

PERMIT-REQUIRED CONFINED SPACE PROGRAM

1.0 PURPOSE:

The purpose of this policy is to establish mandatory practices and procedures for entry and working in confined space areas. This policy will meet the requirements of 29 CFR 1910.146.

2.0 ORGANIZATIONS AFFECTED

This policy applies to all departments/divisions of the City of Wilson who are required to work around and in confined spaces.

3.0 DEFINITIONS

The following words and terms shall have the following meaning, unless the context clearly indicates otherwise.

- 3.1 **"ACCEPTABLE ENTRY CONDITIONS"** means those conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.
- 3.2 **"ATTENDANT"** means an individual with no other duties except assigned to remain immediately outside the entrance to the confined space and who may render assistance as needed to employees inside the space.
- 3.3 **"AUTHORIZED ENTRANT"** means an employee who is authorized by the employer to enter a permit space.
- 3.4 **"BLANKING or BLINDING"** means the absolute closure of a pipe, line or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) 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.
- 3.5 **"CONFINED SPACE"** means any space not intended for continuous employee occupancy, having a limited means of egress, and which is also large enough and so configured that an employee can bodily enter and perform assigned work.
- 3.6 **"ENGULFMENT"** means the surrounding and effective capture of a person by finely divided (flammable) 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.
- 3.7 **"ENTRANT"** means any employee who enters a confined space.
- 3.8 **"ENTRY"** means the action by which *any part of a person* passing through an opening into a permit required confined space. Entry includes subsequent work

activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

- 3.9 **"ENTRY PERMIT"** means a written or printed document that is provided by the employer to allow and control entry into a permit space.
- 3.10 **"ENTRY SUPERVISOR"** means the person (such as the superintendent, 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 policy.

NOTE: an entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by this policy for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

- 3.11 **"GROUND-FAULT CIRCUIT INTERRUPTER"** means a device whose function is to interrupt the electric circuit to the load when a fault current to ground exceeds a predetermined value that is less than that required to operate the overcurrent protective device of the supply current.
- 3.12 **"HAZARDOUS ATMOSPHERE"** means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury or acute illness from one or more of the following causes:

- 3.12.1 a flammable gas, vapor, or mist in excess of 10% of its lower flammable limit (LFL);

- 3.12.2 airborne combustible dust at a concentration that meets or exceeds its LFL;

Note: This concentration may be approximated as a condition in which the dust obscures vision at a distance of five feet (1.52m) or less.

- 3.12.3 an oxygen deficient atmosphere containing less than 19.5% oxygen by volume or an oxygen enriched atmosphere containing more than 23.5% oxygen by volume;

- 3.12.4 an atmosphere concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, *Occupational Health and Environmental Control*, or in Subpart Z, *Toxic and Hazardous Substances*, of this part and which could result in employee exposure in excess of its dose or permissible exposure limit;

Note: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.

- 3.12.5 any other atmospheric condition that is immediately dangerous to life or health.

- 3.13 **"HOT WORK PERMIT"** means the employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.
- 3.14 **"IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH)"** means any condition that poses an immediate or delayed threat to life, or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.
- 3.15 **"IMMEDIATE SEVERE HEALTH EFFECTS"** means that an acute clinical sign of serious, exposure reaction is manifested within 72 hours of exposure.
- 3.16 **"ISOLATION"** means the process by which a permit space is removed from service and completely protected against the release of energy and materials 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; or blocking or disconnecting all mechanical linkages.
- 3.17 **"LOCKOUT OR TAGGING"** means placing locks or tags on the energy isolating device in accordance with this standard. Tags shall indicate that the energy isolating device shall not be operated until the removal of the tag or lock.
- 3.18 **"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.
- 3.19 **"OXYGEN DEFICIENT ATMOSPHERE"** means an atmosphere containing less than 19.5 percent oxygen by volume.
- 3.20 **"OXYGEN ENRICHED ATMOSPHERE"** means an atmosphere containing more than 23.5% percent oxygen by volume.
- 3.21 **"QUALIFIED PERSON"** means a person who is trained to recognize the hazard(s) of the confined space and how to evaluate those anticipated hazards and shall be capable of specifying necessary control measures to assure worker safety. The employer may designate an employee as employer representative for the purpose of assuring safe confined space entry procedures and practices at a specific site. The qualified person may also be the entrant.
- 3.22 **"PERMIT-REQUIRED CONFINED SPACE (permit space)"** means a confined space that has one or more of the following characteristics:
- 3.22.1 Contains or has a potential to contain a hazardous atmosphere;
- 3.22.2 Contains a material that has the potential for engulfing an entrant;
- 3.22.3 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
- 3.22.4 Contains any other recognized serious safety or health hazard.

- 3.23 **"PROHIBITED CONDITION"** means any condition in a permit space that is not allowed by the permit during the period when entry is authorized.
- 3.24 **"RESCUE TEAM"** means those persons whom the employer has designated prior to any confined space entry to perform rescues from confined spaces. A rescue team may consist of outside emergence personnel, provided the training requirements of this standard have been met. (i.e. City of Wilson Fire).
- 3.25 **"RETRIEVAL SYSTEM"** means the 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 persons from permit spaces. A line or rope will be secured at one end to a worker's chest or body harness, or wristlets and the other end secured to 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.
- 3.26 **"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, lever, or button, will not produce a movement which could cause injury.

4.0 **GENERAL INFORMATION**

4.1 **Confined Space Defined**

4.1.1 As defined by North Carolina Occupational Safety and Health Standard 1910.146, a confined space is:

4.1.1.1 large enough and so configured that an employee can bodily enter and perform assigned work, and,

4.1.1.2 having limited means of entry and egress, and,

4.1.1.3 is not designed for continuous employee occupancy.

4.1.2 Confined spaces generally include by are not limited to the following:

Storage tanks	Boilers	Sewers
Digesters	Wet wells	Dry Wells
Manholes	Open Top Pits	Underground Vaults
Tunnels	Lagoons	Ventilation or Exhaust Ducts

Vats and Vessels that are more than four feet in depth and meet the above criteria.

4.1.3 Confined spaces located throughout the Wilson City and County area are identified into two categories; Permit Required Confined Spaces and Non-permit Required Confined Spaces.

4.2 **Permit Required Confined Spaces:**

Are confined spaces that:

- 4.2.1 contain or have the potential to contain a hazardous atmosphere;
- 4.2.2 contains a material that has the potential for the engulfment of an entrant;
- 4.2.3 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
- 4.2.4 contains any other recognized serious safety or health hazard.

4.3 **Non-permit Required Confined Spaces:**

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

5.0 **POLICY FOR SPECIFIC LOCATIONS AND HAZARDS**

- 5.1 **All** manholes, electrical and meter vaults deeper than four feet are considered confined spaces.
- 5.2 **All** Permit-Required Confined Space entries will be Attendant Required and must have an attendant present.
- 5.3 Fall restraint devices and/or lifelines & body harnesses will be used when entering all Permit-required Confined Spaces.
- 5.4 **All** water storage tanks are considered Confined Spaces.
- 5.5 Continuous gas monitoring will be performed at all times while working in all Confined Spaces. (This includes non-permit required Confined Spaces).
- 5.6 For wet wells, dry wells, and vaults having ventilation fans; fans must run at least 10 minutes *after* air sampling has been performed and *prior* to entry.

6.0 **ENTRY REQUIREMENTS**

- 6.1 **Entry** is considered as any action resulting in *any part of the employee* breaking the plane of any opening of the confined space and includes any resulting work activities performed inside the confined space. Generally, there are two types of entry into a confined space, attendant and non-attendant.
- 6.2 Due to the seriousness of unknown hazards, City employees will not be allowed to make entry into a confined space under the following conditions:

- 6.2.1 Immediately Dangerous to Life and Health (IDLH) atmosphere,
- 6.2.2 Hazardous atmosphere, or
- 6.2.3 Potential for engulfment.
- 6.2.4 Additionally, entry into a posted permit-required confined space will not be allowed without securing an Entry Permit signed by a qualified person.

6.3 **Attendant Entry**

6.3.1 Attendant entry is an entry that requires an attendant present at all times when an entrant is inside a confined space. Attendant entry will be allowed when the following conditions are met:

6.3.1.1 The Entrant secures an Entry Permit from a qualified person;

6.3.1.2 Continuous monitoring is performed with a device equipped with an alarm capable of evaluating oxygen, combustible gas, and toxic gas concentrations;

6.3.1.3 Provide general continuous ventilation with a mechanical blower before entry when a toxic atmosphere is indicated, and during entry to maintain minimum acceptable atmospheric conditions; and

6.3.1.4 The Entrant wears a harness fall restraint system secured by a tripod or other approved method (i.e., lifeline).

6.4 **Non-Attendant Entry**

Will be allowed for any entry into non-permit required confined spaces by City of Wilson employees. Employees should seek assistance from other workers to provide attendant services, even when not required by this policy, when working in remote locations throughout the Wilson City and County.

7.0 **RESPONSIBILITIES AND DUTIES**

Qualified individuals in Confined Space Entry will perform one of three roles:

Authorized Entrant

Attendant

Entry Supervisors

7.1 **Authorized Entrant will:**

7.1.1 Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.

- 7.1.2 Properly use appropriate personal protective equipment (e.g., face and eye protection, and other forms of barrier protection such as gloves, aprons, and coveralls);
- 7.1.3 Maintain communication with the attendant as necessary to enable the attendant to alert entrants of the need to evacuate the spaces if a dangerous condition arises.
- 7.1.4 The entrant shall alert the attendant whenever a warning sign or symptom of exposure to a dangerous situation or detects a prohibited condition.
- 7.1.5 The entrant will exit from the space whenever:
 - 7.1.5.1 an order to evacuate is given by the attendant or the entry supervisor,
 - 7.1.5.2 the entrant recognizes any warning sign or symptom of exposure to a dangerous situation,
 - 7.1.5.3 the entrant detects a prohibited condition, or
 - 7.1.5.4 an evacuation alarm is activated.

7.2 **Attendant** will:

- 7.2.1 Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure,
- 7.2.2 Be stationed immediately outside every confined space during entry operations unless relieved by another attendant,
- 7.2.3 Be within sight or call of the entrant at all times and have the means available to summon assistance (i.e. Walkie-talkie, telephone).
- 7.2.4 Maintain an accurate count of employees working within the space,
- 7.2.5 Not go into any posted confined space to aid the entrant or perform any rescue. The practice of handing down tools, equipment, and/or supplies will be avoided when possible. Should attendant need items, the attendant will exit the space and retrieve those items.

NOTICE

If visual or verbal communication is lost with the entrant because of engulfment, asphyxiation, or an accident, the attendant will radio, call, or seek rescue at once by calling 911 for the City of Wilson Fire and Rescue or have a fellow employee call. **THE ATTENDANT WILL NOT ENTER THE CONFINED SPACE AT ANY TIME FOR ANY RESCUE!**

- 7.2.6 Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions:

- 7.2.6.1 if the attendant detects a prohibited condition;
- 7.2.6.2 if the attendant detects the behavioral effects of hazard exposure in an authorized entrant;
- 7.2.6.3 if the attendant detects a situation outside the space that could endanger the authorized entrants; or
- 7.2.6.4 if the attendant cannot effectively and safely perform all the duties required in this section.
- 7.2.7 Take the following actions when unauthorized persons approach or enter a permit space while entry is underway:
 - 7.2.7.1 warn the unauthorized persons that they must stay away from the permit space;
 - 7.2.7.2 advise the unauthorized persons that they must exit immediately if they have entered the permit space; and
 - 7.2.7.3 inform the authorized entrants and the entry supervisor if unauthorized person have entered the permit space.

7.3 **Entry Supervisor** will:

- 7.3.1 Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- 7.3.2 Verify, by checking that the appropriate entries have been made on the Confined Space permit, that all tests specified by the permit have been conducted and that all procedures and equipment are in place before endorsing the permit and allowing entry to begin;
- 7.3.3 Terminate the entry and cancel the permit as required;
- 7.3.4 Verify that rescue services are available on entries found in remote locations or as required by potential or existing hazards;
- 7.3.5 Remove unauthorized individuals who enter or who attempt to enter to permit space during entry operations; and
- 7.3.6 Determine that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.
- 7.3.7 A list of qualified personnel will be kept in each section/division head's office and updated accordingly.

8.0 **INSTRUMENTATION**

- 8.1 Atmospheric testing instruments accepted for use by the City under this standard will have the following features as a minimum:

- 8.1.1 Capable of monitoring oxygen, combustible and toxic gas concentrations;
- 8.1.2 Capable of remote sampling by either hand aspirator, mechanical pump, or electronic cable;
- 8.1.3 Capable of self diagnosis;
- 8.1.4 Numerical digital display;
- 8.1.5 Alkaline or rechargeable Nicad power supply;
- 8.1.6 User replaceable sensors;
- 8.1.7 User calibrated; and
- 8.1.8 Have alarm points set at:

19.5% - 23.0% Oxygen
10% LFL for Combustible
10 PPM for H₂S
10 PPM for CO (if appl.)

9.0 ENTRY PROCEDURES

NOTE: These procedures apply to both Permit and Non-permit required Confined Spaces. However, Confined Space Permits and special equipment (i.e. tripods, lifelines) are not required for Non-Permit Required Confined Spaces.

Entry into a posted confined space shall not be made unless the qualified person has assured that the following procedures have first been completed:

- 9.1 Any conditions making it unsafe to remove an entrance cover shall be eliminated before the cover is removed.
- 9.2 When entrance covers are moved, the opening shall be guarded by a railing, temporary cover, or other barrier that will prevent an accidental fall through the opening and that will protect each employee working in the space from foreign objects entering the space.
- 9.3 **Before** an employee enters the space, the internal atmosphere shall be tested, with a calibrated direct-reading instrument, for the following conditions in the order given:

**Between 19.5% - 23.0% Oxygen
Less than 10% LFL for Combustible
Less than 10 PPM for H₂S
Less than 10 PPM for CO (if appl.)**

- 9.4 If atmosphere inside a confined space fails to meet any of the three above criteria, space will be ventilated either through the act of opening doors or using continuous forced air ventilation.

NOTICE

No employee will enter a permitted space until the Oxygen, Combustibles, and Toxic gas readings are below or within required settings (see above caption).

NOTICE

Self-contained Breathing Apparatus will not be worn while working within any posted confined space at any time for any reason; to include atmosphere testing.

- 9.5 Atmosphere within the confined space will be tested **hourly** and results noted on the Confined Space Permit. If an entrant exits the confined space for more than **15 minutes**, the confined space will be **re-tested prior to re-entry**.
- 9.6 Continuous gas monitoring will be performed at all times.
- 9.7 If a hazardous atmosphere is detected or a dangerous situation develops:
- 9.7.1 Each entrant shall leave the space immediately;
 - 9.7.2 The space shall be evaluated to determine how the hazardous atmosphere developed; and
 - 9.7.3 Measures shall be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place.

NOTICE

If the atmosphere inside a Non-Permit required confined space exceeds any of the three criteria, and/or another potential physical hazard develops (i.e. engulfment), the space will immediately become a Permit-Required confined space and the above procedures in step 7 will apply. Additionally, authorized employees **MUST obtain a Confined Space Permit and attendant before work continues.**

- 9.8 Certification that a confined space is safe for entry will be done using a Confined Space entry permit. These permits will be filled out by the entry supervisor, shift supervisor, or immediate supervisor with no less than:

- 9.8.1 Date of the entry and monitoring,
- 9.8.2 Location of the confined space,
- 9.8.3 the Signature of the person providing the certification, and
- 9.8.4 reason for entry.
- 9.8.5 Also, the signed permit will be posted by the confined space while work is being performed (if attachment is possible) and maintained until the entry has been completed.
- 9.8.6 Permits will be maintained at each of the section/division head's office and a copy forwarded to the Safety & Health office upon completion of the work. Permits will be kept on file for one (1) year.
- 9.9 All safety equipment, special tools (to include harnesses, tripods, and lifelines) are to be present prior to beginning work.
- 9.10 For any form of cutting, welding or burning while inside the permit-required confined space, in addition to a confined space entry permit a "Hot Work" permit must also be obtained prior to work being performed.

10.0 **RESCUE TEAMS**

Rescue teams will not be authorized for City of Wilson as City employees will not be allowed entry into any confined space under the following conditions: (IDLH) atmosphere, hazardous atmosphere, or a potential for engulfment. However, qualified persons will be trained in basic first aid techniques. **City of Wilson Fire and Rescue will be called at 911 or by City 800 mhz radio for rescue.**

11.0 **HOT WORK PERMITS (WELDING & CUTTING)**

The "WELDING AND CUTTING PROGRAM" of the City of Wilson Safety Manual regulates ALL welding and cutting being performed in posted Confined Spaces. Employees performing any kind of hot work must first comply with the safety procedures in this policy and then secure a "Hot Work Permit" for any welding or cutting in Confined Spaces.

12.0 **TRAINING**

- 12.1 Training will be provided to employees required to enter into confined spaces and to those persons identified as qualified persons. The following areas will be included in the instruction:
 - 12.1.1 OSHA Confined Space Standard

- 12.1.2 Hazard Recognition
 - Purging
 - Ventilation Techniques
 - Isolation Procedures (LOTO)
- 12.1.3 Use of Atmospheric Testing Equipment
 - Test Procedures
 - Flammable Gases and Vapors
 - Toxic Gases and Vapors
- 12.1.4 First Aid Procedures
- 12.1.5 Safe Work Practices
 - Performing Hot Work
 - Controlling ignition Sources
 - Personal Protective Equipment
- 12.1.6 Use of Fall Arrest Systems
 - Demonstration and Performance Evaluation(actual hands-on)
- 12.2 Training for employees will occur:
 - 12.2.1 Initially, before new employees are assigned work in confined spaces throughout the City,
 - 12.2.2 Before there is a change in assigned duties,
 - 12.2.3 Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained,
 - 12.2.4 Whenever the employer has reason to believe either that there are deviations from the permit space entry procedures or that there are inadequacies in the employee's knowledge of use of these procedures.
 - 12.2.5 Recurring training will be performed annually.