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SUMMARY: In order to provide a safe work environment in confined spaces, employees must know safe work practice procedures, have available personal protective equipment and other protective equipment to insure their safety and receive appropriate training by OSEH. This Guideline, along with Appendix A properly completed, will provide departments with an effective written program for confined space entry.

SCOPE: This Guideline applies to all UM personnel involved in confined space entries. Outside contractor entry is addressed separately at the end of this Guideline.

REFERENCE REGULATIONS:
- Confined Space Entry: MIOSHA Part 90 and Part 490
- Welding and Cutting: MIOSHA Part 12

DEFINITIONS:

Acceptable Entry Conditions – the conditions that exist in a permit-required space to allow safe entry and work within the space.

Attendant (Spotter) – person stationed outside one or more permit spaces who monitors the authorized employees and performs attendant's duties assigned in this policy.

Authorized Entrant/Employee – person who has received confined space entry training from OSEH as an entrant/supervisor.

Blanking or Blinding – the absolute closure of a pipe, line, or duct by fastening a solid plate (such as a spectacle blind or a skillet blind) completely covering the bore and that is capable of withstanding the maximum pressure of the pipe, line or duct with no leakage beyond the plate. This involves installing a blank between flanges with a leak-proof gasket at a point in the conducting line as close to the confined space area as possible. The blank or blind should be marked identifying its purpose.

Cardiopulmonary Resuscitation (CPR) – a combination of rescue breathing and chest compressions delivered to victims thought to be in cardiac arrest.

Combustible Gas – airborne concentration of gas or vapor which may present the risk of fire or explosion if an ignition source of sufficient energy is introduced. This term is synonymous with "flammable vapor" and "explosive gas."

Confined Space – a space that meets **all** of the following criteria:

- Is large enough and so configured that an em ployee can bodily enter and perform assigned work;
- Has lim ited or restricted m eans for en try and exit, e.g., tanks, tunnels, vessels, silos, storage bins, hoppers, vaults, and pits; and
- Is not designed for continuous employee occupancy.

Double Block and Bleed – the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two cl osed valves. Refer to the OSEH Lockout/Tagout Guideline for additional information.

Engulfment – the surrounding or capture of a person by a liquid or finely divided (flowable) solid substance that can cause asphyxiation, drowning, or can exert enough force on the body to cause death by strangulation, constriction or crushing.

Entry – means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensu ing 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.

Entry Permit – written authorization f or entry into a "perm it-required conf ined space." At the University, perm its m ay be classified as General, Hot W ork or Hazardous.

Entry Supervisor – first-line forem an or designated lead person, responsible for: determining if acceptable entry conditions ha ve been verified and docum ented at a permit-required confined space where entr y is planned; authorizing entry; overseeing entry operations; and terminating entry.

General Entry Permit – type of entry perm it used to enter a confined space when all atmospheric and safety hazards have been controlled or elim inated. The General Permit is used to verify and docum ent th at all hazards have been controlled or eliminated. If an entry is needed to evaluate, control or elim inate the hazardous conditions in the space, then a Hazardous Pe rmit will be needed for this portion of the entry.

Hazardous Atmosphere – an atm osphere that m ay expose em ployees to the risk of death, incapacitation, im pairment of ability to self rescue, injury, or acute illness from one or more of the following causes:

- Flammable gas, vapor, or m ist in ex cess of 10% of its lower f lammable lim it (LFL).
- Airborne com bustible dust that is at or approaching its lower f lammable lim it. This concentration m ay be approxim ated as a condition in which the dust obscures vision at a distance of 5 feet or less.

- Atmospheric oxygen concentration below 19.5% or above 23.5%.
- Any chemical or substance present which may be at concentrations capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects and is above the regulatory limit.
- Any other atmospheric condition that is immediately dangerous to life or health (IDLH).

Hazardous Permit – the type of permit used to enter a confined space when either a hazardous atmosphere and/or a safety hazard has not been completely controlled or eliminated.

Hot Work Operations – cutting, welding, brazing, torch soldering, high speed metal grinding, or use of an open flame.

Hot Work Permit – the type of permit used to enter a confined space when hot work operations will be performed in the space.

Hot Work Safety Permit – specific written authorization to perform hot work operations in any University space, including confined spaces. This is different from a Confined Space Hot Work Permit, in that it addresses potential fire safety hazards as specified in the Plant Operations Hot Work Safety Program.

Immediately Dangerous to Life or Health (IDLH) – means any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

Intrinsically Safe (Equipment) – is defined as equipment and wiring which is incapable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture in its most easily ignited concentration. (ANSI/ISA RP12.06.01-1995 (R2002))

Line Breaking or Misalignment – the intentional and physical disconnection of a pipe, line or duct. Added protection is obtained by misaligning or removing a section of the pipe, line, or duct. When potentially hazardous residues might remain downstream from the disconnecting point, the line should be purged and atmospheric testing conducted.

Lockout/Tagout – a procedure whereby a lock and/or tag device is used to hold an energy-isolating device (such as a switch, valve, etc) in the "off" or safe position. This procedure is fully explained in the OSEH Lockout/Tagout Guideline.

Lower Explosive Limit (LEL) – lowest concentration at which a gas or vapor can ignite and can be used interchangeably with LFL (Lower Flammable Limit). Concentrations below this level are too lean to burn.

Non-Permit Required Confined Space – confined spaces that do not contain or, have the potential to contain, any hazard capable of causing death or serious physical harm.

Oxygen Deficient Atmosphere – means an atmosphere containing less than 19.5 percent 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. When assessing the potential for a hazardous atmosphere, consideration must be given to portals of entry from other areas, such as pipes, ducts and vents.
- 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 and tapers to a smaller cross-section.
- Contains any other recognized serious safety or health hazard that may have an immediate effect or inhibit the employee leaving the space unaided. Examples include: exposed electrical parts, extreme temperature.

Self-Contained Breathing Apparatus (SCBA) – An atmosphere-supplying respirator in which the source of air is contained with the respirator independent of any other source.

Upper Explosive Limit (UEL) – the highest concentration at which a gas or vapor can ignite and can be used interchangeably with UFL (Upper Flammable Limit). Concentrations above this level are too rich to burn.

Work Induced Hazard – hazard created due to nature of work, e.g., welding (generates fumes) and painting (generates solvents in the atmosphere).

RESPONSIBILITY: Deans, Directors and Department Heads

Designate and empower individuals who will be responsible for the preparation and implementation of your departmental confined space entry program. Designated individuals should use this Guideline and Appendix A to develop a program specific to their department's needs.

Ensure an environment where supervisors and employees are encouraged to follow this Guideline.

Ensure that access to confined spaces within your department is controlled by: training potential users in how to recognize and evaluate confined spaces; locking all entrances to confined spaces, when feasible; posting warning signs at confined spaces, when feasible. Training is provided by OSEH upon request (7-1142).

Supervisors/Foremen

Be fully familiar with the specific details of their department's confined space program and attend OSEH training in confined spaces.

Ensure that employees are fully informed and trained about confined space entry requirements and procedures as outlined here, the hazards associated with confined spaces, applicable regulations and safety standards, and prudent safety practices to protect themselves and their fellow employees.

Monitor the need for additional or refresher training for employees based on changes in assigned duties, changes in confined spaces, changes in the UM confined space program or deficiencies in the employee's knowledge. This responsibility is shared between the supervisor and their OSEH Representative.

Follow Work~Connections procedures if there is an accident or injury. http://www.workconnections.umich.edu/forms.html.

Contact OSEH (7-1142) to request technical assistance and to provide training.

Collect copies of permits at the end of the job and mail to OSEH.

Employees

Comply with this Guideline and any other safety recommendations made by the supervisor.

Upon receiving confined space training, conduct assigned tasks as an entrant, attendant or Entry Supervisor in a safe manner. Wear appropriate personal protective equipment, and only use equipment (such as air monitoring equipment) in which formally trained.

Report any job related injuries or illnesses, questions on health and safety, or any unsafe or unhealthy working conditions to the supervisor.

UM – Architecture, Engineering & Construction (AEC)
Inform outside contractors of all permit-required confined spaces they will be working in and use the Contractor Notification Form in Appendix D of this Guideline to identify all potential hazards associated with the space.

Require contractors to comply with all applicable state and federal regulations as per the General Standard Conditions and contract specifications.

Conduct pre-entry coordination meeting and de-briefing meetings as required by this Guideline.

Department of Public Safety (DPS)

DPS staff will respond to calls for assistance in confined spaces and will be trained in: recognition of confined spaces and associated hazards, and proper, prompt notification of OSEH and/or the Ann Arbor Fire Department (AAFD).

OSEH

Review and revise the Confined Space Entry Guideline and permit process to assure employees are fully protected. The review will include prior experiences in confined spaces, any problems that occurred, as well as changes in the use or configuration of confined spaces.

Provide training in all aspects of this program and maintain records of this training.

Monitor the need for additional or refresher training for employees based on changes in assigned duties, changes in confined spaces, changes in the UM confined space program or deficiencies in the employee's knowledge. This responsibility is shared between the supervisor and the OSEH Representative.

Coordinate practice rescue drills with the Ann Arbor Fire Department.

Assist departments in implementing an effective program in their workplace.

Review permits, which are required to be held for one year, document and address any problems with appropriate management personnel.

PROCEDURES:

General – Only University staff that have received Confined Space Entry Training conducted by OSEH may enter permit-required confined spaces or serve as an attendant, Entry Supervisor or conduct air monitoring. The training will review all the materials contained in the Confined Space Training Manual developed by OSEH.

Prior to working in any confined space, all University staff must follow the steps listed below in order to comply with this Guideline.

- Evaluate the space & identify the hazards
- Complete the Permit, using it as an instructional guide
- Monitor hazardous atmospheres
- Implement measures to control the atmospheric and safety hazards
- Select the appropriate personal protective equipment
- Establish appropriate means of communication
- Implement other safety & health controls
- Determine the type permit to be issued
- Plan for evacuation and rescue
- Closeout and cancel the Permit

When work is performed by outside contractors, Construction Management or other project representatives will follow the procedure described in the "Procedures for Outside Contractors" section of this Guideline.

Evaluation of Confined Spaces.

Refer to Appendix B for a general listing of confined spaces on campus and at the Hospital. The Entry Supervisor can use this listing and the Confined Space Evaluation Form located in Appendix C to assist in evaluating the space. First, determine if it is a confined space by answering the first three questions on the form. If the answer is "yes" to all three, then it is a confined space.

To identify the hazards, answer the next five questions on the evaluation form in Appendix C. An answer of "yes" to any one question will classify the space as a permit-required confined space.

NOTE: In evaluating each question, the Entry Supervisor must take into account the work that is to be performed in the confined space and decide if the work itself would create a hazard.

If none of the hazards listed on the Confined Space Evaluation Form are present, then it is a non-permit required confined space and the work may proceed as planned and in accordance with all other applicable safety and health regulations and University safety procedures. *Again, consider the work to be performed and the potential for a hazard that would change the classification to permit-required.*

Other than a few exceptions listed in the table in Appendix B, the University's utility tunnel system is not considered a confined space and does not fall under this Guideline. Safe practices for working in the utility tunnel system are outlined in the Plant Operations Tunnel Safety Program.

Complete the Permit

The Entry Permit (Appendix C) is intended to track each step of preparing the space for entry and to track the conditions before, during, and after the job. It also serves as an instructional guide to the Entry Supervisor, as a warning tag to nearby persons, and provides critical information to emergency responders.

The Entry Supervisor will record all information requested on the Permit and sign where indicated. The steps described in this Guideline will assist in completing the hazard information required.

The completed Permit will be reviewed by the Entry Supervisor with all authorized entrants and attendants. The Permit will also be posted at the work site or otherwise be readily accessible to authorized entrants and emergency personnel.

At the completion of the job, the Entry Supervisor will close out the Perm it and sign where indicated. The Perm it will be f orwarded to the Departm ental Supervisor or Foreman who will send a copy to OSEH, Industrial Hygiene & Safety Program , 1239 Kipke, Box 1010. All canceled perm its must be kept on record for a period of one year. Any problems encountered during an entry operation shall be noted on the Permit so that OSEH can investigate and m ake appropriate revisions to the confined space program.

Monitoring of Hazardous Atmospheres

When it has been determ ined that a hazardous atm osphere m ay potentially be present, test the air in the space to dete rmine if acceptable conditions exist before entry is made, using the following procedure:

1. Only employees who have received OSEH confined space training can perform the monitoring.
2. Ensure that the m onitoring equipm ent has been calibrated according to the manufacturer's instructions and your department's procedures outlined in Appendix A.
3. Monitor remotely for: oxygen (O_2), combustible gases (lower & upper explosive limits), and toxic gases and vapors, e.g., hydrogen sulfide (H_2S), carbon monoxide (CO), etc. Test first for oxyge n, then for com bustible gases and then for toxic gases and vapors, in that order.
4. Types of continuous air monitors used:
   a. Direct reading electronic m onitoring devices which continuously m onitor for all three of the constituents listed above.
   b. Direct reading colorimetric tubes in sufficient quantities to frequently monitor for the levels of the constituents listed above.
5. The minimum acceptable air quality prior to confined space entry is:
   a. oxygen level: between 19.5% and 23.5%, by volume
   b. combustible gas: concentration less than 10% of the lower explosive lim it (LEL)
   c. other toxic contam inants: concen trations shall not exceed the MIOSHA regulatory limit or other recom mended exposure limit to insure the safety and health of the authorized entrants.

   Generally, electronic m onitoring equi pment m ost com monly used is f itted with audible and visual alarm s that will activate when any one of these three criteria is exceeded.
6. If it is determined that unacceptable air quality exists due to contaminants, do not enter the space. Im plement appropriate c ontrol measures as outlined in the next section of this Guideline and re-test to assure acceptable entry conditions are obtained.

7. Record initial readings obtained on the Permit and any changes in the readings as the preparation or work proceeds. **Air monitoring must be continuous while authorized entrants are working in the space to assure that acceptable conditions are being maintained.** Electronic monitoring devices are designed to be easily carried by the employees.

Implementation of Control Measures

1. Hazardous Atmospheres (or potentially hazardous atmospheres):

   Once the confined space has been determined to contain or potentially contain a hazardous atmosphere, steps must be taken to ventilate the space and eliminate the hazard before entry. Control methods include:

   a. Mechanical dilution ventilation: use of fans or blowers to provide positive pressure, uncontaminated air to the space. Assure that the fan is located away from any source of contamination and use explosion-proof fans if there is a potential combustible atmosphere.

   b. Local exhaust ventilation: this is designed to capture contaminants at or near their point of generation using hoods or enclosures with duct work connected to an exhaust fan. The contaminated air is discharged outside the confined space to a safe area. This method is especially effective for welding, cutting, burning, brazing and other operations where the work induces the atmospheric hazard.

   Ventilation in either application must be continuous during the entire entry procedure. Continuous air monitoring will help ensure that the ventilation remains adequate and atmospheric hazards do not develop.

   c. Cleaning or purging: if there are residues of hazardous chemicals or materials present which are capable of generating a hazardous atmosphere or may cause sufficient eye or skin irritation or sufficient to impair self-rescue, they must be removed and the space purged with an appropriate agent, to the extent feasible. Continuous monitoring must still be conducted after this process, and continuous ventilation may also be needed.

2. Safety Hazards

To achieve acceptable entry conditions, any identified safety hazards must be controlled, using the following guideline:

   a. mechanical, moving parts – deenergize and lockout/tagout all equipment in accordance with the OSEH Lockout/Tagout Guideline, or otherwise physically isolate the equipment through guarding, partitions or barriers.

   b. electrical equipment – deenergize and lockout/tagout all electrical equipment in accordance with the OSEH Lockout/Tagout Guideline or physically isolate the equipment by use of barriers or partitions of non-conductive material. Use ground fault circuit interrupters (GFCI) on all electrical equipment used in a damp or wet space. Certified electricians are qualified to work on live

parts and will use appropriate personal protective equipment and follow regulatory safe work practices.

c. chemical or gas lines – isolate by one or more of the following methods:
   - blanking and blinding,
   - double-block and bleed,
   - line breaking or misalignment,
   - lockout/tagout.

d. heat stress – use mechanical dilution ventilation as described above, as well as other appropriate safe work practices as per the OSEH Heat Stress Guideline.

e. hot work operations – control the potential for fire by using a Hot Work safety Permit in addition to the confined space permit and follow the Plant Hot Work Safety Program.

f. lighting – install appropriate temporary lighting. If there is a potential flammable/explosive atmosphere, use explosion-proof or intrinsically safe equipment approved for the location. If water or damp conditions are, or will be, present, use a ground fault circuit interrupter (GFCI). All temporary lighting must be grounded.

g. engulfment – remove the liquid or fine bulk material from the space, or entrant(s) must wear a full body harness and retrieval line and only enter if they can be rapidly pulled out. In addition, the space must be isolated by double blanking & bleeding or line breaking/misalignment to keep out any potential hazardous substances, whether it is a solid, liquid or gas. Isolation cannot be accomplished simply by closing a valve, or turning a switch.

h. entrapment or configuration – extra care must be taken in properly air monitoring (and if necessary, ventilating) all areas of the space, especially where the space configuration becomes smaller and gas pockets may develop. Retrieval or life lines may be necessary so that employees can be easily located.

i. ladders/falling/tripping hazards – maintain clear access to and from the space; use good housekeeping practices; check ladders for slippery rungs, cracks or defects before using; tie off ladders; use a full body harness fall protection device if there is a danger of falling; use other appropriate personal protective equipment, e.g., hard hat, safety shoes, etc.

j. noise – noise levels may be higher than normally expected, due to sound reverberation within the space, and may interfere with communication. In this situation, supplement voice/radio communication with visual hand signals or life lines. Hearing protection in the form of ear plugs and/or ear muffs may also be required to protect the entrant's hearing.

Indicate on the Permit all control measures implemented.

Selection of Personal Protective Equipment (PPE)

Based on the evaluation of specific confined space hazards and the control measures implemented, select the appropriate PPE to be worn during the work. Consideration should be given to the need for each of the following types of PPE:

1. face and eye protection
2. hearing protection
3. protective clothing, gloves, boots, blankets
4. head protection
5. respirators
6. emergency portable lighting, e.g., flashlights (use explosion-proof or intrinsically safe equipment if there is a potential for a flammable/explosive atmosphere)
7. full body safety harnesses and life lines associated with retrieval equipment and/or fall protection

Refer to the OSEH Guidelines on Respiratory Protection and Personal Protective Equipment for additional information on the proper selection of PPE. Indicate on the Permit all PPE to be worn by entrants. Contact your OSEH Representative if assistance is needed and contact OSEH anytime respirators will be required in confined spaces.

Establish Communication

Decide how entrants will communicate with each other and with attendants on the outside of the space. Communication may be voice, radio, hand signals or life lines, etc., or a combination of, as long as it enables the employees to monitor each other and to alert entrants of the need to evacuate the space. Indicate on the Permit the method(s) of communication to be used.

When radios will be used in remote areas, install a remote antenna lead to the radio. Test the radio function with the attendant or other worker outside the space or test by calling the Department of Public Safety (DPS) before entering. Re-verify radio communication after entering the confined space.

NOTE: Make sure radios are labeled as "intrinsically safe" when there is a potential for a flammable/combustible atmosphere.

If the planned communication method is disrupted, entrants will immediately evacuate the space until the problem is corrected.

Other Entry Precautions

The Entry Supervisor is responsible for ensuring all other necessary precautions are taken to address site safety and health concerns, including:

1. Removal of entrance covers: any condition making it unsafe to remove an entrance cover (such as high temperature and pressure) must be eliminated before removing the cover. Conditions may be such that the cover can be loosened gradually to release the pressure. Ventilation may be needed during this process.
2. Guarding entrance covers: When ground level entrance covers are removed, the opening will be guarded by a temporary barrier to prevent accidental falls and protect entrants from foreign objects dropping into the space.
3. Ensure that all equipment is in good repair and functioning properly prior to entering the permitted confined space.

Determine Permit Type

Permits for entry into confined space are classified as either "General", "Hot Work" or "Hazardous" permits due to the unique nature and additional precautions necessary when working in hazardous spaces or when performing hot work. As the Entry Supervisor goes through the process of identifying the hazards and implementing the appropriate controls, he/she will use that information to decide the type of Permit to be issued and will indicate this in the space provided at the top of the Permit. All the information on the Permit will be reviewed with the entrants and attendants before the work proceeds.

1. General Entry Permits:

Use the General Entry Permit when all atmospheric hazards and safety hazards have been controlled as described in the "Implementation of Control Measures" section of this Guideline.

Note: Even though the hazard(s) is/are under control, ventilation and air monitoring must still continue throughout the duration of the job as well as all other permit requirements described previously in this Guideline.

In addition, when using a General Entry Permit, the work party must consist of a minimum of two authorized employees and include an attendant. However, as with all other UM safety programs, the supervisor or employees may decide to take additional precautions such as the use of an attendant or retrieval/fall protection equipment.

NOTE: An attendant is always required, even if any atmospheric hazards have been controlled or eliminated.

2. Hazardous Entry Permits:

When the hazardous atmosphere or safety hazard cannot be brought under control by safety controls, continuous ventilation and verified with continuous monitoring, use a Hazardous Entry Permit.

In addition to all of the permit requirements of this Guideline, the following procedures must be implemented:

a. Contact OSEH at 7-1142 to review the space, the potential hazards and control methods implemented. An OSEH Representative will issue the permit and remain on site during the initial entry and as necessary during the work. OSEH will use the worksheet in Appendix E as a guideline in assessing the space and assuring all proper controls are in place.

b. All entrants will wear a full body retrieval harness while in the space, if feasible, as long as it does not create a greater hazard. In such cases, wristlets can be used in lieu of a harness. (Vertical spaces greater than five feet deep require the use of a retrieval harness.)

   The OSEH Representative will review and approve the type of respiratory protection to be worn as well as other PPE.

c. There must be at least one attendant on site at all times, monitoring the activities inside and outside the space, in frequent communication with the entrant(s) in the space. The attendant will maintain an accurate count of entrants in the space and know the identity of each entrant. He/she will not allow unauthorized persons from entering the space or call DPS or their supervisor for assistance. The attendant cannot perform other duties that would distract from monitoring the space.

   The attendant must be trained in the rescue provisions described in this Guideline and be certified in first aid and CPR techniques.

d. There must be a first aid kit at the site ready for use.

e. OSEH will work with the Entry Supervisor and entrants to determine the need for on-site rescue services vs. off-site rescue services. Depending on the hazards of the space and the estimated travel time for AAFD to respond, an on-site rescue service may be required. If an off-site rescue service will be used, e.g., AAFD, it may be appropriate to involve them in the permitting process and ensure that they will be available. Refer to the "Evacuation and Rescue" section of this Guideline for more details on rescue.

3. Hot Work Entry Permits:

When hot work will be conducted in a confined space, the Entry Supervisor will classify the Permit as "Hot Work."

The following provisions will be followed in addition to the permit requirements stated in this Guideline:

a. Ventilation will be needed since fumes will be generated as a result of the hot work. Fans or ventilators shall be used at the point of entrance of the confined space and/or adjacent to the work area. If the exhaust is not through an alternate access, necessary precautions will be taken so the exhaust is not affecting another work team that may be in the area.

Note: Pressurized sources of oxygen shall never be used for ventilating purposes, and compressed gas cylinders and welding machines must be secured and left outside the confined space.

b. Entrants may have to use respiratory protection if ventilation controls are insufficient. In this case, the Permit should be classified as "Hazardous" and OSEH contacted before proceeding.

c. All entrants will wear full body retrieval harness while in the space, if feasible, as long as it does not create a greater hazard. In such cases, wristlets can be used in lieu of a harness. (Vertical spaces greater than five feet require the use of a retrieval harness.)

The retrieval system requirement may be waived by contacting OSEH at 7-1142 for prior approval.

d. There must be at least one attendant on site at all times, monitoring the activities inside and outside the space, in frequent communication with the entrant(s) in the space. The attendant will maintain an accurate count of entrants in the space and know the identity of each entrant. He/she will not allow unauthorized persons from entering the space or call DPS or their supervisor for assistance. The attendant cannot perform other duties that would distract from monitoring the space.

The attendant must be trained in the rescue provisions described in this Guideline and be certified in first aid and CPR techniques.

e. OSEH will work with the Entry Supervisor and entrants to determine the need for on-site rescue services vs. off-site rescue services. Depending on the hazards of the space and the estimated travel time for AAFD to respond, an on-site rescue service may be required. If an off-site rescue service will be used, e.g., AAFD, it may be appropriate to involve them in the permitting process and ensure that they will be available. Refer to the "Evacuation and Rescue Plan" section of this Guideline below for more details on rescue.

f. There must be a first aid kit at the site ready for use.

g. Authorized entrants performing hot work will follow all provisions of the Factory Mutual hot work permit requirements including the use of Hot Work Permits, as well as the provisions of NFPA 51B (Standard for Fire Prevention During Welding, Cutting and Other Hot Work), to assure that all fire safety precautions have been completed and verified. The attendant will also serve as the fire watch, as per this program.

h. When arc welding is stopped during lunc h or overnight, all electrodes will be removed from the holders and holders located so that accidental contact cannot occur. The machine will be disconnected from the power source.

i. When gas welding or cutting is stoppe d during lunch or overnight, the valves will be closed and the gas supply positiv ely shut off outside the confined space. Remove the torch and hose from the space, if feasible.

j. Secure all cylinders and machinery associated with hot work.

Evacuation and Rescue Plan

1. Evacuation:

Under the following circum stances, all entr ants m ust leave the confined space immediately:

a. If a hazardous atm osphere is detected, i.e., if the audible/visual alarm on the air monitor activates, or there is any other indication of a problem.

b. Entrant(s) are experiencing signs a nd sym ptoms of possible exposure to a hazardous atmosphere or feel that they may become incapacitated in anyway.

c. Conditions in the space change that would require re-evaluation of the potential hazards. That is, the conditions listed on the Perm it are no longer in place.

d. Whenever an attendant is present but he/she is unable to perform the duties of attendant.

e. Whenever the entrants are notified to evacuate by the attendant or Entry Supervisor or by evacuation alarm.

f. Whenever communication with the attendant is disrupted.

2. Rescue:

Rescue m easures m ay be necessary if the authorized entrant in the confined space becomes incapacitated and is unable to exit the space without assistance. Under these circumstances the authorized entrants or the attendant at the site should follow these procedures:

a. At the first indication of a problem , c ontact the Departm ent of Public Safety by calling 911 (*from a campus phone*) or radio channel 1A and request assistance.

b. If the problem is due to an atm ospheric hazard and the entrants are wearing retrieval harness, the attendant and/or other employees present should attempt to activate the retrieval system to rem ove the entrant from the space. If the lifting device fails to lift the entrant out of the space, the attendant should wait outside the space for help to arrive.

Under no circumstances should the attendant enter the confined space until back up personnel are on site, and adequate protective equipment is available.

c. If it can be ascertained that the entrant is incapacitated due to causes not related to the atmosphere in the space (such as a fall or other injury), they should not be moved until the appropriate rescue personnel arrive and direct the removal. First aid, if appropriate, should be rendered.

d. The Department of Public Safety (DPS) will contact OSEH and the Ann Arbor Fire Department (AAFD). The employees at the scene should keep DPS advised as to the nature of the emergency so that appropriate notification can be made at the earliest time possible.

e. Response personnel (AAFD) have been trained in confined spaces and will review the Permit and understand the hazards of the space and condition of the entrants before taking any action. Additional air monitoring may also be conducted by the rescue personnel. Rescuers must assure they are properly protected before beginning rescue operations and be equipped with SCBAs.

   i. If the entrant is incapacitated due to the atmosphere in the space and is wearing a safety harness, the rescue personnel shall use the lifting device to remove the entrant from the confined space.

   ii. If the use of the lifting device fails to extract the entrant from the confined space, rescue personnel wearing SCBA, and all other appropriate protective equipment, shall enter the confined space to assist in the rescue effort only if an additional standby person with an SCBA is at the entrance to the space. The rescuer must evaluate the atmosphere for explosive hazards prior to entry.

   iii. If the entrant is incapacitated due to causes not related to the atmosphere, the rescue personnel will render first aid as appropriate and remove the individual from the space in the most appropriate manner taking the injuries into account.

When an injured entrant has been exposed to a substance for which a Material Safety Data Sheet (MSDS) or other information is available, that MSDS or other information will be provided to the medical facility treating the exposed entrant.

At least one person on the response team shall hold current certification in CPR and first aid and be trained in the OSEH Bloodborne Pathogens program.

Closeout and Cancellation of the Permit

At completion of the work, the Entry Supervisor will closeout and cancel the Permit by signing on the line indicated. The Permit will be forwarded to the Departmental Supervisor or Foreman who will send a copy to OSEH, Industrial Hygiene & Safety Program, 1239 Kipke Drive, Box 1010.

All canceled permits will be kept on record for a period of one year. Any problems encountered during entry or work in a confined space will be noted on the Permit so that OSEH can investigate and make appropriate revisions to the confined space program.

PROCEDURES FOR OUTSIDE CONTRACTORS:

Notification Procedures

When outside contractors will perform work that involves permit-required confined space entry, the University is required to inform the contractor of the following:

1. The location of any permit-required confined spaces.
2. The hazards identified and why the University classifies it as a permit-required space.
3. Precautions or procedures that the University has in place to protect nearby personnel.
4. The regulatory requirement that the contractor comply with the MIOSHA Confined Space Entry regulation, MIOSHA Part 90 and Part 490.

The notification requirements can be accomplished by using the Contractor Notification Form in Appendix D of this Guideline.

Coordination with UM Authorized Entrants

If University personnel will be working in or near the permit spaces(s) where the contractor will be working, then the University and the contractor will coordinate entry operations. OSEH representation may be requested for this meeting by contacting the Industrial Hygiene & Safety program at 7-1142. Issues to be addressed during these discussions include:

1. What permit system will be used.
2. Scheduling of entry into the space.
3. Procedures that will be used to evaluate the hazards and implement controls.
4. Establishment of lines of communication between the contractor and University personnel working in the area.
5. Review of evacuation and rescue plan.

Contractor Confined Space Program

The contractor will inform the University representative of the confined space permit program that will be used. If the contractor encounters or creates any hazards during the entry operation, this information will be communicated to the University representative.

Debriefing

At the conclusion of the entry operation, the University representative and the contractor will hold a debriefing where they will share information about any problems encountered during the work. The University representative may request OSEH representation at this meeting. OSEH will make any necessary changes to the program based on information obtained at the debriefing.

RELATED DOCUMENTS:

OSEH Personal Protective Equipment, General Guideline
OSEH Respiratory Protection Guideline
OSEH Lockout/Tagout Guideline
OSEH Heat Stress Guideline
OSEH Bloodborne Pathogens Guideline
Plant Operations Tunnel Safety Program
Plant Operations Hot Work Safety Program
OSEH Confined Space Training Manual
OSHA Permit-Required Confined Spaces Booklet
MIOSHA Permit-Required CSE Decision Flow Chart
MIOSHA "DANGER Confined Space" (Poster)
MIOSHA "DANGER Confined Space" (Label)

TECHNICAL SUPPORT:

Provided by OSEH (7-1142). All referenced guidelines, regulations, and other documents are available through OSEH.

ATTACHMENTS:

Appendix A – Example Department Specific Confined Space Entry Program
Appendix B – General Listing of Confined Spaces
Appendix C – Confined Space Evaluation Form and Confined Space Entry Permit
Appendix D – Contractor Notification Form
Appendix E – OSEH Worksheet