UNIVERSITY OF TOLEDO FACILITIES AND CONSTRUCTION			
Section:	**Administrative**	**Effective Date:**	**June, 1990**
Subject:	**Procedures for Working in Confined Spaces**	**Standard Operating Procedure**	**ADM-28**

Standard Operating Procedure

Safe procedures, as defined by Occupational Safety and Health Administration (OSHA) and described below, shall be followed by all Facilities Maintenance personnel prior to entry into a confined space.

Purpose

These procedures are deemed necessary to ensure the safety and health of employees, avoid the serious impact upon personnel and/or property if such procedures are not followed and to ensure compliance with the regulations promulgated by OSHA.

Definition

NON-PERMIT CONFINED SPACE

1. A space large enough and so configured that a worker can bodily enter and perform his/her assigned work; **AND**

2. Has limited or restricted means for entry or exit (entry begins as soon as and part of the entrant's body breaks the plane of the entry portal), **AND**

3. Is not designed for continuous human occupancy.

PERMIT REQUIRED

A confined space that has one or more of the following characteristics:

1. Contains or has the potential to contain a hazardous atmosphere.

2. Contains a liquid or finely divided solid material, such as sand, soil, grain, etc. that could cause engulfment of an entrant.

3. 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.

4. Contains any other serious safety or health hazard.

Responsibility

The appropriate Facilities Maintenance Supervisor, or their designees, is responsible for the initiation and execution of approved confined space entry procedures as defined by the Confined Space Entry Permit issued by the Safety & Health Coordinator.

Procedure

A. Hazard Identification

Facilities Maintenance supervisors shall identify all spaces, meeting the criteria listed in the definition, which they believe may be a confined space in which it is reasonably anticipated that employees may be required to enter. (See current list attached.)

B. Confined Space Entry Permits

The entry permit (sample attached) identifies and evaluates the potential hazards of a confined space and is the tool by which employees are authorized to enter the space. The permit will define the conditions under which the space may be entered; states the reason(s) for entering the space; the anticipated hazards of the entry; authorized entrants and attendants; and establishes the length of time for which the permit is valid.

These spaces shall be evaluated by the Safety & Health Coordinator and permits issued accordingly. These spaces shall be readily identifiable as confined spaces by posting of the entry permit at all points of access.

C. The following criteria will be considered in issuing the permit:

1. The space will be emptied, in so far as possible, of any liquid, gas or solid material.

2. The space will be cleaned by the best practical method, such as cold water, warm water, steam, etc.

3. Lock-Out/Tag-Out Permit procedures will be followed, assuring that the equipment is at a zero energy state. (See Policy #S-08-014)

    a) Entry of unauthorized entrants shall be precluded.

    b) Protect entrants from external hazards such as might be created by vehicles or passers-by.

4. All lines or ducts feeding materials or gases into the enclosed space will be disconnected or "blanked-off." Blanking will be of materials adequately resistant to corrosion by the material held back.

5. The atmosphere in the enclosed space shall be tested for oxygen deficiency and unprotected entry will not be made if oxygen content is below 19.5%. Oxygen content of below 19.5% will require the use of a supplied air respirator, with requirements for testing, training, fit testing, etc. met.

6. The atmosphere in the enclosed space shall be tested for toxic materials and if toxins are detected above the OSHA permissible levels for that material, unprotected entry shall not be made.

7. The atmosphere in the enclosed space shall be tested for explosiveness. Entry shall not be made unless measurements assure that explosive levels are not present.

8. An enclosed space which has or may have any of the hazardous characteristics of one through seven above, shall be re-tested at regular intervals during the entry and work procedure to assure that each item is at a safe level. Any indication of an unsafe condition shall require the worker(s) to immediately vacate the space.

9. The presence of toxic or corrosive material in the confined space requires the presence of a charged water hose with a spray nozzle for flushing of eyes and skin.

10. The confined space shall be thoroughly ventilated with natural ventilation, fans or other air movers as required. Such ventilation shall continue as long as people remain in the enclosed space.

11. A confined space, which has held flammable or explosive material, shall be cleaned appropriately and require the use of non-sparking tools and gear.

12. Adequate and safe illumination shall be provided.

13. Torches, hoses and all other hot-work equipment shall be carefully inspected before work begins. This equipment is not to be brought into the enclosed space until use is necessary and is to be removed immediately after use. "A hot work permit" must be obtained to weld within a confined space!

14. All hand and power tools, illumination, etc. shall be properly grounded and shall be non-sparking if there is the potential for fire or explosion. Any two-way radios or other electronic devices should be intrinsically safe if there is a potential for a flammable atmosphere.

D. Confined Space Attendant

A Confined Space Attendant is required by an entry permit. If the attendant must leave for any reason the entrant must exit immediately. This person shall be present outside of the confined space, but able to see the worker inside, at all times when there is the slightest possibility of oxygen deficiency, toxic or corrosive materials, or flammability and explosiveness. For all confined space entries Campus Police (3770) shall be notified, by the

appropriate supervisor, prior to entry and when the last person has exited. Two-way communication shall also be provided between attendant and entrant. The attendant shall summon rescue assistance as soon as the attendant determines entrants need to escape. The attendant shall call Campus Police - "77" - advising of the location of the entrants and the need for "Confined Space Rescue". Campus Police will call 911 and not attempt rescue. The attendant retains ultimate authority to call for the removal of all personnel in the event of an emergency occurs. Neither attendant, nor anyone else should enter the space to attempt a rescue.

E. Personal Protective Equipment

All necessary equipment should be assembled on site prior to entry. Personal protective equipment is never a substitute for the creation of safe working conditions and good judgment on the part of the worker and supervisory personnel. All personal protective equipment shall be selected based upon the potential hazard of the job. When in doubt, overprotect.

1. Safety Harness

   Any potential of oxygen deficiency, toxic or corrosive material, danger from falling or engulfment or flammability and explosiveness shall require the worker(s) inside the space to wear an adequate body harness, so designed as to facilitate immediate removal if an unexpected event should occur. The space attendant shall provide pulleys so as to remove the person from the space without further injury. If the space is 5' or deeper (vertically) a tripod must be set -up. The free end of the lifeline, attached to the harness, shall be anchored outside of the space. Safety harnesses and fall protection equipment can be obtained by contacting Safety & Health at extension 5069. Employees working inside a permit required space should not remove their lifeline or full body harness for any reason.

2. Eye protection shall be selected with regard to the possible hazard(s) involved in the job.

3. Respiratory protection shall meet all requirements of the OSHA Respiratory Protection Standard.

4. Head protection shall be selected with regard to the possible hazard(s) involved in the job.

5. Foot protection shall be selected with regard to the possible hazard(s) involved in the job. Rubber booties or shoes are preferred when flammable material may be present. Rubber overshoes may be substituted.

F. Training

Confined Space Entry Team Duties

Three members of the team have duties specifically spelled out by OSHA. Any employee may perform any of the three duties providing he/she is properly equipped and has been properly trained. A minimum of two people is required for a permit required confined space entry. With the proper training, the entry supervisor may double as the entrant or the attendant. All employees must receive appropriate training when:

1. They are expected to enter into a confined space

2. Whenever there is a change in operations/procedures

3. New employees as part of their initial training

4. Existing employees should receive annual training

5. Any entry does not go according to plan.

No employee shall be a Permit-Required Confined Space entrant, attendant, or entry supervisor without specific authorization or training.

Entry Supervisor

- An employer, foreman or crew chief that authorizes and/or supervises confined space entry operations and determines if acceptable entry conditions are present. Must be available on-site.

- Knows the hazards that may be faced during entry.

- Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified are in place before endorsing the permit and allowing entry to begin.

- Terminates the entry and cancels the permit upon completion.

- Verifies that rescue services are available and that the means for summoning them are operable.

- Removes unauthorized individuals from the entry scene.

- Ensures that entry operations remain consistent with the terms of the entry permit and that acceptable entry conditions are maintained.

- May perform **non-entry** rescue if necessary

** OSHA requires that reevaluation of conditions within the space must be conducted if the original entry supervisor must be relieved and this responsibility is transferred to someone else.

Authorized Attendant

- Must be properly trained and stationed outside the space throughout the duration of entry operations.
- Knows the hazards that may be faced during entry.
- Is aware of the possible behavioral effects of hazard exposure.
- Continuously maintains an accurate count of authorized entrants in the space.
- Remains outside the space until relieved by another attendant.
- Communicates with the authorized entrant as necessary.
- May perform **non-entry** rescue if necessary.
- Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the entrants to evacuate immediately under any of the following conditions:

    1. Unexpected change in space conditions.
    2. Entrants exhibit signs or symptoms of exposure.
    3. Conditions develop outside the space which may endanger entrants.
    4. The attendant must leave for any reason.

Authorized Entrant

- Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of exposure.
- Properly uses equipment as required by the permit program.
- Communicates with the attendant as necessary to enable the attendant to monitor entrant status and alert entrants of the need to evacuate.

- Alerts the attendant whenever:

  1. The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.

  2. The entrant detects a prohibited condition.

- Exits from the space as quickly as possible whenever:

  1. An order to evacuate is given by the attendant or entry supervisor

  2. The entrant recognizes signs or symptoms of exposure

  3. The entrant detects a prohibited condition

  4. An evacuation alarm is activated.

G. Outside Contractors

When outside contractors must enter a known confined space; it is the duty of the appropriate supervisor to provide a copy of the OSHA Standard on confined space entry to that contractor. In this case, "appropriate" supervisor is the supervisor with primary hazard knowledge of the work to take place. In addition to providing a copy of the standard, the supervisor shall enable, to the degree possible, the contractor to provide for safe practices for their employees.

When contractors are to perform permit space entry it is the responsibility of the appropriate supervisor to:

1. Notify the contractor regarding the location and hazards of any permit spaces applicable to their work.
2. Inform the contractor that entry must be in accordance with a permit space program.
3. Inform the contractor of any precautions that have been instituted to protect employees in or near the permit space.
4. Develop procedures to coordinate entry operations when both University of Toledo employees and contractor employees will be working in the space.
5. Conduct a debriefing session with the contractor following the entry.

The contractor has similar responsibilities to University of Toledo.

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LIST OF CONFINED SPACES

LOCATION	ENTRANTS, STAFF FROM	FREQUENCY (X/YR)	POTENTIAL*
Ash Silo	Power House	2	1, 2
Boiler Ash Hoppers (7)	Power House	2	1, 2
Boiler Fire Box (4)	Power House	1	1, 2
Boiler Mud Drum (4)	Power House	1	4
Boiler Steam Drum (4)	Power House	1	4
Coal Bunker	Power House	Infrequent	1, 2
Coal Pits (2)	Power House	Daily	1, 2
De-aerator Tank	Power House	1	1, 2, 4
EP Fan Housing	Power House Electricians	1 1	1, 2
EP Ash Hoppers (6)	Power House	1	1, 2, 4
EP Stack	Power House	1	1, 2
EP Vibrator Housing (4)	Power House Electricians	1	1, 2
WP Wire Rack Housing	Power House Electricians	1	1, 2
FD Fan Housing (4)	Power House Electrician	Infrequent	1, 2
Hot Well Tank	Power House	Infrequent	2, 4
ID Fan Housing (4)	Power House Electricians	Infrequent	1, 2
Tower Pump Pit	Power House Electricians	Winter - Frequent	2, 4
Steam Tunnels:			2, 4
Heatherdowns	Operating Engineers		
Main Campus to P.H.	Operating Engineers Maint. Repair Workers		
Storm Sewer Manholes (Deeper than 4 feet)	Grounds	Infrequent	2, 4

* See last page for code definitions.

1. Combustible Dust
2. Limited Access/Egress
3. Flammable Atmosphere
4. Oxygen Deficiency/Enrichment
5. Exceeds OSHA Limit

Heatherdowns Boiler	Operating Engineer	1	1, 2, 4
Underground Storage Tanks			2, 3, 4
Air Handlers: (Those large enough to enter)	Air Quality Techs. Painters	4	2
Dowling Hall (8)	Maint. Repair Workers		
Health Education (10)	Electricians		
Kobacker Center (1)			
Ruppert Health Center (2)			
Glendale Medical Center (1)			
Dana Center (1)			
Facilities Support (1)			
Mulford Library (1)			
ECI	Maint. Repair Workers	1 Response to Plug	2, 4
Elevator Pits:	Maint. Repair Workers		2, 4
Dowling Hall (4)	Electricians		
Health Education (2)	Plumbers		
Kobacker Center (1)			
Ruppert Health Center (1)			
Glendale Medical Center (1)			
Dana Center (1)			
Mulford Library (5)			
Hospital (8)			
Block Health Science (3)			
Cooling Towers	Air Quality Techs. Electricians	1	2
Sewer Manholes	Plumbers		2, 4
Acid Sumps	Plumbers		2, 4
Utility Tunnel at Sub-station	Electricians		2, 4
Natural Gas Manholes			2, 3
Sump Pump Pits	Plumbers, Air Quality Techs., Engineers		2, 4
Wire Closets			2
Pipe Shafts	Information Systems		2

1. Combustible Dust - An airborne combustible dust at a concentration that obscures vision at a distance of five feet (5') or less.

2. Limited Access/Egress - A space large enough that an employee can enter, which has restricted means for entry or exit and is not designed for continuous employee occupancy.

3. Flammable Atmosphere - A flammable gas, vapors, or mist in excess of ten percent (10%) of its lower flammable limit.

4. Oxygen Deficiency/Enrichment - An atmospheric oxygen concentration below nineteen and one half percent (19.5%) or above twenty-two percent (22%).

5. Exceeds OSHA Limit - Exceeds a "recognized" exposure limit [OSHA permissible exposure limit, immediately dangerous to life or health limit, or published exposure recommendation (i.e., from an MSDS).]