

Environmental Health, Safety and Emergency Management

APPALACHIAN STATE UNIVERSITY

Confined Space Entry Safety Program

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SCOPE

The purpose of the Confined Space Program is to protect workers entering confined spaces to perform maintenance, cleaning, or other types of work. The Program provides information and guidelines for working with all classifications of confined spaces.

DEFINITIONS

ACCEPTABLE ENTRY CONDITIONS The conditions that must exist in a permit space to allow entry so that employees involved with a permit-required confined space entry can safely enter into and work within the space.

ATTENDANT An individual stationed outside the permit space who monitors the authorized entrants and who performs all attendants' duties assigned in the permit space program.

BLANKING OR BLINDING The absolute closure of a pipe, line, or duct by the fastening of a solid plate that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

CONFINED SPACE A space that meets the following criteria:

- Is large enough and so configured that an employee can bodily enter and perform assigned work
- Has limited or restricted means for entry or exit (for example, tanks, vessels, storage bins, vaults, pits, and excavations are spaces that may have limited means of entry); and
- Is not designed for continuous employee occupancy.

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

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

ENTRANT Employee who is authorized to enter a permit space.

ENTRY Action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and occurs as soon as any part of the entrant's body breaks the plane of the opening of the space.

ENTRY PERMIT The written or printed document provided by Appalachian State University allowing and controlling entry into a permit space.

ENTRY SUPERVISOR The person (such as the supervisor, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section.

HAZARDOUS ATMOSPHERE An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness from one or more of the following causes:

- Flammable gas, vapor, or mist in excess of 10 percent of its lower explosive limit (LEL);
- Airborne combustible dust at a concentration that meets or exceeds its LEL;
- Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;
- Atmospheric concentration of any substance for which a dose or a published exposure guideline is available and which could result in employee exposure in excess of its dose or permissible exposure limit.

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH) Any condition that poses an immediately or delayed threat to life or what would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

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

NON-PERMIT CONFINED SPACE A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

PERMIT REQUIRED CONFINED SPACE

- A confined space that has one or more of the following characteristics:
- Contains or has the potential to contain a hazardous atmosphere;
- Contains a material that has the potential for engulfing an entrant;
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
- Contains any other recognized serious safety or health hazard.

RETRIEVAL SYSTEM Equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of a person from a permit space

CONFINED SPACE SAFETY PROGRAM ELEMENTS

1. Identifies and classifies the known confined spaces at the University and discusses the reclassification of areas.
2. Identifies the necessary components for entry into confined spaces including monitoring and equipment which may be required.
3. Identifies rescue and emergency procedures of confined spaces and the responsibilities of authorized employees in such instances.
4. Identifies the University Permit System including preparation, use, and cancellation of permits.
5. Provides training to employees involved with confined space work and identifies their duties.
6. Provides for a review of individual operations involving confined spaces and an annual program review.

SPACE EVALUATION

IDENTIFICATION AND CLASSIFICATION

The Confined Space evaluation identifies and classifies all spaces assessed at Appalachian State University (University) for confined space hazards. The Environmental Health, Safety and Emergency Management Department (EHS&EM) has the responsibility for classifying confined spaces on campus.

The classifications of confined spaces are:

- NON-PERMIT REQUIRED
- PERMIT REQUIRED

POSTING

All Permit Required Spaces are posted with identification signs. The signs state "DANGER – PERMIT REQUIRED CONFINED SPACE, DO NOT ENTER" or other similar language to prevent unauthorized entry. The only exception would be locations such as man-hole covers which are not able to be labeled. These spaces will be marked on a map retained in the Physical Plant Mechanical Shop.

RECLASSIFICATION OF PERMIT SPACE

Permit Required Spaces may be reclassified as Non Permit spaces. Reclassification occurs when all hazards and potential hazards are removed. Neutralization of dangerous moving parts, by lockout for example, may allow reclassification to Non-Permit status.

ENTRY WITHOUT PERMIT

Confined spaces that do not contain known hazards have reduced requirements for entry. Spaces classified as Non-Permit do not involve hazards considered serious. Non-Permit spaces do not require a written permit or attendant for entry, but will instead utilize the University [Alternate Entry Form](#). Non-Permit spaces do not require any special testing or training.

PERMIT REQUIRED ENTRY

Confined Spaces that contain known or potential safety and health hazards to entrants require a permit and an entry procedure or space review prior to entry. This will be logged on the [ASU Entry Permit](#). These areas are PERMIT REQUIRED SPACES. Entry is allowed to trained and authorized individuals only.

ACCEPTABLE ENTRY CONDITIONS

Because of the dangers that exist within Permit required areas, there are conditions that must be eliminated before entry. Precautionary steps such as source isolation, ventilation, and atmospheric level testing are required prior to entry. Acceptable entry conditions for specific areas are contained in Entry Permits.

ISOLATION

Lockout of mechanical hazards follows the requirements identified in the University [Lockout / Tagout Program](#).

PURGING AND FLUSHING

If a confined space contains an atmosphere that is flammable or considered immediately dangerous to life or health (IDLH), the area will require purging before employees can enter. Continual forced ventilation is necessary to keep some areas safe during entry.

VERIFICATION MONITORING

Requirements of entry are listed on Entry Permits. Monitoring of hazardous conditions is required prior to receiving entry authorization. Conditions include atmospheric, mechanical, and physical hazards. Ongoing monitoring may be periodic or continuous as required by the permit. Only personnel trained in the proper use of the equipment are authorized to perform required air monitoring.

BARRIERS

Barriers must be placed around Permit Required Spaces when conditions may cause injury. Conditions may include:

- Unauthorized entry.
- Objects falling into the space.
- Vehicular hazards around the space.

ATTENDANTS

There must be at least one attendant present outside the space for the duration of the work being performed in Permit Required Spaces. Attendants must not monitor more than one operation at any given time.

CONCLUDING OPERATIONS

When scheduled work operations in a Permit Required Space have concluded:

- Entrants will exit the space.
- The area will be closed off.
- The Permit will be cancelled.

EQUIPMENT

Equipment required during entry operations is listed on the permit and may include:

- Testing and Monitoring Equipment.
- Ventilation Equipment.
- Communications Equipment.
- Personal Protective Equipment.
- Lighting Equipment.
- Barriers and Shields.

- Ingress and Egress Equipment.
- Rescue and Emergency Equipment.
- Any other equipment necessary for safe entry and rescue.

Entry equipment will be maintained by the department owners. Only trained and authorized employees are to use the equipment.

RESCUE AND EMERGENCY SERVICES PROCEDURES

An emergency is an event in or near the Permit Space that could endanger entrants. Emergency rescue services during entry by Institute employees will be provided by the Boone Fire Department.

EVACUATION AND RESCUE PROCEDURES

1. Attendant will notify all Entrants to evacuate.
2. Attendant will notify 911 if the emergency involves serious injury or fire.
3. Attendant will execute any "non-entry" rescue procedures appropriate to the situation.
4. Rescue involving space entry will not be performed by Institute employees.
5. The Entry Supervisor will immediately cancel the Entry Permit.

SUPERVISOR AND ATTENDANT RESPONSIBILITIES

- Provide Rescue Services group with information on the work being done.
- Provide the Entry Permit to Rescue Services personnel.
- Provide Rescue Services with any observations or information about the emergency.
- Keep unauthorized personnel out of the area.
- Forward information on any chemicals involved in exposures to the medical facility treating exposed victims.

PERMIT SYSTEM

Entry Permits are kept by supervisors authorized to assign entry.

PREPARATION

Prior to "Permit-Required" Space entry, an applicable permit must be completed in full. Additional requirements may apply to Permit-Required areas based upon entry testing results. A final authorization signature is required by the Shop Supervisor for "Permit-Required" spaces. If the area is a "Non-Permit" space, work may proceed without a permit or notification.

ISSUE / USE

Space entry work must not deviate from the requirements of the permit, including the time required to complete the assignment. Permits must be posted during entry. It is the responsibility of the entry supervisor to see that permits are posted.

CONCLUSION OF OPERATIONS / CANCELLATION OF PERMIT

Upon conclusion of the entry operations, the authorized Entry Supervisor is responsible for terminating the entry and canceling the Permit. The Entry Supervisor is also required to terminate entry and cancel the Permit when a condition exists that is not acceptable by the Permit. Entry must not exceed the

expiration date and time posted on Entry Permits. Upon conclusion of entry operations, the Entry Supervisor shall cancel the Permit and keep on file for at least one year.

TRAINING

Employees working with "Permit-Required" Spaces must receive training. Employees working as attendants, authorized entrants, or entry supervisors receive training for safe performance of assigned duties in confined space areas. Training is not required of employees entering Non-Permit areas.

FREQUENCY

Affected employees must receive training before the first assignment of work in confined spaces. Employees receive additional training when there is a change in assignment, operation, or procedures.

DOCUMENTATION

All training pertaining to confined space duties will have a training outline and an attendance sheet containing the date of training and a listing of trainees. This should be forwarded to EHS&EM upon completion with a copy also retained in the department.

DUTIES

There are three different active roles in the performance of permitted confined space entry operations: Entrants, Attendants, and Entry Supervisors.

ENTRANTS

Entrants are employees authorized to enter a permit space. Entrants shall:

- Know the hazards that they may be faced during entry.
- Properly use equipment mentioned under the "Equipment" section.
- Communicate with the attendant as necessary alerting him/her of hazards.
- Exit from permit space whenever there is an order to evacuate, a hazard is recognized, or an evacuation alarm is activated.

ATTENDANTS

Attendants are employees stationed outside of a permit space to monitor entrant activity and perform duties listed on the permit. Attendants are responsible to:

- Know the hazards that they may be faced during entry.
- Know the behavioral effects of hazard exposure in authorized entrants.
- Keep an accurate count of the number of entrants in the permit space.
- Remain outside the space during operations until relieved.
- Monitor the work area for hazardous conditions.
- Summon rescue and emergency services.
- Communicate with entrants to relay information and monitor the status of the entrants.
- Order the evacuation of the entrants from the space if a hazardous condition is encountered.
- Keep unauthorized employees away from the space.

- Perform no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.
- Perform non-entry rescues.

ENTRY SUPERVISORS

Entry Supervisors authorize and supervise entry operations. An Entry Supervisor that authorizes entry may delegate supervisory responsibilities during entry to another employee authorized as a supervisor. Entry Supervisors are responsible to:

- Recognize the potential hazards during entry, including signs and symptoms of exposure.
- Determine, before entry, that area conditions meet the requirements of the permit.
- Provide necessary equipment, hazardous material information, and assuring rescue services are in place.
- Assure that entrants and attendants are trained prior to entry.
- Determine that entry operations and conditions remain consistent with the terms of the permit.
- Remove unauthorized individuals from the area during entry operations.
- Cancel the permit at the conclusion of the entry.

REVIEWS POST-ENTRY REVIEW

EHS&EM will immediately review specific entry operations under the following circumstances:

- Unauthorized entry.
- Detection of hazards not addressed on a permit.
- Complaints of the effectiveness of entry procedures.
- Subsequent entries will not be authorized until the review is completed with all necessary revisions made.

LINKS and FORMS

1. [ASU Confined Space Entry Permit](#)
2. [ASU Alternate Entry Permit](#)
3. [ASU Lockout/Tagout Policy Manual](#)
4. [ASU Confined Space Policy Manual](#)