



ENVIRONMENTAL & HEALTH & SAFETY

Programs & Policies — CONFINED SPACE PROGRAM

Purpose and Scope

It is the intention of Youngstown State University to comply with the Public Employees Risk Reduction Act (PERRA) by implementing a Permit-Required Confined Space Program as described in 29 CFR §1910.146. In our attempt to comply with PERRA, it is our policy to establish protocols and procedures which will assure worker safety by adopting acceptable federal, state, and local standards.

This program was specifically developed for Youngstown State University in its attempt to protect employees from the hazards associated with entrance into confined spaces which include but are not limited to manholes, exhaust ducts, pipelines, deep sumps, elevator shafts, storage tanks, processing vessels and all other areas as defined in 29 CFR §1910.146. It depicts the policies and procedures of Youngstown State University for administering a Confined Space and Permit-Required Confined Space Program as required by law to protect all employees from the dangers associated with entrance into Confined Spaces.

All University employees must follow the procedures in this program and failure to do so could result in disciplinary action.

Program Responsibility

The Director of Environmental Health and Safety (EHS) has the responsibility for reviewing and updating this program as needed. The Director will work closely with the Administration of Youngstown State University for developing and implementing a written Confined Space Program on campus.

The Director of EHS is the University Confined Space Coordinator. The Confined Space Coordinator is responsible for ensuring that:

- a. All confined spaces and permit confined spaces are identified according to the definition as found in Appendix C
- b. Signs are posted near identified permitted spaces alerting employees to the dangers inherent to that space and that only authorized personnel may enter the space.
- c. Rescue drills are conducted for all rescue team members on an annual basis and documentation of these drills are filed.

YOUNGSTOWN STATE UNIVERSITY



Office of
**Environmental
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- d. Proper pre-entry preparation procedures are followed and documented.
- e. All air monitoring equipment is properly calibrated and available in the necessary quantity to assure the proper operation of the program.
- f. All tools, personal protective equipment, and rescue equipment are properly evaluated and a record of availability and authorization for use be kept on file.
- g. Conduct inspection and audits of all equipment, methods, and procedures as required. All inspection and audits records will be kept on file.
- h. The proper training of all personnel involved in the Permit-Required Confined Space Entry Program is conducted and the personnel are competent to perform their designated tasks as outlined in the program. All training records will be kept on file.
- i. A permit system for the entrance of Permit-Required Confined Spaces is implemented and that records of all permits are retained on file for a period not less than twelve (12) months.
- j. Outside contractors have the qualification and capabilities to ensure an effective Confined Space Entry Program.

Any member of EHS, and Facilities directors and supervisors can be an Entry Supervisor. The Entry Supervisor has the responsibility for overseeing all activities at a Permit-Confined Space site. This includes the following program elements:

- a. Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- b. Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.
- c. Terminates the entry and cancels the permit when:
 - 1. The entry operations covered by the entry permit have been completed; or
 - 2. A condition that is not allowed under the entry permit arises in or near the permit space.
- d. Verifies that rescue services are available and that the means for summoning them are operable.
- e. Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations.
- f. Verify that the Permit-Required Confined Space is safe for entry by filling out the permit in its entirety and then signing it.
- g. Assure that a communication link between the entrant(s), attendant(s) and the rescue team is established prior to entry.
- h. Assure that all tools, personal protective equipment, and rescue devices are approved and suitable for the environment to be entered.
- i. Assure that continuous atmosphere testing is performed when indicated on the permit.
- j. Assure that the condition around the space is monitored to protect entrants from hazardous conditions that may develop outside of the space.



- k. Determine procedures to be used for safe entry using the knowledge obtained on each Permit-Required Confined Space as a guide and re- evaluate the known hazards as they change.
- l. Establish measures to prevent unauthorized or accidental entry.
- m. Eliminate all conditions making a Permit-Required Confined Space unsafe before allowing entry.
- n. Coordinate entry operations with outside contractors.

All members of Facilities can be an Attendant as long as they have completed training. An Attendant has the responsibility for the following duties:

- a. Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- b. Is aware of possible behavioral effects of hazard exposure in authorized entrants.
- c. Continuously maintains an accurate count of authorized entrants in the Permit-Required Confined Space and ensures that the means used to identify authorized entrants accurately identifies who is in the permit space.
- d. Remains outside the Permit-Required Confined Space during entry operations until relieved by another attendant.
- e. Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the Permit-Required Confined Space.
- f. Monitors activities inside and outside the Permit-Required Confined Space to determine if it is safe for entrants to remain in the Permit-Required Confined Space and orders the authorized entrants to evacuate the Permit-Required Confined Space immediately under any of the following conditions:
 - 1. If the attendant detects a prohibited condition.
 - 2. If the attendant detects the effects of hazard exposure in an authorized entrant.
 - 3. If the attendant detects a situation outside the space that could endanger the entrants.
 - 4. If the attendant cannot effectively and safely perform all the duties required
- g. Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from Permit-Required Confined Space hazards.
- h. Takes the following actions when unauthorized persons approach or enter a Permit-Required Confined Space while entry is underway:
 - 1. Warn the unauthorized persons that they must stay away from the Permit-Required Confined Space.
 - 2. Advise the unauthorized persons that they must exit immediately if they have entered the Permit-Required Confined Space.
 - 3. Inform the entrants and the entry supervisor if unauthorized persons have entered the Permit-Required Confined Space.
- i. Performs non-entry rescues as specified by the employer's rescue procedure.



- j. Performs no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.
- k. Monitor the conditions both inside and outside the Permit-Required Confined Space the entire time an Entrant is inside the space.
- l. Be familiar with the proper techniques for testing and monitoring atmospheres.
- m. Assure that all entrants into Permit-Required Confined Space are familiar with proper monitoring procedures before entering.
- n. Monitor the atmospheric conditions of the Permit-Required Confined Space per the entry permit.

All members of Facilities can be an Entrant as long as they have completed training. An Entrant has the responsibility for the following duties:

- a. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- b. Properly use equipment as required the entry permit.
- c. Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space.
- d. Alert the attendant whenever:
 - 1. The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.
 - 2. The entrant detects a prohibited condition.
- e. Exit from the Permit-Required Confined Space as quickly as possible whenever:
 - 1. An order to evacuate is given by the attendant or the entry supervisor.
 - 2. The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.
 - 3. The entrant detects a prohibited condition.
 - 4. An evacuation alarm is activated.
- f. Follow the instructions that are present on the entry permit.
- g. Secure the appropriate monitoring instrumentation from EHS prior to entering a Permit-Required Confined Space.
- h. Be familiar with the proper use of atmospheric test equipment prior to entering a Permit-Required Confined Space.
- i. Continuously monitor the atmospheric conditions of the Permit-Required Confined Space as per the entry permit.

Confined Space Evaluation

All confined spaces will be assumed to be Permit-Required Confined Spaces until EHS and Facilities management have evaluated the space. If it is determined a permit is not required, the space will then be classified as a Non-Permit Confined Space. Non-permit confined space means a confined space



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

Table 1. Permit-Required Confined Space Inventory.

ID Number	Location	Identified Hazards
Permit-Required Spaces must be posted with a sign stating "DANGER - PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER without permit"		
01-OS-TK	Basement Pool Surge Tank	Water, Drowning
27-BLR-16	Boilers 1, 2, 3	Hazardous Atmosphere
27-TK-1	Deaerator Tank	Hazardous Atmosphere
27-TK-2	Surge Tank	Hazardous Atmosphere
00-MH-23	Sewer Manholes deeper than 5 feet	Hazardous Atmosphere
33-TK-1	Chill Water Storage Tank	Water, Drowning
66-OS-TK	Stormwater Detention Tank	Water, Drowning
54-PIT-1	Silvestri Hall Sump Pump Pit	Hazardous Atmosphere
06-B-5	Basement Crawl Space	Limited Movement
13-B25-7	Basement B25 Crawl Space	Limited Movement
13-B26-8	Basement B26 Crawl Space	Limited Movement

Table 2. Non-Permit Confined Space Inventory.

ID Number	Location	Identified Hazards
00-TNL	Map of Tunnels	Possible long distance to exit
<p>If hazards arise within a space that has been declassified to a non-permit space, entrants shall exit the space and contact EHS and Facilities Management. EHS and Facilities Management will then reevaluate the space and determine whether it must be reclassified as a permit-required confined space. * Hot-Work cannot be performed in Non-Permit Confined Spaces until the space is set-up as a Permit-Required Confined Space and the Hot Work Procedure is followed.</p>		

Table 1 lists the spaces on YSU campus that are determined to be Permit-Required Confined Spaces. Table 2 lists the spaces on YSU campus that are determined to be Non-Permit Confined Spaces.

Please note that some rooms or other areas on campus may have the potential unsafe conditions to be present but do not meet the definition of a confined space. In these situations, please work with EHS (as



needed) to develop an appropriate safety and health procedure to enter those areas.

Authorization and Training

No individual may act as an entry supervisor, attendant, or entrant, without authorization from the Confined Space Coordinator.

All individuals acting in the capacity of entry supervisor, attendant, entrant, or atmosphere tester, must complete a training program specific to the capacity in which the individual will perform.

The EHS Director will be responsible for assuring that initial and annual training is provided for all employees serving in any capacity involved with Permit- Required Confined Space entry.

Permit System

Pre-Entry Procedures

Before entering any area listed as a Permit-Required Confined Space, the entrant must obtain an entry permit. The entry permit must be filled out in its entirety and signed by an authorized entry supervisor.

The entry permit is a written approval for the individuals listed on the permit to enter and work in a Permit-Required Confined Space and assures that all hazards have been evaluated and precautions to ensure worker safety have been taken.

Expiration of Permits

Permits will be valid for only one (1) eight (8) hour shift after which time a new permit must be re-issued. At that time the space must again be evaluated and atmospheric testing be performed.

Immediately Dangerous to Life and Health

No permits will be issued for entrance into environments which:

- a. Might expose workers to toxic air concentrations that would be potentially life threatening, acute illness, incapacitation, or otherwise impair their ability for self-rescue.
- b. Contains flammable vapors in excess of 10% of the Lower Flammable Limits (LFL).
- c. Contain radioactive, or uncontrollable electrical, mechanical or engulfment hazards.
- d. Contain less than 19.5% or more than 23.5% oxygen.

Required Permit Information

Permits are to be filled out in their entirety. Entry Supervisors must fill out a blank permit as found in this document. The permit must contain the following information:

- a. Entrants name
- b. Tools and equipment required
- c. Estimated length of time of occupancy
- d. Description of task to be conducted



- e. Description/location of the confined space
- f. Date of work to be done
- g. Attendant's name
- h. Pre-entry preparation details
- i. Data on atmospheric testing

After all of the above information is recorded on the entry permit, the entry supervisor will sign the permit. Entry authorization will be given only if all required conditions for safe entry are met.

Posting of Permit

Permits will be posted at the entrance of the Permit-Required Confined Space for the entire time that the work is in progress. At the conclusion of the work a copy of the permit will be forwarded to the Confined Space Coordinator and kept on file for annual review.

Pre-Entry Preparation

Decision Flow Chart

Prior to entry into any Permit-Required Confined Space the entry supervisor should work through the Decision Flow Chart found in this document with the entrant and the attendants. (App A)

Evaluation of Means of Entrance/Egress

Means of entrance/egress should be evaluated by the entrant and the entry supervisor prior to entry into the space. It should be determined that the means of entrance/egress will accommodate the size of the worker in both the normal and incapacitated state.

Mean of Isolation

All pumps, lines, etc. which may under any circumstances convey hazardous substances into a Permit-Required Confined Space must be disconnected, blinded or isolated by some other means. Valves and disconnected pipes must be "locked out" in such a manner as to assure that inadvertent opening or re-connecting will not occur.

Mechanical/Electrical Energy

All devices producing mechanical or electrical energy that have the potential to inflict injury must be brought to a "zero energy state" and "locked out". Refer to YSU's Lockout/Tagout Program.

Hot Work Permits

Prior to welding, cutting, brazing, or performing any other type of "hot work" in a Confined Space or Permit-Required Confined Space, a "hot work" permit must be issued as per university policy.

Purging/Flushing Confined Spaces

Prior to entering a Permit-Required Confined Space where the concentration of toxic substances are above the Permissible Exposure Level (PEL) the space will be flushed, emptied, or purged such that the



air concentration of toxic substance is below the PEL.

Use of Mechanical Ventilation

Mechanical ventilation equipment may be used to reduce and maintain air contaminants to safe levels so that workers can enter the Permit-Required Confined Space without the use of respiratory equipment if feasible. In the event this cannot be achieved suitable personal protective equipment will be issued. If respirators are needed, they will be issued in accordance with YSU's Respiratory Protection Program. Confined spaces with an atmospheric condition at or above the IDLH level must be made safe before entry.

Atmospheric Testing

Pre-Entry Testing

Pre-entry testing will be performed in such a way as to test the atmosphere without entering the space. Remote sensors, Air-Monitor tubing, probes or any other means which will assure the safety of the worker may be used. The atmosphere will be tested in the following order: Oxygen Levels, Flammability, Toxic Materials (known or expected).

Instrumentation

Direct reading instrumentation is required to conduct atmospheric tests. The instrumentation must be properly calibrated and in good working condition prior to use. When not in use the atmosphere test instruments will be stored by the Program Coordinator and requisitioned from the Program Coordinator by the Entry Supervisor Prior to each job. All atmospheric test equipment will be calibrated on a timetable as recommended by the manufacturer and field tested prior to use.

Monitoring Procedure

Atmospheric monitoring will be performed as frequently as deemed necessary by the Entry Supervisor but in no instance less frequently than every hour for the duration of the time work is being performed in the space. Whenever possible continuous monitoring will be performed by the entrant(s) using personal monitors. The results of the atmospheric tests will be recorded on the entry permit. Under no circumstance will entry be permitted into an atmosphere at or exceeding the IDLH levels.

Authorized Personal Protective Equipment

Specifications regarding the use and type of Personal Protective Equipment (PPE) worn by entrants, attendees, and rescue workers will be established prior to entering a Confined Space. The selection will be made based on statutory requirements when they exist, acceptable industry standards (ex. ANSI standards), and the best available information at the time.

All PPE will be selected based on the information obtained specific to the type of hazard present in each Confined Space. The Pre-Entry Procedures serve as a guide in the selection of the specific type of PPE necessary to safely enter a confined space.



Emergency Rescue Plan

An authorized attendant will be stationed outside of every Permit-Required Confined Space that has an environment found to have the potential to have a hazardous atmosphere, the potential for engulfment, or any other hazard that could potentially threaten the life, health, or safety of the entrant. The attendant is to remain at the entrance of the space at all times that an entrant is in the space. The attendant will have a means of communicating with the entrant(s) at all times. In addition, the attendant will have immediately available means to communicate with emergency services such as the fire department and medical service.

Communication Equipment

Attendants will be provided the necessary communication equipment to assure that they are able to maintain contact with entrants. This may include such devices as telephones, beepers, radios, distinctive alarms.

Body Harness and Retrieval Lines

A safety harness will be worn by all entrants in a Permit-Required Confined Space. A safety harness may also need to be worn depending on the configuration and distance an entrant needs to travel in a Non-Permit Confined Space. The harness will be such as to permit easy lifting and/or dragging of incapacitated entrants safely from the space either at both shoulders or a single line connection between the shoulders and the back. Safety Harnesses must be a full body harness.

The only exception to wearing a safety harness/safety line would be where the configuration of the space would cause the harness/line to become a hazard in themselves because of the potential for entanglement with equipment, lines, etc. within the space. The Confined Space Coordinator will determine if this exception can be made. If an exception is granted the Confined Space Coordinator will work with the Confined Space Supervisor to develop an alternate rescue plan.

Hoisting Devices

Whenever entry to the space is through a manhole or other top or vertical opening a hoisting device must be provided. The hoisting device may not be electrically or pneumatically powered. Instead, the hoisting device must be manually powered using mechanical advantage such as pulleys, ratchets, etc. The hoist must be designed so as to assure that the descent speed of suspended loads is slow enough to prevent injury to entrants who might fall during rescue attempts.

Whenever an overhead structure is not provided or is not suitable for mounting the hoist, a tripod system with sufficient strength and height must be mounted over the entrance to the space. This system must be constructed so as to be able to safely remove the entrant from the space and swing him/her to the adjacent walking surface.

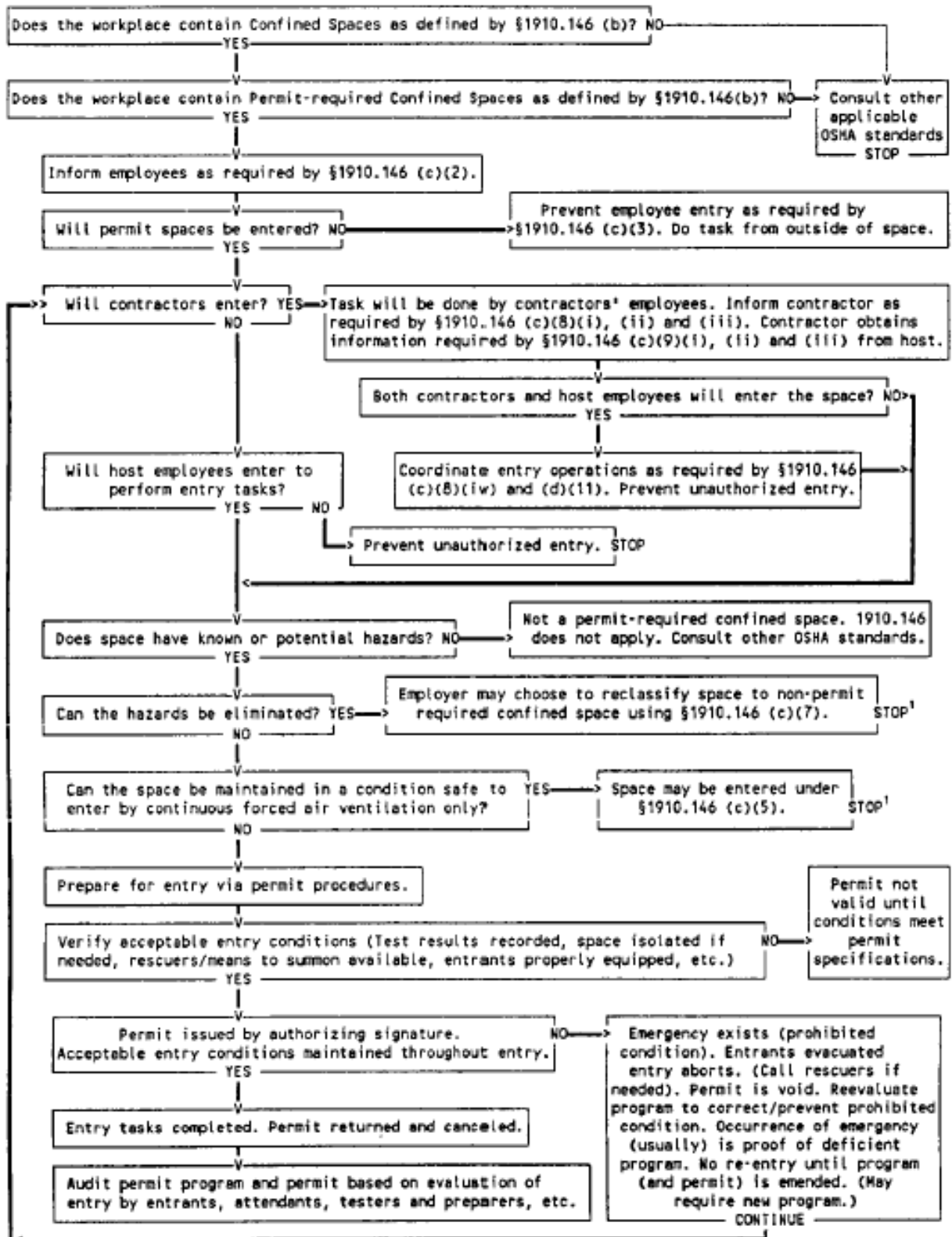


Rescue Procedures

Authorized Attendants are not to enter confined spaces for purposes of rescue unless trained in confined space rescue and only after being relieved by another Authorized Attendant. For each Permit-Required Confined Space a written rescue procedure must be established. This procedure must include provisions for rescue, medical treatment, transportation to a medical facility, and emergency telephone numbers.



Appendix A. Confined Space Flowchart



¹ Spaces may have to be evacuated and re-evaluated if hazards arise during entry



Appendix B. Confined Space Entry Permit

This permit is not valid unless completed in its entirety--POST PERMIT AT JOB SITE UNTIL WORK IS COMPLETE

This permit is valid for one (1) eight (8) hour shift only. All copies of this permit must remain at the job site until all work is completed.

SPACE ID # _____ DATE _____ TIME _____ ENTRY SUPERVISOR _____

LOCATION _____ PURPOSE OF ENTRY _____

REQUIREMENTS COMPLETED	DATE	TIME
LOCKOUT/DE-ENERGIZED		
PROTECTIVE CLOTHING (LIST TYPE BELOW)		
SPACE: PURGED, FLUSHED, VENTED		
ADEQUATE VENTILATION		
SECURE AREA--POST AND FLAG		
BREATHING APPARATUS		
RESUSCITATOR--INHALER		
STANDBY SAFETY PERSONNEL ALERTED		

REQUIREMENTS COMPLETED	DATE	TIME
LOCKOUT/DE-ENERGIZED		
PROTECTIVE CLOTHING (LIST TYPE BELOW)		
SPACE: PURGED, FLUSHED, VENTED		
ADEQUATE VENTILATION		
SECURE AREA--POST AND FLAG		
BREATHING APPARATUS		
RESUSCITATOR--INHALER		
STANDBY SAFETY PERSONNEL ALERTED		

NOTE: IF ITEM DOES NOT APPLY ENTER N/A IN THE TIME AND DATE SPACE

RECORD INSTRUMENT READING HOURLY

CONTINUOUS MONITORING	REQUIRED	PEL	TIME	TIME	TIME	TIME	TIME	TIME
AVAILABLE OXYGEN (%VOLUME)	YES	19.5%-23.5%						
LOWER FLAMMABLE LIMITS (LFL)	YES	2%-5%						
HYDROGEN SULFIDE		PPM						
CARBON MONOXIDE		PPM						
OTHER (LIST)		PPM						

NAME OF ATMOSPHERE TESTER		AUTHORIZED ENTRANT(S)		AUTHORIZED ATTENDANT	
INSTRUMENT(S) USED	MODEL OR TYPE				
SIGNATURE OF ENTRY SUPERVISOR		EMERGENCY TELEPHONE NUMBERS RESCUE: _____ FIRE: _____ AMBULANCE: _____			
TELEPHONE: DATE: _____ ISSUED: _____		PROGRAM COORDINATOR: _____		OTHER: _____	
JOB COMPLETED	YES	NO	REMARKS:		
JOB TERMINATED	YES	NO	IF YES STATE REASON FOR TERMINATION:		

ORIGINAL COPY TO PROGRAM COORDINATOR DUPLICATE COPY TO BE FILED BY ENTRANT SUPERVISOR



Appendix C. Definitions (Source 29 CFR 1910.146)

Attendant means an individual stationed outside one or more permit spaces who monitors the authorized entrants.

Blind or blinding or blanking means the absolute closure of a pipeline or duct to prevent passage of any material (by fastening a solid plate or “cap” across the pipe).

Confined Space means any space that:

1. has a limited means of entrance/egress
2. is large enough and so configured that a worker can bodily enter and perform assigned work
3. and is not designed for continuous worker occupancy.

Typically, a confined space can generally include, but is not limited to hoppers, storage tanks, process vessels, storage rooms, bins, boilers, ventilation or exhaust ducts, sewers, manholes, underground utility tunnels, acid tanks, digesters, ovens, diked areas around tanks, and pipelines. Open top spaces more than four feet in depth such as pits, tubs, vaults, and vessels may also be confined spaces if any of the three criteria above are met. See Permit-Required Confined Space

Engulfment means the surrounding and effective capture of a person by finely divided particulate matter or a liquid.

Entrant means any employee who is authorized to enter a Permit-Required Confined Space.

Entry means any action resulting in any part of the employee’s body breaking the plane of any opening of the confined space and includes any ensuing work activities inside the confined space.

Entry Permit means the written authorization for employee entry into a confined space under defined conditions for a stated purpose during a specified time.

Entry Supervisor means the person responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section.

Hazardous Atmosphere means an atmosphere presenting a potential for death, incapacitation, impairment of ability to self- rescue, injury, or acute illness from one or more of the following causes:

- A flammable gas, vapor, or mist in excess of 10% of its lower explosive limit (LFL).
- An oxygen-deficient atmosphere containing less than 19.5% oxygen or an oxygen enriched atmosphere containing more than 23.5% oxygen.
- An atmosphere concentration of any substance listed in Subpart Z of Part 1910 Standards above the listed numerical value of the permissible exposure limit (PEL).



- Airborne combustible dust at a concentration that meets or exceeds its LEL, e.g., approximated where dust obscures vision at a distance of five feet or less.
- A condition immediately dangerous to life or health as defined in this subsection.

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

Isolation means the process by which a permit space is removed from service and completely protected against the release of energy and material into the space.

Lockout or Tagout means placing locks or tags on the energy-isolating device. Tags shall indicate that the energy-isolated device shall not be operated until the removal of the tag.

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

Permit Required Confined Space means a confined space that has the following additional qualifying characteristics:

1. Contains or has potential to contain a hazardous atmosphere.
2. Contains a material that has the potential for engulfing an entrant.
3. Has internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.
4. Contains any other serious safety or health hazard (electrical, radioactive, moving machinery parts, thermal, toxic).

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

Rescue Team means those persons designated to perform rescues from confined spaces. A rescue team may consist of external emergency personnel, provided the training requirements of applicable OSHA standards have been met.

Retrieval Line means a line or rope secured at one end to a workers' safety belt, chest or body harness, (or wristlets, if appropriate) with the other end secured to an anchor point or lifting device located outside the entry portal. The anchor point shall not be a motor vehicle. Retrieval lines must be of sufficient strength to remove an entrant when necessary.

Zero Mechanical State means that the mechanical potential energy of all portions of the machine or



equipment is set so that the opening of the pipe(s), tube(s), hose(s) or actuation of any valve, or button, will not produce a movement which could cause injury.

