Confined Space Plan

Department of Environmental Health and Safety

EHS Standard Operating Procedure- 3.5

1.0 PURPOSE

The purpose of this program is to establish procedures for safe working practices and for safe entry of confined spaces.

2.0 SCOPE

The Confined Space Entry (CSE) program applies to the safe working practices for entering and working in confined spaces. A confined space is a space large enough for a person to physically gain entry, but with limited means of egress, and is a space not designed for continuous occupancy. These spaces may also contain a variety of hazards which may cause injury or death.

This program specifically outlines the definitions, procedures, and training requirements to be utilized by Millersville University employees to prevent accident which may cause injury or death, when entering or working in a confined space. It is the duty of each employee to become familiar with the contents of this program and ensure compliance with its procedures. Heads of departments shall ensure that employees under their supervision comply with this procedure and follow confined space entry safety protocols. Heads of departments shall ensure that employees under their supervision receive training in the contents of this program and ensure records of this training are maintained.

The CSE program applies to all employees, contractors, or other individuals whose job duties require them to work directly in confined spaces.

3.0 DEFINITIONS

Attendant: Employees stationed outside one or more confined space entry points to monitor the Authorized Entrant and who performs all Attendant duties.

Authorized Entrant: An employee authorized by the University to enter a confined space.

Confined Space: A space that is large enough and so configured that a person can bodily enter and perform assigned work and has limited or restricted means of entry and exit and is not designed for continuous occupancy. Examples of confined spaces include storage tanks, sub-cellars, bins, boilers, septic tanks, sewers, utility tunnels, chimneys, ducts, and wells. A confined space can also be open topped, especially if it is four feet or more in depth.

Confined Space Qualified: A confined space qualified person is an employee who has had confined space training and is familiar with:

I. the recognition of hazards associated with entry into confined spaces

II. procedures for use of entry permits

III. atmospheric testing techniques and methods

IV. interpretation of atmospheric test results

V. ventilation methods and equipment

VI. use of personal protective equipment

VII. safe work practices

VIII. rescue techniques and equipment

IX. use of respirators

Entry: The action by which a person passes through and opening into a confined space.

Entry Permit: A written document provided by the University to control entry into a permit required confined space.

Entry Supervisor: A person responsible for determining if acceptable entry conditions are present at a permit required confined space, for authorizing and overseeing entry operations, and for terminating entry operations.

Hazardous Atmosphere: An atmosphere that may exposure an employee to risk of death, incapacitation, impairment of ability to self-rescue, injury nor acute illness from either:

I. Flammable gases, vapors or mists.
II. Airborne combustible dust.
III. Insufficient oxygen concentration (below 19.5% oxygen) or excessive oxygen concentration (above 23.5% oxygen).
IV. Atmospheric concentrations of a chemical or other agent for which there is dose or permissible exposure limit.
V. Any Immediately Dangerous to Life and Health (IDLH) atmosphere.

Immediately Dangerous to Life and Health (IDLH) Atmosphere: Maximum concentration of a contaminant from which a person could escape within 30 minutes without any escape-impairing symptoms or irreversible health effects.

MSA Passport: The confined space entry testing device also referred to as a combustible gas meter. This instrument is used to test the atmosphere in the confined space prior to, and during entry.

Non-Permit Required Confined Space: A confined space, which is completely free of hazards and can be so proven without entering the space. The entrant must be a qualified person and would be able to work alone with no safety attendant

required. A confined space can only be designated a non-permit required confined space by the Office of Environmental Health and Safety.

Permit Required Confined Space: A confined space that has one or more of the following characteristics:

I. Contains, or has the potential to contain, a hazardous atmosphere.
II. Contains a material that has the potential for engulfing an entrant.
III. Has an internal layout such that someone entering could be trapped or asphyxiated by inwardly converging walls or a floor that slopes downward and tapers to a smaller cross section.
IV. Contains any other recognized serious safety or health hazard.

Testing: The process by which the hazards that may confront entrants into confined spaces are identified and evaluated.

4.0 PRE-ENTRY PROCEDURES

I. **Complete the pre-entry checklist and permit form.**

a. The Entry Supervisor must authorize the permit (the entry) and sign off on the permit form.
b. Cancel the permit after the CSE operations are complete.

II. **Provide the necessary safety equipment to perform permit-required confined space entry. This equipment shall include, but not be limited to the following:**

a. The permit and checklist form
b. Calibrated testing and monitoring equipment (the MSA Passport)
c. Ventilation equipment (fan, motor, blower, tubing, electrical extension cords)
d. Communication equipment (walkie talkie)
e. Personal protective equipment as necessary (gloves, hardhat, eye protection, hearing protection respiratory protection)
f. Lighting equipment (explosion proof and intrinsically safe)
g. Barriers, warning signs to protect opening.
h. Manhole cover lifting device.
i. Ladders
j. Rescue equipment (tripod, winch, lanyards, fall arrestor, etc.)

III. **Isolate and secure the confined space and the environment.**

a. De-energize all electrical equipment, lock out and tag out, release any stored energy.
b. Close all valves, lock and tag.
c. Place appropriate barricades and warning signs around the entrance to the space (to prevent pedestrians from falling in)
d. Isolate and secure any other known hazard inside or feeding to the confined space, prior to entry.

IV. **Perform initial atmospheric monitoring.**

a. Safely remove the cover (manhole) to the confined space.
b. Make sure the MSA` Passport testing device is calibrated and operating properly. Put the instrument through it's start up and internal calibration procedures. If the instrument is not working properly do not enter the confined space. Contact the EHS office for assistance.
c. Test the atmosphere using the instrument and the extension probe. Move the probe around inside the space so that it reaches all levels (i.e., face of the opening, one foot down, two feet down, three feet down, etc.). Hold the probe at each level for a minimum of one minute to obtain an accurate reading.
d. If the confined space entry meter should alarm do not enter the space. Allow the meter to clear itself in clean air then re-test. If the instrument alarms again, call EHS.
e. Carefully watch the readings at each level. Write down the readings on the checklist for each contaminant (Combustibles/LEL, CO, H2S, oxygen). If the readings begin to increase (or decrease) towards unsafe levels, contact the EHS office before entering.
f. If there are suspected hazards which the MSA` Passport will not sample for, contact the EHS office prior to entry. The EHS office will provide additional sampling devices, techniques, and methods as necessary.

V. **Ventilate the confined space as required.**

a. If a hazardous atmosphere has been identified entry will not be permitted until the space has been ventilated and the hazard removed and controlled.
b. Direct the mechanical ventilation into the immediate area where the employee will be working
c. Provide continuous forced air ventilation to the space until the hazard has been eliminated
d. Maintain the mechanical ventilation in the space until all employees have exited. The air supply for the forced mechanical ventilation must be from a clean source. Locate the blower and motor at least 5 feet from the opening
e. Lower the supply air hose (duct) no more than 25% of the depth of the hole. Purge the air in the space for at least 10 minutes prior to entry.
f. Locate the air intake of the blower away from sources of vehicle exhaust
g. Retest the atmosphere to make sure the hazard has been eliminated and the mechanical ventilation has been successful at controlling the hazard. Employees may not enter the space until the atmosphere has been retested.

VI. **Designate confined space entry roles.**

a. Designate who will be the Authorized Supervisor, Authorized Entrant, Attendant, and any other persons assisting in the entry. Make sure everyone understands their responsibilities and roles.
b. Develop and Implement Emergency and Rescue Procedures
c. Emergency rescue (retrieval) systems are required for any permit-required confined space entry.
d. Make sure the retrieval line (cable) is attached to the harness above the Entrant's head at the upper part of the back, shoulder level.

e. Attendants must make sure the cable is properly connected to the Entrants harness, check the fall arresting device and winch to make sure it is operating properly, check to make sure the tripod is sturdy and well positioned above the space, and all other measures necessary to ensure retrieval of the Entrant in an emergency.
f. The Attendant must wear a harness with the lanyard attached to the tripod as a secondary means of protection (to prevent the Attendant from falling into the space during rescue operations).
g. The Attendant must ensure warning signs and barricades are posted around the confined space and only authorized individuals are near the entrance.
h. The Attendant must monitor the mechanical ventilation system (if it is operating and ventilating atmosphere in the space).
i. The Attendant always remains in visual and voice contact with the Entrant.

5.0 PERMIT-REQUIRED ENTRY PROCEDURES

Those entering a permit-required confined space must complete the CSE Permit form and follow the checklist on the form, to ensure necessary precautions have been taken, prior to entry. Entry Supervisors are required to authorize a permit and the Supervisor or Authorized Entrant must complete the form, prior to entry. Keep copies of the permit form in the FM or EHS departments.

5.1 DUTIES OF AUTHORIZED ENTRY SUPERVISOR

I. Know the hazards that may be faced during entry.
II. Verify by checking that the permit is complete, that testing and monitoring has been performed, that all procedures and equipment specified by the permit are in place, operational, and being used properly, before endorsing the permit and allowing entry.
III. After procedures are complete, terminate the permit.
IV. Verify that rescue services are available and there is a means for summoning them. Make sure unauthorized individuals are removed from the area.
V. If the responsibility for entry operation is transferred to other individuals, make sure the safety of the entry operations remain consistent with the procedures listed in the permit.

5.2 DUTIES OF AUTHORIZED ENTRANTS

I. Know the hazards that may be faced during entry.
II. Know how to properly use the equipment necessary for safe entry.
III. Authorized Entrants shall wear appropriate harnesses/lanyards connected to a fall arresting device and mechanical winch, attached to a tripod placed over the manhole (entrance to the space).
IV. Carry the MSA Passport on their body to continuously monitor the air while they are in the confined space. If at any time while inside the confined space, the MSA Passport instrument alarms, the Attendant must leave the space immediately. Contact the EHS office and determine how a hazardous atmosphere developed (or returned to) in the

space.

V. Communicate with the Attendant as necessary about the status of the work being performed, any problems encountered, and the need to evacuate the space (or perform an Entry Rescue).

VI. Alert the Attendant and exit the space immediately if:
   a. An order to evacuate is given by the Attendant or Supervisor.
   b. The Entrant recognizes a warning sign or symptom of exposure to a dangerous situation.
   c. The Entrant detects a prohibited condition.
   d. The alarm sounds on the air monitoring device.

5.3 DUTIES OF AUTHORIZED ATTENDANTS

I. Know the hazards that may be faced during entry.

II. Know how to properly use the equipment necessary for safe entry and rescue.

III. Be familiar with the Emergency and Rescue Procedures.

IV. Know the early warning signs and symptoms of exposure to hazardous contaminants that the Attendant may display. Know how to act quickly and properly.

V. Wear a harness with the lanyard attached to the tripod as a secondary means of protection (to prevent the Attendant from falling into the space during rescue operations).

VI. Make sure the retrieval line (cable) is attached to the harness above the Entrant's head at the upper part of the back, shoulder level.

VII. Make sure the cable is properly connected to the Entrants harness, check the fall arresting device and winch to make sure it is operating properly, check to make sure the tripod is sturdy and well positioned above the space, and all other measures necessary to ensure retrieval of the Entrant in an emergency.

VIII. Ensure warning signs and barricades are posted around the confined space and only authorized individuals are near the entrance.

IX. Remain in visual and voice contact with the Entrant at all times.

X. Communicate with the Entrant to monitor the status of the work, and the Entrant's condition.

XI. Monitor activities inside and outside the space to make sure it is safe to continue entry operations and it is safe for the Entrant to remain in the space.

XII. Prevent unauthorized individuals from approaching and entering the work space. Contact the Supervisor, the EHS office, or University Police if an unauthorized individual refuses to leave the space.

XIII. Monitor all equipment to make sure it is operational during the entry procedure.

XIV. Monitor the mechanical ventilation system (if it is operating and ventilating atmosphere in the space).

XV. Summon rescue and emergency services as soon as the Attendant determines the Entrant may need rescue or immediate extraction from the space.

XVI. Perform all steps necessary to conduct an Entry Rescue, if necessary.

6.0 EMPLOYEE TRAINING

Training is to be provided to each employee who is required to use eye or face PPE in at least the following:

I. When PPE is necessary

II. What PPE is necessary

III. How to properly put on, take off, adjust, and wear PPE

IV. The limitations of the PPE

V. The proper care, maintenance, useful life, and disposal of PPE

When there is a reason to believe that any affected employee, who has already been trained, does not have the understanding and skills required to use the PPE, the employee will be retrained. Retraining is required when changes in the workplace render the previous training obsolete, changes in the types of PPE to be used render previous training obsolete, or if there are inadequacies in an affected employee's knowledge or usage of the PPE.

Each affected employee will demonstrate an understanding of the training and the ability to use PPE properly before being allowed to perform work requiring the use of PPE. Documentation is to include: the name of each employee trained, the date(s) of training, and the subject.

Confined Space Entry - Pre-entry Checklist

Does the history of the confined space show that it to be free of atmospheric hazards from chemical contaminants or other sources such as vehicle exhaust, piping, tank or gas leaks, or sewer gasses? yes ( ) no ( )

Does your knowledge of the confined space indicate the area is likely to remain free of dangerous air contaminants while occupied? yes ( ) no ( )

Have you been trained in the operation and calibration of the confined space entry instrument (MSA Passport) to be used to test the atmosphere prior to and during entry? yes ( ) no ( )

Has the MSA Passport testing instrument been calibrated within the past month? yes ( ) no ( )

Did you test the atmosphere of the confined space prior to entry? yes ( ) no ( )

Record the readings from this testing:

Oxygen _____%
LEL _____%
CO _____ ppm
H2S _____ ppm

Did the atmosphere test as acceptable for each contaminant? yes ( ) no ( )

Did the MSA Passport alarm sound during the testing? yes ( ) no ( )

Will the atmosphere be continually monitored while the space is occupied? yes ( ) no ( )

Have all other hazard within the space been eliminated? yes ( ) no ( )

If any of the above questions have been answered "no" DO NOT ENTER THE SPACE. Contact your supervisor and the EHS office. This may be a permit-required confined space and will require a permit and corrective action before entry.

Contact University Police and the Millersville Fire Department in the event of an emergency by calling 911, or 8-911.

If there are no atmospheric hazards present and if the pre-entry tests show there is no dangerous air contaminant and/or oxygen deficiency within the space and there is no reason to believe that any is likely to develop, the space is non-permit required.

Job Location: _____

Authorized Entrant or Supervisor Signature: _____

Date: _____

Permit-required Confined Space Entry - Permit

Entry Information

Entry Date: _____

Termination Date: _____

Location and Description of Confined Space: _____

Description of the Work: _____

Number of Entrants Assigned: _____

Names of Entrants: _____

Isolation Checklist

Lockout/Tagout Performed? yes ( ) no ( ) Lines and

Pipes Isolated? yes ( ) no ( )

Electrical Power Controlled/Dissipated? yes ( ) no ( ) Signs and

Barricades in Place? yes ( ) no ( ) Unauthorized Entrance

Prevented? yes ( ) no ( )

Pre-entry Checklist

Ventilation Performed? yes ( ) no ( )

Air Tested to Confirm Adequacy of Ventilation? yes ( ) no ( ) Ventilation

Maintained During Entry? yes ( ) no ( ) Atmospheric Air Testing

Performed? yes ( ) no ( )

Sample Results:

Oxygen _____% LEL
_____%
CO _____ ppm H2S _

_____ ppm

Contaminant Levels Within Safe Limits? yes ( ) no ( )

Name of Air Testing Instrument Used _____

Instrument Recently Calibrated? yes ( ) no ( )

Special Equipment Needed

List Any Special Safety Equipment Needed to Perform the Entry or Job Respirators? yes

( ) no ( )

Fire Suppression? yes ( ) no ( ) Lighting? yes (

) no ( )

Body Protection? yes ( ) no ( ) Hearing

Protection? yes ( ) no ( ) Eye Protection? yes

( ) no ( )

Other: _____

Special Task Specific Hazards

Welding? yes ( ) no ( )

Burning/Brazing/Other Hot Work? yes ( ) no ( ) Other: _

Special Precautions Taken To Minimize Hazards

List Any Special Precautions Taken Because of Task Specific Hazards

_____

Rescue/Emergency Procedures

All rescue equipment in place and operational? yes ( ) no ( ) Communication

equipment operational? yes ( ) no ( )

Attendants and Entrants know their responsibilities? yes ( ) no ( )

Verification

I verify that actions and conditions necessary for safe entry have been performed.

Name: _____

Signature: _____

Date: _____