

Confined Space Entry ProgramDate of
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EMUDPS-EHS-P044

Revision: 6

I. PURPOSE

The purpose of this protocol is to establish a confined space entry program in accordance with the Occupational Safety and Health Administration (OSHA) standard [1910.146 Permit-Required Confined Spaces](#) and the Michigan Occupational Safety and Health Administration (MIOSHA) [General Industry Safety and Health Standards, Part 90 and Part 490 Permit-Required Confined Spaces](#).

This program is designed to control and protect employees from, permit space hazards and for regulating employee entry into permit and non-permit confined spaces.

II. SCOPE

This program applies to all Eastern Michigan University (EMU) employees engaged in activities where confined space hazards may exist or may be created. Contractors are required to following their companies Confined Space Entry Program requirements which must meet the OSHA and MIOSHA requirements.

Areas meeting the definitions of either a confined space or a permit required confined space shall only be entered when the requirements of the program have been fulfilled. The criteria for classification of confined space as permit-required or non-permit-required are described in section V.A. Environmental Health and Safety maintains the confined space inventory and should be contacted to obtain information regarding specific confined spaces on campus.

III. DEFINITIONS

Acceptable entry conditions - are the conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

Attendant - an individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program.

Authorized entrant - an employee who is authorized to enter a permit space.

Blanking or blinding - the absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers

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the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

Confined space - a space that: (1) Is large enough and so configured that an employee can bodily enter and perform assigned work; and (2) Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and (3) 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 closed valves.

Emergency - any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.

Engulfment - the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

Entry - the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing 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 (permit) - the written or printed document provided by the entry supervisor to allow and control entry into a permit space and that contains the information specified in section V. B.

Entry supervisor - the person (such as the foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations and for terminating entry as required by this section. NOTE: An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by this section for each role filled. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

Hazardous atmosphere - an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes: (1) Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL); (2) Airborne combustible dust at a concentration that meets or exceeds its LFL; NOTE: This concentration may be approximated as a condition in

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which the dust obscures vision at a distance of 5 feet (1.52 m) or less. (3) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent; (4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, of this Part and which could result in employee exposure in excess of its dose or permissible exposure limit; NOTE: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision. (5) Any other atmospheric condition that is immediately dangerous to life or health. NOTE: For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as Material Safety Data Sheets that comply with the [Hazard Communication Standard, section 1910.1200](#) of this Part, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

Hot work permit - the written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

Immediately dangerous to life or health (IDLH) - 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. NOTE: Some materials -- hydrogen fluoride gas and cadmium vapor, for example -- may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. The victim "feels normal" from recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

Inerting - the displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible. NOTE: This procedure produces an IDLH oxygen-deficient atmosphere.

Isolation - the process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

Line breaking - the intentional opening of a pipe, line or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

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Non-permit confined space - a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

Oxygen deficient atmosphere - an atmosphere containing less than 19.5 percent oxygen by volume.

Oxygen enriched atmosphere - an atmosphere containing more than 23.5 percent oxygen by volume.

Permit-required confined space (permit space) - a confined space that has one or more of the following characteristics: (1) Contains or has a potential to contain a hazardous atmosphere; (2) Contains a material that has the potential for engulfing 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; or (4) Contains any other recognized serious safety or health hazard.

Permit system - the written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

Prohibited condition - any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

Rescue service - the personnel designated to rescue employees from permit spaces.

Retrieval system - the equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

Testing - the process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space. NOTE: Testing enables the entry supervisor to devise and implement adequate control measures for the protection of authorized entrants and to determine if acceptable entry conditions are present immediately prior to and during entry.

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IV. RESPONSIBILITIES

A. Administrators, Directors and Department Heads

1. Provide the leadership and the management systems necessary to ensure safe working conditions are maintained in their Colleges, Schools and Departments.
2. Ensure the Confined Space Entry Program is implemented in their area as applicable.
3. Motivate and assist forepersons, managers and supervisors with confined space entry compliance.
4. Provide the necessary resources for the Confined Space Entry Program.
5. Require appropriate staff to attend all applicable training sessions.

B. Forepersons, Managers and Supervisors

1. Implement the Confined Space Entry Program in their work area.
2. Train employees on the requirements of the Confined Space Entry Program prior to conducting a confined space entry. The training must be documented.
3. Provide the engineering controls and safety equipment, for example air monitors, lockout/tagout equipment, etc., to reduce the risk of injuries and accidents.
4. Ventilation and air monitoring must be provided in areas where toxic fumes may be generated by hot work or other activities.
5. Ensure the necessary PPE is provided, used and maintained. This includes but is not limited to:
 - a. Face, eye and foot protection as necessary.
 - b. Other personal protective clothing or equipment, such as gloves, aprons, hearing protection devices and other required PPE as determined by the PPE assessment to protect the employee assigned to enter a confined space.
6. Collect and review completed [Confined Space Entry Permits](#) and [Hot Work Permits](#), if applicable. Forward them to EHS for documentation.
7. Promptly investigate and report to Workers' Compensation and EHS any accidents and incidents in a confined space.
8. Enforce the rules and requirements of the Confined Space Entry Program, including disciplinary action for repeated and/or egregious non-compliance.

C. Employees

1. Attend all required training sessions.
2. Use hot work equipment as trained and authorized.
3. Use the required personal protective equipment (PPE) and report any defects to your supervisor. Do not tamper with safety devices.
4. Complete the confined space entry permit as required by the program.

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D. Confined Space Entry Assigned Responsibilities

In addition to the other requirements specified in this program, entries into permit required confined spaces are prohibited unless and attendant and/or entry supervisor are present for the entire duration of the entry. Authorized entrants, attendants and entry supervisors must be trained and tested regarding their assigned responsibilities.

1. Authorized Entrants

- a. Are authorized by EMU to enter a permit required confined space.
- b. Must comply with the criteria set forth in this Confined Space Entry Program.
- c. Must also comply with the criteria dictated by other EMU health and safety programs, including but not limited to lockout/tagout, personal protective equipment, hazard communication, etc.

2. Attendants

- a. Are employees stationed **outside** a permit space to monitor the authorized entrants, perform **non-entry** rescue and to summon emergency rescue services if necessary.
- b. Must recognize symptoms of overexposure regarding entrants and to monitor the area around the exterior of the confined space to prevent operations outside the space that could adversely affect the interior environment of the confined space.
- c. Personnel assigned to attendant duties **must not** leave the area, or become distracted from their responsibilities during the entry.

3. Entry Supervisors

- a. Are responsible for determining whether entry conditions are acceptable, arranging/confirming the emergency rescue services are on stand-by, authorizing entry, overseeing entry operations and terminating the entry.
- b. All permit-required entries **must** be authorized by an entry supervisor.
- c. Have overall authority/responsibility to ensure confined space entries are performed in as safe a manner as possible and that all pre-entry testing and equipment are accessible and in working order.
- d. May act as attendants if appropriate.

E. Environmental Health and Safety

1. Provides oversight and guidance on the Confined Space Entry Program.
2. Provides consultation, training, exposure monitoring and inspections as needed.
3. Maintains documentation of air monitoring, completed confined space entries, permits and space reclassifications.
4. Maintains the master confined space inventory.
5. Periodically reviews and updates the Confined Space Entry Program.

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F. Outside Contractors

Outside contractors are commonly used by the University to perform various tasks. It is the responsibility of the department acquiring contracted services to inform contractor personnel of potential confined space hazards and procedures regarding confined space entry, if such spaces are to be entered by these personnel. It is also the responsibility of the contracting department to inform contractor personnel of other potential hazards in accordance with EMU's [Hazard Communication Program](#) and other safety programs ([Lockout/Tagout](#), [Hot Work](#), etc.).

Contractors are responsible for providing appropriate training and equipment to their employees such that anticipated operations can be performed in a safe manner, in compliance with federal, state, local, EMU and internal policies/regulations. [A Contactor Health and Safety Sign-Off form](#) should be completed for documentation purposes. When questions or concerns arise regarding contractor health and safety requirements for specific tasks, Environmental Health and Safety should be contacted for guidance.

If deemed necessary by the contacting department, a contractor may be required to complete a "Contractor Health and Safety Sign-off Form" in addition to any other applicable permits. This form is designed to ensure all contracted employees have been appropriately trained, equipment is constructed and maintained according to applicable regulations and all administrative precautions have been fulfilled by the contractor.

Contractors performing major construction or renovation projects at EMU are subject to construction safety standards ([29 CFR 1926](#)). The company providing said personnel/services shall be held responsible for the health and safety of their employees and bystander personnel.

V. PROCEDURES

A. Identification of Confined Spaces

1. Confined Space Definition

A confined space is defined by MIOSHA as any space that:

- a. Is large enough and so configured that an employee can bodily enter and perform assigned work;
- b. Has limited or restricted means for entry or exit (e.g. bins, tunnels, hoppers, silos, tanks, vaults, pits, etc.); and
- c. Is **not** designed for continuous employee occupancy.

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2. Permit Required Confined Space Definition

A permit-required confined space or permit space is defined by MIOSHA as any confined space that has one or more of the following characteristics:

- a. Contains or has a potential to contain a hazardous atmosphere (i.e. oxygen deficient or enriched, flammable, and/or toxic);
- b. Contains a material that has the potential for engulfing an entrant (e.g. sand, grain, liquids, etc.);
- c. 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; or
- d. Contains any other recognized serious safety or health hazard.

3. Posting Requirements

- a. Confined spaces and permit-required confined spaces must be identified and posted with signs.
- b. Permit-required confined space signs shall read (as a minimum):

**DANGER
PERMIT-REQUIRED CONFINED SPACE
DO NOT ENTER**

- c. Non-permit required confined spaces shall be identified with labels or signs that read (as a minimum):

**DANGER
CONFINED SPACE
AUTHORIZED PERSONNEL ONLY**

OR

**DANGER
CONFINED SPACE
KEEP OUT UNLESS AUTHORIZED**

- d. Where labeling of a confined space is not practical, it is not necessary to affix a label to the opening of the space (i.e., manhole covers, etc.) However, it is necessary to inform personnel entering the space of the requirements and classification of the space prior to entry.
- e. Confined spaces not identified with labels/signs include:
 - i. Sanitary and storm sewers;
 - ii. Some sanitary/storm sumps;
 - iii. Crawlspace/pipe chase access points in public areas (i.e., stairwells, classrooms, mechanical room doors, attic accesses, etc.);
 - iv. Air plenums above drop ceilings;
 - v. Exterior window wells and air intake wells;
 - vi. Exterior access points to utility tunnels (manholes) and

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- vii. Other spaces where it is impractical to affix labels to the point of entry (specifically, floor hoist pits and hot surfaces such as boilers or exhaust stacks).

B. Entry Permit System

1. No entry into the permit space shall be authorized until or unless:
 - a. The space has been isolated from any and all sources of hazardous energy release;
 - b. Any and all vehicular traffic routes which could impact worker safety have been identified and controlled;
 - c. Any and all pedestrian access routes have been identified and controlled;
 - d. The space has been opened and ventilated, identified, flushed or purged, where applicable;
 - e. The atmosphere inside the space has been characterized using appropriate direct reading instruments. This includes monitoring for oxygen content, flammable gases and vapors and potential toxic air contaminants (e.g., carbon monoxide, hydrogen sulfide). In addition, monitoring for specific chemical contaminants suspected of being present within the space must be performed.
 - f. A written [Confined Space Entry Permit](#) is completed, documenting the means, procedures and practices required for a safe permit space entry, and
 - g. The rescue team is notified and is on standby.
2. In addition to the above reference requirements, before entry, **all portions** of the [Confined Space Entry Permit](#) must be completed and verified.
 - a. Each entrant, supervisor and attendant must sign the permit acknowledging the permit contents and their assigned duties/responsibilities.
 - b. The [Confined Space Entry Permit](#) can be found at the [EHS website](#).
3. The completed confined space entry permit must be posted at or near the opening to the confined space and remain posted for the duration of the entry.
4. Upon termination of the entry, the completed permit(s) must be given to the departmental person authorizing the entry and subsequently to Environmental Health and Safety to be archived for at least one year.
5. Whenever possible, if a permit-required confined space can have the hazards eliminated and be reclassified to a non-permit space, then the entry should be done following the requirements of the [Change of Classification from Permit-Required to Non-Permit Confined Space form](#).

C. General Confined Space Entry Procedures

The following precautions should be taken in both permit-required and non-permit required confined spaces until historical air monitoring data has been collected and the atmospheric quality within the confined spaces has been characterized.

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1. Opening
 - a. Prior to opening a permit-required confined space, the potential for fires, explosions or sudden release of hazardous materials must be eliminated.
 - b. It is best if the atmosphere in the interior space can be monitored remotely (i.e., through a manhole cover or from outside the space) prior to opening.
2. Preliminary Atmospheric Evaluation
 - a. Initial atmospheric testing must be performed prior to entry and prior to ventilation of the space using appropriate direct reading instruments.
 - b. Air monitoring instruments must be calibrated before measurements are taken. Sampling shall proceed **ONLY** in the following order:
 - i. Oxygen content
 - ii. Flammable gasses/vapors and
 - iii. Possible toxic air contaminants
 - c. **It is essential these criteria (at a minimum) are measured and documented prior to entry into the permit space.**
 - d. Air monitoring instruments shall be stored at the following locations:
 - i. Environmental Health and Safety
 - ii. HVAC Shop
 - e. Calibration kits for the air monitors are located in the EHS Office.
3. Forced Air Ventilation
 - a. A permit space having the potential to contain hazardous atmospheres must be ventilated using a mechanical blower before and during entry, regardless of the readings obtained from the initial atmospheric evaluation noted above.
 - b. Forced air ventilation should achieve at least 8 air changes prior to re-evaluating the atmosphere in the permit space and initial entry.
4. On-going/Continuous Atmospheric Evaluation
 - a. Continuous atmospheric monitoring shall be conducted throughout the entire permit confined space entry operation.
 - b. Continuous air monitoring is required regardless of the operations inside the space.
5. The following table provides information regarding air monitoring action levels and required actions.

AIR MONITORING ACTION LEVELS

ATMOSPHERIC CONDITION(S)	INSTRUMENT	REQUIRED ACTION
Oxygen (O ₂) content less than ambient conditions (<20%)	Direct reading oxygen meter* ¹	Entry prohibited* ¹
Oxygen (O ₂) content greater than 23.5%	Direct reading oxygen meter* ¹	Entry prohibited. Fire/explosion hazard with oxygen enrichment.
Gas, vapor and/or mist in concentrations greater than 10% of	Direct reading combustible gas	Entry prohibited. Fire/explosion hazard

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LEL/LFL	indicator	
Concentrations of airborne combustible/toxic dust which obscure visibility at < 5 ft.	Visual Observation	Entry prohibited. Fire/explosion hazard, toxic hazard.
Inhalation hazards at concentrations > 50% of its IDLH value	Direct reading instrument* ²	Entry prohibited. Chronic/acute health hazard.
Any inhalation hazard at concentrations that could impair self rescue	Direct reading instrument* ²	Entry prohibited. Chronic/acute health hazard.
Any inhalation hazard at concentrations > 50% of its lowest exposure guideline (OSHA-PEL/ACGIH-TLV)	Direct reading instrument* ²	Entry permitted* ³

*Notes

1. OSHA allows entry at oxygen concentrations as low as 19.5%, however, the reason for the depleted oxygen must be determined before the space can be considered safe. If oxygen content cannot be brought to near ambient **levels** (i.e. 20%), supplied air respirators must be used. EMU personnel **shall not** enter confined spaces with oxygen deficient or enriched atmospheres.
2. Depends upon the specific hazard. It is essential that the instrument chosen is capable of detecting the chemical hazard at concentrations or near one-half the respective PEL/TLV, or other exposure guideline designated by EHS. The direct reading instruments available are capable of detecting carbon monoxide and hydrogen sulfide at less than half of their respective PEL/TLV. Detector (colorimetric) tubes or other such devices may be required if the direct reading instruments are not equipped with the appropriate sensors for the chemical being measured.
3. The entry is permitted with the provision that the appropriate air-purifying respirator is used and sufficient atmospheric oxygen is present.

6. Equipment Safety Requirements

- a. Air monitoring equipment must be certified as safe for use in hazardous atmospheres.
- b. Ventilation equipment is often **not** intrinsically safe and must be used with caution in potentially flammable atmospheres.
- c. The blower motor and other potential ignition sources must be kept outside the space until the contaminant levels are reduced to <5% of the LEL.
- d. See Item 7 below for information regarding control of electrical hazards associated with ventilation, air monitoring and other equipment.
- e. Electrical devices such as portable lighting, power tools, extension cords, etc., may **not** be taken into a flammable, oxygen enriched or other hazardous atmosphere unless they have been tested for intrinsic safety and have no potential to be ignition sources.
- f. If a flammable or oxygen enriched atmosphere is encountered, **all** non-intrinsically safe equipment (i.e., pagers, radios, flashlights, cellular phones, calculators, etc.) must be left outside the space during entry. These types of electrical devices are typically not inherently safe and may pose an ignition hazard if taken into a hazardous atmosphere or environment.
- g. If working in a flammable atmosphere, non-sparking (i.e. brass, etc.) tools must be used as long as a potentially flammable atmosphere exists in the space.
- h. If the hazardous atmosphere is eliminated, any type of tool may be safely used in the space.

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7. Control of Electrical Hazards Associated with Ventilation, Air Monitoring and Other Equipment
 - a. Fire and Explosion Hazards
 - i. Fires and explosions should be regarded as one of the most significant potential hazards associated with confined spaces. Therefore, all sources of ignition must be completely controlled. Failure to control ignition sources could result in a fire or explosion and present a serious threat to life and health.
 - ii. Whenever forced air (mechanical) ventilation is used in atmospheres where flammable, combustible or explosive materials are present, all such equipment shall be approved for **Class I, Division I hazardous atmospheres** if the ventilation equipment is to be operated inside the hazardous atmosphere.
 - iii. The blower duct must be positioned to blow as deeply into the space requiring ventilation as possible. Do not attempt to suck out gases or vapors unless the source of the contamination is a point source (such as welding/brazing). Ventilation blowers, mechanical equipment and tools that could release sparks or static electricity must be bonded and/or grounded.
 - iv. Similarly, the atmosphere within the confined space, as well as the surrounding work area must be routinely monitored using direct reading instruments approved for **Class I, Division I hazardous atmospheres**.
 - v. If combustible gas levels equal or exceed 10% of the lower explosive limit (LEL), when monitored as described previously, operations in the confined space shall immediately cease and the affected area evacuated until appropriate control measures have been implemented and the atmosphere re-tested and verified safe for re-entry.
 - vi. Regardless of actual instrument readings, if all sources of ignition can not be controlled in areas where flammable, combustible or explosive atmospheres exist, operations shall cease. The confined space and the surrounding area must also be evacuated until the ignition sources have been eliminated.
 - b. Ignition Sources
 - i. Ignition sources included, but are not limited to: smoking, static electricity, lighting, open flames, spontaneously ignitable materials, frictional heat/sparks, hot surfaces/objects, radiant heat, electrical sparks, stray current, cutting/welding/brazing, ovens, furnaces and heating equipment.
 - ii. At a minimum, one 10-lb. ABC rated fire extinguisher must be located within 100 feet of each work area.
 - c. Electrical Hazards
 - i. MIOSHA regulations require employees who may be exposed to electrical equipment be trained to recognize the hazards associated with the equipment and be familiar with the accepted control methods.

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- All extension cords** used for portable tools or other equipment shall be designed for hard or severe usage and be (three prong) grounded.
- ii. All 120-volt, single phase 15-and 20-ampere receptacle outlets on construction sites and other locations where moisture/water contact may occur must be equipped with **ground-fault circuit interrupters (GFCIs)**. GFCIs must be attached directly to or as close as possible to the receptacle. GFCIs located away from the receptacle will not protect any wiring, tools or equipment located between the receptacle and the GFCI. Only the wiring plugged into the GFCI and outward (down current) will be protected by the GFCI.
 - iii. All temporary lighting lamps used for general illumination must be protected from accidental breakage. Metal case sockets must be grounded. Portable lighting in wet or conductive locations should be 12 volts or less.
8. Personal Protective Equipment (PPE)
- a. It may be necessary to use personal protective equipment (PPE) to perform an entry if the hazards present in the confined space cannot be effectively eliminated using engineering controls.
 - b. PPE may consist of any one or more of the following:
 - i. Respirators
 - ii. Protective overalls
 - iii. Protective eyewear
 - iv. Hard hats
 - v. Safety shoes/boots
 - vi. Chemical or heat/cold resistant gloves
 - vii. Boot covers
 - viii. Fall protection and/or retrieval equipment
 - ix. Hearing protection
 - x. Any other apparel or apparatus worn on the body to isolate the entrant from environmental hazards.
 - c. PPE **must** be constructed of appropriate materials and provide adequate protection from the particular hazards encountered.
 - d. If there are concerns regarding the type PPE needed, contact Environmental Health and Safety for recommendations.
 - e. Respirators of any kind **must** be used in compliance with EMU's [Respiratory Protection Program](#).
 - f. Tight-fitting respirators may **not** be used if the persons requiring protection have any of the following characteristics:
 - i. Facial hair (especially beards and sideburns)
 - ii. Emphysema
 - iii. Lung cancer
 - iv. Tuberculosis
 - v. Any other cardiopulmonary disease
 - vi. Contact lenses
 - vii. Claustrophobia
 - viii. Epilepsy (unless a buddy is present and in visual contact at all times)

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- ix. Large facial scars
- x. Other factors influencing the fit or use of a respiratory protective device
- g. Retrieval equipment shall consist of a five-point body harness, anklets or wristlets in combination with a lifeline or other retrieval device.
- h. Body belts are not to be used as retrieval attachments due to the potential for causing additional injuries to the entrant if emergency retrieval becomes necessary.
- i. All PPE has limitations regarding effectiveness, chemical resistance, comfort, thermal stress, weight and many other factors. Contact Environmental Health and Safety for information regarding both the applicability and limitations of specific protective equipment.

D. Assigned Responsibilities

In addition to the other requirements specified in this program, entries into permit required confined spaces are prohibited unless and attendant and/or entry supervisor are present for the entire duration of the entry. Authorized entrants, attendants and entry supervisors must be trained and tested regarding their assigned responsibilities.

1. Authorized Entrants

- a. Are authorized by EMU to enter a permit required confined space.
- b. Must comply with the criteria set forth in this Confined Space Entry Program.
- c. Must also comply with the criteria dictated by other EMU health and safety programs, including but not limited to [lockout/tagout](#), [personal protective equipment](#), [hazard communication](#), etc.

2. Attendants

- a. Are employees stationed **outside** a permit space to monitor the authorized entrants, perform **non-entry** rescue and to summon emergency rescue services if necessary.
- b. Must recognize symptoms of overexposure regarding entrants and to monitor the area around the exterior of the confined space to prevent operations outside the space that could adversely affect the interior environment of the confined space.
- c. Personnel assigned to attendant duties **must not** leave the area, or become distracted from their responsibilities during the entry.

3. Entry Supervisors

- a. Are responsible for determining whether entry conditions are acceptable, arranging/confirming the emergency rescue services are on stand-by, authorizing entry, overseeing entry operations and terminating the entry.
- b. All permit-required entries **must** be authorized by an entry supervisor.
- c. Have overall authority/responsibility to ensure confined space entries are performed in as safe a manner as possible and that all pre-entry testing and equipment are accessible and in working order.
- d. May act as attendants if appropriate.

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E. Training and Certifications

1. All confined space entrants, attendants, supervisors and rescue personnel must be appropriately trained with respect to their assigned responsibilities and use/limitations of the equipment to evaluate and control hazards within the confined space. Untrained personnel shall not perform entries into permit required spaces.
2. Authorized Entrants and Attendants
 - a. The following training and certification requirements for authorized entrants and attendants shall be completed prior to any permit space entries.
 - b. Completion of a confined space entry “Entrant/Attendant” course addressing the requirements of [MIOSHA Part 490 Permit-Required Confined Space, 1910.146\(g\)](#).
3. Entry Supervisor
 - a. In addition to Entrant and Attendant training, the following supplemental training and certification must be completed by entry supervisors prior to authorization of **any** permit space entries.
 - b. Completion of a confined space entry “Entry Supervisory” course addressing the requirements and responsibilities of entry supervisors under [MIOSHA Part 490 Permit-Required Confined Space, 1919.146\(g\)](#).
4. Rescue Team Members
 - a. Completion of an 8-hour confined space rescue course which provides instruction on retrieval of personnel from confined spaces and the use of available retrieval equipment; and,
 - b. Periodic practice session (annually) in which rescue team members practice retrieval of personnel from (non-hazardous) representative confined spaces.
 - c. At this time, EMU contracts out permit entry work and rescue team responsibilities and does not allow EMU employees to perform permit-required entries.

F. Rescue and Emergency Services

As would-be rescuers comprise over 60% of all confined space fatalities, it is critical that rescuers are trained in proper procedures and equipment use. The following subsections describe rescue procedures and equipment to be used for extracting an entrant from a confined space safely.

1. Non-Entry Rescue by Attendants
 - a. Each authorized permit space entrant must wear a 5-point body harness and lifeline when:
 - i. A vertical traverse is present
 - ii. Potential falling hazards exist and/or
 - iii. The entrant is expected to be out of the line-of-vision of the attendant

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- b. The retrieval lineal (lanyard, cable, rope, etc.) must be attached to the center of the entrant's back, either near shoulder level or above the entrant's head.
 - c. If a five-point, full body harness is impractical, wristlets/anklets may be used.
 - d. Body belts may not be used as either fall protection or retrieval attachments.
2. If the retrieval distance involves less than 5 feet of vertical travel, the retrieval line may be attached to **either a fixed anchor point or a mechanical device** (such as a retrieval tripod/winch) located outside the permit space. If the retrieval involves vertical distances of greater than 5 feet, the retrieval line **must** be attached to a retrieval device located outside the permit space.
3. Unless otherwise authorized, attendants may not enter the permit space to perform rescue operations. Attendant rescue actions must be conducted from outside the permit space using the retrieval devices specified previously.
4. The following procedures shall be followed by contract rescue personnel performing rescue operations:
 - a. If the attendant observes the entrant is injured or unconscious, the rescue team and medical assistance must be summoned immediately.
 - b. If the cause of the entrant's injury or loss of consciousness is not apparent, **the attendant shall not enter the space** to perform rescue until the cause of the "symptom" has been determined, a replacement attendant has arrived on-scene and there are no hazards to rescue personnel that they are not prepared to deal with.
 - c. Once assistance has arrived at the space, contract rescue personnel wearing self-contained breathing apparatus (SCBA) and other appropriate PPE (if necessary), may enter the space to attach a lifeline or lanyard to the entrant's harness/wristlets/anklets and extract the person from the space.
 - d. If the cause of the injury is not determined, rescuers equipped with the appropriate PPE shall enter the space to extract the injured person.
 - e. Continuous atmospheric monitoring must be performed during rescue operations.
 - f. If a winch and tripod retrieval system is used, someone must remain in the space with the injured entrant to help extract them from the space.
 - g. **Do not** drag the injured person horizontally using the tripod and winch as the system is not designed to pull in a sideways direction and may tip over or fall into the space if not used correctly.
 - h. Do not use (electrically or mechanically) powered equipment to extract entrants from the space unless absolutely necessary.
 - i. Powered equipment may generate air contaminants, introduce electrical hazards, provide an ignition source or cause additional injuries to the entrant due to pulling too rapidly or with too much force.
 - j. If the cause of an entrant's injury is obvious and there is no danger to additional personnel, the space may be entered to assist the injured entrant exit the space once help arrives.

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- k. Once the injured entrant has been extracted from the space, they should be stabilized and appropriate first aid administered.
 - l. If the entrant is not breathing and/or has no pulse, begin CPR immediately and continue until the injured person begins breathing on their own and has a pulse or until the emergency medical service (EMS) arrives.
 - m. Unless qualified, **do not** attempt medical treatment beyond first-aid, CPR or other life saving measures.
 - n. If it is safe to do so, remove the retrieval and/or PPE from the injured person so that they can be transported to a medical facility.
 - o. The attendant **must not leave the area** even after EMS arrives, as they may need detailed information regarding the cause of the injury, especially if a chemical exposure is involved. If a chemical exposure is involved or was the cause of the injury, relevant information may need to be reported to medical personnel.
 - p. Any significant injury, work-related illness or incident **must** be reported to Workers' Compensation using the [Employee Occupational Injury Report Packet](#). Environmental Health and Safety should also be notified.
5. Outside Rescue Services
- a. EMU will use a contracted service to provide rescue personnel and equipment during permit-required confined space entries. The rescue service personnel shall be notified of the confined space entry prior to actual entry into the space. All entries into a permit-required confined space must have the contracted rescue personnel stationed at the entrance of the space to extract the entrant should an emergency situation arises.

G. Records Retention

- 1. All documentation related to confined space entries must be submitted to EHS. This includes:
 - a. Completed entry permits
 - b. Canceled entry permits
 - c. Change of classification documentation
 - d. Air monitoring data
 - e. Any other pertinent information related to confined spaces.
- 2. Documentation will be maintained for a minimum of one year.

H. Standard Operating Procedures for Specific Confined Spaces

- 1. **Tunnels (Non-Permit)**
 - a. General Information
 - i. The majority of tunnels on the EMU campus have been designated non-permit confined spaces.
 - ii. However, due to the potential for physical injury (steam burns, trip/falls, electrical hazards, etc.) the buddy system should be used during entry,

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especially when work on live steam, gas or electrical lines or hot work is to be performed in the space.

- iii. The buddy system means at least two personnel are to enter the space and maintain either voice or visual contact at all times to ensure that if an accident/incident occurs, assistance is available in a short time period.
 - iv. If asbestos is known to be present on the lines requiring service and the potential exists to disturb the asbestos insulation, arrangements for abatement must be made prior to performing any maintenance in the affected area.
- b. Air Monitoring
- i. Air monitoring should be conducted whenever entry into the tunnels is made.
 - ii. If there is a question or doubt regarding the air quality within the space, at a minimum, monitoring for oxygen, LEL/LFL, carbon monoxide and hydrogen sulfide must be conducted.
 - iii. Contact EHS if there are any concerns of other chemicals being present in the air.
- c. Egress
- i. When entering a tunnel space, entrants should review the tunnel and determine a primary and alternate means of egress in preparation for an event necessitating an emergency egress.
 - ii. When work is being performed within a tunnel, stationing someone outside the tunnel to assist in the event of an emergency is highly recommended.
 - iii. If an egress point is located in a traffic area (street, sidewalk, parking lot, etc.) sturdy barricades should be placed around the space opening.
- d. Other
- i. When working on steam or other utility lines, the affected utility shall be shut off or disconnected upstream from the work area.
 - ii. If there is the possibility of materials or hazardous energy to flow back to the work area from the downstream direction, the utility line shall be disconnected (isolated) in both upstream and downstream directions prior to commencement of work on the affected line or component.
- 2. Tunnels (Permit-Required)**
- a. General Information
- i. There are several sections of tunnel in which atmospheric and other factors are unknown or workers in the space could potentially be cut off from their egress route. These portions of the tunnel system are permit-required confined spaces.
 - ii. The areas of abandoned tunnel are all permit-required due to the unknown atmospheric quality in the space relative to asbestos and oxygen content.
 - iii. Other tunnel sections are classified as permit-required due to the distance to a point of egress and potential to be cut off from a means of escape due to a dead-end or obstructions in the tunnel.

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- iv. The dead-end sections of tunnel to the east of the Alexander Music Building and south of Mark Jefferson are examples of such spaces.
 - v. Tunnels may become extremely hot and humid due to leaking steam lines. If the ambient conditions are uncomfortably hot and humid, a work/rest regimen must be devised if the lines cannot be deactivated or the area cannot be adequately ventilated.
- b. Abandoned Tunnels
- i. Entry into abandoned tunnels is always a permit-required entry.
 - ii. The buddy system must be used as retrieval equipment is impractical.
 - iii. Entrants shall remain in voice and/or visual contact at all times during entry.
 - iv. As with all permit entries, air monitoring is mandatory.
- c. Air Monitoring
- i. Air monitoring for oxygen content, flammable vapors/gases and toxic gases/vapors (carbon monoxide and hydrogen sulfide at a minimum) shall be performed.
 - ii. Due to the limited visual range and potential for adverse atmospheric changes, continuous air monitoring is required in permit-required tunnels.
 - iii. It may be impractical to monitor air quality remotely due to the configuration of the tunnels.
 - iv. If an alarm sounds on the air monitor or any other alarm (fire, tornado, equipment, etc.) all entrants must exit the space immediately.
 - v. There are no direct reading instruments available for determining asbestos (or other dust) exposures. If damaged and/or friable asbestos present in the tunnel work area, arrangements for abatement must be made prior to entry into the area for work.
 - vi. When performing initial site visits, take steps to minimize the amount of dust raised during the investigation and wear disposable protective suits to minimize potential asbestos contamination of clothing and footwear.
- d. Egress
- i. When entering a tunnel space, entrants should review the tunnel and determine a primary and alternate means of egress in preparation for an event necessitating an emergency egress.
 - ii. If working in a dead-end tunnel, a manhole or other means of egress must be opened on either side of the work area to allow safe exit from the space.
 - iii. If it would be difficult to extract an unconscious entrant from the tunnel space, appropriate retrieval equipment must be attached prior to entry.
 - iv. If vertical entry or egress into the space is necessary, retrieval equipment must be available and in place prior to the actual entry.
 - v. If an egress point is located in a traffic area (street, sidewalk, parking lot, etc.) sturdy barricades should be placed around the space opening to prevent unauthorized or accidental entry.

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- vi. An attendant must be stationed outside the space throughout the entry to watch for external hazards, call for help if needed and to prevent unauthorized entry into the space.
- e. Dead-End Tunnels
 - i. Dead-end tunnels do not necessarily present any greater hazard to entrants than a normal tunnel. The primary concern with dead-end tunnels is how a safe egress can be accomplished should an unforeseen incident were to occur.
 - ii. Follow the procedures for abandoned tunnels when entering dead-end tunnels.
- 3. Sanitary and Storm Sewers and Sump Pits Greater than 4 Feet Deep**
 - a. General Information
 - i. All sanitary and storm sewers and sump pits greater than a 4-foot depth are permit-required confined spaces and all the requirements for vertical entry into permit spaces must be performed.
 - ii. The primary hazards associated with sewers/sump pits are atmospheric hazards in the form of oxygen deficiency, flammable gas/vapors (from decaying vegetation), hydrogen sulfide gas (“sewer gas”) and possibly chemical exposures from automobile exhaust, chemicals entering the sewer system or operation in the space involving hot work (welding, brazing, cutting, grinding, etc.) or chemical use. In the case of sanitary sewers, exposure to biological hazards may also be present.
 - iii. Physical hazards including slip/trip/fall hazards, engulfment and overhead hazards will be present no matter what type of operations are taking place in the space. These hazards must be evaluated prior to entry into the space.
 - b. Air Monitoring
 - i. All sewers/sumps shall be monitored for oxygen content, flammable gases/vapors and toxic gases/vapors prior to entry into the space.
 - ii. Due to the possibility of chemical vapors stratifying within the space, all levels of the space must be measured and evaluated prior to entry.
 - iii. Be sure to allow enough time for the air sample to travel through the tubing and to the sensor before moving to the next level to be monitored.
 - iv. Avoid dropping the tubing/probe into standing water as this may damage the sensor and electrical components.
 - v. If oxygen deficient atmospheres or high concentrations of unknown contaminants are detected, supplied air respirators must be used during entry or the space must be artificially ventilated until the internal atmospheric quality is acceptable.
 - vi. Continuous air monitoring is required throughout the entry.
 - c. Safety Concerns
 - i. As most sewers/sump pits are accessed by vertical entries through manholes or metal covers, a retrieval system shall be used to ensure

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that falls do not occur during initial entry and to help extract entrants from the space.

- ii. Entries with less than a five-foot (5') vertical lift may use a retrieval system attached to a mechanical device (i.e., winch) or fixed point outside the space.
- iii. Confined space entries into sewers/sump pits greater than 5" deep require the use of a mechanical device located outside the space.
- iv. The retrieval line must be attached to a full body harness, unless the harness creates an unacceptable safety hazard.
- v. If a full body harness is impractical, a set of wristlets or anklets shall be used in place of a harness.
- vi. It is not necessary to have entrants attached to the retrieval line if they are working at a distance from the point of attachment, however, a non-entry rescue will be impossible if the entrant is disabled and the retrieval line is not attached to the harness.
- vii. Another possible concern is engulfment by liquids flowing through the sewers/sumps.
- viii. If it is necessary to enter a sewer/sump during high flow periods, the lifeline shall remain attached to the entrant's harness throughout the duration of entry.

d. Other

- i. Many of the sump pits on campus contain electrical powered sump pumps. The pumps shall be disconnected or removed from the space prior to entry to avoid electrical hazards as well as entanglement hazards.
- ii. If it is not feasible to remove or disconnect the electrical/mechanical devices from the space prior to entry, lockout/tagout procedures for powered equipment shall be implemented prior to entering the space.
- iii. Most of the sump pits are located below floor grade in open areas. Barricades must be used to prevent objects/debris from falling into the space.
- iv. In high traffic areas (streets, sidewalks, parking lots) barricades with flashing lights shall be placed around the opening.
- v. The attendant stationed outside the space is responsible for ensuring passers-by do not fall into the sump pit or commence operations that could potentially affect the occupied space (turning power on, moving objects near the opening, running vehicles, etc.).

4. Boilers and Associated Spaces

a. General Information

- i. All boilers, economizers, burner boxes, exhaust stacks, etc. are permit-required confined spaces and all requirements for entry into permit spaces must be performed.
- ii. The primary hazards associated with boilers and associated spaces are atmospheric hazards in the form of oxygen deficiency, flammable gas/vapors (from defective/damaged gas supply valves/lines, etc.) and combustion by-products such as metals and organic compounds.

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- iii. Other operations in the space involving hot work (welding, brazing, cutting, grinding, etc.) or chemical use will introduce additional contaminants into the space.
 - iv. Physical hazards in the form of slip/trip/fall hazards and thermal hazards will be present no matter what sort of operations are taking place inside the space. These physical hazards must be considered and evaluated before entry into the space.
- b. Air Monitoring
 - i. All boilers, etc. shall be monitored for oxygen content, flammable gases/vapors, and toxic gases/vapors (especially carbon monoxide) prior to entry into the space.
 - ii. Due to the possibility of chemical vapors stratifying within the space, all levels of the space must be measured and evaluated prior to entry. Be sure to allow enough time for the air sample to travel through the tubing and to the sensor.
 - iii. If oxygen deficient atmospheres or high concentrations of unknown contaminants are detected (i.e., low oxygen readings), supplied air respirators must be used during entry, or the space must artificially be ventilated until the internal atmospheric quality is acceptable (i.e. within EMU's designated action levels).
 - iv. Artificial ventilation should continue for the duration of the entry, or until it is certain that the internal atmosphere will not change while it is occupied.
 - v. Continuous air monitoring is required throughout the entry.
- c. Safety Concerns
 - i. As most of the boilers are accessed via side access ports or vertical entries through panels or metal covers, a retrieval system shall be used to ensure that falls do not occur during initial entry and to help extract entrants from the space in case an entrant injury occurs.
 - ii. Entries with less than a five-foot (5') vertical lift may use a retrieval system attached to a mechanical device (i.e., winch) or fixed point outside the space.
 - iii. Vertical confined space entries into boilers greater than 5' deep require the use of a mechanical device located outside the space. The retrieval line must be attached to a full body harness, unless the harness, creates an unacceptable safety hazard.
 - iv. If a full body harness is impractical, a set of wristlets or anklets shall be used in place of a harness. It is not necessary to have entrants attached to the retrieval line if they are working at a distance from the point of attachment, however, a non-entry rescue will be impossible if the entrant is disabled and the retrieval line is not attached to the harness.
 - v. For side (horizontal) entries, a tripod/winch combination may be impractical as a retrieval device. In this case, a lifeline/lanyard attached to either wristlets/anklets or a harness may be used to retrieve a disabled entrant.

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- vi. It is critical that the interior space has cooled to ambient temperatures before entrants are allowed into the space. Under no circumstances are personnel allowed to enter an active (i.e., connected to gas, water, etc.), boiler or associated space.
- d. Other
 - i. All energy sources, material/power feed lines (water, gas, electrical, diesel, etc.) must be blanked or locked and tagged out before entry into the space in accordance with EMU's [Lockout/Tagout Program](#).
 - ii. If grinding, shot-blasting, or other noisy operations are taking place inside the boiler, appropriate hearing protection must be used to maintain noise exposures below 90 dBA as an 8-hour time weighted average.
 - iii. If atmospheric contaminants are generated inside the space while occupied, appropriate respiratory and other PPE must be provided and used by all entrants in accordance with EMU's [Respiratory Protection Program](#).

5. Storage Tanks

- a. General Information
 - i. All storage tanks with internal access are permit-required confined spaces and all requirements for entry into permit spaces must be performed regardless of the tank contents.
 - ii. The primary hazards associated with storage tanks are atmospheric hazards in the form of oxygen deficiency (from either stored product, oxidation of the tank interior, or fermentation) flammable gas/vapors (from stored materials), and toxic atmospheres in the case of the diesel fuel storage tanks.
 - iii. Other operations in the space involving hot work (welding, brazing, cutting, grinding, etc.) or chemical use will introduce additional contaminants into the space.
 - iv. Physical hazards in the form of slip/trip/fall hazards and overhead hazards will be present regardless of the type of operations taking place inside the space. These physical hazards must be considered and evaluated before entry into the space.
- b. Air Monitoring
 - i. All storage tanks shall be monitored for oxygen content, flammable gases/vapors, and toxic gases/vapors prior to entry into the space.
 - ii. Due to the possibility of chemical vapors stratifying within the space, all levels of the space must be measured and evaluated prior to entry. Be sure to allow enough time for the air sample to travel through the tubing and to the sensor.
 - iii. If oxygen deficient atmospheres or high concentrations of unknown contaminants are detected (i.e., low oxygen readings), supplied air respirators must be used during entry, the space must artificially be ventilated until the internal atmospheric quality is acceptable.

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- iv. Artificial ventilation should continue for the duration of the entry, or until it is certain that the internal atmosphere will not change while it is occupied.
 - v. If artificial ventilation is used in a flammable atmosphere, the blower or exhaust motor must be located outside the space such that clean air is being supplied to the space and there is no possibility of ignition from the blower motor.
 - vi. If contaminants are generated from a point source such as welding, exhaust ventilation should be used. Conversely, if the contaminant is dispersed throughout the space, forced air ventilation should be used.
 - vii. All openings to the tank interior should remain open during entry.
 - viii. Continuous air monitoring is required no matter the type of work (chemical, hot work, etc.) being performed in the tank.
 - ix. While working inside the diesel fuel tanks, continuous air monitoring must be performed while the space is occupied unless the space has been thoroughly cleaned, ventilated, and no fuel sludge/residues are present, or the tank interior has been inerted by introduction of carbon dioxide or other inert gas.
 - x. If the tank is inerted, supplied air respirators must be worn during entry and air monitoring is required.
- c. Safety Concerns
- i. Most storage tanks are accessed via side access ports or vertical entries through panels or metal covers, a retrieval system shall be used to ensure that falls do not occur during initial entry and to help extract entrants from the space should the entrant be incapacitated during the entry.
 - ii. Entries with less than a five- foot (5') vertical lift may use a retrieval system attached to a mechanical device (i.e., winch) or fixed point outside the space.
 - iii. Vertical confined space entries into storage tanks greater than 5' deep require the use of a mechanical device located outside the space.
 - iv. The retrieval line must be attached to a full body harness, unless the harness creates an unacceptable safety hazard.
 - v. If a full body harness is impractical, a set of wristlets or anklets shall be used in place of a harness.
 - vi. It is not necessary to have entrants attached to the retrieval line if they are working at a distance from the point of attachment, however, a non-entry rescue will be impossible if the entrant is disabled and the retrieval line is not attached to the harness.
 - vii. Many of the storage tanks at EMU are cylindrical in shape, the floors of the tanks are curved and therefore, present a slip and fall hazard.
 - viii. If footing inside the tank is slippery, boot covers, or some other traction-aiding footwear should be worn.
 - ix. For side (horizontal) entries, a tripod/winch combination may be impractical as a retrieval device. In this case a lifeline/lanyard attached

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to either wristlets/anklets or a harness may be used to retrieve a disabled entrant.

- x. There shall be no cutting, grinding, brazing, or other hot work performed either inside or outside the storage tank (especially diesel fuel tanks) unless the space has been cleaned and inerted or it is determined that there is no danger of ignition in the immediate area.
 - xi. There shall be no smoking, internal combustion engines or other ignition sources allowed within 25 feet of the fuel storage tank openings or intake for the ventilation system while the tanks are occupied.
 - xii. It is the responsibility of the attendant to ensure that this rule is strictly enforced.
- d. Other
- i. All energy sources, material/power feed lines (water, gas, electrical, diesel, etc.) must be blanked or locked and tagged out before entry into the space in accordance with [EMU's Lockout/Tagout Program](#).
 - ii. If noisy operations are taking place inside the storage tank, appropriate hearing protection should be used to maintain noise exposures below 90 dBA as an 8-hour TWA.
 - iii. If atmospheric contaminants are generated inside the space while occupied, appropriate respiratory and other PPE must be provided and used by all entrants in compliance with [EMU's Respiratory Protection Program](#).
 - iv. If entry is made despite the presence of measurable flammable vapor concentrations inside the space, only intrinsically safe equipment and non-sparking tools may be used inside and near the storage tank

6. Air Handlers

- a. General Information
- i. Air handlers are present in virtually all buildings on the EMU campus.
 - ii. Because there are limited hazards associated with these spaces they have been classified as non-permit confined spaces.
 - iii. As non-permit required confined spaces, there are no generic air monitoring, permits, retrieval, or standby requirements associated with entry into the air handler cabinets.
 - iv. There may be, however, potential hazards associated with these units as described below.
- b. Air Monitoring
- i. As there are no anticipated air quality concerns inside the air handlers, air monitoring is not required unless potential air contaminants are suspected of entering the ventilation system (i.e., through chemical spills, fires, etc.).
 - ii. If it is suspected that contamination has entered the air handler cabinet, it will immediately be re-classified as a permit-required confined space and all of the requirements for a permit entry will be mandatory.

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- iii. In addition, if hot work is performed or chemicals are used in the space, continuous air monitoring for the appropriate parameters must be performed for the duration of the entry.
- iv. If the potential for a Freon release in air-conditioned units is present, oxygen concentrations must be determined prior to entry into the space.
- c. Safety Concerns
 - i. The primary safety concerns when entering air handling units include electrical and mechanical hazards due to moving belts, shafts, blades, etc. and the electrical power providing the energy to drive the equipment.
 - ii. To address these factors, the power to the air handler shall be locked out and tagged out as close to the energy source as possible to prevent accidental equipment start-up while the space is occupied.
 - iii. If it is not feasible to lock out the power to the unit, all moving parts shall be physically blocked by some object to prevent movement of the equipment inside the space while occupied.
 - iv. In addition, there are many air handlers that provide conditioned air by heating with steam or hot water. If the possibility exists for entrants to come into contact with hot air or surfaces, the hot water/steam feed to the equipment should be shut off or covered with an insulating material until the internal operations are completed and personnel have exited the space.
 - v. Access panels to some ducts and switches are located near ceiling levels and therefore, a fall hazard is created. If high work from a ladder or scaffold is necessary, a partner should be present to stabilize the ladder or fall protection with an approved fall arrest system should be used.

7. Electrical Vaults

- a. General Information
 - i. The electrical vaults on the EMU campus are to be considered permit-required confined spaces.
 - ii. Limited atmospheric hazards are anticipated inside these vaults. The primary atmospheric hazard is oxygen deficiency.
 - iii. Because the main operations performed by EMU personnel involve pumping of water from the spaces without actual entry into the space, there is a limited potential for injury.
 - iv. If it is necessary to enter the electrical vaults, all of the requirements for a permit-required entry are mandatory unless it is shown that all potential hazards have been eliminated. If all hazards have been eliminated and documented, the vault may be entered as a non-permit space.
- b. Air Monitoring
 - i. As indicated previously, there are limited atmospheric hazards anticipated inside the electrical vaults. The primary atmospheric hazard is oxygen deficiency.

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- ii. If decaying organic materials are present in the space, it is possible that an oxygen deficient atmosphere could accumulate within the space. In this case, forced-air ventilation shall be used until the oxygen concentration is near ambient levels (+/- 20.0%).
 - iii. No entry into either an oxygen enriched or deficient environment is allowed unless all permit-required entry precautions are performed.
 - iv. In addition, if hot work, chemical use, or other operations take place inside the space that could potentially contaminate the internal atmosphere, continuous air monitoring must be performed for the duration of the entry.
- c. Egress
- i. There is generally only one access port to a vault, thus, the egress route from the space is pre-determined.
 - ii. If personnel are inside the electrical vault, a ladder or other means of egress from the space must be present before entry.
 - iii. A retrieval winch and cable are not recommended for electrical vault entries because a metal cable attached to an entrant presents an unacceptable electrical shock hazard.
 - iv. Instead, a harness and non-conductive (i.e., cotton, hemp, nylon, or other synthetic rope material) lanyard should be used.
 - v. If personnel must be retrieved by an attendant without the benefit of a mechanical retrieval device, it may be prudent to have more than one attendant present to assist in lifting the entrant from the space should an injury occur inside.
 - vi. If the vault access is greater than five feet above the floor of the vault and no fixed ladder is present, a fall arrest system should be used in conjunction with the retrieval equipment.
- d. Other
- i. Because access to electrical vaults is via manholes, barricades should be placed around the opening to prevent people and objects from falling into the space.
 - ii. It is the responsibility of the attendant to ensure that no operations take place outside the space that could affect the internal atmosphere or operations.
 - iii. It is also the responsibility of the attendant to ensure that vehicles and other potential sources of atmospheric contaminants are kept away from the manhole opening and ventilation system intake (if applicable).
 - iv. Some electrical vaults tend to fill with water, creating a potential engulfment hazard in those spaces.
 - v. If sufficient water is present in the space to engulf an entrant, entry is prohibited.
 - vi. Prior to entry, all standing water must be evacuated from the space such that engulfment and electrical hazards associated with water/electricity are eliminated.

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- vii. Non-conductive gloves shall be used while handling pump hoses if there is a potential for hazardous electrical energy exposure during pumping operations.
- viii. If the space must be entered while water-filled, all appropriate retrieval equipment must be used.
- ix. The primary safety control is the careful placement of the pump hose such that it does not contact the conducting cables/wires and transmit electrical current to the workers.
- x. If it is suspected that there may be a hazardous electrical energy exposure, the vault shall be de-energized or locked and tagged out, if possible.

8. Sprinkler and Water Main Vaults

a. General Information

- i. The sprinkler and water main vaults on the EMU campus have been classified as non-permit required confined spaces.
- ii. Limited atmospheric hazards are anticipated inside these vaults.
- iii. The primary atmospheric hazard is the possibility of an oxygen deficient atmosphere.
- iv. The main operations performed by EMU personnel on sprinkler and water main vaults do not involve entry into the vault to open/close valves or pumping of water from the spaces and thus, there is a limited potential for injury. As such, there are no strict entry procedures that must be performed prior to entry into the space.

b. Air Monitoring

- i. As indicated previously, there are limited atmospheric hazards anticipated inside the irrigation/main vaults.
- ii. For historical information and documentation, air quality should be tested with a direct-reading instrument and the data provided to EHS.
- iii. Once the atmospheres inside these spaces have been characterized and are shown to be acceptable, further air testing will not be required.
- iv. However, if an oxygen deficient atmosphere or other hazardous condition is detected, these spaces will be recharacterized as permit-required confined spaces and all of the requirements for a permit-required entry will be mandated.
- v. If an oxygen deficient atmosphere is detected, forced air ventilation will be necessary prior to entry.

c. Egress

- i. As there is generally only one access port to these vaults, the egress route from the space is pre-determined.
- ii. If personnel are inside the irrigation/main vault, a ladder or other means of egress from the space must be present before entry.
- iii. If the space is re-classified as a permit space for any reason, an attendant and retrieval equipment must be present before entry.
- iv. Because there are no significant electrical or mechanical hazards associated with these spaces, a harness/winch/tripod retrieval system

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is an acceptable means of extracting personnel from the space should an accident occur.

- d. Other
 - i. Because access to the main/irrigation vaults is via manholes, barricades should be placed around the opening to prevent people and objects from falling into the space.
 - ii. It is the responsibility of the entrant(s) to ensure that no operations are taking place outside the space that could affect the internal atmosphere or operations before entry is performed.
 - iii. If the access point to the interior space is in a high traffic area, it would be prudent to have an attendant stationed outside the space to prevent potential atmospheric and physical hazards from affecting the internal environmental and to keep pedestrian and vehicular traffic away from the opening.
 - iv. In addition, a potential engulfment/drowning hazard could exist if the vault is water-filled. Irrigation and water main vaults must be pumped as much as possible (sufficient to eliminate the engulfment hazard) before entry is attempted.
 - v. If the vaults are entered while filled water, the spaces shall be immediately re-classified as permit-required and all pre-entry precautions must be performed.
- 9. Swimming Pool Balancing Tanks**
- a. General Information
 - i. All swimming pool balancing tanks greater than four feet depth at EMU are to be considered permit-required confined spaces and all requirements for entry into permit spaces must be performed.
 - ii. The primary atmospheric hazards associated with the balancing tanks are from oxygen deficiency, toxic gases/vapors (chlorine from water treatments) or contaminants generated during hot work (welding, brazing, cutting, grinding, etc.) or chemical use.
 - iii. Physical hazards in the form of slip/trip/fall hazards, possible engulfment (if deep enough), and overhead hazards will be present no matter what sort of operations are taking place inside the space. These physical hazards must be considered and evaluated before entry into the space.
 - b. Air Monitoring
 - i. All balancing tanks shall be monitored for oxygen content, flammable gases/vapors, and toxic gases/vapors (especially chlorine gas) prior to entry into the space.
 - ii. Due to the possibility of chemical vapors stratifying within the space, all levels of the space must be measured and evaluated prior to entry. Be sure to allow enough time for the air sample to travel through the tubing and to the sensors.
 - iii. Avoid dropping the tubing/probe into standing water (this may damage the sensors and electronics).

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- iv. If oxygen deficient atmospheres or high concentrations of unknown contaminants are detected (i.e., low oxygen readings), supplied air respirators must be used during entry, or the space must artificially be ventilated until the internal atmospheric quality is acceptable.
 - v. If chemicals are used, hot work is performed, or other operations take place in the space that could potentially adversely affect the internal atmosphere, continuous air monitoring is required.
 - vi. It is critical the intake for the ventilation system is located in a "clean" area and there is no possibility of contaminants entering the system.
 - vii. The intake duct should be located away from vehicular traffic or internal combustion engines in general, as this could introduce airborne contaminants into the space.
- c. Safety Concerns
- i. As the balancing tank is accessed via an above-grade ladder and entry through a small opening at the top of the tank, a retrieval system shall be used to ensure that falls do not occur during initial entry and to help extract entrants from the space.
 - ii. It should be noted that egress from the balancing tank may be very difficult due to the vertical lift and configuration of the tank. Pre-planning is essential for determining the most efficient means of extracting personnel from the space.
 - iii. Due to the small opening at the top of the balancing tank, it may be difficult to enter the space wearing a backpack type self-contained breathing apparatus.
 - iv. It may be necessary for the entrant to don the face-piece while a helper holds the harness/tank and subsequently pass the unit to the entrant once he/she is through the tank opening.
 - v. An airline respirator may be a more appropriate form of respiratory protection in this case.
 - vi. Because of the anticipated presence of chlorine or other biocide in the water, biological hazards are expected to be minimal.
 - vii. The SDS for the type of biocide used should be evaluated and the required PPE must be provided to entrants during entry operations.
 - viii. It is not known what kinds of mechanical or electrical equipment are present within the space, but all potential sources of hazardous energy must be locked and tagged out and the system isolated before entrants are allowed to enter the space.
 - ix. Entry into the balancing tank while the swimming pool is full or the potential exists for the balancing tank to fill with overflow water is prohibited.

10. Trenches and Excavations

- a. General Information
 - i. All trenches and excavations greater than four feet in depth are confined spaces.
 - ii. The excavations may be either permit-required or non-permit confined spaces.

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- iii. If the excavation is large enough for a person to enter the space it must be treated as a confined space.
 - iv. The primary hazards associated with excavations are physical agents such as catastrophic burial, slope failure, or other kinetic hazards.
 - v. Atmospheric hazards are not generally the greatest concern because usually, trenches and excavations are constructed outdoors, where there is adequate ventilation and air movement.
 - vi. Physical hazards in the form of slip/trip/fall hazards, possible engulfment (if deep enough), and overhead hazards will be present no matter what sort of operations are taking place inside the space. These physical hazards must be considered and evaluated before entry into the space.
 - vii. In addition, there is often heavy equipment near the excavation and this type of equipment can pose significant safety hazards to persons in the trench or excavation.
- b. Air Monitoring
- i. Although hazardous atmospheres are not generally anticipated in trenches or excavations, air monitoring for oxygen content, flammable gases/vapors, and other potentially hazardous materials must be performed prior to entry into the space. Due to the possibility of chemical vapors stratifying within the space, all levels of the space must be measured and evaluated prior to entry.
 - ii. Be sure to allow enough time for the air sample to travel through the tubing and to the sensor and avoid dropping the tubing/probe into standing water (this may damage the sensor and electrical components).
 - iii. If oxygen deficient atmospheres or high concentrations of unknown contaminants are detected (i.e., low oxygen readings), supplied air respirators must be used during entry, or the space must artificially be ventilated until the internal atmospheric quality is acceptable. If the above referenced parameters are within acceptable levels, no additional air monitoring requirements are mandated.
 - iv. If chemicals are used or hot work is performed in the space, continuous air monitoring is mandatory.
- c. Safety Concerns
- i. As trenches and excavations over four feet depth often have limited means of access and egress, a means of quickly exiting the space must be provided before entry.
 - ii. This has been interpreted by MIOSHA as a ladder or other means of escape within 25 feet of the work area. The side walls of trenches/excavations must be sloped to a sufficient degree such that the potential of slope failure is minimized.
 - iii. This evaluation must be according to the guidelines set forth in [MIOSHA Rules R408.40932-40942](#), or by a qualified soil scientist.
 - iv. If it is not feasible to slope the sidewalls to an acceptable angle (i.e., structures in the way, etc.) the side walls of the excavation shall be

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braced or shored with pilings, sheet pilings, underpinnings, or some other physical structure that will support the sides of the excavation while occupied.

- v. In addition, all utility cables, pipes, etc. must be located and identified prior to beginning excavation in a given area.
 - vi. It will be left to the discretion of the Entry Supervisor whether or not retrieval equipment will be required for entrants.
 - vii. Retrieval equipment may pose additional hazards to entrants and therefore, the use or non-use of said equipment must be evaluated.
 - viii. Engulfment by liquids flowing into the excavation is another possible concern.
 - ix. Entries should not be made during heavy rains or under saturated soil conditions. If it is necessary to enter an excavation during high flow periods, the excavation must be shored and/or sloped and the depression should be pumped such that water and/or mud do not pose an engulfment hazard to the entrants.
- d. Other
- i. As it is expected that excavations will be located below grade, barricades must be used to prevent objects and debris from falling into the space from above.
 - ii. In high traffic areas such as streets, sidewalks, and parking areas, conspicuous barricades with flashing lights shall be placed around the opening.
 - iii. In addition, excavated material must be placed such that it does not pose a hazard to personnel inside the excavation (i.e., on the "low side" of the excavation or at a safe distance from the excavation).
 - iv. An "attendant" should be stationed outside the space to watch for potential hazards that may not be apparent to the person inside the space.
 - v. Please see the [MIOSHA Part 9 Excavation, Trenching and Shoring standard](#) for additional information.

11. Mechanical Rooms with Restricted Access

- a. General Information
 - i. There are several mechanical rooms present on the EMU campus where it is necessary to traverse a steep stairway to access the room or to exit the room.
 - ii. These rooms pose no greater hazard than any other mechanical room except the escape from the room may be impeded by these steep stairs.
 - iii. Due to the restricted means of egress, the mechanical rooms with such stairs have been classified as non-permit confined spaces.
 - iv. As non-permit required confined spaces, there are no generic air monitoring, permits, retrieval, or standby requirements associated with entry into the mechanical rooms.
 - v. There may be, however, potential hazards associated with these units as described below.

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- b. Air Monitoring
 - i. As there are no anticipated air quality concerns inside the mechanical rooms, air monitoring is not required unless potential air contaminants are suspected of entering the ventilation system (i.e., through chemical spills, fires, etc.).
 - ii. If it is suspected that contamination has entered the mechanical room, it will immediately be re-classified as a permit-required confined space and all of the requirements for a permit entry will be mandatory.
 - iii. In addition, if hot work is performed or chemicals are used in the space, continuous air monitoring for the appropriate parameters must be performed for the duration of the entry.
 - iv. If the potential for a Freon release in the mechanical room is present, oxygen concentrations must be determined prior to entry into the space.
- c. Safety Concerns
 - i. The primary safety concern when entering these types of mechanical rooms is the limited means of egress from the room.
 - ii. There is a potential for slips, trips, and/or falls while walking up or down the stairs. Fall protection for the stairways is not a feasible alternative and therefore, the best way to avoid fall hazards is to use care when using the stairs (i.e., watch your step, avoid trying to carry too much, etc.).
 - iii. Some of the tunnel and crawlspace accesses in the mechanical rooms are well above ground level. Care should be taken to avoid falls from ladders when entering and exiting these spaces.

12. Attics with Restricted Access

- a. General Information
 - i. There are several attics present on the EMU campus where it is necessary to climb a vertical ladder or steep stairway to access the room or to exit the room.
 - ii. These spaces pose no greater hazard than any other room except the escape from the attic may be impeded by the ladder/stairway access.
 - iii. Due to the restricted means of egress, the attic spaces with such ladder accesses have been classified as non-permit confined spaces.
 - iv. As non-permit required confined spaces, there are no generic air monitoring, permits, retrieval, or standby requirements associated with entry into these attic spaces.
 - v. There may be potential hazards associated with these units as described below.
- b. Air Monitoring
 - i. As there are no anticipated air quality concerns inside the attics, air monitoring is not required unless potential air contaminants are suspected of entering the ventilation system or attic space (i.e., through chemical spills, fires, etc.).

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- ii. If it is suspected that contamination has entered the attic, it will immediately be re-classified as a permit-required confined space and all of the requirements for a permit entry will be mandatory.
- iii. If hot work is performed or chemicals are used in the space, continuous air monitoring for the appropriate parameters must be performed for the duration of the entry.
- c. Safety Concerns
 - i. The primary safety concern when entering these types of attic spaces is the limited means of egress from the room.
 - ii. There is a potential for slips, trips, and/or falls while walking up or down the stairs or climbing the ladders. Fall protection for the ladders/stairways is not a feasible alternative and therefore, the best way to avoid fall hazards is to use care when using the ladders/stairs (i.e., watch your step, avoid trying to carry too much, etc.).

13. Air Plenums above Drop Ceilings

- a. General Information
 - i. There are numerous areas on the EMU campus where the spaces above drop ceilings are used as return air or fresh air plenums.
 - ii. There are limited hazards associated with entry into these spaces.
 - iii. The primary hazard in spaces above drop ceilings is the potential to fall through the ceiling tiles.
 - iv. These spaces are not designed to be occupied and will not generally support the weight of an adult.
 - v. The spaces pose no anticipated atmospheric nor physical hazards other than the fall potential mention previously.
 - vi. Egress from drop ceiling air plenums is not as restricted as other spaces, because as long as the ceiling is not too high, it is always possible to break a tile and jump to the floor below.
 - vii. Fall protection while working above high ceilings (e.g., above the swimming pools or gymnasiums) is strongly recommended.
 - viii. Work above a normal classroom ceiling can usually be performed from a ladder with minimal risk. It will be left to the discretion of the department supervisors to determine when fall protection is necessary and what type of fall arrest system will be utilized (if any).
- b. Air Monitoring
 - i. As there are no anticipated air quality concerns inside the drop ceilings, air monitoring is not required unless potential air contaminants are suspected of entering the ventilation system or ceiling space (i.e., through chemical spills, fires, etc.).
 - ii. If it is suspected that contamination has entered the air plenum, it will immediately be re-classified as a permit-required confined space and all of the requirements for a permit entry will be mandatory.
 - iii. If hot work is performed or chemicals are used in the space, continuous air monitoring for the appropriate parameters must be performed for the duration of the entry.

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c. Safety Concerns

- i. The primary safety concern when entering these types of spaces is the limited means of egress from the space without falling to the floor below.
- ii. There is a potential for slips, trips, and/or falls while working inside the plenum.
- iii. Fall arrest systems for ladders and spaces inside drop ceilings are generally not feasible, and therefore, the best way to avoid fall hazards is to use care when working above drop ceilings (i.e., watch your step to avoid trying to carry too much, etc.).

14. Hot Work

a. General

- i. Hot Work is defined as any operation which may generate heat, sparks, electrical discharge or any other potential source of ignition. This includes but is not limited to: grinding (on metal), welding, brazing, soldering, riveting, cutting (metal, stone, or concrete), burning, etc.
- ii. The primary hazards associated with hot work in a confined space are ignition of a flammable atmosphere or material and generation of atmospheric contaminants.
- iii. Procedural and precautionary measures to be implemented before and during hot work operations are detailed in the [EMU Hot Work Program](#).
- iv. Hot work performed in a confined space may change the classification of the space from non-permit to permit-required or additional requirements may be necessary to prevent dangerous conditions from occurring, see below.

b. Air Monitoring

- i. Hot work inside of a confined space will require continuous air monitoring even if it is determined that there is sufficient air movement to prevent accumulation of waste gas/vapor/fume/smoke in the work area.
- ii. Hot work operations in a totally enclosed confined space such as a storage tank will require continuous air monitoring regardless of air movement.
- iii. If a measurement of combustible gases/vapors greater than 10% LEL is detected using a direct reading instrument, hot work of any kind is prohibited in the space until the space is cleaned and ventilated such that the potentially flammable atmosphere has been eliminated.
- iv. If an emergency condition exists such that hot work must be performed in an atmosphere containing greater than 10% LEL, the space must be inerted with nitrogen, carbon dioxide, or some other inert gas before the ignition source is introduced to the space. Note that if a space is inerted, an oxygen deficient atmosphere exists in the space and supplied air respirators are mandatory.

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c. Safety Concerns

- i. The primary safety concerns when performing hot work are ignition of either the atmosphere or nearby combustible materials and thermal/electrical hazards.
- ii. If combustible materials are located in the vicinity of hot work operations, a fire watch must be posted to watch for stray sparks and welding spatter so that a fire will not burn out of control before it is noticed.
- iii. Hot work of any kind must not be performed on any storage tanks or vessels containing flammable materials including secondary containments unless all flammable materials have been removed from the space and the atmosphere contains less than 10% LEL both in and around the affected area.
- iv. In addition to the above-noted requirements, personnel performing hot work operations shall don appropriate respiratory protective equipment to protect them from welding gases/vapors, fumes, and smoke.
- v. Respiratory protection and other protective devices shall be used in accordance with the [EMU Respiratory Protection Program](#) and general health and safety requirements (as indicated in the [EMU Safety Policy and Procedures Program](#)).
- vi. The following items must be evaluated and implemented (if appropriate) during any hot work operations inside a (permit-required or non-permit-required) confined space.
 - a) The Entry Supervisor shall ensure the confined space does not contain an explosive, toxic, or oxygen deficient atmosphere, or contain other chemical/physical hazards that could pose a significant health/safety threat to entrants.
 - b) Pre-entry atmospheric testing must be performed and if an atmosphere contains greater than 10% LEL, no hot work is permitted either in the space or in close proximity to the space.
 - c) If appropriate, local exhaust ventilation should be used at the point of generation to prevent accumulation of a hazardous atmosphere inside the space. Do not use forced air ventilation in areas where friable asbestos containing materials are present (i.e., tunnels, vaults), as this will increase asbestos exposures to entrants. Never use compressed gas from a cylinder for ventilation purposes.
 - d) The work party must consist of a minimum of two workers that are able to effectively communicate with each other as well as appropriate rescue personnel.
 - e) A standby/attendant equipped with an SCBA must be posted at the entrance to the space if hot work is performed in a permit-required space. Note that personnel that may be required to wear an SCBA must be trained in the use of the equipment.

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- f) Any welding operations inside the space must follow the applicable requirements of Michigan [General Industry Standard 529](#) and [Construction Rules R408.40761-40762](#).
- g) Compressed gas cylinders must be periodically leak tested.
- h) Compressed gas cylinders must be placed outside the confined space if possible during hot/entry work. If this is impractical, the compressed gas cylinders must be placed as far from the hot work operations as practical and isolated from the work area if possible.
- i) All compressed gas cylinder supply valves are to be closed during any breaks and when work is completed. In addition, tanks, torches and hose shall be removed from the work area during shut down if feasible.
- j) All welding leads and ground cables shall be de-energized during shutdown periods or any time the equipment is left unattended. Also, electrical shock hazards must be addressed and appropriate PPE provided to avoid the potential for electrocution.
- k) If a shielding gas is used during welding (e.g., MIG or TIG welding), continuous measurement of atmospheric oxygen must be performed.

15. Contractor-Owned Confined Spaces

- a. Contractor-owned confined spaces include but are not limited to trash dumpsters, recycling bins and mobile trash compactors.
- b. Most of these spaces pose a minimal hazard, with the exception of trash compactors.
- c. The hazards associated with trash containers, recycling bins and trash compactors relate primarily to potential biological hazards from trash and vermin contained inside.
- d. Other potential physical hazards such as lacerations and abrasions may occur due to the presence of sharp or rough-surfaced materials in the containers.
- e. There are significant hazards associated with the compactor units as they are energized by electricity, hydraulics and pneumatics and therefore pose potential crushing and electrical hazards.
- f. There is no anticipated reason for EMU personnel to enter these spaces because the contracting company performs all repair and maintenance operations on the containers.
- g. EMU personnel shall not enter these confined spaces.
- h. If a malfunction occurs in one of the trash compactors, the company providing the particular service/container shall be contacted and informed of the nature of the problem and their personnel will be responsible for repairing or replacing the equipment.

I. Confined Space Inventory

- 1. Environmental Health and Safety (EHS) maintains the inventory of confined spaces on campus.

