UNIVERSITY OF MINNESOTA
FACILITIES MANAGEMENT

CONFINED SPACE ENTRY PROGRAM

Effective: January 1, 2008

**PURPOSE:**
The purpose of this program is to establish safe confined space entry and work procedures for Facility Management employees whom are required to work in confined spaces. These procedures are intended to prevent harm to personnel while entering or working in a confined space exposed to potential hazards such as air contaminates, oxygen deficient or enriched atmospheres, engulfment hazards, or configurations which may impede employee escape or retrieval in the event of an emergency.

**Note:** See Electrical Safety Program on enclosed spaces for high voltage electrical vault entry procedures.

**DEFINITIONS:**

**Confined Space** –
A special configuration that can include any or all of the following properties:
- Limited or restricted means of entry or exit.
- Large enough for employee to enter and perform assigned work, and is not designated for continuous occupancy by an employee.
- A condition in which dangerous air contamination, oxygen deficiency or enrichment, or engulfment condition exists or may develop.

**Engulfment** –
The surrounding and effective capture of a person by finely divided particulate matter or a liquid.

**Entry** –
Any part of the body entering through the plane of the confined space opening.

**Hazardous Atmosphere** –
An atmosphere presenting a threat of death, acute injury, illness or disablement due to the presence of flammable, explosive, toxic, oxygen deficiency or enrichment, or otherwise injurious substances as follows:
- Flammable gas or vapor concentrations greater than 10 percent of its lower explosive limit (>10% LEL).
- Combustible particulate concentrations greater than 10 percent of the minimum explosive concentration of the particulate (>10% MEC).
- Atmospheric oxygen concentration either below 19.5 percent or above 23.5 percent
- Toxic, corrosive or asphyxiate substance concentrations above Permissible Exposure Levels and/or Threshold Limit Values (> PEL and/or TLV).
- Any substance that is present at concentrations greater that the value established as Immediately Dangerous to Life and Health (> IDLH).

Non-permit Required Confined Space –
A confined space that does not:
- Contain a physical hazard capable of causing death or serious physical harm to entrants.
- Contain or have the potential to contain a hazardous atmosphere capable of causing death or serious physical harm to entrants.

Oxygen Deficient or Enriched –
An atmosphere containing less than 19.5% oxygen by volume or greater than 23% oxygen by volume.

Permit Required Confined Space –
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 for engulfing an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward or tapers to a smaller cross section.
- Contains any other recognized serious safety or health hazard.

Physical Hazards –
Confined space physical hazards include items such as heat exposures, electrical hazards, fall hazards, stored energy sources and excessive noise.

**TRAINING:**
All supervisors, entrants and attendant personnel assigned to enter confined spaces must be trained in safe confined space entry and emergency procedures prior to engaging in confined space entry operations. After the initial training has been completed, employees must be trained annually thereafter and additional training may be required under any of the following conditions.
- Before a change in assigned duties,
- When there are changes in safe confined space entry or emergency procedures,
- When employee re-training is needed.

**ATMOSPHERIC TESTING:**
All confined spaces must be atmospherically evaluated before entry is authorized.

Permit required confined spaces must be atmospherically monitored before entry and continuously throughout the authorized entry.
After the initial evaluation of non-permit required confined spaces and no hazards are found, continuous air monitoring is not required.

**PERMIT REQUIRED CONFINED SPACE ENTRY PROCEDURES:**
Safe entry into a permit required confined space can only be accomplished when work procedures account for all potential hazards. Based on the configuration of the confined space and the hazards which employees will be exposed, best work practices for safe confined space entry include the following:

A. **Pre-entry Hazard Assessment** –
Prior to entering a permit required confined space, the space must be thoroughly assessed by:

- Determining what, if any, hazards may be present including, but not limited to: entry/exit restrictions, chemical, mechanical, physical, entrapment, engulfment or hazards related to the task to be performed.
- Taking all necessary precautions that will minimize the risks based on the known or suspected hazards. This includes atmospheric testing of the confined space, lockout/tagout of energy sources, cleaning out of residual materials, purging lines, providing adequate means of entry/exit, etc.
- Conducting a hazard assessment of the work task(s) to be completed in the confined space to ensure all hazards that may be created by the work activities are accounted for and corrective actions taken. For example: If the work task includes welding or cutting, additional ventilation may be required to remove the smoke and fumes.
- Communicating the work plan with all the confined space entry team members.
- Evaluate whether or not the confined space entry can be completed safely within the scope of this program. If not, re-evaluate and contact Facility Management’s Environmental Health, Safety and Risk Management section for consultation.

B. **Preparing for Confined Space Entry** –
Take all necessary precautions that will minimize or eliminate the risks based on the known or suspected hazards:

- Place guards or barriers to protect employees and the public from fall hazards and to prevent unauthorized entry into the confined space.
- Provide an adequate means of entry/exit from the confined space.
- Close valves and isolate energy sources in accordance with lockout/tagout procedures. When applicable, purging the contents of the confined space.
- Ventilate the confined space. When using positive pressure ventilation, locate the ventilator intake in an area with a clean air source.
• Perform atmospheric testing. When practical, remote probes are to be used for initial atmospheric testing of the confined space from outside of the space. Atmospheric testing includes: oxygen level, flammable gases, toxic atmospheres and any additional testing for any suspected toxins.

• Evaluate whether or not the confined space entry can be completed safely within the scope of this program. If not, re-evaluate and contact Facility Management’s Environmental Health, Safety and Risk Management section for consultation.

C. Complete the Confined Space Entry Permit –
Before entering the confined space, the confined space entry permit must be completed. The entry permit verifies that pre-entry procedures have been completed and the confined space is safe to enter. The permit must be signed and dated by the trained confined space team lead person on-site immediately prior to entry. The entry permit must be posted at the entrance(s) to the confined space or otherwise be immediately available on-site at all times while the confined space is being occupied.

• The duration of the entry permit can not exceed the time required to complete the work assignment or a maximum of one work shift.

• The trained lead person must terminate an entry and cancel the entry permit when:
  1. An assignment is complete,
  2. The shift is completed,
  3. Or when a new hazard or condition exists. Note: The new hazard or condition must be noted on the cancelled permit and used when issuing a new permit.

• Copies of the completed entry permit should be placed in a job file and the original forwarded to Facility Management’s Environmental Health, Safety and Risk Management department.

D. Safe Confined Space Entry –
During entry and while working in a permit required confined space:

• Maintain an attendant outside the permit required confined space by the entrance to:
  1. Maintain communications with personnel in the confined space.
  2. Assist personnel in the confined space from the outside.
  3. Order an evacuation of the confined space when a hazardous situation develops.
  4. Summon emergency personnel when necessary.

  Note: At no time is the attendant to enter the confined space.

• When practical, continuously ventilate the confined space.

• Continue atmospheric testing of the confined space.

• When making a vertical confined space entry of greater than ten (10) feet, the following equipment must be utilized:
1. Full body harness with attached lifeline.
2. Hoist or other retrieval equipment.

- Personnel making a horizontal confined space entry must be equipped with a ten (10) minute emergency rescue air supply pack whenever there is a risk for the development of a hazardous confined space atmosphere.
- If a hazardous situation develops during the confined space entry or if the attendant instructs the entrants to exit the space, entrants must evacuate the confined space immediately.

**NON-PERMIT REQUIRED CONFINED SPACE ENTRY PROCEDURES:**
A non-permit required confined space is a confined space that does not contain a hazardous atmosphere or have the potential to contain a hazardous atmosphere capable to cause death or serious harm to entrants.

**Note:** See Electrical Safety Program on enclosed spaces for high voltage electrical vault entry procedures.

**CONFINED SPACE EMERGENCY PROCEDURES:**
In case of emergency, the attendant must carry out the following responsibilities to ensure that no one, including oneself, is put at unnecessary risk while attempting a confined space rescue.

- **ALWAYS CALL FOR EMERGENCY ASSISTANCE (911) BEFORE ATTEMPTING TO RESCUE THE VICTIM(S) IN THE CONFINED SPACE.** When contacting emergency assistance, explain the type of incident, location of the confined space and the hazards of the confined space.
- **DO NOT ENTER** the confined space until:
  1. Emergency Assistance has been called,
  2. Backup assistance is standing by to provide additional help,
  3. AND the confined space atmosphere has been tested and cleared for safe entry.
- **RESCUE/RETRIEVAL** – Begin preparations/attempts to retrieve the victim(s) from **OUTSIDE** the confined space after calling for emergency assistance.
  1. If a victim is wearing a full body harness with a lifeline attached, use a mechanical device to pull the victim from the confined space.
- **PREVENT RE-ENTRY** – Isolate the confined space to prevent re-entry until the situation has been stabilized and rendered safe.
- Surrender all rescue activities to the rescue team (St. Paul/Minneapolis Fire Department) upon their arrival.
- Notify your immediate supervisor of the situation.
RESPONSIBILITIES:

Managers –
- Assure this Confined Space Entry Program is implemented by supervisors and employees assigned to enter confined spaces.
- Ensure the equipment necessary for safe confined space entry is readily available for employee use.

Supervisors –
- Assure the Confined Space Entry Program procedures are implemented by all entrants and attendants of confined spaces under their supervision.
- Ensure all employees assigned to a confined space entry have attended initial confined space entry training and annual refreshers thereafter.
- Identify and evaluate each confined space employees under their supervision are assigned to enter. Establish and maintain an inventory of all assigned confined spaces in their work area. Where practical, post confined spaces in their work area with identification labels.
- Plan each confined space entry by completing or reviewing the confined space evaluation form and identifying the hazards with the employees assigned to the confined space entry.
- Review each completed confined space entry permit for hazards identified. Submit expired permits to Facilities Management’s Environmental Health, Safety and Risk Management department. If questions arise on the permit, consult with the Environmental Health, Safety and Risk Management department.

Entrants and Attendants –
- Understand and follow the Confined Space Entry Program safe work procedures.
- Only enter assigned confined spaces.
- Report any space which may be a confined space, but not designated as a confined space to your supervisor.
- Immediately report any unaccounted confined space hazards to your supervisor.
- Assist in the completion of the confined space entry permit prior to entry.
- Participate in the initial and annual confined space training sessions.

APPENDICES:
A – Confined Space Evaluation Form
B - Confined Space Entry Permit
C – Equipment Checklist

Legal Reference: 29CFR 1910.146