

**Section Sixteen: *Confined Space Entry Program***

**CITY OF MOBERLY  
CONFINED SPACE ENTRY PROGRAM**

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## Section Sixteen: *Confined Space Entry Program*

### A. PURPOSE

The purpose of this program is to establish procedures to protect the City of Moberly's employees from the hazards of entry into confined spaces. Under this program, the City of Moberly shall:

1. Evaluate the workplace to identify and determine if confined spaces are permit-required or non-permit required confined spaces.
2. Inform exposed employees of the existence, location of, and dangers posed by the identified confined space.
3. Provide sufficient training to restrict unauthorized employees from entering confined spaces.
4. Implement a written permit-required confined space entry program for employees who are authorized to enter confined spaces.

Only designated employees of the City of Moberly who have received the proper training will be authorized to participate in permit-required confined spaces.

### B. DEFINITIONS

1. Confined space is a space that:
  - a. Is large enough and so configured that an employee can bodily enter and perform assigned work; and
  - b. Has limited or restricted means for entry or exit; and
  - c. Is not designed for continuous employee occupancy.
2. Nonpermit-required confined space is 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.
3. Permit-required confined space is a confined space that has one or more of the following characteristics:
  - a. Contains or has the potential to contain a hazardous atmosphere;
  - b. Contains a material that has the potential for engulfing an entrant;
  - c. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by floor which slopes downward and tapers to a smaller cross section; or
  - d. Contains any other recognized serious safety or health hazard (falling, noise, electrical, mechanical, hydraulic, etc.).
4. Entry Supervisor is responsible for determining, designating, authorizing, and overseeing a permit-required confined space entry.
5. Attendant closely monitors and assists the authorized entrants from outside the permit-required confined space.

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6. Authorized Entrant is that which enters and works in the permit-required confined space.
7. Engulfment means 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.

### **C. PROGRAM OBJECTIVES**

The City of Moberly shall:

1. Implement measure necessary to prevent unauthorized entry into permit-required confined spaces.
2. Identify and evaluate the hazards of permit-required confined spaces before employees enter them.
3. Develop and implement the means, procedure, and practices necessary for safe confined space operations.
4. Provide all necessary equipment, at no cost to employees, for safe entry into and rescue from permit-required confined spaces; maintain this equipment properly and insure that employees use this equipment properly.
5. Evaluate permit-required confined space conditions when entry operations are conducted.
6. Provide at least one attendant outside the confined space into which entry is authorized for the duration of the permit-required confined space operations.
7. Designate the persons responsible for active roles in permit-required confined space operations (authorized entrants, attendants, and entry supervisors); identify the duties of each designated person; and, provide the training for each designated person.
8. Develop and implement procedures for summoning rescue and emergency services, and for preventing unauthorized personnel from attempting rescue from a permit-required confined space.
9. Develop and implement a system for the preparation, issuance, use, and cancellation of confined space entry permits.
10. Develop and implement procedures necessary for concluding all entries, including closing off a permit-required confined space and canceling the entry permit.
11. Review entry operations when there is reason to believe that the measures taken under the confined space entry program may not protect employees; and revise the program to correct deficiencies found during the review before subsequent entries are permitted.

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12. Review the confined space program, using the cancelled permits, within one year after each entry; and revise the program as necessary to insure employees are protected from confined space hazards.

### **D. CONFINED SPACE TRAINING**

The City of Moberly shall provide training so that all utility employees whose work is regulated by this Program acquire the understanding, knowledge, and skills necessary for the safe performance of their duties before they are assigned these duties.

The training shall establish employee proficiency in the duties required by this Program, including:

1. Confined Space Hazards.
2. Safe Entry/Rescue Techniques, Equipment & Practices.
3. Ventilation Equipment & Procedures.
4. Confined Space Entry Permit Requirements.
5. Hot Work Permit Requirements.

New or revised procedures shall be introduced, as necessary, into training for compliance with this Program.

Additional, ongoing training shall be provided (at least annually) to assure continued proficiency in the safe performance of employees' duties.

Training shall be conducted in cooperation with the Fire Department, Ambulance District, or other rescue agencies during mock drills.

The City of Moberly shall maintain a record of all safety training. A record of successful training shall include the employee's name, trainer's name, course descriptions, and dates of training.

### **E. CONFINED SPACE HAZARDS**

#### **1. ATMOSPHERIC HAZARDS**

Atmospheric hazards are some of the most dangerous, yet frequently unnoticeable hazards found in a confined space. A hazardous atmosphere is an atmosphere which exposes employees to a risk of death, incapacitation, injury, or acute illness from one or more of the following causes:

- a. An atmospheric oxygen concentration below 19.5% (oxygen deficiency), or above 23.5% (oxygen enrichment).
- b. A flammable gas or vapor in excess of 10% of its lower explosive limit (LEL).

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- c. An atmospheric concentration of any toxic contaminant above the OSHA permissible exposure limit (PEL).
- d. An airborne combustible dust at a concentration that obscures vision at a distance of five feet or less.
- e. Any immediately dangerous atmosphere 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 could impair escape.

### **2. BIOLOGICAL HAZARDS**

Bacteria and infectious materials exist in many confined spaces.

### **3. PHYSICAL HAZARDS**

- 1. Engulfment.
- 2. Falling.
- 3. Tripping.
- 4. Poor Visibility.
- 5. Flooding.
- 6. Steam.
- 7. Noise.
- 8. Insects / Rodents / Animals / Snakes.
- 9. Traffic.

### **4. TEMPERATURE EXTREMES**

#### **a. Hot Environments:**

- (1) Heat stress.
- (2) Heat exhaustion.
- (3) Heat cramps.
- (4) Heat rashes.

#### **b. Cold Environments**

- (1) Hypothermia.
- (2) Frostbite.
- (3) Trench foot.

### **5. ELECTRICAL & MECHANICAL HAZARDS**

Mandatory Precaution: Energy sources and mechanical equipment, which could be a hazard, shall be locked out or disconnected to protect against the release of energy or material into the permit-required confined space.

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### **F. SUPPLEMENTAL PROCEDURES FOR SEWER SYSTEM ENTRY**

1. Sewer system entry differs from other permit-required confined space entries in that:
  - a. There rarely exists any way to completely isolate the space.
  - b. Because isolation is not complete, the atmosphere may suddenly and unpredictably become lethal or hazardous (toxic, flammable or explosive, or oxygen deficient) from causes beyond the control of the entrant or the City.
2. In sewer work, permit-required confined space entry procedures shall be followed exactly as required.
3. Atmospheric monitoring requirements shall be strictly adhered to.
  - a. Atmospheric monitoring equipment which monitors at least three parameters (oxygen, toxic gases, and flammable gases) with an audible alarm as well as visual readout shall be used.
  - b. The atmospheric monitoring equipment shall be carried by the entrant while in the confined space. When more than one entrant is working together in the same immediate location, one instrument used by the lead entrant is acceptable.
4. A minimum of two attendants shall be required for entry when:
  - a. Permit-required confined space is over 20 feet in depth; or
  - b. Space where the entrant is required to have a self-contained breathing apparatus; or
  - c. Permit-required confined space is in a remote area (away from truck) or the use of additional equipment is being used (sewer jet, jackhammer, compressor, etc.) that would otherwise cause the attendant to temporarily leave the immediate confined space area.
5. The following situations shall **require** a method of fall protection, such as a mechanical lifting device with lifeline attached to entrant's body harness.
  - a. Vertical entry into any space over 12 feet deep.
  - b. Entry into any sanitary sewer space with an outlet pipe diameter of 18 inches or larger.
  - c. The entry supervisor so directs or the attendant or entrant so requests.
6. When testing demonstrates the existence of dangerous or deficient conditions and ventilation cannot reduce concentrations to safe levels, or when the atmosphere tests as safe, but unsafe conditions can reasonably be expected to develop:
  - a. All personnel must be trained in the use of self-contained breathing apparatus (SCBA);
  - b. A SCBA shall be carried and used when needed by any person entering the space;
  - c. The SCBA must have an adequate air supply to allow for the entrant to escape from the space (10-minute minimum).

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7. All sanitary sewer permit-required confined spaces which are not completely isolated, and contain, or have the potential to contain, a hazardous atmosphere shall be ventilated for a minimum of five minutes prior to entry and continuously during entry and occupation. If this is not feasible because of the size of the configuration of the space, a SCBA shall be carried and used when needed by the entrant.
8. Smoking shall be prohibited within 10 feet of an open sewer system permit-required confined space.

### **G. ACCEPTABLE ENTRY CONDITIONS**

Certain conditions must be known to exist in a confined space to ensure that employees can safely enter and work within a space.

#### **1. ATMOSPHERIC TESTING**

Atmospheric testing shall be performed to determine if acceptable conditions exist before entry is authorized to begin.

If the space is isolated to prevent any unexpected atmospheric changes from occurring, the atmosphere in the space shall then be tested as necessary (after the initial pre-entry testing) to determine if acceptable conditions are being maintained during occupancy.

If isolation of the space is not feasible because the space is large or is part of a continuous system (such as a sewer), atmospheric conditions shall be **continuously** monitored in the areas where entrants are working.

**Atmospheric tests should always be performed in the following order:**

- a. Oxygen
- b. Flammables & Combustibles
- c. Toxic Gases

**Note:** Air should be tested at different levels within the confined space because contaminants have different vapor densities. (Methane is lighter than air and Hydrogen Sulfide is heavier than air and Carbon Monoxides density is approximately the same as air.)

#### **2. VENTILATION**

When required, forced air ventilation shall be used to provide a positive **fresh air supply** to the confined space to eliminate or control the atmospheric hazards.

The air supply for the blower shall be from a **clean source**. The best position for the blower is a minimum of 5 feet from the opening of the confined space.

Ventilation equipment that is used shall be **explosion proof**.

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### **H. ENTRY PERMIT REQUIREMENTS**

The Entry Permit authorized by the City of Moberly shall identify:

1. The identity, name, and/or location of the permit space to be entered.
2. The purpose of the entry.
3. The date and the authorized duration of the entry.
4. The authorized entrants' name.
5. The authorized attendants' name.
6. The authorizing entry supervisors name and signature.
7. The hazards of the permitted spaced to be entered.
8. The measures used to isolate the permitted space and to eliminate or control hazards before entry.
9. The acceptable entry conditions.
10. The results of initial and periodic atmospheric tests for oxygen, combustible gases, and toxic gases accompanied by the name or initials of the tester and the time the tests were performed.
11. The rescue and emergency services that can be summoned and the means for summoning those services.
12. The communication procedures used by the authorized entrants and attendants to maintain contact during entry.
13. The required equipment to be provided for compliance with the program. This may include the following items: barricades, ladders, testing and monitoring equipment, ventilators, communications equipment, lighting, personal protective equipment, body harness, lifeline, tripod, hoist, rescue and emergency equipment, etc.
14. Any other necessary information given the circumstances of the particular confined space in order to insure employee safety.

### **I. HOT WORK PERMIT REQUIREMENTS**

#### **1. HOT WORK DEFINITION**

Hot work is an activity capable of providing a source of ignition; including welding, cutting, burning, or heating.

#### **2. HOT WORK AUTHORIZATION**

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To perform any hot work in a permit-required confined space, a hot work permit must be completed.

Authorization to perform hot work must be noted on the hot work permit and attached to the confined space entry permit. The entry supervisor must sign the hot work permit before hot work begins but not until all actions and conditions required by the entry permit have been performed.

### **3. HOT WORK RESTRICTIONS**

Under no circumstances should hot work be permitted in a confined space if the atmospheric level of a combustible gas is more than 10% of LEL, or if the dust, mist, or fumes may present a potential explosive hazard.

### **4. HOT WORK EQUIPMENT PRECAUTIONS**

Gas cylinders or welding machines used for hot work operations shall be placed outside of the confined space where the work is being performed.

**Compressed gas cylinders should never be taken into a confined space.**

A fuel supply shut off valve and an oxygen supply shut off valve shall be accessible outside the confined space.

All welding leads, acetylene torches, etc. should be removed from the confined space and shut off or de-energized during lunch breaks or prolonged periods that the confined space is unattended.

## **J. DUTIES OF ENTRY SUPERVISORS**

Entry supervisors are responsible for determining if acceptable entry conditions are present for confined space entry. The entry supervisor designates entrants and attendants for each authorized entry. The entry supervisor authorizes entry by signing the confined space entry permit and corresponding hot work permit if applicable. The entry supervisor oversees the entry operation and terminates the entry as required by the Confined Space Entry Program.

Entry supervisors shall:

1. Know the hazards which may be present during confined space entry including the mode, signs or symptoms, and consequences of exposure;
2. Verify that all tests specified in the permit are conducted and that all procedures and equipment specified in the permit is available and in place before endorsing the permit and allowing entry to begin;
3. Determine the need and provide for any additional assistance required to safely enter and exit the confined space before authorizing entry;
4. Verify that rescue services are available and the means for summoning them are operable;

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5. Review and re-evaluate entry conditions at appropriate intervals and upon transfer of responsibility to determine that acceptable entry conditions are maintained;
6. Terminate entries and cancel permits when entry operations covered by the permit have been completed or a condition not under the permit arises in or near the permit space;
7. Prevent unauthorized individuals from entering or attempting to enter the permit-required confined space;
8. Reclassify and nonpermit-required confined space to a permit-required confined space if any change of condition justifies such reclassification.

### **K. DUTIES OF ATTENDANTS**

Attendants are to closely monitor and assist the authorized entrants from outside the permit-required confined space.

Attendants shall:

1. Maintain constant communication with the entrant;
2. Know the potential hazards of the permit space and the signs, symptoms, consequences, and behavioral effects of exposure;
3. Have access to a Public Utilities frequency radio or a cell phone that can be used to summon rescue or emergency assistance;
4. Monitor both inside and outside the space for situations or conditions requiring evacuation of the confined space or surrounding area;
5. Inform the entrant to leave the confined space if a spill, fire, or other incident should occur which may affect the attendant or those inside the confined space;
6. Summon the designated rescue team or emergency services in the event of an emergency without leaving the confined space area;
7. Operate non-entry rescue equipment such as tripod, winches, ventilator, etc.
8. Take appropriate action when unauthorized persons approach or attempt to enter the permit space.
9. Guard the confined space opening to prevent an accidental fall through the opening and protect entrants from objects falling into the confined space.
10. Restrict themselves to non-entry rescues and remain outside the confined space until relieved by another authorized attendant.

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### **L. DUTIES OF AUTHORIZED ENTRANTS**

Entrants are authorized by the City of Moberly to enter and work in permit-required confined spaces.

Authorized entrants shall:

1. Know the hazards that may be faced during entry, including the signs or symptoms and consequences of exposure;
2. Review the entry permit prior to entering the space to confirm that all pre-entry conditions have been performed and that the entry is authorized;
3. Properly use the equipment required by the permit for safe entry;
4. Maintain constant communication with the attendant as necessary to enable the attendant to monitor the entrant's status and enable the attendant to alert the entrant of the need to evacuate the space if required;
5. Alert the attendant of any warning sign or symptom of exposure to a dangerous situation or detection of dangerous gases;
6. Exit from the permit space as quickly as possible whenever an order to evacuate is given, the entrant recognizes a warning sign or symptoms of exposure, or the entrant detects a prohibited condition.

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### **APPENDIX A: PERMIT REQUIRED CONFINED SPACES**

Below is a list of possible permit-required confined spaces within the City of Moberly. The list is non-conclusive and should be used as a reference only.

**Note:** Permit-required confined spaces shall never be reclassified to nonpermit-required confined spaces by the entry crew.

#### **WASTEWATER TREATMENT DIVISION**

1. Wastewater Treatment Plant Lift Station Wetwell
2. Wastewater Treatment Plant Grit Chamber
3. Digester Decant Boxes
4. All Lift Station Wetwells
5. West CSO Lagoon Effluent Structure
6. Lift Station “A” Diversion Manhole
7. East CSO Lagoon Effluent Structure
8. Lift Station “D” Diversion Structure
9. Wastewater Manholes
10. Electrical Manholes
11. Sludge Truck Tank

#### **DISTRIBUTION & COLLECTION**

1. All Wastewater Manholes

#### **WATER TREATMENT**

1. Alum Storage Bin
2. Lime Storage Bin

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### **APPENDIX B: NONPERMIT REQUIRED CONFINED SPACES**

Below is a list of possible nonpermit-required confined spaces within the City of Moberly. This is non-conclusive and should be used as a reference only.

**Note:** Nonpermit-required confined spaces shall be reclassified to permit-required confined spaces by the entry crew if a change of characteristics or atmospheric conditions justify such a reclassification.

#### **WASTEWATER TREATMENT DIVISION**

1. Influent Channel
2. Inside SBR Basins
3. Valve Pits
4. All Below-Ground Drywells
5. Inside Grit Separator At Lift Station "E".

#### **DISTRIBUTION & COLLECTION**

1. Trenches Over 4 Feet Deep
2. Valve Pits

#### **WATER TREATMENT**

1. Chlorine Building
2. Inside Basins