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# CITY OF FIFE

## REQUIRED SAFE PROCEDURES FOR ENTRY INTO CONFINED SPACES

### 1. PURPOSE

To provide proper training and stimulate safety practices for City of Fife employees in maintenance operations, the establishment of effective, practical and safe sewer entry procedures into confined spaces are necessary. The procedures herein outlined are intended to reduce or eliminate fatalities and injuries in sewers, manholes, wet wells, vaults, and other confined spaces.

The following procedures are mandatory and are required practices to be utilized by City of Fife employees. Current safety standards require that *management shall be responsible for procedures, training, and planning for entry into confined spaces* which present a problem due to toxicity, flammability, oxygen deficiency or excess, mechanical, electrical, corrosive or temperature hazard and H<sub>2</sub>S.

The procedures outlined here meet the requirements of current safety standards. They are requirements which as adopted are intended to achieve the purpose stated above. *Management shall distribute and enforce this written procedure* which shall include *planning, general precautions, procedures, evaluation of hazards, ventilation requirements, personal protection, isolation, and leadmen* who are competent in the evaluation of hazards, precautions, *first aid* and *artificial respiration* shall be specifically assigned. Management shall instruct all involved employees in the safe procedures to be followed.

### 2. APPLICATION

This procedure shall apply to all persons working in sewers, manholes, wet wells, vaults, dry wells, and other confined spaces. City employees most likely to enter confined spaces are building, public works, engineering, and police personnel.

### 3. REFERENCES

- A. Washington State Occupation Health Standards WAC-296-62-145 through 296-62-14529.
- B. WAC-296-62-071 through 296-92-07121

### 4. POLICY

It is the policy of the City of Fife, to require all employees assigned to work in, around confined spaces to be adequately trained, and protected from the hazards that might be encountered. All employees and supervisors working in or near confined spaces shall rigidly follow the procedures set forth herein.

5. DEFINITIONS

A. WAC 296-62-14501

**Confined Space** A confined space means any space having a limited means of egress which is subject to the accumulation of toxic, flammable contaminants, oxygen-deficient atmosphere, and H<sub>2</sub>S. Confined spaces include but are not limited to storage tanks, process vessels, bins, boilers, ventilation, exhaust ducts, sewers, underground sewage pump stations, wet wells, underground utility vaults, tunnels, and pipelines. Open top spaces of more than four (4) feet in depth such as pits, tubes, vaults, and other deep openings are confined spaces within this definition.

B. WAC 296-62-14507

**Toxic Atmospheres** Are atmospheres having concentrations of airborne chemicals in excess of permissible exposure limits defined in Chapter WAC 296-62.

C. WAC 296-62-14511

**Oxygen Deficient Atmospheres** Are deemed to exist if the atmosphere at sea level has less than 18% oxygen by volume or has a partial pressure of 135 millimeters of mercury or less.

D. WAC 296-62-14509

**Flammable Atmospheres** Are atmospheres in excess of 20% of the lower explosive limit. (LEL)

E. WAC 296-62-14521

**Blower-Ventilation Equipment** Gasoline, diesel, electrical, propane or hand powered equipment used to ventilate confined spaces shall be able to deliver tempered air and not provide excessive air velocities. Blower ventilators shall conform to NFPA requirements and not create an ignition hazard.

F. **Contaminants** Any organic or inorganic substance, dust, fume, mist, vapor, gas, and whose presence in air may be harmful to human beings.

G. **Gases** Refers to gases most commonly found in manholes, sewers, wet wells, vaults. See Appendix "A" for tabulation of hazardous gases commonly found in sewers, sewage treatment, and disposal systems.

## 6. COMPLIANCE

- A. All employees and supervisors of personnel who enter confined spaces shall know the procedures thoroughly and ensure that these provisions are enforced.
- B. Every employee who enters a confined space shall ensure that all provisions of this procedure have been satisfied prior to entry.
- C. The supervisor is responsible for safe entry, shall be responsible for the issuance of all oxygen, gas detectors, and other sampling equipment. The entry permit shall be completed prior to testing or sampling in a **confined space**. The supervisor and employees shall know the proper procedure of operation of all sampling equipment. The person responsible for confined spaced safety as listed on the entry permit shall know the proper operation of all equipment to be used.
- D. **Equipment Malfunction** At no time should a confined space be entered, or employees remain if malfunction of any gas detector, sampling device or ventilation equipment or any other device required for safe entry shall write a discrepancy report and remove the equipment from service. A method of tagging or otherwise identifying faulty equipment shall be utilized. See Appendix "B". The person noting the malfunction shall tag or otherwise identify the equipment as deficient, personally deliver the equipment, and the discrepancy report to their supervisor. The report will identify the faulty equipment, nature of defect, date taken from service and person reporting the discrepancy. A copy of the report should be retained by the originator.
- E. The supervisor shall be responsible for stocking, controlling, maintaining the material, and equipment needed. They shall be responsible to ensure that sampling complies with the manufacture's instructions.

## 7. SAFETY ENTRY PROCEDURES

- A. The on site person that is in charge will be responsible for the safety of entry, shall evaluate plan, and implement the procedures necessary to safeguard the personnel assigned to the job. The pre-planning will ensure the availability of required safety equipment, its serviceability, and a thorough analysis of potential hazards from unplanned events or actions which could alter the plan. An entry permit shall be completed for each separate job each day. See Appendix "C" for confined spaces entry permit form.

### B. Safety Equipment

The following will be available for the purpose of this procedure:

1. Oxygen, gas detectors and other sampling devices as needed. (Exotox four gas detector) (Serial #0272597, 08907941)

2. Blowers and auxiliary equipment as designated for entering confined spaces. (Blower PES/240 two speed)
3. A full body harness and life line for the observer. NOTE: If the worker in the confined space is required to wear a full body harness, the observer shall also have a full body harness. An emergency 5 minute respirator (ELSA-5) is available to supply an adequate breathing air in the event that it may be needed. (Rose Serial #10327 Tripod with fall protection - retrieval #88645) (Rose full body harness) (Serial #501220)
4. All manholes over four (4) feet deep shall be entered via safely installed manhole steps or a separate ladder of appropriate length.
5. Ear protection from noise, protective clothing for heat, electrical or corrosive hazards, and *respirators shall be worn as needed.*
6. Appropriate traffic control signs--devices, guards to protect the manhole, and workers *shall be utilized.*
7. Tripod with fall and retrieval protection.

C. Entering Manholes, Vaults, Wet Wells, Sewers, and other confined spaces (other than new construction)

Before Entering:

1. Warning devices, guards, etc., should be installed to provide adequate protection to workers and public.
2. If possible initial testing of a manhole atmosphere should be done through holes in manhole cover.
  - a. If not possible, crack the manhole cover just enough to insert the testing device to get an accurate test. This should be done without scraping to avoid sparks. Never use an open flame to thaw ice around a cover.
  - b. If the initial test checks OK, remove the manhole cover and make additional test at various levels in the manhole. Test a potentially toxic atmosphere for flammability and oxygen content.
  - c. Even if all tests are within allowable limits, the manhole shall be purged with a power blower with a fresh supply of air for *at least ten (10) changes of air*, but never less than ten (10) minutes.

- d. Prior to entry, *test again!* If all tests are OK, the manhole may be entered. Upon initial entry, *take additional tests* with a gas detector. Test generally at all areas and levels of the manhole. The *atmosphere* shall be continuously tested while someone is in the manhole.

*Continuous power ventilation must be maintained at all times* whenever anyone is confined space. All work shall stop and the manhole evacuated if ventilation fails. Re-entry sampling shall be conducted after ventilation has been restored. Sampling should be conducted anytime a manhole is reopened or for crew changes.

- e. **If gases are found or an oxygen deficiency exists, the following procedure should be implemented.**

1. For *oxygen deficiency, ventilate for ten (10) air changes* and test again. Do not enter an atmosphere that tests below 18% O<sub>2</sub> by volume. If you cannot get a safe (18+%) reading, close the manhole and contact your supervisor. Ten (10) minutes shall be the minimum ventilation time.
2. *If gases are detected, purge the manhole until you can get a zero reading.* In such cases, additional reading should be taken at least every hour. At any time the concentrations excess 20% of the lower explosive limit (LEL, cease operations, and exit area. Continue to monitor and immediately advise the supervisor).

- D. *Blowers should be located so there are no unnecessary bends in the hose.* One 90° bend, reduce the blower capacity to 70% of rated capacity. Two 90° bends reduce capacity to 50% or one-half. When the output of the blower capacity is reduced to below 500 CFM, a larger or additional blower should be used. For continuous ventilation with people in a manhole, a blower of at least 1000 CFM shall be used. (Gas + oxygen tests shall be made continuously no matter how "clean" the confined space seems to be.)

*Blowers shall be located so they will not pick up exhaust gases* from vehicles, heaters, furnaces or the blower engine. They shall not ingest fuel vapors, e.g., gasoline, propane, etc. *The blowers should operate for one (1) minute, to flush out the hose,* prior to placing it in the manhole. Air should be tempered eliminating temperature extremes. *The blowers shall meet NFPA requirements* to prevent ignition hazard.

- E. Entry into a manhole, wet well, dry, and/or vault, or other confined space shall be made only when a *minimum of one (1) person is available outside* to handle a safety line and to provide assistance or emergency aid as necessary. *This person shall not leave the other unattended* and shall observe all operations while the person is below the rim of the vault.
- F. Safety harness shall be worn under the following circumstances:
  - 1. If the probability of a highly toxic, flammable atmosphere, oxygen deficiency exists can develop, workers shall wear a safety harness with lifeline attached, and a means of lifting to effect rescue shall be provided.
  - 2. A full body type harness shall be used which will facilitate the emergency removal from the space.
- 8. Respirator protection shall be required in cases of oxygen atmospheres of less than 18% or in presence of airborne contaminant concentration above the permissible exposure limit (PEL) as defined in Chapter WAC 296-62. All respirator programs shall comply with WAC 296-62-071. All respirators shall be selected based on the degree of protection required. An ongoing respirator safety program shall be implemented which will ensure proper equipment is available. *Proper training is provided for the circumstances in which they are to be used.* Training will be conducted by Pierce County Fire District #10 SCB, will be available at the site entrance.

No individual shall enter an oxygen deficient atmosphere, toxic atmosphere or flammable atmosphere without the knowledge, permission of their supervisor. The person responsible for the safety of the operation as indicated on the entry permit.

*All employees* working in manholes, wet wells, dry wells, vaults, sewers, and other confined spaces shall be provided with respirator, and rescue procedure training at least once a year. A log of training shall be kept.

- 9. Protective clothing, gloves shall be worn when entering a manhole, wet well, dry, and/or sewer. In spaces which do or could contain corrosive chemicals which are toxic through contact, special equipment to prevent skin or eye contact shall be worn.
- 10. All workers shall wear a hard hat.
- 11. All workers at a manhole entry *shall carry a current first-aid card* recognized by the Department of Labor and Industries.
- 12. LIGHTING

The Occupational Health Standards and National Electrical Code require special lighting, for work in manholes. The agency shall provide the *proper* equipment

and *no other equipment shall be used*. All portable lights and tools shall be "explosion proof" when working in flammable atmospheres. (See N.E.C.)

13. Supervisors shall ensure that workers in manholes are not exposed to chemical, physical and biological agents. They shall provide appropriate protective clothing as the situation requires.
14. *No matches, lighters or any other items capable of producing a spark or flame* (other than approved tools) are allowed in a manhole. Radios, flashlights, lanterns, lighted smoking materials shall not be used in or within ten (10) feet of an open manhole.
15. *Emergency Rescue All Employees* who work in or may be called upon to rescue people shall be trained on confined spaces entry procedures. If employees in an emergency situation can not determine if the confined space is safe to enter, they shall enter only with an approved respirator. Procedures for the use and training of the respirator shall be as outlined in the City of Fife Respirator Program.

### Confined Spaces Entry Permit

Job Description \_\_\_\_\_

Location \_\_\_\_\_

Employees Assigned \_\_\_\_\_

Person responsible for safe entry on site: \_\_\_\_\_

Date and Time of Issue \_\_\_\_\_ Date and Time of Expiration \_\_\_\_\_

**Have the following precautions been taken?**

- |   | Yes                      | No                       |
|---|--------------------------|--------------------------|
| Discussion of oxygen deficiency detection, elimination and entering procedures. | <input type="checkbox"/> | <input type="checkbox"/> |
| Discussion of probable gases to be encountered and eliminated                   | <input type="checkbox"/> | <input type="checkbox"/> |
| Discussion of need, use, and availability of respirators and serviceability.    | <input type="checkbox"/> | <input type="checkbox"/> |
| Discussion and review of testing equipment and calibration.                     | <input type="checkbox"/> | <input type="checkbox"/> |
| Discussion, use, testing of serviceability of rescue gear.                      | <input type="checkbox"/> | <input type="checkbox"/> |
| Discussion of noise problems, temperatures, weather conditions.                 | <input type="checkbox"/> | <input type="checkbox"/> |
| Burning (Hot Work) permits. Exhaust ventilation, fire fighting equipment        | <input type="checkbox"/> | <input type="checkbox"/> |

**SAMPLING EQUIPMENT TO BE USED:**

Type	Serial #	Date of Calibration	By Whom

**TESTS CONDUCTED: O<sub>2</sub> Deficiency - Flammability - Toxicity - H<sub>2</sub>S**

Time	Results	Time	Results

List safety equipment to be on the scene: \_\_\_\_\_

Person qualified as observer, to wear emergency equipment and coordinate a rescue: \_\_\_\_\_

Emergency equipment required to be available at work site: \_\_\_\_\_

**No one shall enter any confined space under any conditions until it has been properly tested for O<sub>2</sub> deficiency and toxic or flammable gases and appropriate procedures are followed.**

I certify I have evaluated the situation and assigned personnel and the procedures to be followed are in compliance with the confined space procedures.

\_\_\_\_\_  
Signature