

ADMINISTRATIVE PROCEDURES



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C. Deibel
County Administrator

SUBJECT: **PERMIT REQUIRED CONFINED SPACE PROCEDURES**

DEPARTMENT RESPONSIBLE: **Risk Management**

I. PURPOSE

To establish procedures to minimize risks for Pima County employees entering into and performing work in confined spaces.

These procedures are mandated by the Occupational Safety and Health Act (OSHA) part 29CFR 1910.146 which states that employers must follow practices and procedures to protect employees from those hazards of entry into and work within permit required confined spaces in General Industry which can be identified by an employer exercising reasonable care.

II. POLICY

Pima County shall protect the health and safety of its employees by ensuring that personnel whose jobs entail the risk of working in permit required confined spaces shall receive information as to the types of hazards and their severity in the permit required confined space areas, training in the means, procedures and practices by which the permit spaces can be entered safely, and a written permit system.

III. DEFINITION

To better assure an understanding of the procedures, and for uniformity in terminology, the following definitions are used.

Acceptable Entry Conditions - Conditions that must exist in a permit space to allow entry and to insure 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 required confined space who is trained as required by this standard and who monitors the authorized entrants inside the permit required confined space. An attendant may monitor not more entrants nor more permit spaces than the entry permit specifically authorizes.

Authorized Entrant - An employee who is authorized by the employer to enter a permit required confined space. Authorized entrants may rotate duties, serving as attendants if the permit program and the entry permit so state. Any properly trained employee with the authority to function as an entry supervisor may enter the permit space during the term of the permit provided the attendant is informed of that entry.

Blanking or Blinding - The absolute closure of a pipe, line or duct, by fastening across its bore a solid plate or cap which completely covers the bore, which extends at least to the outer edge of the flange at which it is attached; and which is capable of withstanding the maximum upstream pressure.

Confined Space - Means 1. Large enough and so configured that an employee can bodily enter and perform assigned work and 2. has limited or restricted means for entry or exist and 3. Is not designed for continuing employee occupancy.

Double Block and Bleed - The closure of a line, duct or pipe by locking and tagging a drain or vent which is open to the atmosphere in the one between two locked-closed valves.

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

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

Entry - The act by which a person intentionally passes through an opening into a permit required confined space including ensuing work activities in that space. The entrant is considered to have entered as soon as any part of the entrant's body breaks the plane of an opening into the space.

Entry Permit - The written or printed document established by the employer, the content of which is based on the employer's hazard identification and evaluation for that confined space (or class or family or confined spaces if a number of spaces may contain similar hazards) and is the instrument by which the employer authorizes his or her employees to enter that permit required confined space. The entry permit: defines the conditions under which the permit space may be entered; states the reason(s) for entering the space; the anticipated hazards of the entry; the entry supervisor, the attendants and entrants, and establishes the length of time for which the permit may remain valid.

Entry Permit System - The employer's written procedures for preparing and issuing permits for entry and returning the permit space to service following termination of entry, and designates by name or title the individuals who may authorize entry.

Hazardous Atmosphere - An atmosphere which exposes employees to a risk of death, incapacitation, injury or acute illness from one or more of the following causes:

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- A flammable gas, vapor or mist in excess of ten (10) percent of its lower flammable limit (LFL).
 - An airborne combustible dust at a concentration that obscures vision at a distance of five (5) feet (1.52 M) or less.
 - An atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.
 - An atmospheric concentration of any substance for which a permissible exposure limit (PEL) is published in Subpart Z of 29 CFR Part 1910 and could result in employee exposure in excess of its PEL.

Note: For substances for which a PEL has not been issued, Material Safety Data Sheets (MSDS) can be used.

- Any atmospheric condition recognized as immediately dangerous to life and health (IDLH).

Hot Work Permit - The employer's written authorization to perform operations which could provide a source of ignition, such as riveting, welding, cutting, burning or heating.

Immediately Dangerous to Life or Health (IDLH) - Any condition which poses an immediate threat of loss of life; may result in irreversible or immediate-severe health effects; may result in eye damage; irritation or other conditions which could impair escape from the permit space.

Immediate - Severe Health Effects - Any acute clinical sign(s) of a serious, exposure-related reaction manifested within 72 hours after exposure.

Inerting - Rendering the atmosphere of a permit space non-flammable, non-explosive or otherwise chemically non-reactive by such means as displacing or diluting the original atmosphere with steam or a gas that is non-reactive with respect to that space.

Isolation - The separation of a permit space from unwanted forms of energy which could be a serious hazard to permit space entrants. Isolation is usually accomplished by such means as blanking or blinding; removal or misalignment of pipe sections or spool pieces; double block and bleed; or lockout and/or tagout.

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

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

Oxygen Deficient Atmosphere - An atmosphere containing less than 19.5 percent oxygen by volume.

Oxygen Enriched Atmosphere - An atmosphere containing more than 23.5 percent oxygen by volume.

Permit Required Confined Space - An enclosed space which meet the definition of confined space and has one or more of the following characteristics:

- Contains or has a known potential to contain a hazardous atmosphere;
- Contains a material with the potential for engulfment of an entrant;
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or a floor which slopes downward and tapers to a smaller cross-section; or
- Contains any other recognized serious safety or health hazard.

Permit Required Confined Space Program - Means the employers overall program for controlling and, where appropriate, for protecting employees from permit space hazards and for regulated employee entry into permit spaces.

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

Retrieval Line - A line or rope secured at one end to the worker by a chest-waist or full-body harness and with its other end secured to either a lifting (or other retrieval) device, or to an anchor point located outside the entry portal.

Rescue Service - The personnel designated to rescue employees from permit spaces.

Testing - The process by which the hazards that may confront entrance of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

IV. PERMIT REQUIRED CONFINED SPACE ENTRY PROGRAM REQUIREMENTS

Under this program, each department shall:

- A. Perform hazard evaluation: Identify and evaluate each hazard of the permit spaces, included determination of severity. Supervisors in each department shall complete a Confined Space Data Sheet for each permit required confined space in their areas of responsibility. A copy of each Confined Space Data Sheet shall be forwarded to the Department Safety Officer and Risk Management. A complete set of the Confined Space Data Sheets will be maintained by Risk Management. Supervisors will maintain the Confined Space Data Sheets for their areas of responsibility. Not only shall these data sheets document the designation of an area as a confined space, they shall also serve as a reference for individuals or teams entering that space.

- B. Hazard Control: Establish and implement the means, procedures and practices by which the permit spaces can be entered safely. This shall include the following:
1. Specifying acceptable entry conditions.
 2. Isolating the permit space.
 3. Purging, inerting, flushing or ventilating the permit space as necessary to eliminate or control atmospheric hazards.
 4. Verifying that conditions in the permit space are acceptable for an entry throughout the duration of the entry.
- C. Utilize the written permit system.
- D. Signs must be posted near permit spaces to notify employees what hazards may be present and restricting entry to authorized entrants. The signs shall state, in addition:

DANGER

**CONFINED SPACE
ENTRY BY PERMIT/CHECKLIST ONLY**

- E. Prevent unauthorized employee entry through such means as posting signs and barriers, or a positive locking system.
- F. Designate the persons who are to have active roles in entry operations, identify the duties of each employee and provide training; training attendants, entrants and personnel authorizing or in charge of entry to work safely in and around the permit space.
- G. Provide, maintain, and train employees in the proper use of the equipment necessary for safe entry, including testing, monitoring, communication and personal protective equipment. This shall include:
1. Testing and monitoring equipment for atmospheric testing.
 2. Ventilating equipment needed to obtain acceptable entry conditions.
 3. Communications equipment.
 4. Personal Protective Equipment, insofar as engineering controls do not adequately protect employees.
 5. Lighting equipment (explosion proof) required to enable employees to see well enough to work safely and to exit the space in an emergency.
 6. Equipment, such as ladders, needed for safe ingress and egress.

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- H. Evaluate permit space conditions as follows when entry operations are conducted:
1. Test conditions in the permit spaces to determine if acceptable entry conditions exist before entry is authorized to begin. If isolation of the space is not possible, because it is large or part of a continuous system (such as a sewer) pre-entry testing shall be performed to the extent possible before entry is authorized and conditions shall be continuously monitored in the areas where authorized entrants are working.
 2. Test or monitor the permit space as necessary to determine if acceptable entry conditions are being maintained during the course of entry operations.
 3. When conducting atmospheric conditions, first test for oxygen, then for combustible gases and vapors and then for toxic gases and vapors.
- I. Provide at least one attendant outside the permit space into which entry is authorized for the duration of entry operations.
- J. Develop and implement a system for the preparation, issuance, use and cancellation of entry permits.
- K. Develop and implement procedures to coordinate entry operations when employees of more than one employer are working simultaneously as authorized entrants in a permit space, so that employees of one employer do not endanger the lives of another.
- L. Review entry operations and cancelled permits to revise this program as necessary.
- M. Rescue: Ensure that the procedures and equipment necessary to rescue entrants from permit spaces are developed, implemented and followed.
- N. Ensure all pedestrian, vehicles or other barriers necessary to protect entrants from external hazards are provided.
- O. Contractors or other employers: When an employer (such as a contractor) plans to send employees into a permit space at a Pima County facility, we shall provide the contractor with all available information on permit space hazards, on efforts to comply with this program or any other workplace hazards, safety rules and emergency procedures for which the contractor needs to be aware in order to comply with this program. This shall include:
1. Informing the contractor that the workplace contains permit spaces and that the Permit Space Program requirements must be met.

2. Informing the contractor associated with work in the space.
3. Informing of precautions or procedures implemented by the department to protect employees in or near permit spaces where contractor personnel will be working.
4. Coordinating entry operations with the contractor, when both host employer personnel and contractor personnel will be working in or near permit spaces.
5. Debriefing the contractor at the conclusion of the entry operations regarding any hazards confronted or created in permit spaces during entry operations.

V. WRITTEN PERMIT SYSTEM

The permit must include the following information in a checklist portion of the permit: (see attachment B)

- A. The permit space to be entered.
- B. The purpose of the entry.
- C. The date and authorized duration of the entry. This may be stated in terms of completion of the task for which the permit is being issued.
- D. The known hazards of the permit space.
- E. The measures for isolation of the permit space.
- F. Measures, such as lock-out/tag-out, equipment and procedures for purging, inerting, ventilating and flushing, used to remove or control hazards.
- G. The acceptable environmental conditions, quantified with the levels of hazards identified in the permit space which must be maintained during the entry.
- H. Testing and monitoring equipment and procedures which will verify that acceptable environmental conditions are being maintained during this entry.
- I. Test results and the legible signature of the tester.
- J. The rescue and other services which would be summoned in case of emergency and the means of communications with those services.
- K. Rescue equipment to be provided if necessary.
- L. The communication procedures and equipment used by authorized entrants and attendants to make contact.

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- M. Personal Protective Equipment, such as respirators, clothing or retrieval lines provided to insure employee safety.
 - N. Any other information necessary to the circumstances to the particular permit space.
 - O. A list of authorized entrants.
 - P. A list of attendants.
 - Q.. The name of the entry supervisor.
 - R. The signature of the entry supervisor.

The completed permit shall be made available at the time of entry to authorized entrants, by posting it at the entry portal or by any other effective means, so that entrants can confirm that pre-entry preparations have been completed.

Hot Work Permits

Whenever hot work, such as welding, is performed in a permit space, it shall be so noted on the entry permit and a separate hot work permit shall be filled out. This must be fastened to the entry permit.

The individual authorizing entry shall sign or initial the permit, when all conditions necessary for entry have been performed.

Canceling the Permit

Upon completion of the entry covered by the permit, and after all entrants have exited, the individual authorizing the entry shall cancel the permit.

Cancelled entry permits shall be retained at least one year to facilitate review of the confined space program. Any problems encountered during an entry operations must be noted on the pertinent permit so that revisions to the program can be made.

VI. ATTENDANT TRAINING AND DUTIES

During the time a permit required confined space entry is taking place:

- A. Attendant shall be aware of hazards that may be faced during the entry and possible behavioral effects.
- B. Attendants shall make sure traffic safety procedures have been followed in areas at risk for vehicular traffic.
- C. Attendants shall continuously maintain an accurate count of all person (see Attachment A) in the space.

- D. The attendant must be able to recognize potential permit space hazards and monitor activities inside and outside the permit space to determine if it is safe for entrants to remain in the space. The attendant must be trained to monitor the atmosphere within the confined space.
- E. The attendant must make sure rescue equipment is in place. If the entry requires a vertical drop (such as a manhole) a tripod fitted with a lifting device must be in place over the opening.
- F. Communication; the attendant must:
1. Maintain effective and continuous contact with authorized entrants during entry.
 2. Order authorized entrants to evacuate the permit space immediately when:
 - a. The attendant observes a condition which is not allowed in the permit.
 - b. The attendant detects behavioral effects of hazard exposure.
 - c. The attendant detects a situation outside the space which could endanger the entrants.
 - d. The attendant detects an uncontrolled hazard within the permit space.
 - e. The attendant cannot effectively and safely perform all of the duties required.
 - f. The attendant must leave the work station.
 3. Summon rescue and other emergency services as soon as the need is determined for entrants to escape from permit space hazards.
 4. Take the following actions, as necessary, when unauthorized persons approach or enter a permit space while entry is underway:
 - a. Warn the unauthorized persons away from the space.
 - b. Require the unauthorized persons to exit immediately if they have entered the permit space.
 - c. Inform entrants and any other persons designated by the employer if unauthorized persons have entered the permit space.

G. Rescue

1. Attendants shall not enter the permit space to attempt rescue of entrants and;
2. Shall properly use any rescue equipment provided for their use and perform any other assigned rescue and emergency duties without entering the permit space.

H. The attendant shall perform no duties that might interfere with the attendants primary duty to monitor and protect the entrants.

VII. AUTHORIZED ENTRANT TRAINING AND DUTIES

A. In training received prior to a permit required confined space entry, authorized entrants must:

1. Know the hazards which may be faced during entry.
2. Recognize the signs and symptoms of being exposed to a hazard.
3. Understand the consequences of exposure to a hazard.

B. During the entry, authorized entrants must:

1. Maintain communication with the attendant.
2. Notify the attendant when the entrants self-initiate evacuation of a permit space.
3. Be aware of the personal protective equipment, such as a retrieval lines, respirators or clothing, needed for safe entry and exit. A full body harness is required when a vertical entry is made into a permit space not considered low hazard.
4. Be provided with the necessary personal protective equipment.
5. Be able to use the personal protective equipment properly.
6. Be aware of the external barriers needed to protect entrants from external hazards and of the proper use of those barriers.

C. The entrant shall exit the permit space, unless it is physically impossible to do so, when:

1. The attendant orders evacuation.

2. The entrant recognizes any warning sign or symptom of exposure.
3. An evacuation alarm is activated.
4. The entrant detects a prohibited condition.
5. The entrants perceive they are in danger.

VIII. ENTRY SUPERVISORS

A. Employees authorizing and supervising entry shall:

1. Determine that the entry permit contains the requisite information before allowing or authorizing entry.
2. Determine that the necessary procedures, practices, and equipment for safe entry are in effect before allowing entry.
3. Determine, at appropriate intervals, that entry operations remain consistent with the terms of the entry permit, and that acceptable entry conditions are present.
4. Know the hazards that may be encountered during entry, including information on the mode, signs or symptoms and consequences of exposure.
5. Verify that rescue services are available and the means for summoning them are operable.
6. Cancel the entry authorization and terminate entry whenever acceptable entry conditions are not present.
7. Take the necessary measures for concluding an entry operation, such as closing off a permit space and canceling the permit, once the work authorized by the permit has been completed.
8. Individuals who may authorize entries may also serve as authorized entrants or attendants for an entry if they have the proper training.
9. Individuals in charge shall take the appropriate measures to remove unauthorized personnel who are in or near permit entry spaces.

IX. RESCUE TEAM

The department shall have either an in-plant rescue team or an arrangement under which an outside rescue team responds to a request for rescue services.

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- A. If the department decides to use an in-plant team, the department shall ensure that:
1. Personnel assigned to an in-plant rescue team are provided with and trained to use properly the personal protective equipment, including respirators, and rescue equipment necessary for making rescues from the department's permit spaces.
 2. The rescue team is trained to perform the assigned rescue functions and has received the training required for authorized entrants.
 3. Rescue teams practice making permit space rescues at least once every twelve (12) months, by means of simulated rescue operations in which they remove dummies, mannequins or personnel through representative openings and portals whose size, configuration and accessibility closely approximate those of the permit spaces from which rescues may be required.
 4. At least one member of each rescue team maintains current certification in basic first-aid and cardiopulmonary resuscitation (CPR) skills.

B. Outside Rescue Team

If a choice is made to use outside rescue services, the designated rescuers shall be made aware of the hazards they may confront when called on to perform rescues at the Pima County facility, so that the outside rescue team can equip, train and conduct itself appropriately.

X. HAZARDOUS AREAS DECLASSIFIED FROM PERMIT REQUIRED CONFINED SPACES

- A. Alternate procedures may be used if the following conditions exist:
1. It can be demonstrated that the only hazard posed by the permit space is an actual or potentially hazardous atmosphere.
 2. Forced air ventilation sufficiently makes the entry safe as demonstrated by inspections and previously collected monitoring data.
 3. If initial entry of the permit space is to obtain the data required, that entry must be made in accordance with requirements for permit required confined spaces.
 4. This determination and the supporting data must be made available to each employee entering this space.
 5. Entry to be performed in the following way:
 - a. Any conditions making it unsafe to remove an entrance cover shall be eliminated before the cover is removed.

- b. When the entrance cover is removed, the opening shall be promptly guarded by a railing, temporary cover, or other temporary barrier to prevent accidental falls and entrants from foreign objects entering the space.
- c. The atmosphere is monitored prior to entry for:
 - (1) Oxygen.
 - (2) Flammable gas or vapor.
 - (3) Toxic air contaminants.
- d. A hazardous atmosphere must not be present within the space when occupied by an employee.
- e. Continuous forced air ventilation shall be used as follows:
 - (1) Entry shall not be made until forced air ventilation has eliminated any hazardous atmosphere.
 - (2) Forced air ventilation shall be directed into the immediate areas where an employee is or will be continued until all employees have left the space.
 - (3) The air supply for the forced air ventilation is coming from a clean source and may not increase the hazards in the space.
 - (4) The atmosphere in the space shall be monitored to ensure the absence of atmospheric hazards.
 - (5) If a hazardous atmosphere is detected during an entry,
 - (a) The space shall be vacated immediately.
 - (b) An evaluation shall be made to determine how the hazardous atmosphere developed.
 - (c) The space shall be reclassified as a permit required and, it can be proven that the hazards have been, and will remain, eliminated.
 - (d) An attendant is present at the time of entry.

Attachment A

TRAFFIC SAFETY

Any confined space entry performed in traffic shall require the following traffic control measures:

1. Vehicle with amber warning beacon between traffic flow and manhole;
2. Reflective vests on all personnel;
3. Three (3) people at work site if traffic is very heavy;
4. When the work site is in a heavy traveled area, the police or sheriff can be called to assist with traffic control; advance notice shall be given to these agencies if the job is preplanned;
5. Set up warning signs and cones for traffic channelization;
6. The following criteria for work within a two-lane road shall be utilized. For other roadway conditions, traffic control shall be utilized. For other roadway conditions, traffic control shall be in accordance with the government agency having jurisdiction of the roadway and/or in compliance with the U.S. Department of Transportation manual on Uniform Traffic Control Devices:

WORK SITE IN MPH ZONE		INITIAL WARNING "MEN WORKING"		TAPERED DISTANCE OF CONES	
0 - 25 MPH		200 Feet		125 Feet	
26 - 35 MPH		300 Feet		250 Feet	
36 - 50 MPH		500 Feet		600 Feet	
Over 50 MPH		1000 Feet		660 Feet	

