee or contractor who will enter the Confined Space. The entrant is trained on the procedures of the Confined Space Entry Procedures and is authorized by Penn to enter.

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

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Entry Permit - a written authorization to enter a Permit-Required Confined Space. It defines the conditions under which the permit space may be entered. It states the reasons for entering, identifies all hazards and identifies the Entry Supervisor.

Entry Supervisor - a Qualified Employee who is responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, authorizes entry (Does this mean that Penn will have a Penn person on all contractor entries?), oversees entry operations, and terminates entry when required.

Hazardous Atmosphere: An atmosphere that may expose employees to the risk of death, incapacitation, interfere with an individual's ability to escape unaided from a space, or cause acute illness from one or more of the following causes:

Flammable gas, vapors, or mists in excess of five percent (5%) of its Lower Explosion Limit (LEL).

Atmospheric oxygen concentrations below 19.5% or above 23.5%.

Atmospheric concentrations of any substance that could meet or exceed the permissible exposure limit as prescribed by OSHA standards. Review the MSDS sheets of all known substances contained within a space.

Any other atmospheric condition that is immediately dangerous to life or health (IDLH).

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

Non-Permit Confined Space - a Confined Space which does not contain or have the potential to contain a "Hazardous Atmosphere" or any hazard capable of causing death or serious physical harm.

Permit Required Confined Space (PRCS):

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 with the potential for engulfment of an entrant,
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or a floor which slopes downward and tapers to a smaller cross-section; or
- Contains any other recognized serious safety or health hazard.

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Any space meeting the above definition will be entered by permit only.

See Attachment A for a list of PRCS and their potential hazards.

Qualified Employee - an employee that has been trained on confined space entry procedures and the use of confined space equipment, air-monitoring equipment, and ventilation equipment.

Rescue Services – Philadelphia Fire Department

Stratified Atmosphere - an atmosphere where the contents have become "layered". Atmospheric testing may indicate different percentages of oxygen, explosive gasses, and hazardous contaminants at different levels.

5. RESPONSIBILITIES

5.1. **The Executive Director of Environmental Health and Radiation Safety or Designee**

- 5.1.1 Shall ensure that Penn personnel maintain compliance with this program.
- 5.1.2 Shall ensure that only trained employees assume roles and perform work in confined spaces in accordance with this program.
- 5.1.3 Ensures that an annual review of the overall effectiveness of the Confined Space Program/Procedures is conducted.

5.2 Supervisors

- 5.2.1 Are responsible for initiating and controlling this procedure on shift.
- 5.2.2 Ensure that the proper procedures for isolating all energy sources are followed and that all energy sources have been controlled.
- 5.2.3 Ensure Entry Supervisors are inspecting work in spaces to ensure adherence to procedures.
- 5.2.4 Train employees for confined space operations.

5.3 Entry Supervisors

- 5.3.1 Be trained to be aware of hazards of the space to be entered, and signs, symptoms, and consequences of exposure, and specific space control procedures.
- 5.3.2 Execute all requirements of this instruction before work begins within a confined space.

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5.3.3 Authorize entry into a confined space when acceptable entry conditions have been met.

5.3.4 Ensure that all personnel entering and leaving the confined space are accounted for.

5.3.5 A Confined Space Entry Permit is valid for a period not to exceed one work shift.

5.3.6 The entry supervisor shall terminate entry and cancel the entry permit when:

5.3.6.1 The entry operations covered by the entry permit have been completed or

5.3.6.2 A condition that is not allowed under the entry permit arises in or near the permit space.

5.3.7 Canceled Penn entry permits shall be retained by Penn for at least one year to facilitate the review of the PRCS program. Any problems encountered during an entry operation shall be noted on the pertinent permit so that appropriate revisions to the program can be made.

5.3.8 Ensure any re-energization of equipment is conducted following Penn's Lock-out/Tag-out Program.

5.3.9 Verify that rescue services have been identified and that means for summoning them are operable.

5.3.10 Prohibit unauthorized individuals from entering the permit space during entry operations.

5.4 Entrants

5.4.1 Be trained to know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.

5.4.2 Use all equipment as required by this instruction and the specific permit space entry procedures.

5.4.3 Communicate with the attendant as necessary to enable the attendant to alert entrants of the need to evacuate the space as required by this instruction and for attendant to be able to monitor status of entrants.

5.4.4 Alert the attendant whenever:

- The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or

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- The entrant detects a prohibited condition.

5.4.5 Exit from the confined space as quickly as possible whenever:

- Order to evacuate is given by the attendant or the entry supervisor.
- The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or the entrant detects a prohibited condition or an evacuation alarm is activated.

5.5 **Attendants**

5.5.1 Be trained to know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.

5.5.2 Be aware of the possible behavioral effects of hazardous exposure in authorized entrants.

5.5.3 Continuously maintain an accurate count of authorized entrants in the permit space and ensure that the means used to identify authorized entrants in the permit under this procedure is accurate.

5.5.4 Remain outside the permit space during entry operations until relieved by another attendant. Attendants shall never monitor more than one Confined Space.

5.5.5 Communicate with authorized entrants as necessary to monitor entrant status and to alert entrant of the need to evacuate the space if conditions warrant.

5.5.6 Initiate onsite rescue procedures and if necessary, summon additional rescue and other emergency rescue services when self-rescue is not possible.

5.5.7 Perform no duties that might interfere with his/her ability to monitor and protect the authorized entrants.

5.5.8 Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space.

5.5.9 Warn unauthorized persons to stay away and advise those who may have entered the permit space that they must leave.

5.5.10 Inform authorized entrants and Entry Supervisor of unauthorized persons.

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6. GENERAL INFORMATION

6.1. General Rules

6.1.1. When practical, all permit required confined spaces shall be permanently marked, or the hazard information may be shared by any other equally effective means. ([1910.146\(c\)\(2\)](#))

When signs are used they shall be at each opening of the permit required confined space. Signs should contain the following text or similar language:

**DANGER – PERMIT REQUIRED CONFINED SPACE
DO NOT ENTER**

6.1.2. All confined spaces where there is an opening that can easily be walked into (floor openings, manhole openings, etc.) shall have a physical barrier (guardrail, gate, etc.).

6.1.3. When required, isolating energy sources to the confined space shall be performed in accordance with Penn’s Lockout/Tagout Program.

6.1.4. If “hot work” conditions exist, precautions shall be taken in accordance with Penn’s Welding, Cutting, and Hot Work Program. Cylinders of compressed gases are never permitted in a confined space.

6.1.5. No smoking is permitted in a Confined Space or near the entrance/exit area.

6.1.6. Air monitoring is required before entering any PRCS.

6.1.7. Portable electrical equipment used in Confined Spaces, which have wet surfaces, shall be supplied power through a ground fault interrupter or be battery powered.

6.2. **Confined Space Personnel** - The following individuals are required when entry into a PRCS is necessary. Employees shall receive the appropriate level of training before entry into the Confined Space is permitted. Note: An attendant can also act as an entry supervisor if properly trained.

6.2.1. Entry Supervisor

6.2.2. Attendant

6.2.3. Entrant(s)

7. PROCEDURE

7.1. Confined Space Entry Permit

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- 7.1.1. Before entry is authorized, the entry supervisor shall document the safety measures taken in order to enter the PRCS by preparing a Confined Space Entry Permit (See Attached).
- 7.1.2. Before entry begins, the entry supervisor identified on the permit shall complete and sign the entry permit to authorize entry. Acceptable entry conditions must be met in order for entry to be authorized.
- 7.1.3. The completed permit shall be made available at the time of entry to all authorized entrants, by posting it at the entry portal or by any other equally effective means; so that the entrants can confirm that pre-entry preparations have been completed.
- 7.1.4. The duration of the permit may not exceed the time required to complete the assigned task, the job identified on the permit or one work shift.
- 7.1.5. The entry supervisor shall terminate entry and cancel the entry permit when:
 - 7.1.5.1. The entry operations covered by the entry permit have been completed or
 - 7.1.5.2. A condition that is not allowed under the entry permit arises in or near the permit space.
- 7.1.6. Canceled entry permits shall be retained, by FRES for at least one year to facilitate the review of the PRCS program. Any problems encountered during an entry operation shall be noted on the pertinent permit so that appropriate revisions to the program can be made.

7.2. **Air Testing**

- 7.2.1. The only equipment used to conduct Air Testing shall be that which is provided and/or approved by Penn.
- 7.2.2. The atmosphere within the space will be tested to determine whether dangerous air contamination and/or oxygen deficiencies exist. Direct reading instruments, detector tubes, alarm only gas monitors and explosion meters are examples of monitoring equipment that may be used to test confined space atmospheres. Employees who have successfully completed air-monitoring training for the type of monitor they will use shall perform the air testing. Air testing equipment shall be calibrated (bump tested using span gas) and certified according to the manufacturer's recommendations. Calibration records shall be kept.
- 7.2.3. The minimum parameters to be monitored are oxygen deficiency, LEL and, if applicable, contaminants that may be present which are over OSHA's PELs. When testing for atmospheric hazards, first test for oxygen content, then for flammable gases or vapors and lastly for toxic gases or vapors. The initial air readings shall be recorded on the Permit and kept at the work site for the duration of the job. The employees shall be able to review the testing results.

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7.2.4. Air Testing Procedures. Prior to atmospheric testing, check air readings outside of the Confined Space to ensure proper operation of the instrument and that air readings are within normal ranges. Record Air test readings on the Permit.

7.2.4.1. Air testing for Confined Spaces having a top entrance (manholes, tanks, etc.):

- From each entrance, drop the sampling probe of the Meter to the bottom of the space. Additionally, use other available openings, which would facilitate air testing for that confined space.
- Slowly raise the sampling probe, stopping at intervals of two feet to ensure that the atmosphere is not stratified. The rate of sampling shall be slowed to accommodate detector response due to the length of the sampling line and probe.
- Record air testing data on the confined space permit.
- The Entry Supervisor shall review Air Testing results with both the Attendant and the Entrants before entry is made.

7.2.4.2. Air testing for Confined Spaces having a side or bottom manway (ducts, tanks, etc.):

- From each entrance, move the sampling probe of the Meter to the opposite side of the space. Use rods, poles or other means to extend the probe to the opposite side of the space.
- Slowly test all areas inside the Confined Space. The rate of sampling shall be slowed to accommodate detector response due to the length of the sampling line and probe.
- Record air testing data on the confined space permit.
- The Entry Supervisor shall review Air Testing results with both the Attendant and the Entrants before entry is made.

7.2.4.3. Upon initial entry, all areas that could not be tested from the manway shall be tested. Slowly test the areas with the sampling probe out in front of you, checking all areas that were missed.

7.2.5. If there are no non-atmospheric hazards present and if the pre-entry tests show there are no dangerous air contamination and/or oxygen deficiency within the space, entry into and work within the space may proceed.

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7.2.6. The atmosphere within the space shall be continuously tested to ensure no accumulation of a hazardous atmosphere. Air monitoring shall be performed at the actual work location in the confined space. The results of this monitoring shall be documented on the confined space permit, at a frequency established by the Entry Supervisor. Employees will be provided the opportunity to observe the air monitoring of a space.

7.2.7. The workers will immediately leave the permit space and notify their supervisor and EHRS @ (215) 898-4453, when any of the gas monitor's alarm set points are reached as defined. After a suitable ventilating period, repeat the testing. Entry may not begin until testing has demonstrated that the hazardous atmosphere has been eliminated and EHRS approves.

7.3. **Entry Procedures**

7.3.1. Prior to entry into a confined space, The Entry Supervisor will conduct a job review to discuss the safe entry procedures with the personnel involved. The required equipment will be assembled and instructions will be conveyed to those involved in the entry; procedures will be discussed; and hazards, which may be encountered, will be explained. The Confined Space Hazard Evaluation contained in Attachment A must be reviewed and the acceptable entry conditions must be met in order for entry to be authorized:

7.3.1.1. Specifying acceptable entry conditions,

7.3.1.2. Isolating the permit space,

7.3.1.3. Purging, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards,

7.3.1.4. Providing pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards and

7.3.1.5. Verifying that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry.

7.3.2. Retrieval and rescue equipment is required for entry into the permit required confined spaces. The use of a harness is not required if it will create a greater hazard to the wearer.

7.4. **Heat Hazard Assessment and Abatement Procedures**

It is the intent of Penn to isolate confined space steam hazards using the double block and bleed method, whenever practical. If the confined space can be isolated using double block and bleed without a significant impact to operations, the supervisor shall ensure this process is completed. When double block and bleed is not practical, the supervisor shall discuss means to abate the hazards associated with the work with EHRS to determine the method of isolation for the confined space.)

7.4.1. Prior to entry into a Steam Manhole, the Entry Supervisor shall conduct a Heat Hazard Assessment to determine the heat hazards present or likely to become present during the work activity. Results of the assessment and methods to abate shall be recorded on the Confined Space Entry Permit (Attachment A).

7.4.2. The following procedure shall be followed to assess the hazards associated with heat and heat stress in manholes:

7.4.2.1. Assessment of heat conditions using Penn provided equipment:

- Pit Temperature
- Ambient Temperature
- Ambient Wet Bulb Temperature

7.4.3. In order to establish acceptable conditions for entry, the following hazards and methods to abate these hazards shall be determined and recorded on the Confined Space Entry Permit:

7.4.3.1. Heat Stress: Guidelines for Work in Hot Environments

- Use of Ventilation
- Training of employees on recognizing symptoms of heat stress
- Cool beverages available
- Establish time limitations in the confined space based on acclimatization

7.4.3.2. Exposed Steam Pipes:

- Method of isolation and cool-down of pipes
- Use of Insulating Blankets or other Barrier Devices
- Other means to abate

7.4.3.3. Steam Leaks:

- Method of Isolation
- Use of Barrier Devices
- Other means to abate

7.4.3.4. Other hazards not listed, but present:

- How to abate the hazard

7.5. **Alternative Procedures**

7.5.1. After approval by EHRS, alternative entry procedures may be used in the following circumstances:

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7.5.1.1. The only hazard posed by the permit space is an actual or potential hazardous atmosphere.

7.5.1.2. The employer can demonstrate that continuous forced air ventilation alone is sufficient to maintain the permit space safe for entry. Concentrations in air must be below 50% of established permissible exposure levels.

7.5.1.3. The employer develops monitoring and inspection data that supports the demonstration that continuous forced air ventilation alone is sufficient to maintain the permit space safe for entry.

7.5.2. The atmosphere within the space shall be continuously monitored to ensure that forced air ventilation is preventing the accumulation of a hazardous atmosphere.

7.5.3. Training shall be provided to the employees who enter permit spaces under the alternative procedures and to the employer's representatives who verify that permit spaces are safe for entry under the alternative procedures.

7.5.4. The Attendant and Entry Supervisor are not required by the Alternative Procedures nor is retrieval and rescue equipment.

7.5.5. The Entry Supervisor is responsible for documenting the basis for determining that all atmospheric hazards in the permit space have been eliminated or controlled through a certification that contains the date, the location of the space, any air sampling data to support this and the signature of the Entry Supervisor making the determination. This certification shall be made available to all employees involved.

7.5.6. See Appendix B for alternate entry procedures.

7.6. Reclassifying a Permit Required Confined Space

7.6.1. A space classified as a PRCS may be reclassified as a non-permit confined space under the following procedures.

7.6.2. If the PRCS poses no actual or potential atmospheric hazards or if all hazards within the space are eliminated without entry into the space and without the use of forced ventilation, the permit space may be reclassified as a Non-Permit Confined Space for as long as the non-atmospheric hazards remain eliminated.

7.6.3. If it is necessary to enter a PRCS to eliminate a hazard or to test for atmospheric hazards, such entry shall be completed under a confined space permit.

7.6.4. Once the space is reclassified, it may be treated as a Non-Permit Confined Space for the duration of the work being performed. The permit is no longer required as well as the attendant, supervisor, retrieval and rescue equipment. Air monitoring should be conducted each day before entering the non-permitted space. Once a job is complete, the space reverts to a PRCS.

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The Entry Supervisor is responsible for documenting the basis for determining that all hazards in the permit space have been eliminated through a certification that contains the date, the location of the space, any air sampling data to support this and the signature of the Entry Supervisor making the determination (the use of a confined space entry permit will meet this requirement). The Supervisor will sign on the permit that the space has been reclassified, as non-permit required. This certification shall be made available to all employees involved.

7.7. Contractors

7.7.1. At a minimum, Contractors must follow the requirements of OSHA’s Confined Space requirements.

7.7.2. Penn will provide Contractors: information on all PRCS to be entered, and the potential hazards associated with the Confined Space.

7.7.3. Contractor employees must be trained in confined space entry. Contractors that are required to enter a Confined Space must attest that their employees have been trained in accordance with 29 CFR 1910.146.

7.7.4. Penn’s Contractor Representative will communicate to the Contractor, the requirements of this program and potential hazards they may encounter inside the confined space and the surrounding area. Contractor Training should be documented.

7.7.5. Penn will coordinate efforts anytime an employee and a Contractor(s) employee(s) are simultaneously entering a space. If multiple contractors/employees are going to be occupying the same area, the following shall take place:

- A pre-job briefing shall be conducted involving all pertinent work groups. This briefing shall include the requirement of a separate air monitoring and permitting for each contractor, means to prohibit unauthorized/accidental entry, known hazards associated with the space, means to abate those hazards, and procedures for emergency response.
- A review of Penn’s Lock-out/Tag-out Program and requirements for its use.
- Identification of all Entry Supervisors, Attendants, and Entrants.
- Means of communication between work groups, including signaling for evacuation.
- A collective debriefing between all work groups at the closing of each permit day.

8. CONFINED SPACE RESCUE

8.1. In the event of an emergency of any type in the confined space, entrants in the space shall evacuate as quickly as possible. Injured employees are encouraged to use self-rescue when applicable.

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8.2. If rescue from within the confined space is required, the attendant should immediately call **PennCOM, (215) 573-3333 or 911 from a cell phone.** Inform the PennCOM Operator that rescue is needed from a confined space. Give PennCOM the location, the type of confined space, and the hazards associated with the space. After a rescue response confirmed, the Attendant shall notify their Supervisor and EHRS .

8.3. Under no circumstances will a Confined Space Attendant enter a confined space during rescue. Their responsibility is to ensure that the rescue team arrives at the correct location and receives all information regarding the confined space and the circumstances surrounding the need for rescue.

8.4. Rescue personnel shall follow their own procedures for confined space entry.

9. TRAINING

9.1. All personnel involved with confined space activities shall receive training consistent with their duties. Employees will receive training in order to acquire the understanding, knowledge and skills necessary for the safe performance of the duties assigned under this program.

9.2. Training shall be provided to each affected employee that may be designated as a supervisor, entrant or attendant:

9.2.1. Before the employee is first assigned duties,

9.2.2. Before there is a change in assigned duties,

9.2.3. Whenever there is a change in confined space operations which presents a hazard to an employee who has not been previously trained and

9.2.4. Whenever the employer has reason to believe that there are deviations from the confined space entry procedures or that there are inadequacies in the employee's knowledge or use of these procedures.

9.2.5. The training shall establish employee proficiency in the duties required and shall introduce new or revised procedures, as necessary, for compliance.

9.3. Training content shall include:

9.3.1. Duties of Entry Supervisor, Entrant and Attendants,

9.3.2. Penn's Confined Space Program and other procedures relating to Confined Space Entry (Lockout/Tagout, Hot Work, etc.),

9.3.3. Hazards of Confined Spaces,

9.3.4. Use of Air Monitoring Equipment,

9.3.5. Use of ventilation equipment,

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9.3.6. Emergency Action & Rescue Procedures,

9.3.7. Confined Space Entry Equipment, including Personal Protective Equipment and

9.3.8. Requirements of 29 CFR 1910.146 Permit Required Confined Spaces.

10. DOCUMENTATION

- 10.1. Penn shall retain each canceled entry permit for at least one year to facilitate the review of the PRCS program. EHRS will conduct and document this review. One single annual review of the Confined Space Entry Program shall be conducted covering all entries from the previous 12 months. This review shall be conducted to evaluate the effectiveness of the program, identify changes in the work environment that will affect future permits, and ascertain the need for changes in procedure. If there has been no entry in the previous 12 months, no review is necessary; however, documentation shall be completed to certify this non-entry status.
- 10.2. Training documentation shall be kept for all affected employees. Training rosters shall indicate the employee's name, date, level of training (supervisor, entrant, and/or attendant) and the instructor who performed the training. EHRS shall maintain all training records.
- 10.3. Calibration and/or certification of air monitoring instruments shall be conducted in accordance with the manufacturer's recommendations. EHRS shall conduct calibration, maintain records, and periodically inspect the calibration records to ensure completion.
- 10.4. The Confined Space Procedure will be reviewed annually or when Penn has reason to believe that measures taken may not protect employees or contractors that enter a space.

Appendix A

CONFINED SPACE ENTRY PROCEDURE

JOB PLANNING MEETING

- 1) Prior to entry into a confined space, personnel involved with the job will discuss the procedures that will be followed, so that the confined space work will be completed safely. The required equipment will be assembled; instructions will be conveyed to those involved in the entry; procedures will be discussed; and hazards, which may be encountered, will be explained. The attendant should ensure that any ignition source taken into the confined space is limited to ones required to perform the necessary work. Each location may have different hazards.
- 2) All necessary equipment to be used for entry will be assembled by the attendant, including communication devices (radios, if required) to be used to quickly summon Rescue Personnel

ENTRY PROCEDURE

- 1) Follow Penn's Lockout/Tagout procedures to isolate any potential hazardous sources, which will adversely affect those working in confined space.
- 2) Open sufficient manhole covers, doors, vents, or other openings in the confined space.
- 3) Where necessary, use ventilators to change the air in the confined space.
- 4) A Qualified Employee will test the air for oxygen content, flammable and toxic gases (See Section 6.2). Initial air monitoring data will be recorded on the confined space permit. (See Attached Confined Space Permit)
 - a) Oxygen must be between 19.5% and 23.5%
 - b) Flammable/Explosive gases must be below 5% Lower Explosive Limit (LEL)
 - c) Toxic gases/vapors must be below OSHA's Permissible Exposure Limits
- 5) The Entry Supervisor will assign a trained Attendant to control entry into the confined space.
- 6) The Attendant will ensure that all Entrants are authorized; keep an accurate count of all who enter; continually communicate with those within the confined space; watch out for the well-being and safety of all entrants; and stay until relieved. Attendants will verify that all Entrants sign the Permit prior to entry.
- 7) If all is clear in step 6, the Entry Supervisor will authorize entry. Continuous forced ventilation should be used when required. Continuous air monitoring shall be conducted and recorded periodically on the back of the permit when required.
- 8) If work is stopped for any reason, the air tests shall be re-taken if deemed necessary by the Entry Supervisor, prior to re-entry.
- 9) When the job has been completed, the Attendant will account for all Entrants before they leave the job site.
- 10) The Entry Supervisor will check to ensure that all personnel are out, all equipment is clear, and when he is satisfied with the site conditions, he/she can close out the confined space entry permit, prior to allowing the Confined Space to be sealed.

Appendix B ALTERNATIVE ENTRY PROCEDURES

This Appendix lists the alternative entry procedures. It may be used as a checklist when permit space entry by the alternative procedures is allowed. The signature of the employer's representative verifies that the space is safe for entry. This certification shall be made before entry and shall be available to each employee entering the space.

Alternative entry procedures may be used in the following circumstances. The only hazard posed by the permit space is an actual or potential hazardous atmosphere. The employer can demonstrate that continuous forced air ventilation alone is sufficient to maintain the permit space safe for entry, and the employer develops monitoring and inspection data that supports the demonstration that continuous forced air ventilation alone is sufficient to maintain the permit space safe for entry.

Permit Space Location: _____ Date: _____

1. Eliminate any conditions making it unsafe to remove an entrance cover. List the hazards and precautions:
2. When the entrance covers are removed, promptly guard the entrance to prevent accidental falls through the opening and to protect the entrants from foreign objects. Describe the guards to be erected:
3. Before an employee enters the space, test the internal atmosphere for the following conditions, in the order given, and record below. List the acceptable range for the potential toxic air contaminants.

Oxygen Content: _____	Acceptable Range 19.5% to 23.5%
Flammable Gas and Vapors: _____	0% to 5% LEL
Toxic Air Contaminants (____): _____	0 to 50% of PEL
4. Provide continuous forced air ventilation as follows:
 - An employee may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere.
 - Forced ventilation is so directed as to ventilate the immediate areas where an employee is or will be present within the space and shall continue until all employees have left the space.
 - The air supply for the forced air ventilation is from a clean source and does not increase the hazards in the space.
5. Continuous monitoring will be conducted. Employees must evacuate the space if the oxygen content drops below 19.5%, the flammable gas or vapor concentration is at or above 5% of the LEL, and the toxic gases or vapor concentration exceeds 50% of the PEL.
6. If a hazardous atmosphere is detected during entry, each employee shall leave the space immediately; the space shall be evaluated to determine how the hazardous atmosphere developed; and measures shall be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place

I, _____, certify that these procedures have been followed and that the confined space is safe for entry.

Entry Supervisor: _____
Signature Date

PENN

Attachment A Confined Space Inventory

CONFINED SPACE LOCATION	DESCRIPTION	HAZARDS	SPACE LABELED	SAFETY REQUIREMENTS / PPE
Steam Manholes	Pits containing steam line	Atmospheric High Pressure Steam Heat Stress	Caution Confined Space Permit Required	Follow Confined Space Entry Permit Procedure Lockout/Tagout
Electrical Manholes	Pits containing electrical lines	Atmospheric Electrical Heat Stress	Caution Confined Space Permit Required	Follow Confined Space Entry Permit Procedure Lockout/Tagout
Air Handling Units	Without Energy recovery units	Mechanical	No	Lockout/Tagout
Air Handling Units	With Energy Recovery Units (BRB2/3, Johnson, CRB, Stellar Chance, Rosenthal)	Chemical/ Radiological Mechanical	Danger Do Not Enter Follow Service Procedure	Follow specific unit's entry procedure
MOD 6	ICE TANK PIT	Asphyxiation	Danger Permit Required Confined Space Do not enter	Follow Confined Space Entry Permit Procedure Lockout/Tagout
Sump Pit		Atmospheric		Lockout Tagout Follow Confined Space Entry Permit Procedure

Penn CONFINED SPACE ENTRY PERMIT

(Complete Prior to Entry)

I. ENTRY DESCRIPTION

Confined Space Location/Number: _____

Purpose of Entry: _____

Date Permit Issued: _____ Time of 1st Entry: _____ Time Out: _____

Permit Expires: _____

Any Equipment in need of repairs must be reported to the Supervisor who will take proper steps to have repairs made immediately.

II. ENTRY TEAM MEMBERS

NAME: (List First & Last Name Below)	TRADE
Attendant:	
Entrant:	
Entrant:	
Entrant:	
Entrant:	

III. ATMOSPHERIC TESTING

Has the Air Monitoring Device been calibrated within the last year? YES/NO Battery Checked? YES/NO

Location in the Space	% O ₂	% LEL	CO ppm	H ₂ S	Initials of Tester
Prior to Entry (At opening)					
Middle					
Bottom					
Acceptable Limits*	19.5 –23.5%	Below 5%	Below 25 ppm		

* Continuous monitoring may be required. Site-specific conditions may require entrant to wear a monitor.

** Contact EHRS (215-898-4453) if any reading exceeds the acceptable limit.

IV. SAFETY CHECKLIST (Initial each item when completed)

- _____ 1. Establish communication from worksite with PENNCOM using # 511 from phone (direct line 215-573-3333).
- _____ 2. Barricades in position.
- _____ 3. Establish continuous ventilation/monitoring if required.
- _____ 4. Method of communication established between entrants and attendant (List How: _____)
- _____ 5. Escape Harness, Tripod, and Winch Available. Date of last Tripod Certification: _____.
- _____ 6. Lock-out/tag-out completed (if required). Permit #: _____.
- _____ 7. Appropriate PPE Worn (Check all that must be worn).

_____ Harness _____ Hard Hat _____ Gloves _____ Hearing Protection

_____ Foot Protection _____ Personal Monitor _____ Eye Protection _____ Other

- _____ 8. Lighting
- _____ 9. Heat Conditions Assessed: - Pit Temp: _____ Ambient Temp: _____ Ambient Wet Bulb Temp: _____
- _____ 10. Others (List): _____

V. INSTRUCTIONS FOR ACCEPTABLE ENTRY

1. Exposed Steam Pipes: How will this hazard be abated?
 - a. Isolation and cool-down of Pipes: (Method) _____
 - b. Insulated Blankets/Barrier Devices. _____
 - c. Other: (Explain) _____

2. Steam Leaks: How will this hazard be abated?
 - a. Isolation: (Method) _____ b.
 - Barrier Devices: _____ c.
 - Other: (Explain) _____

3. Heat Stress: How will this hazard be abated?
 - a. Ventilation Installed? YES/NO
 - b. Employees trained on recognizing symptoms of heat stress? YES/NO
 - c. Cold Gatorade and/or Cold Water available? YES/NO
 - d. Time limitations in Confined Space? YES/NO. If YES, indicate: _____

4. Other: _____ How will this hazard be abated? (Explain) _____

VI. AUTHORIZATION FOR ENTRY

Entry Supervisor (Print Name): _____ Signature: _____ Date: _____

OR: Entry into this Confined Space can be completed using *Alternative Method Procedures*:

Entry Supervisor (Print Name): _____ Signature: _____ Date: _____

OR: The above Confined Space has been reclassified to *Non Permit Required*:

Entry Supervisor (Print Name): _____ Signature: _____ Date: _____

VII. Record of Entry

Entrant's Name	Time In	Time Out	Time In	Time Out	Time In	Time Out	Time In	Time Out	Time In	Time Out

THIS FORM SHALL BE RETAINED BY THE SUPERVISOR FOR ONE (1) YEAR FROM DATE OF ISSUE