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EASTERN MICHIGAN UNIVERSITY™

Confined Space Entry Program

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EASTERN MICHIGAN UNIVERSITY

CONFINED SPACE ENTRY PROGRAM

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1.0 PURPOSE

The purpose of this document is to establish a confined space entry program in accordance with the United States Occupational Safety and Health Administration (OSHA) standard; 29 Code of Federal Regulation *Required Confined Spaces"* and Part 90 of Michigan Occupational Safety and Health Administration (MIOSHA) Act 154, Rule R408.19001 *"Confined Space Entry".*

The provisions of this document apply to all Eastern Michigan University (EMU) employees engaged in activities where confined space hazards may exist or may be created.

There shall be an EMU internal confined space review committee who will evaluate the confined space program on an annual basis and modify the program. The committee will consist of representatives from Physical Plant, Public Safety, Union representatives, and other personnel whose operations may be affected by the program.

Confined spaces meeting the definitions of both a *confined space* and a *permit required confined space* may only be entered when the requirements of OSHA 1910.146 and MIOSHA R408.19001 as specified in this written compliance document have been fulfilled. The criteria for classification of confined space as permit-required or non-permit required are described below in section 2.1. An inventory of Eastern Michigan University's confined spaces is attached as Appendix A.

For supplemental information and procedures which address confined space entry hazards associated with construction operations such as trenching, and excavations, please refer to Appendix G.

* MIOSHA Trenching and Excavation Safety regulations, part 9 of Rule 154.

2.0 IDENTIFICATION OF CONFINED SPACES

2.1 Confined Space Definition

A "Confined Space" is defined (by MIOSHA) as any space that:

I. Is large enough and so configured that an employee can bodily enter and perform assigned work;

II. Has limited or restricted means for entry or exit (e.g.: bins, tunnels, hoppers, silos, tanks, vaults, pits, etc.); and

III. Is **not** designed for continuous employee occupancy.

2.2 PERMIT REQUIRED CONFINED SPACES

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:

I. Contains or has a potential to contain a hazardous atmosphere (i.e.: oxygen deficient or enriched, flammable, and / or toxic);

II. Contains a material that has the potential for engulfing an entrant (e.g.: sand, grain, liquids, etc.);

III. 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

IV. Contains any other recognized serious safety or health hazard.

2.3 POSTING REQUIREMENTS

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

DANGER
PERMIT-REQUIRED CONFINED SPACE
DO NOT ENTER WITHOUT AUTHORIZATION

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

Examples of confined space signs and labels are provided in Appendix 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. Confined spaces not identified with labels / signs include: sanitary and storm sewers; some sanitary / storm sumps; crawlspace / pipechase access points in public areas (i.e., stairwells, classrooms, mechanical room doorways,

attic accesses, etc.); air plenums above drop ceilings; exterior windows wells and air intake wells, etc.); exterior (i.e., manholes) access points to utility tunnels, and other spaces in which it is impractical to affix labels to the point of entry (specifically, floor hoist pits, and hot surfaces such as boilers or exhaust stacks.)

3.0 ENTRY PERMIT SYSTEM

No entry into the permit space may be authorized until / unless:

I. The space has been *isolated* from any and all sources of hazardous energy release;

II. Any and all vehicular traffic routes which could impact worker safety have been identified and controlled:

III. Any and all pedestrian access routes have been identified and controlled;

IV. The space has been opened and ventilated, identified, flushed or purged, where applicable;

V. 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.

VI. A written entry permit is completed, documenting the means, procedures and practices required for a safe permit space entry, and,

VII. The rescue team is notified and is on standby.

In addition to the above-reference requirements, before entry, **all portions** of the Confined Space Entry Permit must be completed and verified. Each Entrant, Supervisor and Attendant must sign the permit acknowledging the permit contents and their assigned duties/responsibilities. A confined space entry permit is provided as Appendix B and a sample hot work permit is attached as Appendix C.

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. Upon termination of the entry, the completed permit(s) must be given to the department head authorizing the entry and subsequently to the Health and Safety Compliance Administrator to be archived for at least one year.

4.0 GENERAL CONFINED SPACE ENTRY PROCEDURE

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.

4.1 Opening

Prior to opening a permit-required confined space, the potential for fires, explosions, or sudden release of hazardous materials must be eliminated. 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.

4.2 Preliminary Atmospheric Evaluation

Initial atmospheric testing must be performed prior to entry and prior to ventilation of the space, using appropriate direct reading instruments. Air monitoring instruments must be calibrated before measurements are taken. Sampling shall proceed ONLY in the following order:

1. Oxygen Content
2. Flammable gases / vapors, and
3. Possible toxic air contaminants

It is essential that these criteria (at a minimum) are measured and documented prior to entry into the permit space.

Air monitoring instruments shall be stored at the following locations (tentative):

1. Heating Plant
2. Plumbing Shop (2 units)
3. Carpentry Shop

Calibration kits for the air monitors will be staged at the plumbing Shop and Heating Plant.

4.3 Forced Air Ventilation

A permit space that has 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. Forced air ventilation should achieve at least 8 air changes prior to re-evaluating the atmosphere in the permit space and initial entry.

4.4 On-going / Continuous Atmospheric Evaluation

Continuous atmospheric monitoring shall be conducted throughout the entire permit confined space entry operation. Continuous air monitoring in permit-required confined spaces shall be performed for the duration of the entry, regardless of operations inside the space.

4.5 Air Monitoring and Action Levels

The following table provides information regarding air monitoring action levels and required actions.

AIR MONITORING ACTION LEVEL

ATMOSPHERIC CONDITION(S)	INSTRUMENT	REQUIRED ACTION
Oxygen **(O_2)** content less than ambient conditions (<20%)	Direct reading oxygen meter (see note 1)	Entry prohibited ***** (see note 1)
Oxygen **(O_2)** content greater than 23.5%	Direct reading oxygen meter (see note 1)	Entry prohibited Fire / explosion hazard oxygen enriched
Gas, vapor and /or mist in concentrations greater than 10% of LEL / LFL	Direct reading combustible gas indicator	Entry prohibited Fire / explosion hazard
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 ***** (see note 2)	Entry Prohibited Chronic / acute health hazard
Any inhalation hazard at concentrations that could impair self-rescue	Direct reading instrument ***** (see note 2)	Entry Prohibited Chronic / acute health hazard
Any inhalation hazard at concentration > - 50% of its lowest exposure guideline (OSHA-PEL/ACGIH-TLV)	Direct reading instrument ***** (see note 2)	Entry Permitted ***** (see note 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 unless authorized to do so by the Entry Supervisor.

2. Depends upon the specific hazard. It is essential that the instrument chosen is capable of detecting the chemical hazard at concentrations at concentrations at or near one-half the respective PEL/TLV, or other exposure guideline designated by the Health & Safety Compliance administrator. 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.

4.6 Equipment Safety Requirements

Air monitoring equipment must be certified as safe for use in hazardous atmospheres. Ventilation equipment is often **not** intrinsically safe and must be used with caution in potentially flammable atmospheres. The blower motor and other potential ignition sources must be kept outside the space until the containment levels are reduced to <5% of the LEL. Refer to Appendix E for information regarding control of electrical hazards and intrinsically safe instruments. In addition, electrical devices such as portable lighting, power tools, extension cords, etc. may **not** be taken into a flammable or oxygen enriched (or other hazardous) atmosphere unless they have been tested for intrinsic safety and have no potential to be ignition sources.

If a flammable or oxygen enriched atmosphere is encountered, **all** non-intrinsically safe electrical 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. In addition, if working in a flammable atmosphere, non-sparking (i.e. brass, etc.) tools must be used as long as a potentially flammable atmosphere is exists in the space. If the hazardous atmosphere is eliminated, any type of tool may be safely used in the space.

4.7 Personal Protective Equipment (PPE)

It may be necessary to use personal protective equipment to perform an entry if the hazards present in the confined space cannot be effectively eliminated using engineering controls. PPE may consist of any one or more of the following pieces of equipment: respirators; protective coveralls; protective eyewear; hard hats; safety shoes/boots; chemical or heat/cold resistant gloves; boot covers; fall protection (and retrieval equipment); hearing protection; or any other apparatus worn on the body to isolate the entrant from environmental hazards.

Personal protective equipment **must** be constructed of appropriate materials and provide adequate protection form the particular hazards encountered. If there are concerns regarding the type of equipment needed, contact the Health & Safety Compliance Administrator with the Department of Public Safety for recommendations.

Respirators of any kind **must** be used in compliance with the University's "Respiratory Protection Program". Tight-fitting respirators may **not** be used if the persons requiring protection have any of the following characteristics: facial hair (especially beards and sideburns); emphysema, lung cancer, tuberculosis or any other cardiopulmonary disease; contact lenses; claustrophobia; epilepsy (unless a buddy is present and in visual contact at all times); large facial scars; or other factors that could influence the fit or use of a respiratory protective device

(especially beards and sideburns); emphysema, lung cancer, tuberculosis, or any other cardiopulmonary disease; contact lenses; claustrophobia; epilepsy (unless a buddy is present and in visual contact at all times); large facial scars; or other factors that could influence the fit or use of a respiratory protective device.

Retrieval equipment shall consist of a five-point body harness, anklets, or wristlets in combination with a lifeline or other retrieval device. 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.

Note: All PPE has limitations regarding effectiveness, chemical resistance, comfort, thermal stress, weight, and many additional factors. Contact the Health & Safety Compliance Administrator with the Department of Public Safety for information regarding both the applicability and limitations of specific protective equipment.

5.0 ASSIGNED RESPONSIBILITIES

In addition to the other requirements specified in this program, entries into permit spaces are prohibited unless an "attendant" and/or "entry supervisor" are present for the entire duration of the entry. Authorized entrants, attendants and entry supervisors must be trained and certified regarding their assigned responsibilities. The Health and Safety Compliance Administrator shall maintain the master confined space inventory and written program. The Administrator shall also have general authority to revise and modify the inventory/program as deemed necessary.

5.1 Authorized Entrants

An "Authorized Entrant", is defined by OSHA as an employee authorized by the employer to enter a permit space. It is the responsibility of the authorized entrant to comply with the criteria set forth in this written confined space entry program, as well as criteria dictated by other Eastern Michigan University health and safety programs (i.e., lockout/tagout, respiratory protection, hazard communication, etc.).

5.2 Attendants

An "Attendant" is defined by OSHA as an employee stationed **outside** a permit space to monitor the authorized entrants, perform **non-entry** rescue, and to summon emergency rescue services if necessary. In addition, it is the responsibility of the attendant to 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. Personnel assigned to attendant duties **must not** leave the area, or become distracted from their responsibilities during the entry.

5.3 Entry Supervisors

The "Entry Supervisor" is defined by OSHA as an employee 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. All permit-space entries **must** be authorized by an entry supervisor. Entry supervisors have overall authority/responsibility to ensure that all confined space entries are performed in as safe a manner as possible and that all pre-entry testing and equipment are in acceptable and working order. Entry supervisors may act as attendants if appropriate.

5.4 Outside Vendors

Outside contractors/suppliers/vendors are commonly used by the University to perform certain 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 contracted personnel of other potential hazards in accordance with EMU's "Hazard Communication Program". Contractor personnel 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. For documentation purposes, a contractor/vendor health and safety sign-off form is provided as Appendix N. When questions or concerns arise regarding the vendor/contractor health and safety requirements for specific tasks, the Health and Safety Compliance Administrator should be contacted for guidance relating to the anticipated tasks.

If deemed necessary by the contracting department, contract personnel 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 that 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.

Note that contracted personnel performing major construction or renovation projects on the EMU campus 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.

Contractor-owned confined spaces such as: trash dumpsters, recycling bins, and mobile trash compactors are present on the EMU campus. Most of these spaces pose a minimal hazard, with the exception of the trash compactors. The hazards associated with trash containers, recycling bins, and trash compactors relate primarily to potential biological hazards from trash and vermin contained inside. Other potential physical hazards such as lacerations and abrasions may occur due to presence of sharp or rough-surfaced materials in the containers. However, there are significant physical hazards associated with the compact or units as they are energized by electricity, hydraulics and pneumatics and therefore pose potential crushing and electrical hazards.

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. EMU personnel shall not enter these confined spaces. If a malfunction occurs in one of the trash compactors, the company providing the particular service/container should be contracted and informed of the nature of the problem and their personnel will be responsible for repairing or replacing the equipment.

6.0 TRAINING AND CERTIFICATIONS

All confined space entrants, supervisors, rescue personnel, and attendants 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.

6.1 Authorized Entrants and Attendants

The following training and certification requirements for authorized entrants and attendants are to be completed prior to any permit space entries.

a. Completion of an 8-hour confined space entry "Entrant/Attendant" course which addresses the requirements of 29 CFR 1910.146.

6.2 Entry Supervisors

The following supplemental training and certification requirements for entry supervisors are to be completed prior to authorization of **any** permit space entries.

a. Completion of a 16-hour confined space entry Supervisor course which addresses the requirements and responsibilities of entry supervisors under 29 CFR 1910.146.

6.3 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 sessions (annually) in which rescue team members practice retrieval of personnel from (non-hazardous) representative confined spaces.

7.0 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.

7.1 Non-Entry Rescue by Attendants

Each authorized permit space entrant must wear a 5-point body harness and lifeline when: a vertical traverse is present, potential falling hazards exist, and/or the entrant is expected to be out of the line-of-vision of the attendant. 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. If a five point, full body harness is impractical, wristlets/anklets may be used. Body belts may not be used as either fall protection or retrieval attachments.

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.

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.

The following procedures shall be followed by contract rescue personnel performing rescue operations:

If the attendant observes that the entrant is injured or unconscious, the rescue team and medical assistance must be summoned immediately. 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. Once assistance has arrived at the space, contract rescue personnel wearing self-contained breathing apparatus (SCBA) and other appropriate personal protective equipment (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. If the cause of the injury is not determined, rescuers equipped with the appropriate personal protective equipment shall enter the space to extract the injured person. Continuous atmospheric monitoring must be performed during rescue operations. If a winch and tripod retrieval system is used, someone must remain in the space with the injured entrant to help extract him/her from the space. **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. Do not use (electrically or mechanically) powered equipment to extract entrants from the space unless absolutely necessary.

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.

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.

Once the injured entrant has been extracted from the space, he/she should be stabilized and appropriate first aid administered. 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. Unless qualified, **do not** attempt medical treatment beyond first-aid, CPR or other life saving measures. If it is safe to do so, remove the retrieval and/or personal protective equipment from the injured person so that they can be transported to a medical facility. 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.

Any significant injury, work-related illness, or incident, **must** be reported to the Health & Safety Compliance Administrator Immediately.

7.2 Outside Rescue Services

Eastern Michigan University 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 permit-required confined 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 arise.

Rescue services must be summoned in the event that a non-entry rescue attempt fails in a permit-required confined space.

8.0 RECORDS RETENTION

In addition to EMU's general health and safety record retention policy, each cancelled entry permit shall be retained on file for at least one year by the Health and Safety Compliance Administrator with the EMU Department of Public Safety. In addition, any air monitoring documentation or change of confined space classification must be communicated to the Administrator to assist in the annual program evaluation. Records may be subject to periodic audit and review by EMU's Health and Safety Office.

Cancelled confined space entry permits and other pertinent data will be stored at the Health and Safety Office.

9.0 REFERENCES

* NIOSH CRITERIA DOCUMENT, WORKING IN CONFINED SPACES, DHEW PUBLICATION #80-106;

* NIOSH, A GUIDE TO SAFETY IN CONFINED SPACES, DHHS PUBLICATION #87-113;

* OSHA STANDARD 29 CFR 1910.146; AND,

* MIOSHA STANDARD, PART 90 OF R408-19001

10.0 STANDARD OPERATING PROCEDURES FOR SPECIFIC CONFINED SPACES

10.1 TUNNELS (NON-PERMIT)

GENERAL:

The majority of tunnels on the EMU campus have been designated non-permit confined spaces. However, due to the potential for physical injury (steam burns, trip/falls, electrical hazards, etc.) the buddy system should be used during entry, especially when work to be done on live steam, gas, or electrical lines or hot work is to be performed in the space. The buddy system means that 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.

If asbestos is known to be present on the lines requiring service and the potential exists to disturb the asbestos insulation, appropriate respiratory protection must be worn to protect the worker from asbestos exposure in accordance with EMU's Respiratory Protection Program.

AIR MONITORING:

When atmospheric quality is in question within the space, measurements including oxygen content and LEL/LFL at a minimum must be collected. Additional air monitoring parameters may require testing and documentation depending on the suspected air contaminant in the space.

EGRESS:

A means of egress from the space must be determined by the entrants before entry into the space. It will be left to the discretion of the entrants to determine the most effective escape route should a hazard present itself and require egress from the space or area. If possible, alternate routes of escape should be planned prior to entry and communicated to all affected personnel. It may be prudent to station someone at the point(s) of egress to ensure that the access is not blocked. In addition, if the egress point is located in a traffic area (i.e., street, sidewalk, parking lot, etc.) barricades with flashing lights should be placed around the opening to the space.

OTHER:

If it is necessary for employees to work on steam or other utility lines, the affected utility shall be shut off or disconnected "upstream" from the work area. In addition, if there exists the possibility of materials or hazardous energy to flow back to the work area from and "downstream" direction, the utility line shall be disconnected (isolated) in both upstream and "downstream" directions prior to commencement of work on the affected line/component.

10.2 TUNNELS (PERMIT-REQUIRED)

GENERAL:

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 route of egress. These portions of the tunnel system will be considered permit-required confined spaces. The areas of abandoned tunnel will be permit required due to the unknown atmospheric quality in the space relative to asbestos and oxygen content. Other sections of tunnel are classified as permit-required simply due to the distance to a point of egress and potential to be cut off from a means of escape from the space due to a dead-end or obstructions in the tunnel. The dead-end sections of tunnel to the east of the Alexander Music Building and south of Jefferson Hall are examples of such spaces. Some sections of abandoned or dead-end tunnels may become extremely hot, with high humidity from leaking steam lines. If the ambient conditions are uncomfortably hot and humid, a work/rest regimen should be devised. Contact the Health and Safety Compliance Administrator for recommendations concerning heat-related health and safety issues.

ABANDONED TUNNELS:

All entries into abandoned sections of tunnel shall be performed using the buddy system. The buddy system simply indicates a need to work with partners so that if an accident or injury occurs, there is someone available nearby to assist or summon help. This is particularly important in the abandoned sections of tunnel, as retrieval equipment will be impractical. Entrants shall remain in voice and/or visual contact at all times during entry. For the purpose of obtaining historical air monitoring data, all entries into permit-required tunnels will require measurements of oxygen content.

AIR MONITORING:

As these areas are considered permit spaces, air monitoring for oxygen content, flammable vapors/gases, and toxic gases/vapors must be performed. It may be impractical to monitor air quality in the space from a remote location, so the monitor must accompany the entrants into the space. All entrants must exit the space immediately if an alarm sounds on the air monitor, or if any other alarm (i.e., fire, tornado, etc.) sounds that could potentially affect the entrants or their means of escape. Due to the limited visual range and potential for adverse atmospheric changes, continuous air monitoring is required in the permit-required sections of the tunnel system.

As there are no direct reading instruments available for determining asbestos (or other dust) exposures, there is no way to immediately determine asbestos exposures. Because there is damaged and friable asbestos insulation present in these abandoned tunnels, efforts should be made to minimize the amount of dust raised during work operations. Therefore, in addition to a requirement for air monitoring and working in pairs, all entrants should use

(at a minimum) a half mask air-purifying respirator equipped with high-efficiency particulate air (HEPA) filter cartridges if acceptable oxygen content is indicated. If other parameters are detected in the atmosphere, other appropriate respiratory protection must be used in accordance with EMU's Respiratory Protection and General Health & Safety Program. In the case of an oxygen deficient atmosphere in the space, supplied air respirators must be used, as forced-air ventilation into the space will increase airborne asbestos levels and potentially contaminate the adjacent tunnels and building interiors.

In the case of entry into abandoned tunnels, disposable protective suits shall be worn to minimize asbestos contamination of work clothing or street clothes.

EGRESS:

A means of egress from the space must be determined by the entrants before entry into the space. It will be left to the discretion of the entrants to determine the most effective escape route should a hazard present itself and require egress from the space or area. 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. If it would be difficult to extract an unconscious entrant from the space, appropriate retrieval equipment must be attached prior to entry.

If the entry is through a manhole, barricades (warning tape, traffic cones, etc.) must be placed around the opening to prevent unauthorized or accidental entry. In areas where vehicular or pedestrian traffic could present problems, saw horse barricades with flashing lights shall be placed around the opening. In addition, an attendant must be present outside the space during entry to watch for external hazards, call for help if needed, and prevent unauthorized entry into the space.

If vertical entry or egress into the space is necessary, retrieval equipment must be available and in place prior to actual entry.

DEAD-END TUNNELS:

Dead-ended tunnels do not necessarily present any greater hazard to entrants than a normal tunnel. The primary concern in these types of spaces is how a safe egress from the space can be accomplished should an unforeseen incident occur. If the procedures indicated above for abandoned tunnels are followed, no additional precautions need to be taken.

10.3 SANITARY AND STORM SEWERS AND SUMPS GREATER THAN FOUR FEET DEEP

All (sanitary and storm) sewers and sumps greater than 4' depth are to be considered permit-required confined space and all requirements for vertical entry into permit spaces must be performed. The primary hazards associated with sewers/sumps 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 operations 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.

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.

AIR MONITORING:

All sewers/sumps shall be monitored for oxygen content, flammable gases/vapors, and toxic gases/vapors 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. 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).

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 be artificially ventilated until the internal atmospheric quality is acceptable. If the above-referenced parameters are within acceptable levels, no additional air monitoring requirements are mandated. However, if chemicals are used or hot work is performed in the space, continuous air monitoring is mandatory.

SAFETY CONCERNS:

As most of the sewers/sumps are accessed via vertical entries through manholes 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. 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. Confined space entries into sewers/sumps 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. 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, but note that a non-entry rescue will be impossible if the entrant is disabled and the retrieval line is not attached to the harness. Also of possible concern is engulfment by liquids flowing through the sewer system. If possible, entries should not be mad during heavy rains or high flow rates within the sewer system. If it is necessary to enter a sewer/sump during high flow periods, the lifeline should remain attached to the entrant's harness throughout the duration of the entry.

OTHER:

Many of the sumps at the University contain energy sources such as electrically powered sump pumps. The pumps shall be disconnected or removed from the space before entry is performed to avoid electrical hazards, as well as entanglement hazards inside the space. If it is not feasible to remove or disconnect the electrical/mechanical devices from the space prior to entry, the University lockout/tagout procedure for powered equipment **must** be implemented prior to entry into the space.

As most of the sewer sumps are located below floor grade in open areas, barricades must be used to prevent objects/debris from falling into the space from above. In high traffic areas such as streets, sidewalks, and parking areas, barricades with flashing lights shall be placed around the opening.

The attendant stationed outside the space is responsible for ensuring that passers-by do not fall into the sump or commence operations that could potentially affect the occupied space (i.e., turning power on, moving objects around near the opening to the space, etc.).

10.4 BOILERS AND ASSOCIATED SPACES

All boilers, economizers, burner boxes, exhaust stacks, etc. are to be considered permit-required confined spaces and all requirements for entry into permit spaces must be performed. Although an attendant may not always be necessary, it is strongly recommended that entrants work in the buddy system to add an additional level of safety to the entry.

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. Other operations in the space involving hot work (welding, brazing, cutting, grinding, etc.) or chemical use will introduce additional contaminants into the space.

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.

AIR MONITORING:

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. 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.

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 ventilated until the internal atmospheric quality is acceptable (i.e. within EMU's designated action levels). 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. If the above-referenced parameters are within acceptable levels, no additional air monitorings are mandated. However, if chemicals are used, hot work is performed, or other operations that could adversely affect the interior atmospheric quality, continuous air monitoring is mandatory. mandatory.

SAFETY CONCERNS:

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. 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. 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. 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, but note that a non-entry rescue will be impossible if the entrant is disabled and the retrieval line is not attached to the harness.

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.

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.), or active boiler or associated space.

OTHER:

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 the University's Lockout/Tagout Program.

If grinding, shot-blasting, or other noisy operations are taking place inside the boiler, appropriate hearing protection should be used to maintain noise exposures below 90 dBA as an 8-hour time weighted average.

If atmospheric contaminants are generated inside the space while occupied, appropriate respiratory and other protective equipment must be provided and used by all entrants bin accordance with EMU's Respiratory Protection Program.

10.5 STORAGE TANKS

All storage tanks with internal access are to be considered permit-required confined spaces and all requirements for entry into permit spaces must be performed regardless of the tank contents. Although an attendant may not always be necessary, it is strongly recommended that entrants work in the buddy system to add an additional level of safety to the entry.

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. Other operations in the space involving hot work (welding, brazing, cutting, grinding, etc.) or chemical use will introduce additional contaminants into the space.

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.

AIR MONITORING:

All storage tanks shall be monitored for oxygen content, flammable gases/vapors, and toxic gases/vapors 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. Be sure to allow enough time for the air sample to travel through the tubing and to the sensor.

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 ventilated until the internal atmospheric quality is acceptable. 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. 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. Note that if the 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. All openings to the tank interior should remain open during entry.

If chemicals are used, hot work is performed, or operations take place inside the space that have the potential for adversely affecting the internal atmosphere, continuous air monitoring is required. 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. *Note – if the space is inerted with an inert gas, supplied air respirators **must** be worn during entry.

10.5 STORAGE TANKS (continued)

SAFETY CONCERNS:

As most of the 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. 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. Vertical confined space entries into storage tanks 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. 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, but note that a non-entry rescue will be impossible if the entrant is disabled and the retrieval line is not attached to the harness.

As many of the storage tanks present at the university are cylindrical in shape, the floors of the tanks are curved and therefore, present a slip and fall hazard. If footing inside the tank is slippery, boot covers, or some other traction-aiding footwear should be worn.

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.

There shall be no cutting, grinding, brazing, or other hot work performed either inside or outside the storage tank (especially the 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.

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. It is the responsibility of the attendant to ensure that this rule is **strictly** enforced.

OTHER:

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.

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.

10.5 STORAGE TANKS (continued)

If atmospheric contaminants are generated inside the space while occupied, appropriate respiratory and other protective equipment must be provided and used by all entrants in compliance with EMU's Respiratory Protection Program.

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.

10.6 AIR HANDLERS

GENERAL:

Air handlers are present in virtually all buildings on the EMU campus. Because there are limited hazards associated with these spaces they have been classified as non-permit confined spaces. 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. There may be, however, potential hazards associated with these units as described below.

AIR MONITORING REQUIREMENTS:

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.). 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. 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.

If the potential for a Freon release in air conditioned units is present, oxygen concentrations must be determined prior to entry into the space.

SAFETY CONCERNS:

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. 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. 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.

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.

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.

10.7 ELECTRICAL VAULTS

GENERAL:

The electrical vaults on the EMU campus are to be considered permit-required confined spaces. Limited atmospheric hazards are anticipated inside these vaults. The primary atmospheric hazard is oxygen deficiency. 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. However, if it 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.

AIR MONITORING:

As indicated previously, there are limited atmospheric hazards anticipated inside the electrical vaults. The primary atmospheric hazard is oxygen deficiency. If decaying organic materials are present in the space, it 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%). No entry into either an oxygen enriched or deficient environment is allowed unless all permit-required entry precautions are performed.

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.

EGRESS:

As there is generally only one access port to the interior space, the egress route from the space is pre-determined. If personnel are inside the electrical vault, a ladder or other means of egress from the space must be present before entry. A retrieval winch and cable is **not** recommended for electrical vault entries because a metal cable attached to an entrant presents an unacceptable electrical shock hazard. Instead, a harness and non-conductive (i.e., cotton, hemp, nylon, or other synthetic rope material) lanyard should be used. 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.

If the manhole 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.

10.7 ELECTRICAL VAULTS (continued)

OTHER:

Because access to the electrical vaults is via manholes, barricades should be placed around the opening to prevent people and objects from falling into the space. It is the responsibility of the attendant(s) to ensure that no operations take place outside the space that could affect the internal atmosphere or operations. 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).

As some of the electrical vaults tend to fill with water, a potential engulfment hazard may exist in some of the spaces. If sufficient water is present in the space to engulf an entrant, entry is prohibited. Prior to entry, all standing water must be evacuated from the space such that engulfment and electrical hazards associated with water/electricity are eliminated. Non-conductive gloves shall be used while handling pump hoses if there is a potential for hazardous electrical energy exposure during pumping operations. If the space must be entered while water-filled, all appropriate retrieval equipment must be used.

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. 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.

10.8 SPRINKLER AND WATER MAIN VAULTS

GENERAL:

The sprinkler and water main vaults on the EMU campus have been classified as non-permit required confined spaces. Limited atmospheric hazards are anticipated inside these vaults. The primary atmospheric hazard is the possibility of an oxygen deficient atmosphere. Because the main operations performed by EMU personnel involve entry to open / closed valves or pumping of water from the spaces without actual entry into the space, 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.

AIR MONITORING:

As indicated previously, there are limited atmospheric hazards anticipated inside the irrigation/main vaults. For historical information and documentation, air quality should be tested with a direct-reading instrument, and the data communicated to the Health & Safety Office to be archived. Once the atmospheres inside these spaces have been characterized and are shown to be acceptable, further air testing will not be required. However, if an oxygen deficient atmosphere or other hazardous condition is detected, these spaces will be re-characterized as permit-required confined spaces and all of the requirements for a permit-required entry will be mandated. If an oxygen deficient atmosphere is detected (even once), forced air ventilation will be necessary prior to entry.

EGRESS:

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

OTHER:

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. 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. 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.

10.8 SPRINKLER AND WATER MAIN VAULTS (continued)

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. 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.

Irrigvau.lts

10.9 GENERAL HOT WORK REQUIREMENTS

GENERAL:

"Hot Work" is defined as any operation which may generate heat, sparks, electrical discharge, or any other potential source of ignition. This would include: grinding (on metal), welding, brazing, soldering, riveting, cutting (metal, stone, or concrete), burning, etc.. The primary hazards associated with hot work in a confined space are ignition of a flammable atmosphere or material and generation of atmospheric contaminants. Procedural and precautionary measures to be implemented before and during hot work operations are described below. Note that 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.

AIR MONITORING REQUIREMENTS:

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. Hot work operations in a totally enclosed confined space such as a storage tank will require continuous air monitoring regardless of air movement.

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. 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.

SAFETY CONCERNS:

The primary safety concerns when performing hot work are ignition of either the atmosphere or nearby combustible materials, and thermal/electrical hazards. 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. 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.

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. Respiratory protection and other protective devices shall be used in accordance with EMU's "Respiratory Protection Program" and general health and safety requirements (as indicated in EMU's "Safety Policies and Procedures Program").

10.9 GENERAL HOT WORK REQUIREMENTS (continued)

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.

I. The Entry Supervisor shall ensure that 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. 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;

II. 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;

III. 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.

IV. 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;

V. Any welding operations inside the space must follow the applicable requirements of Michigan General Industry Rules R408.11261-11262 and Construction Rules R408.40761-40762;

VI. Compressed gas cylinders must be periodically leak tested;

VII. 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;

VIII. **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;

IX. **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;

X. If a shielding gas is used during welding (e.g., MIG or TIG welding), continuous measurement of atmospheric oxygen must be performed.

10.10 SWIMMING POOL BALANCING TANK

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. The primary atmospheric hazards associated with the balancing tanks are atmospheric hazards in the form of oxygen deficiency, toxic gases/vapors (chlorine from water treatments) or contaminants generated during hot work (welding, brazing, cutting, grinding, etc.) or chemical use.

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.

AIR MONITORING:

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. 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 and avoid dropping the tubing/probe into standing water (this may damage the sensors and electronics).

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 ventilated until the internal atmospheric quality is acceptable. If the above-referenced parameters are within acceptable levels, no additional air monitoring requirements are mandated. 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. Note that it is critical that the intake for the ventilation system is located in a "clean" area and that there is no possibility of contaminants entering the system. 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.

SAFETY CONCERNS:

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. 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.

balnctnk.pr

10.10 SWIMMING POOL BALANCING TANK (continued)

Note that 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. 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. An airline respirator may be a more appropriate form of respiratory protection in this case.

Because of the anticipated presence of chlorine or other biocide in the water, biological hazards are expected to be minimal. However, the he type of biocide used should be evaluated (using MSDS') and appropriate personal protective equipment must be provided to entrants during entry operations.

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.

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.

10.11 TRENCHES AND EXCAVATIONS

All trenches and excavations greater than four feet in depth are to be considered confined spaces. The excavations may be either permit-required or non-permit confined spaces. If the excavation is large enough for a person to enter the space it must be treated as a confined space. The primary hazards associated with excavations are physical agents such as catastrophic burial, slope failure, or other kinetic hazards. Atmospheric hazards are not generally the greatest concern because usually, trenches and excavations are constructed outdoors, where there is adequate ventilation and air movement.

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. In addition, there is often heavy equipment near the excavation and this type of equipment can pose significant safety hazards to persons in the excavation.

AIR MONITORING:

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. 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).

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 ventilated until the internal atmospheric quality is acceptable. If the above-referenced parameters are within acceptable levels, no additional air monitoring requirements are mandated. However, if chemicals are used or hot work is performed in the space, continuous air monitoring is mandatory.

SAFETY CONCERNS:

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**. 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. This evaluation must be according to the guidelines set forth in MIOSHA Rules R408.40932-40942, or by a qualified soil scientist. 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 braced or shored with pilings, sheet pilings, underpinnings, or some other physical structure that will support the sides of the excavation while occupied.

trenches.np

10.11 TRENCHES AND EXCAVATIONS (continued)

In addition, all utility cables, pipes, etc. must be located and identified prior to beginning excavation in a given area.

It will be left to the discretion of the Entry Supervisor whether or not retrieval equipment will be required for entrants. Retrieval equipment may pose additional hazards to entrants and therefore, the use or non-use of said equipment must be evaluated.

Also of possible concern is engulfment by liquids flowing into the excavation. If possible, 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 / mud do not pose an engulfment hazard to the entrants.

OTHER:

As it is expected that excavations will be located below grade, barricades must be used to prevent objects / debris from falling into the space from above. In high traffic areas such as streets, sidewalks, and parking areas, conspicuous barricades with flashing lights shall be placed around the opening. 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).

An "attendant" should be stationed outside the space to watch for potential hazards that may not be apparent to the person inside the space.

Note that a copy of the MIOSHA Trenching and Excavation regulations is attached as Appendix F.

10.12 CERTAIN MECHANICAL ROOMS (with restricted access)

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. These rooms pose no greater hazard than any other mechanical room except the escape from the room may be impeded by these steep stairs. Due to the restricted means of egress, the mechanical rooms with such stairs have been classified as non-permit confined spaces. As non-permit required confined spaces, there are no generic air monitoring, permits, retrieval, or standby requirements associated with entry into the mechanical rooms. There may be, however, potential hazards associated with these units as described below.

AIR MONITORING REQUIREMENTS:

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.). 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. 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.

If the potential for a Freon release in the mechanical room is present, oxygen concentrations must be determined prior to entry into the space.

SAFETY CONCERNS:

The primary safety concerns when entering these types of mechanical rooms is the limited means of egress from the room. In addition, 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.)

In addition, some of the tunnel / crawlspace accesses in the mechanical rooms are well above ground level. Care should be taken to avoid falls from ladders when entering / exiting these spaces.

10.13 ATTICS (with restricted access)

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. These spaces pose no greater hazard than any other room except the escape from the attic may be impeded by the ladder/stairway access. Due to the restricted means of egress, the attic spaces with such ladder accesses have been classified as non-permit confined spaces. As non-permit required confined spaces, there are no generic air monitoring, permits, retrieval, or standby requirements associated with entry into these attic spaces. However, there may be potential hazards associated with these units as described below.

AIR MONITORING REQUIREMENTS:

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.). 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. 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.

SAFETY CONCERNS:

The primary safety concerns when entering these types of attic spaces is the limited means of egress from the room. In addition, 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.)

attics.np

10.14 AIR PLENUMS ABOVE DROP CEILINGS

There are numerous areas on the EMU campus where the spaces above drop ceilings are used as return air or fresh air plenums. There are limited hazards associated with entry into these spaces. The primary hazard in spaces above drop ceilings is the potential to fall through the ceiling tiles. These spaces are not designed to be occupied and will not generally support the weight of an adult. The spaces pose no anticipated atmospheric nor physical hazards other than the fall potential mention previously.

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.

Fall protection while working above high ceilings (e.g., above the swimming pools or gymnasiums) is strongly recommended, however, 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).

AIR MONITORING REQUIREMENTS:

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.). 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. 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.

SAFETY CONCERNS:

The primary safety concerns when entering these types of spaces is the limited means of egress from the space without falling to the floor below. In addition, there is a potential for slips, trips, and/or falls while working inside the plenum. 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.)

APPENDIX A
INVENTORY OF CONFINED SPACES AT EMU

EASTERN MICHIGAN UNIVERSITY
CONFINED SPACE INVENTORY
BY BUILDING

TABLE OF CONTENTS

I: 1. Irrigation Vaults

J: 1. McKenny Union
2. Jones Residence Hall

K: 1. King Hall

L: None

M: 1. Mark Jefferson Science Building (Pre-Renovation)
2. Munson Hall Apartments

N: None

O: 1. Oestrike Stadium (Baseball Field)
2. Olds-Robb Student Recreation Building (Rec I.M.)

P: 1. Parking structure 1 (On Main Campus)
2. Pease Auditorium
3. Phelps Residence Hall
4. Physical Plant Building
5. Pierce Hall
6: Pittman Residence Hall
7: Porter Building
8: Pray-Harrold Building (Pre-Renovation)
9: Public Safety Building (Pre- Move to Hoyt Conf. Center)
10: Putnam Residence Hall

Q: 1. Quirk Dramatic Arts Building & Theatres (Sponberg)

R: 1. Rackham
2. Roosevelt Hall
3. Rynearson Stadium (Football Field)

S: 1. Sanitary Sewers
2. Sculpture Studio Building
3. Sellers Residence Hall
4. Sherzer Hall
5. Sill Hall
6. Snow Health Center Building
7. Softball Fields
8. Starkweather Hall
9. Storm Sewers
10. Strong Physical Science Building
11. Student Center Building

T: 1. Terrestrial and Aquatic Ecology Research Facility (Greenhouse)
2. Tunnels

U: 1. University House

V: 1. The Village & Community Buildings

W: 1. Walton Residence Hall
2. Warehouse Building / Mail Room / Central Stores / Shipping & Receiving
3. Warner Gymnasium
4. Welch Hall
5. Westview Apartments
6. Wise Residence Hall

X: None
Y: None
Z: None

Buildings Deleted From the Program:	**Year of Demolition:**
1. Business & Finance	(2003)
2. Goodison	(Unknown)
3. Pinegrove Terrace Apartments	(2005 - 2006)
4. University Library (Now Halle)	(Remodeled in 1998, Now Porter)
5. Public Safety Building	(Pre- Move to Hoyt Conference Center)
6. Greenhouse (“Old Greenhouse)	(2001, Was Attached To Hover)

EASTERN MICHIGAN UNIVERSITY
CONFINED SPACE INVENTORY BY BUILDING

1996: Original Program

2001: Update

- 611 West Cross Street
- Boone
- Convocation Center
- Halle
- Marshall Building
- Porter
- Terrestrial & Aquatic Ecology Research Facility
- Village Apartments
- Electrical Vaults

2003: Update

- Hover
- Softball Fields
- University House

2006: Update

- Student Center

2012: Update

- University Library (Now Halle)
- Public Safety Building
- Greenhouse (“Old Greenhouse)
- Also Title / Nickname Updates / List of Buildings Awaiting Survey

Buildings Remaining To Be Surveyed

- Bob's Lake House
- Cooper Building
- DPS / Marketplace (Hoyt- Conference Center)
- Eagle Crest Golf Course Buildings
- Eagle Crest Corporate Education Building
- Fletcher
- Geddes Town Hall School House
- Indoor Practice Facility "The Bubble"
- Mark Jefferson (Post-renovation)
- Parsons Center
- Pray-Harrold (Post-renovation)

APPENDIX B

CONFINED SPACE ENTRY PERMIT

CONFINED SPACE ENTRY PERMIT

PROJECT NAME: _____ LOCATION: _____

PROJECT MANAGER: _____

DESCRIPTION OF CONFINED SPACE: _____

NATURE OF WORK/REASON FOR ENTRY: _____

KNOWN CHEMICAL OR ATMOSPHERIC HAZARDS: _____

_____

EMERGENCY PHONE NUMBERS AND CONTACT INFORMATION

HOSPITAL: _____ AMBULANCE: _____

POLICE: _____ FIRE: _____

HOSPITAL NAME AND ADDRESS: _____

_____

RESCUE AND EMERGENCY SERVICE: _____

PHONE #: _____ LOCATION OF NEAREST PHONE: _____

_____

ENTRY SUPERVISOR'S VERIFICATION CHECKLIST

*** "X"** indicates that the item applies and/or is under control, **"NA"** indicates that the item is not applicable.

GENERAL:

[ ] Is entry necessary – if the task can be accomplished without entry, entry is prohibited
[ ] Have appropriate action levels been established
[ ] Are appropriate monitoring instruments available
[ ] Are the instruments selected approved for use in a flammable atmosphere
[ ] Have all instruments been properly calibrated

ATMOSPHERIC HAZARD DETERMINATION / IDENTIFICATION

[ ] Are monitoring locations specified (i.e. top, middle, and bottom
[ ] Are monitoring frequencies specified (i.e. continuously / periodically)
[ ] Is the oxygen level acceptable (i.e., < 20 and < 23.5 < %
[ ] Are combustible (i.e. < 10% of LEL / LFU
[ ] Are chemical contaminants below the set action levels (check if O.K.)

[ ] Hydrogen Sulfid **[ ]** Carbon Monoxide **[ ]** Methane
[ ] VOC's / BTEX **[ ]** Other: _____ **[ ]** Other: _____

VENTILATION

[ ] Has pre-entry ventilation been performed in accordance with this program
[ ] Is ventilation equipment approved for use in flammable atmospheres
[ ] Is the ventilation equipment positioned to achieve the most efficient movement of air based upon the vapor density and exhaust locations

VENTILATION (continued)

[ ] Is ventilation to be performed for entire duration of entry
[ ] Is the air intake positioned away from potential sources of contaminants
[ ] If ventilated after being found unacceptable, has the air been retested after ventilation

OTHER HAZARDS

[ ] Have temperature extremes been eliminated or controlled
[ ] Have engulfment hazards been eliminated or controlled
[ ] Have slick / wet surfaces or other slip / trip / fall hazards been eliminated or controlled
[ ] Have overhead / falling object hazards been eliminated or controlled
[ ] If hot-work (welding / cutting / brazing) is to be performed in the space, have the associated fire / explosion / atmospheric hazards been identified and controlled
[ ] If cleaning solvents or other chemicals are to be used in the space, have the associated fire/ explosion / atmospheric hazards been identified and controlled
[ ] If tools or mechanical equipment are to be used have the associated fire / explosion / atmospheric hazards been identified and controlled

LOCKOUT / TAGOUT

[ ] Have all sources of potentially hazardous energy release been identified, eliminated, or controlled
[ ] Have all requirements of EMU's Lockout / Tagout program been satisfied

PERSONAL PROTECTIVE EQUIPMENT (PPE)

[ ] Have all requirements for PPE been determined
[ ] Hardhats **[ ]** Glasses / Goggles **[ ]** Coveralls (type): _____
[ ] Boots (type): _____ **[ ]** Gloves (type): _____
[ ] Other: _____ **[ ]** Other: _____
[ ] Has appropriate respiratory protection been determined.
[ ] Have all requirements of EMU's *Respiratory Protection Program* been satisfied
[ ] Have all limitations associated with the use of respiratory protection / PPE been accounted for (i.e. is the hole big enough to fit through wearing the selected PPE)

RESCUE AND RETRIEVAL

[ ] Have all authorized entrants been equipped with a full body harness and retrieval line / lanyard
[ ] Have retrieval lines / lanyards been secure to a fixed point or mechanical device located outside the permit space
[ ] Have methods been specified to enable the outside attendant to maintain visual, verbal, or signal contact with the authorized entrants in the space.
[ ] Have rescue services, personnel and assignments, including emergency first aid / medical personnel, phone numbers and other contact information been established and communicated

EMPLOYEE INFORMATION AND TRAINING

[ ] Have affected employees received training required for assigned duties, including the additional requirements for: respiratory protection, first aid / CPR, site specific confined space briefing, emergency rescue procedures, etc.

AIR MONITORING AND OTHER PRECAUTIONARY REQUIREMENTS

1. Has the confined space been adequately cleaned to prevent physical contact with hazardous materials?

   _____ Yes (If yes, proceed to step 2)

   _____ No (If no, safety coordinator / designee must evaluate space and issue permit)

2. **Confined Space Atmospheric Testing:** With all artificial ventilation **off**, test internal atmosphere for (at a minimum):

   Direct Reading Instrument Measurement

   a. Flammable / Explosive Atmospheres: _____(result)_____

      (Entry **NOT ALLOWED** if over 10% of LEL / LFL

   b. Oxygen Content: _____(result)_____

      (If <20%, retest with ventilation on; if repeated measurements <19.5% oxygen, supplied air respirators required for entry)

   c. Toxicity: _____(result)_____

      Measurements above the chemical specific PEL / TLV requires the use of appropriate respiratory protection.

3. Confined space entry equipment requirements case 1: spaces never containing hazardous materials; case 2 other conditions.

		Case 1	Case 2
a.	Standby personnel present during **entire entry**	X	X
b.	Powered equipment locked out, tagged, blocked, etc.	X	X
c.	Lifeline / lanyard & harness or wristlets worn	X	X
d.	Continuous monitoring of LEL / oxygen content in space	X	X
e.	Tank Isolation Permit	X	X
f.	Ventilation: (type) _____		X

PERSONNEL ASSIGNMENTS

Authorized Entrants

1.	Entry Time [ ]	Exit Time [ ]	Initials [ ]
2.	Entry Time [ ]	Exit Time [ ]	Initials [ ]

Attendants

1.	Start Time [ ]	End Time [ ]	Initials [ ]
2.	Start Time [ ]	End Time [ ]	Initials [ ]

Entry Supervisor

1.	Start Time [ ]	End Time [ ]	Initials [ ]
2.	Start Time [ ]	End Time [ ]	Initials [ ]

APPENDIX C
SAMPLE HOT WORK PERMIT

EASTERN MICHIGAN UNIVERISTY

HOT WORK PERMIT

Date _____ W.O. #_____
Time Started _____ Time Finished_____
Building _____
Room # _____ Floor_____
Location on Floor _____
Nature of Job _____
Issued To: _____

____ Welding ____Brazing ____Soldering ____ Heating ____Grinding ____ Cutting ____Jet Torch ____Other

TYPE OF EQUIPMENT TO BE USED:

____ Electrical Arc ____ Open Flame Torch ____ Grinding ____ Cutting ____ Hot Iron
____ Other _____

REQUIRED PRECAUTIONS CHECKLIST

____ Sprinklers, fire hose, extinguishers are in service and are operational.
____ Hot work equipment is in good condition.
____ DPS notified.
____ Appropriate PPE is worn.
____ Continuous air monitoring is conducted.
____ Appropriate area shielding is used.
____ Flammable liquids, dust, lint, oil, deposits removed.
____ Explosive atmosphere in area eliminated.
____ Floors clean/clear of combustibles.
____ Combustible floors wet down, covered with fire-resistant material.
____ Remove combustible material where possible.
____ Otherwise protect with fire resistive tarpaulins or metal shields.
____ All floor and wall openings covered.
____ Construction is non-combustible and without combustible covering or insulation.
____ Combustibles on the other side of the walls moved away.
____ Enclosed equipment cleaned of all combustibles.
____ Containers purged of flammable liquids and vapors.
____ Fire Watch (name): _____
____ Fire Watch will be provided during and after work for 30 minutes, including coffee or lunch breaks.
____ Fire Watch supplied and trained in the use of extinguishers, hose, alarms, phone emergency numbers.
____ Fire Watch may be required for adjoining areas, above and below floors or obstructions.
____ Piping valved/blanked off.
____ Other precautions taken: _____

I verify the above location has been examined. The precautions checked on the Required Precautions Permit have been taken to prevent fire and permission is authorized for this work.

1. Permit will be retained by workers during job.
2. When job is completed, permit will be returned to Worker's Foreman or DPS.
3. Permit is good for one shift only.

Signed _____ Signed _____
Permit Issuer DPS Shift Sergeant

Signed _____ Signed _____
Hot Work Operator(s) Standby Person

Completed permit shall be posted outside the immediate work area.

APPENDIX D

DANGER SIGN / PLACARD SPECIFICATIONS


DANGER
PERMIT REQUIRED
CONFINED SPACE
DO NOT ENTER
QS4-337-G © EMED Co., Inc. • 1-800-442-3633


DANGER
CONFINED SPACE
—KEEP OUT—
UNLESS AUTHORIZED
QS3317 © EMED Co., Inc. • 1-800-442-3633


DANGER
CONFINED SPACE
— KEEP OUT —
UNLESS AUTHORIZED
JQS202 © EMED Co., Inc. • 1-800-442-3633

APPENDIX E

CONTROL OF ELECTRICAL HAZARDS ASSOCIATED WITH VENTILATION, AIR MONITORING AND OTHER EQUIPMENT

APPENDIX E
CONTROL OF ELECTRICAL HAZARDS ASSOCIATED WITH VENTILATION, AIR MONITORING AND OTHER EQUIPMENT

* **Fire and Explosion Hazards:** Fire and explosion 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 fire or explosion and present a serious threat to life and health.

  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.

  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.

  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.**

  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.

  Regardless of actual instrument readings, if all sources of ignition cannot 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.

  Ignition Sources include, but are not restricted 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.

  At least one 10-lb. ABC rated fire extinguisher must be located within 100 feet of each work area.

APPENDIX E
CONTROL OF ELECTRICAL HAZARDS ASSOCIATED WITH VENTILATION, AIR MONITORING AND OTHER EQUIPMENT
(continued)

* **Electrical Hazards:** OSHA regulations require that employees who may be exposed to electrical equipment be trained to recognize the hazards associated with the equipment and familiar with the accepted control methods. **All extension cords** used for portable tools or other equipment shall be designed for hard or severe usage and be (three prong) grounded.

  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 interrupter (GFCIs)** units. GFCI units must be attached directly to or as close as possible to the receptacle. GFCI units located away from the receptacle will not protect any wiring, tools, or equipment located between the receptacle and the GFCI unit. Only the wiring plugged into the GFCI and outward (downcurrent) will be protected by the GFCI.

  All (temporary lighting) lamps used for general illumination must be protected for accidental breakage. Metal case sockets must be grounded. Portable lighting in wet or conductive locations should be 12 volts or less.

AIR MONITORING DOCUMENTATION

TEST PARAMETER	RESULT / TIME	RESULT / TIME	RESULT / TIME
Oxygen Content (%)			
Flammable Gases / Vapors (% LEL)			
Carbon Monoxide (ppm)			
Hydrogen Sulfide (ppm)			
Other: (specify) _____ _____			
Other: (specify) _____ _____			

Notes:

1. Any air monitoring results in excess of EMU action levels or indicating oxygen deficiency dignify that the entry is prohibited until atmospheric conditions are shown to be acceptable.

2. All levels of the internal atmosphere must be tested to ensure that stratification of gases / vapors has not occurred in the space.

3. If hot work or chemicals are used in the space while occupied, this form is **NOT** valid and the space may not be declassified to a non-permit status.

4. All air monitoring measurements must be confirmed by the appropriate entry supervisor and accompanied by his / her signature on the first page of this form.

*This form must be submitted to the Department of Public Safety to be retained as historical data.

APPENDIX F

SUPPLEMENTAL INFORMATION AND PROCEDURAL REQUIREMENTS

APPENDIX F
SUPPLEMENTAL INFORMATION AND PROCEDURAL REQUIREMENTS

I) DISCUSSION

A substantial number of accidents involving worker fatalities can be attributed to improper confined space entry. The primary hazards addresses in OSHA 29 CFR 1910.146 are: 1.) *atmospheric hazards*, including those containing too much or too little oxygen, those containing toxic gases, vapors fumes, etc., and those containing flammable gases, vapors, dusts, etc. at concentrations greater than 10% of their lower explosive limits (LEL) 2.) *engulfment hazards*, where the entrant(s) may be enveloped by liquids, solid bulk material, or the collapsing walls of an excavation and 3.) *entrapment hazards*, where the entrant(s) could be trapped or asphyxiated by inwardly converging walls or a downward sloping floor.

Other recognized hazards associated with confined space entry may include: 1.) *mechanical hazards*, where entrants fail to perform lockout/tagout procedures prior to entry, and 2.) *unplanned/untrained rescue operations*, (i.e., untrained would-be rescuers who rush into a hazardous situation without appropriate PPE). NIOSH studies suggest that as many as two-thirds of the confined space fatalities are would-be rescuers. The primary reason that this happens is that workers often do not recognize the potential invisible hazards associated with confined spaces.

Typical confined space entry operations may include: tank cleaning; tank demolition/removal; sampling operations; equipment inspections; and excavation sampling/testing.

II) ENTRY SEQUENCE

Before opening a confined space, the potential for fire explosion, or sudden release of hazardous materials must be evaluated and eliminated (e.g., if an atmosphere within a confined space could potentially ignite or explode, the space must be ventilated, purged, flushed, inerted and/or cold-cutting methods used.

Once opened, barriers must be positioned around the entrance to the confined space to prevent unauthorized personnel from entering, or objects from falling into the space where the entrance is above the workers inside the space.

Preliminary atmospheric evaluation: Initial atmospheric testing must be performed prior to entry and prior to ventilation. Readings must be obtained for each potential atmospheric hazard at the bottom, middle, and top of the space, as well as in any other location within the space where hazardous atmospheres are likely to accumulate. (Note: confined spaces that are accessed from bottom to top (exhaust stacks) or horizontally inward (ventilation ducts) must be

carefully evaluated to determine if, or how the atmosphere within the space can be monitored throughout the space, as lowering a sample probe into said spaces from above may not be feasible or may give non-representative readings.

Direct reading instruments must be calibrated by a trained person prior to use. Direct reading instruments must also be field checked against reference standards recommended by the manufacturer at least twice per shift. Instrument probes must remain at each sampling location long enough for the instrument to accurately respond. Sampling/monitoring must proceed **only** in the following order:

* Oxygen content
* Flammable gases, vapors, mists, and
* Potentially toxic air contaminants

Forced air Ventilation: Any space which is likely to contain hazardous atmospheres must be ventilated prior to and during entry, regardless of actual readings obtained from the preliminary atmospheric evaluation described above. The ventilation hose/duct may not be removed to facilitate entry and/or egress. If both the entrant and the blower hose/duct cannot fit simultaneously through the access hole, the hose must be moved to an alternate opening to the space or a "saddle-vent ™" or similar attachment which flattens the duct, making it possible for both the hose and the entrant to fit through the opening simultaneously.

In tank entry situations, the blower intake must be located at least 5 feet from the opening to the space. The blower discharge opening should be directed downward and should be 1 to 1.5 feet from the bottom of the vessel. This method is designed to maximize air turbulence within the tank.

Non-tank entries should be evaluated to determine which blower configuration is most efficient in the given situation

Pre-entry Ventilation Time: Forced air ventilation should achieve at least 8 air changes prior to re-evaluation of the interior atmosphere and initial entry.

EXAMPLE:

a. Volume = [(a 12,000 gallon diesel fuel tank) X (0.134 ft^3/gallon)] = 1608 ft^3
b. Blower Velocity = 1,000 cubic feet per minute (cfm)
c. Time (minutes) Per Air Change = Volume/blower velocity
d. Ventilation Time = Time (minutes) per air change X 8

Therefore, the pre-entry ventilation time required for the given space would be {[1608 ft^3)/(1,000 cfm)] X 8} 12.86 or 13 minutes.

Note: If the space size or configuration make it unfeasible to achieve the air exchange rate specified above, methods which provide adequate ventilation in the immediate work area may be used if oxygen and flammable air contaminates are controlled to within the allowable limits specified by OSHA throughout the entire space, and appropriate respiratory protective equipment/PPE is worn for the highest anticipated concentration of hazardous material that could exist within the space.

On-going Atmospheric Evaluation: Atmospheric testing must continue throughout the confined space entry operation. The frequency should be adequate to ensure that the continuous forced air ventilation is preventing accumulation of hazardous materials in the atmosphere. If a hazardous atmosphere is detected during the entry:

* Each entrant must leave the space immediately;
* The space must be re-evaluated to determine how the hazardous atmosphere developed; and,
* Measures must be implemented to protect entrants from the hazardous atmosphere prior to re-entry into the space.

III) ENTRY PERMIT SYSTEM

No entry may be authorized until a written permit is completed, documenting the means, procedures, and precautions necessary for safe permit space entry operations, including, but not limited to, the following:

* Acceptable entry conditions;
* Permit space isolation;
* Control of atmospheric hazards by inerting, flushing, ventilating, or other appropriate measures;
* Appropriate barriers to protect entrants from external hazards;
* Barriers to prevent unauthorized entry:, and,
* Verification that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry.

Permit Space Isolation: No entry is permitted unless the space has been isolated from all sources of potentially hazardous energy release. Spaces which have been completely removed from service through such means as blanking, blinding, or removal of sections of pipe/duct may be considered isolated. Spaces that have not been from services or otherwise pose a threat of hazardous energy release or materials release into the space must be isolated in accordance with EMU's written *Lockout/Tagout/Isolation Program*.

Control of Atmospheric Hazards: No entry is permitted unless:

* The atmosphere has been tested; and,
* The space has been opened and inerted, flushed, or purged (where appropriate), and the space has been ventilated.

Barriers: No entry is permitted unless:

* All vehicular traffic routes which could impair worker safety have been identified and controlled. Whenever necessary, barriers or other methods must be established to prevent injury due to moving vehicles. This is especially important when manholes are located in parking areas, ramps, garages, etc., OSHA 1926.201 specifies that signs, signals, or barricades do not provide adequate protection from vehicular traffic, flagmen must be utilized. Flagpersons must wear red or orange garments and garments worn at night must be reflective.

* All pedestrian access routes have been identified and controlled. Prior to opening a confined space the area must be evaluated to determine if, when and where pedestrians may gain access to the space. This would include walkways, parking lots, gates, doorways, etc.. Barriers and/or caution tape should be placed to exclude all pedestrian traffic.

Verification and Permits: Prior to entry, all portions of the Confined Space Entry Permit must be completed and verified. Each Entrant, Supervisor, and Attendant must sign the permit acknowledging the permit contents and their assigned responsibilities/duties (as indicated below).

IV) ASSIGNED DUTIES

In addition to the other requirements of this program, no entry may be permitted by "authorized entrants" unless an "attendant" and an "entry supervisor" is present throughout the confined space entry operations. An "attendant" or "authorized entrant" may also serve as the "entry supervisor" as long as all duties/responsibilities noted below can be performed in a safe and effective manner.

Authorized Entrants: An "authorized entrant" as defined by OSHA is an employee who is authorized by and employer to enter a permit-required confined space. Authorized entrants must be trained and certified regarding their assigned duties to:

* Know the health and safety hazards associated with the confined space;
* Properly use the required equipment (ventilation, air monitors, etc.)

* Maintain communication with the attendant regarding any warning sign or symptom of overexposure, dangerous or prohibited conditions; and,
* Exit whenever any warning sign, symptom of overexposure, dangerous or prohibited conditions are encountered, an evacuation alarm is sounded, or when ordered to exit by the attendant.

Attendants: An "attendant" as defined by OSHA is an employee who is stationed outside the permit space to monitor the authorized entrants. Attendants must be trained and certified regarding their assigned duties / responsibilities to:

* Know the health and safety hazards associated with entry;
* Properly use the required equipment (ventilation, air monitors, etc.);
* Maintain communication with the entrant regarding any warning sign or symptom of overexposure and dangerous or prohibited conditions;
* Recognize behavioral effects of overexposure in authorized entrants;
* Continuously monitor who enters the space, and when they enter and exit as indicated on the permit;
* Order authorized entrants to exit whenever any warning sign or symptom of exposure, dangerous/prohibited conditions (from either inside or outside the space) are encountered, if the attendant cannot safely perform all assigned duties, or the attendant must leave the space unattended for any reason;
* Remain outside the permit space throughout the entry operations until relieved by another attendant;
* Warn unauthorized persons to keep out or exit immediately if they have entered the space. (If an unauthorized persons enters the space, the authorized entrants and entry supervisor(s) must be notified immediately);
* Summon rescue and emergency services when assistance is required;
* Perform no duties that might interfere with the attendant's primary responsibility to monitor and protect the authorized entrants.

Entry Supervisors: The "Entry Supervisor", as defined by OSHA is an employee who is responsible for: 1) determining if acceptable entry conditions are present at a permit space where entry is planned; 2) for authorizing entry and overseeing entry operations; and , 3) terminating entry. Entry Supervisors must be trained and certified regarding their assigned duties to:

* Know the health and safety hazards associate with the entry;
* Check and verify that the appropriate entries have been made on the entry permit, that all tests specified on the permit have been correctly performed, and that all procedures and equipment specified on the permit are in place prior to endorsing the permit and allowing the entry to commence;

* Terminate the entry and cancel the permit when operations are complete or when hazardous conditions cannot be adequately controlled;
* Verify the rescue services are available and that the means to summon help are available and operable;
* Remove unauthorized individuals who enter or attempt to enter the permit space during entry operations; and,
* Determine whenever responsibility for a permit space entry operation is transferred and the intervals dictated by the hazards and operations performed within the space, that operations remain consistent with the terms of the entry permit and that acceptable entry conditions are maintained.

V) RESCUE AND EMERGENCY SERVICES

Non-Entry Rescue By Attendants: Each authorized entrant must wear a full body harness with a retrieval line attached to the center of the entrant's back near should level or above the entrant's head. If retrieval requires less than 5 feet of vertical travel, the retrieval line must be attached to a fixed point or mechanical device (e.g., tripod mounted winch) located outside the permit space. If retrieval requires more than 5 feet of vertical travel, the retrieval line must be attached to a mechanical device located outside the permit space.

Unless specifically authorized by the Entry Supervisor, attendants shall not enter a permit space to perform emergency rescue operations. Attendant rescue actions must be conducted from outside the permit space using the retrieval systems described above.

Rescue Services: Rescue services must be summoned in the event that a non-entry rescue attempt fails or it is otherwise necessary to enter the permit space to perform an emergency rescue. The emergency rescue personnel may be employees of EMU or an outside rescue service or agency.

If an outside agency or rescue service is to be relied upon, prior arrangements/agreements must be made between EMU and the outside agency if rescue service to assure that they are aware of, when they may be called (i.e., when the confined space entry operations are performed) and, the nature of the hazards involved, so that they are able to develop appropriate rescue plans. An immediate and effective means of summoning the outside agency or rescue service must be established and specified on the entry permit.

Each member of EMU's rescue team and/or the outside agency/rescue service must be trained and certified. Training and certification must include:

* The duties/responsibilities of the authorized entrant specified in this Program;

* The proper use of personal protective equipment and other equipment specified on the entry permit;
* Simulated rescue attempts using dummies, manikins, or actual persons from representative confined space.

In addition, each of the rescue personnel shall be trained in basic first aid and adult cardiopulmonary resuscitation (CPR). At least one member of the rescue service team must hold current certification in basic first aid and CPR and be available to respond immediately.

APPENDIX G

STATE OF MICHIGAN TRENCHING AND EXCAVATION REGULATION

(For more information, please contact Environmental Health & Safety at 734-487-0794)

APPENDIX H

FEDERAL PERMIT - REQUIRED CONFINED SPACE ENTRY REGULATION

(For more information, please contact Environmental Health & Safety at 734-487-0794)

APPENDIX I

STATE OF MICHIGAN CONFINED SPACE ENTRY REGULATION

(For more information, please contact Environmental Health & Safety at 734-487-0794)

APPENDIX J

RECOMMENDED EQUIPMENT FOR
PERMIT - REQUIRED CONFINED SPACE ENTRY

(For more information, please contact Environmental Health & Safety at 734-487-0794)

APPENDIX K
GLOSSARY AND DEFINITIONS

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GLOSSARY & DEFINITIONS

Atmosphere: Refers to the gases, vapors, mists, fumes, dust, etc. within a confined space.

Attendant: See "standby person".

Authorized Entrant: An employee that is authorized by the employer to enter the permit space.

Blanking / Blinding: The absolute closure of a pipe, line or duct by fastening a blank plate that completely covers the bore and can withstand the maximum pressure of the line without leakage.

Ceiling Limit: The maximum airborne concentration of a toxic agent to which an employee may be exposed for an instantaneous period of time.

Combustible Dust: A dust capable of undergoing combustion or burning when exposed to an ignition source.

Confined Space: Refers to a space which by design has limited openings for access/egress; unfavorable natural ventilation which could contain or produce hazardous concentrations of air contaminants, and which is not designed for continuous human occupancy. Confined spaces include but are limited to: storage tanks; reaction vessels; pits; silos; vats; degreasers; boilers; trenches; exhaust ducts; furnaces; sewers; tunnels; vaults and pipelines.

Confined Space (Class "A"): A confined space that contains conditions that are "Immediately Dangerous to Life and Health" (IDLH). These conditions may include, but are not necessarily limited to, oxygen deficient atmospheres, flammable/explosive atmospheres, and/or high concentrations of toxic substances.

Confined Space (Class "B"): A confined space that has the potential for causing injury and/or illness if preventive measures are not implemented, but not immediately dangerous to life and health.

Confined Space (Class "C"): A confined space in which the conditions would not require any special practices or modification of work.

Engulfment: The surrounding or effective capture of a person by a liquid or finely divided solid that can be aspirated or fill the lungs to cause strangulation, asphyxiation, or crushing.

Entry Supervisor: The person responsible for determining that acceptable entry conditions are present (or not) and authorizing entry into a confined space.

Hazardous Atmosphere: An atmosphere that may expose an employee to risk of death, injury or incapacitation due to:

1. Combustible / Flammable Atmosphere
2. Oxygen deficiency / Enrichment
3. Toxic / IDLSH Atmosphere

Hot Work: Any work which involves burning, welding, riveting, cutting, etc. that produces or has the potential to produce and ignition source. This would also include such operations as abrasive blasting, heating and drilling.

IDLH: Immediately dangerous to life and health. A chemical concentration or environmental condition in which a person would have 30 minutes to escape without experiencing any permanent injury or escape impairing health effects.

Inerting: The process of displacing the atmosphere in a space by injection of an inert gas (such as nitrogen or carbon dioxide) to the extent that the resulting atmosphere is non-combustibles (i.e. oxygen deficient).

Isolation: A process/procedure in which a space is removed from service and completely disconnected from power, chemical, and electrical energy to eliminate the possibility of inadvertent release of energy or chemicals into the confined space. Methods of isolation include: blanking of supply pipes; lockout/tagout; blocking mechanical systems; bleeding supply lines; and disconnecting mechanical linkages.

Lower Flammable Limit / Lower Explosive Limit (LFL/LEL): The minimum concentration of a combustible or a flammable gas/vapor (usually expressed in % by volume), which forms an ignitable mixture if a source of ignition is present.

Non-Permit Space: A confined space that does not contain a hazardous atmosphere, or the potential to contain any hazard capable of causing serious physical harm or death.

Oxygen Deficiency: Is an atmosphere in which the oxygen concentration is less than 19.5%, or a partial pressure (PO_2) of less than 132 mm Hg. Normal air contains oxygen at about 21% with a partial pressure of 160 Hg.

Oxygen Enriched: Is any atmosphere in which the oxygen concentration is greater than 25% (23.5% as defined by OSHNEPA), or a PO_2 of 190 mm Hg or greater at normal atmospheric pressure.

Permissible Exposure Limit (PEL): The maximum allowable concentration to which a person may be exposed for 8 hours per day for 5 days per week. The PELs are listed in 29 CFR 1910.1000, Subpart Z.

Permit-Required Confined Space: A confined space in which atmospheric hazards or other serious physical/chemical hazards exist or could potentially exist within the space indicating a requirement for administrative and other precautions. (i.e., hazardous atmosphere, engulfment hazards, entrapment hazards, or any other serious health or safety hazards).

Purging: A method by which gases, vapors, or other airborne materials are displaced from a space.

Qualified Person: A person designated by the employer, in writing, as capable (by education, training, or experience) of anticipating, recognizing, and evaluating employee exposure to hazardous materials or unsafe conditions in a confined space. The person must be capable of specifying and implementing the necessary control and/or protective measures to ensure worker safety.

Respirator (approved): A device that has met the requirements of 30 CFR Part 11 and is designed to protect the wearer from potentially harmful inhalation exposures and has been approved by the Mine Safety and Health Administration – MSHA (Bureau of Mines) and the National Institute of Occupational Safety and Health – NIOSH.

Retrieval: The process by which an entrant is extracted from a confined space.

Retrieval System: Equipment required to perform non-entry rescue/retrieval from a confined space (i.e., tripod or mounting system, winch, harness/wristlets/anklets, etc.)

Short Term Exposure Limit (STEL): An exposure guideline for a 15 minute exposure with a minimum 1 hour recovery time between exposures. Maximum 4 exposures per day at the STEL.

Standby Person: A person trained in emergency rescue procedures and assigned to remain outside the confined space and remain in communication with the authorized entrant(s) while they are inside the confined space.

Threshold Limit Value (TLV): Exposure guidelines published by the American Conference of Governmental Industrial Hygienists (ACGIH) for chemical and physical agents (similar to PEL).

APPENDIX L

CHANGE OF CLASSIFICATION FORM

(PERMIT TO NON-PERMIT)

CHANGE OF CLASSIFICATION FROM PERMIT REQUIRED TO NON-PERMIT REQUIRED CONFINED SPACE

Date: _____ Building / Facility: _____

Location(s) of space(s) within building: _____

_____

Description of confined space: _____

_____

Reason for Entry: _____

Air Monitoring Results (**BEFORE ENTRY**): _____ Oxygen Content (inside space) _____ Combustible Gas (% LEL / LFL)

Toxic Gas / Vapor Concentration: _____ H_2S _____CO _____ Other (specify): _____

If **ANY** test parameters are in excess of EMU's designated action levels **ENTRY IS PROHIBITED** until the hazards have been eliminated. (i.e., <19.5% O_2, 23>5% O_2, >10% LEL, or toxics > ½ the respective PEL)

Air monitoring Frequency: _____ Continuous _____ Hourly _____ Periodically

Is Space Isolated (blanked, locket out, tagged out, de-energized, disconnected, etc.?

_____ Yes _____ No (if no entry is prohibited)

Is the space Ventilated? _____ Yes _____ No

If Yes, by what means? (specific equipment) _____

Safety Precautions: _____ Space Emptied _____ Fall Hazards Eliminated

_____ Thermal / Gravitational / Kinetic Hazards Eliminated

Personal Protective Equipment Required: _____

_____

*** Note: if hazards arise in a space that has been declassified to a non-permit space, employee(s) must exit the space until the space has been re-evaluated. All of the above requirements must be redone prior to entry of personnel back into the space.**

Authorized Entrant Signature(s): _____

Entry Supervisor Signature: _____

* This form must be submitted to the Department of Public Safety to be retained as historical data.

APPENDIX M

BUILDING FLOOR PLANS INDICATING CONFINED SPACE LOCATIONS

(For more information, please contact Environmental Health & Safety at 734-487-0794)

APPENDIX N

CONTRACTOR HEALTH & SAFETY SIGN-OFF FORM

CONTRACTOR / VENDOR

HEALTH AND SAFETY SIGN-OFF SHEET

I,_____ , _____ for
Print Name Print Job Title

_____, certify that to the best of
Company Name

my knowledge, all equipment utilized on Eastern Michigan University (EMU) Property is constructed, used, and maintained in accordance with all applicable Federal, State, and Local health and safety regulations. In addition, I certify that all on-site personnel have been trained to perform their duties in a safe manner, consistent with regulatory guidance and Eastern Michigan University Policy. I understand that Eastern Michigan University reserves the right to request appropriate documentation of regulatory compliance from any employer working for the University at any time. It is also understood that EMU may deny initiation or continuance of work if such documentation is not provided within five (5) working days of said request.

_____ _____
Contractor Signature Date