**Confined Space Program and Procedures/Facilities Management**

**Revised: 10-02-2003**

**Reference:  29 CFR 1910.146**
**Keller’s Official OSHA Safety Handbook**

**Purpose:** To establish procedures for identifying, accessing, and working in and around confined spaces on the University of Maine at Farmington campus.

**Definitions:**

1.   Oxygen-Deficient Atmosphere:  An atmosphere containing less than 19.5 percent oxygen by volume.

2.   Oxygen-Enriched Atmosphere:  An atmosphere containing more than 23.5 percent oxygen by volume.

3.   Engulfment:  The surrounding and effective capture of a person by a liquid or flowable solid substance that can be inhaled and cause death, or that can exert enough force to cause death by strangulation, constriction, or crushing.

4.   Immediately Dangerous to Life or Health:  IDLH-Any condition that: poses an immediate or delayed threat to life, would cause irreversible adverse health effects, or would interfere with an individuals attempt to escape unassisted from a space.

5.   Hazardous Atmosphere:  An atmosphere that may expose a worker to the risk of death, incapacitation, impairment or ability to self-rescue from a work area.

6.   Confined Space:  Any space that: is large enough and configured so that a worker can bodily enter and perform work, has limited or restricted mean for entry and exit, and is not designed for continuous occupancy.

7.   Permit Required Confined Space:  A confined space that has one or more of: contains or has 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, or contains any other recognized serious safety or health hazard.

8.   OSHA:  Occupational Safety and Health Administration.

9.   MBLS:  Maine Bureau of Labor Standards.

**Discussion:**

1.   Thousands of workers are exposed to possible death or injury in what are referred to as “Confined Spaces”.  OSHA estimates over 5,000 injuries occur in confined spaces each year.  Examples of confined spaces include vats, sewers, tunnels, crawl spaces, vaults, and tanks.  While these environments are often dangerous, access is vital to maintain equipment and/or systems and inspect structural elements.

2.   Confined space hazards include dangerous vapors and gases that can accumulate in these spaces.  Fire, explosion and physical hazards can also endanger entrants.  In addition to the potential dangers of combustibility, toxic air contaminants, and physical hazards, there is also a potential the space may be oxygen deficient.  Normal air contains 20.8 percent oxygen by volume.  OSHA established safe oxygen range is 19.5 percent to 23.5 percent (by volume).  Less than 19.5 percent is deemed oxygen deficient and greater that 23.5 percent is oxygen enriched.

3.   The University of Maine at Farmington has numerous areas known to be or treated as confined spaces.  Any time these spaces are accessed, specific measures must be taken to ensure worker safety.  Facilities Management personnel shall be familiar with these locations and any known specific hazards to each area.  Should a space be encountered with the potential of being a confined space, the Facilities Management Office shall be contacted for further guidance before any entry is made into the area.

4.   This Confined Space Entry Program shall supplement other safety guidance established by the Director of Facilities Management.  (i.e. Control of Hazardous Energy, Fall Protection, etc.)

5.   This program shall be administratively reviewed and Facilities Management supervisory personnel on an annual basis.  New employees to the department will be trained on these procedures within thirty (90) days after hire.

6.   All Facilities Management personnel and other employees deemed at risk shall comply with this program.  Contractors working on campus shall be made aware of this program should their work involve or be in the vicinity of a confined space.

**Procedures:**

1. These procedures shall cover:

A. Space Identification

B. Atmospheric Testing

C. Mechanical Controls

D. Permit-Required Confined Spaces

E. Pre-Entry Procedures

F. Entry Operations

G. Emergency Procedures

H. Training and Documentation

1.A.  **Space Identification:**

Facilities Management personnel shall understand the definition of a confined space
and treat areas meeting that definition as such.  If entry into the space is required for
completing work, the appropriate Assistant Director of Facilities will be informed.

The criteria used in confined space identification includes three characteristics:

1. Limited or restricted means of entry or exit

2. Space large enough for an employee to enter and perform assigned work

3. Not designed for continuous occupancy by employees

The space will be evaluated for structural integrity, tested for oxygen content and
contaminants, and surveyed for other readily apparent physical hazards.  If
atmospheric testing indicates the presence of hazards, the space will be considered a
permit-required confined space.  If there is sufficient oxygen and no hazards
detected, the area is a confined space.

Areas currently identified as a confined space include, but are not limited to:

Health & Fitness Center: Basement Mechanical Room – Sand Filter

Health & Fitness Center: Pool Area – Surge Tank

Health & Fitness Center: Pool Area – Air Shaft under Pool Deck

Scott Hall: Crawl space under the Student Health Center

Merrill Hall: Space under and around the coal bin

Purington Hall: Space under the coal bin

Admissions: Crawl space under the front part of the building

Observatory: Crawl space under the main structure

1.B.   **Atmospheric Testing:**

If through testing or other processes, the area is deemed a permit-required confined
space, attempts to influence oxygen levels (increase or decrease) and remove other
atmospheric contaminants should occur.

A hazardous atmosphere exists when any one or more of the following conditions
are present:

1. Oxygen deficient or enriched

2. Flammable gas, vapor or mist

3. Toxic gas, vapor or mist

4. Airborne combustible dust

Acceptable atmospheres for entry, wearing appropriate respiratory and personal
protection, include:

1. Oxygen content no less than 19.5% and no greater than 23.5%

2. Flammable gas at less than 10% of the Lower Explosive Limit

3. Toxic material at or less than the Permissible Exposure Limit

4. Combustible dust less that the Lower Explosive/Flammability Limit

Atmospheric testing shall be performed to determine appropriate levels of
personal protection, to establish entry procedures, and to ensure worker safety
during the entry.  Air testing shall be done:

1. In advance of the entry to establish limits, personal protective equipment standards, and to define entry procedures

2. Immediately prior to entry for verification

3. At pre-determined intervals during the entry to ensure worker safety and maintain situational awareness

Individuals conducting tests must be proficient in the calibration and use of a
MSA Five-Star Multi-Gas Detection Instrument.  Testing will be conducted every
four feet in elevation to ensure proper detection of hazards with various vapor
densities.  The order of testing will begin with oxygen, then combustible gases, and
lastly toxic gases or vapors.

1.C.  **Mechanical Controls:**

Should hazardous conditions outside of operating parameters be detected, efforts
will be made to bring the space within acceptable limits using mechanical controls.
This includes the use of exhaust or supply fans to remove or introduce air
exchanges to the space making it safer to enter.

If, after using mechanical controls, the space remains excessively hazardous, the
Director of Facilities Management will make the determination whether or not to
enter the confined space.

1.D.  **Permit-Required** **Confined Spaces:**

Spaces meeting the definition of a Permit-Required Confined Space shall be tested
according the procedures defined in section 1.C.  UMF Facilities Management shall
provide employees with any and all safety equipment required prior to making any
entries.

In addition to confined space procedures, access into a permit-required
confined space will also include the completion a confined space permit.  Permits
will be issued for a specific job for and limited period of time.  The permit will
also include all the test results, who performed which functions and a
narrative of the work performed.  Completed confined space permits will be
retained for a period of year after work completion.

1.E.   **Pre-Entry Procedures:**

Prior to a confined space or permit-required confined space entry, a thorough
inspection of the space will be performed.  This will include, but not be limited to:

1.  Checking the historical use of the space

2.  Validating structural integrity through visual observation and blue prints

3.  Conducting atmospheric testing

4.  Introducing mechanical controls and retesting if needed

5.  ***Notify local area rescue services if needed (Note:  Farmington Fire***
***Department is a confined space rescue and recovery trained department)***

6.  Hold a pre-entry safety brief with entrants, attendant(s) and supervisor

1.F.   **Entry Operations:**

Operations will be continuously monitored when entrants are in the space.
Monitoring will include air testing and communications checks with the entrants at
ten minute intervals.  Entry of a confined space or permit required confined space
shall also include:

1. Use of a designated attendant and entry supervisor outside the space

2. An established rescue procedure

3. Completion of all atmospheric testing documented on the confined space permit

4. A reliable means of communication between the entrants and the attendant

Entrants will employ the “Buddy System” whenever the space is of sufficient size
to accommodate two entrants.  When not feasible, the entrant shall remain in sight
of the attendant as best possible.  Attendants will assist entrants when entering and
leaving the confined space access.  Attendants will also facilitate transfer of tools
and material **IF** their proximity to the access does not unnecessarily expose the
attendant to additional hazards.  The entry supervisor’s sole responsibility is to
observe the entire process to ensure worker safety and for adherence to established
safety standards.  Entry supervisors shall also be supplied with a means of
communication to alert rescue personnel.

1.G.  **Emergency Procedures:**

In the event of an emergency, knowing what steps to take will increase overall
safety and may minimize dangers to entrants.  The situation does not have to be
lethal for it to be considered an emergency.  The first initial action in an emergency
will be to get entrants out of the confined space expeditiously.

An emergency situation will be deemed to exist when:

1. There is a loss of voice communication between the entrants and the
attendant

2. Oxygen levels increase or decrease outside of acceptable levels

3. Flammable gas levels increase above nominal lower explosive limit

4. Toxic levels climb above the permissible exposure limit

5. Combustible dust levels exceed lower explosive/flammable limit

6. An entrant becomes injured, asphyxiated, or for any other reason uncomfortable with their being in the space

7. Changes occur to the structural integrity of the space making it unsafe for occupancy

8. An unrelated condition outside of the confined space requiring entrants to get out of the space

Line-Hand signals to be used in the event of an emergency shall include use of the
“OATH” line signal technique:

 One tug on the tag line by the entrant to indicate they are Okay.  If used by the attendant, it takes the form of a question.  “Are you okay?”

 Two tugs on the tag line by the entrant to indicate they wish to Advance or be given some slack.  If used by the attendant, it takes the form of a question.  “Do you need slack?”

 Three tugs on the tag line by the entrant to indicate they wish slack Taken up.  If used by the attendant, it takes the form of a question.  “Do you need me to take up slack?”

 Four tugs on the tag line by the entrant to indicate they need Help.  If used the attendant, it takes the form of a question.  “Do you need help?”  If sending or receiving four tugs on the tag line, be prepared to be pulled out of the space, or to pull the entrant out.

 To confirm a Line-Hand signal, either the entrant or attendant will tug on the tag line with the same number of tugs.  If a response is different, the entrant or attendant will use the number of tugs that correspond with their response.

Example 1:  An attendant asks if the entrant is okay using one tug of the
line.  The entrant confirms with one tug that they are okay.  This
procedure can also be used from the entrant to the attendant.

Example 2:  An attendant asks if the entrant needs help using four tugs
of the line.  The entrant responds with one tug of the line to indicate they
are okay.  This procedure can also be used from the entrant to the
attendant.

Should an entrant become incapacitated in the space, and the other entrant cannot
effectively render assistance, they are to exit the space immediately.  Confined
space rescue and recovery will be dispatched to retrieve the incapacitated entrant.
Under normal circumstances, a rescue team can be at any confined space site on
campus within 6-8 minutes.

1.H.  **Training and Documentation:**

Confined space training will be incorporated into annual training for Facilities
Management personnel.  This training will normally be conducted by an outside
state source (i.e. Safety Works).  This training will, at a minimum, cover the
essentials of confined space training as described by this program.  Training
agendas, rosters and any other related material is to be retained for a period of one
year from the time the training was conducted.  Additional documentation
pertaining to confined space entry, not previously addresses by this program,
shall be retained for a minimum of one year from the date the entry was done.