

# **CONTRA COSTA WATER DISTRICT**

## **CONFINED SPACE ENTRY PROGRAM**

September 2010

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## 1.0 INTRODUCTION

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### 1.1 Purpose

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To establish the minimum standards necessary to ensure that all entries into confined spaces at Contra Costa Water District (District) facilities are performed utilizing safe work practices. It is understood that site-specific confined space procedures may be written which contain requirements which exceed or supplement those found in this document.

### 1.2 Scope

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This program applies to all District personnel and anyone who enters confined spaces at District owned or leased facilities.

This program complies with California Code of Regulations (CCR), Title 8; GISO sections 5156 through 5158 “Confined Spaces”

### 1.3 General Requirements

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All District facilities shall be evaluated to determine whether any spaces are classified as confined spaces.

All identified confined spaces must be further evaluated to determine if they are permit-required confined spaces.

All confined spaces on District property must be labeled.

Permit-required confined spaces shall be labeled by the posting of Danger signs, or other equally effective means. (Note: A sign reading “Danger Permit-Required Confined Space, Do Not Enter”, or using other similar language would satisfy the requirement for a sign).

Any District employee who enters, or performs work in, a confined space, or performs attendant or entry supervisor duties shall receive training in confined space entry procedures prior to starting those tasks.

## 1.4 Confined Space Classifications

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A “Confined Space” is defined as a space that meets the following three conditions:

- large enough for an individual to enter and perform assigned work; and
- limited or restricted means of entry or exit; and
- not designated for continuous human occupancy

Entry into a confined space occurs when *any* part of a person’s body passes through an opening into a confined space.

Some examples of confined spaces are:

Piping	Reservoirs	Open Pits (deeper than 4’)	Canal (deeper than 4’)
Tunnels	Vaults deeper than 4’	Pressure Vessels	Canal Under-crossings
Manholes	Crawl Spaces	Tanks	Culverts/Siphons

Confined spaces are classified into two categories: permit-required confined spaces, and non-permit confined spaces.

- **Permit-Required Confined Space**- A permit required confined space has one or more of the following characteristics:
  - contains or has the potential to contain a hazardous atmosphere
  - contains a material with the potential to engulf an entrant
  - has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or a floor that slopes downward and tapers to a smaller cross section
  - contains any other recognized serious safety or health hazard
- **Non-Permit Confined Space** – Confined spaces that do not contain any of the above listed hazards at the time of entry may be treated as non-permit confined spaces. Non-permit confined spaces must be upgraded to permit-required confined spaces upon the introduction of any serious safety or health hazard.

*Note: Non-permit confined spaces must be reclassified as permit-required confined space if the work performed introduces a serious hazard. For example, toxic vapors or gases exceeding permissible limits, explosion/fire hazards, engulfment/drowning hazards, or exposed electrical equipment will turn a non-permit confined space into a permit-required confined space.*

(See Appendix D for determination on classification.)

## 2.0 HAZARD IDENTIFICATION

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### 2.1 Confined Space Evaluation Forms and Pre-Entry Hazard Assessment Checklists

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Prior to entering a confined space, a Pre-Entry Hazard Assessment Checklist (Appendix F) shall be reviewed and completed. If there are any hazards listed on the form, which are not eliminated prior to entry, the space is considered a permit required confined space, and a confined space entry permit must be used.

The completed Pre-Entry Hazard Assessment Checklist shall be available at the jobsite, and a copy shall be sent to the Safety Officer.

### 2.2 Hazardous Atmospheric Conditions

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The fundamental rule for any one planning to enter a confined space is “never trust your senses.” What may look like a harmless situation may become a potential threat, and what may smell strange at first can impair the sense of smell and lull you into a false sense of safety. In fact, some of the deadliest gases and vapors have no odor at all.

Oxygen-deficient atmospheres, or those that contain combustible or toxic gases, vapors, or fumes, constitute serious hazards in confined spaces. Normal air contains approximately 20.9% oxygen. An atmosphere is defined as oxygen deficient if it contains less than 19.5% oxygen, and oxygen rich if it contains more than 23.5% oxygen.

If an ignition source is present in, or is introduced into, an environment that contains flammable gases, solvents, or dust, fire or explosion may result. Serious injury or death may result when the atmosphere contains even low concentrations of toxic gases (e.g., ammonia, hydrogen sulfide, chlorine, ozone, or carbon monoxide). Everyday operations (e.g., welding, painting, and use of solvent or inert gases) that are normally safe can quickly become hazardous when performed in small, poorly ventilated areas. This can change a non-permit confined space into a permit-required confined space.

The following criteria define a hazardous atmosphere:

- Flammable gas, vapor, or mist greater than 10% of the lower explosive limit (LEL)
- Airborne combustible dust at a concentration that meets or exceeds its LEL
- Oxygen concentration less than 19.5% or greater than 23.5%
- Carbon monoxide concentration greater than 25 parts per million (ppm)
- Hydrogen sulfide concentration greater than 10 ppm
- Ammonia concentration greater than 25 ppm
- Chlorine concentration greater than 0.5 ppm
- Ozone concentration greater than 0.1 ppm
- Any airborne contaminant to which a worker may be exposed above an acceptable dose or the permissible exposure limit (PEL)

*Note: An oxygen level below ambient, or an LEL greater than zero (even if below 10%) could indicate the presence of an unknown potential atmospheric hazard.*

## 3.0 ENTRY INTO CONFINED SPACES

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### 3.1 Confined Spaces (All)

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The following requirements apply to all CCWD confined space entries (permit-required confined spaces and non-permit required confined spaces).

- Unauthorized access is prohibited. Barricades will be placed to exclude the public and unauthorized employees. If necessary, the space should be protected to prevent accidental falls through the opening and/or barricaded from vehicular traffic and objects falling into the space.
- Electrical equipment (e.g., ground fault circuit interrupters [GFCI] on power hand tools and other electrical equipment) must be properly grounded and listed by Underwriters Laboratories. All other energy sources (e.g., pneumatic, mechanical, hydraulic, and potential energies) must be isolated by use of lock and tag procedures.
- Adequate lighting must be present to perform the job safely.
- Entrants shall survey the surrounding area to detect and eliminate hazards such as drifting gases/vapors from combustion engines, piping or sewers. Entrants shall also consult available CCWD Confined Space Evaluation forms on the District server under “\Safety\Confined Spaces\” for information on potential hazards.
- For confined spaces other than excavations and “shallow” open-top pit structures where width and/or length dimensions are greater than the depth, the atmosphere is tested with a direct-read monitor (oxygen content, LEL, potential toxic contaminants such as carbon monoxide [CO], hydrogen sulfide [H<sub>2</sub>S], ozone, chlorine, ammonia) immediately prior to each entry, and periodically thereafter. This data must be documented on a Pre-Entry Hazard Assessment Checklist (Appendix F).
- If proposed activities shall introduce hazards into the space or if any other hazard is noted, it shall be documented on the Pre-Entry Hazard Assessment Checklist and reviewed by an entry supervisor. Permit-required confined space entry procedures are used for spaces with serious hazards.
- No employee shall enter a confined space unless they have received the District’s confined space entry training.

### 3.2 Permit-Required Confined Spaces

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In addition to the requirements for non-permit confined spaces, the following minimum requirements also apply to all CCWD permit-required confined space entries:

- A written entry permit
- Tests of the atmosphere before and during entry into the confined space (continuous atmospheric monitoring).
- Purging and ventilating the space if an atmospheric hazard is present.
- Two-way communication between entrants and attendants

- Personal protective equipment deemed necessary by the entry supervisor and/or Safety Officer
- Hazardous energy sources must be isolated.
- Ignition sources must be controlled.
- An attendant must be stationed outside the space during entry operations.
- Provisions for rescue

***If unexpected hazards arise, all employees within a confined space must immediately exit the space. The entry supervisor must then notify the Safety Officer to determine the problems and to reevaluate the space before re-entry.***

### 3.2.1 Alternate Entries into Permit Spaces

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If the only hazard in a permit-required confined space is an actual or potentially hazardous atmosphere, and an assessment of the space hazards and conditions can be performed without entering the space, alternate entry procedures may be used to enter the space according to the following requirements:

- Continuous forced air ventilation is present and sufficient to maintain the space safe for entry as confirmed by actual monitoring data taken. This data must be documented on a Pre-Entry Hazard Assessment Checklist (Appendix F), and be made available to any person who enters the space under alternate entry procedures.
- Entry is prohibited until forced air ventilation has eliminated any hazardous atmosphere.
- The forced air ventilation shall ventilate the immediate employee work area, shall continue until all employees have left the space, and shall be from a clean source.
- Any conditions making it unsafe to remove an entrance cover shall be eliminated before the cover is removed.
- When entrance covers are removed, the opening shall be promptly guarded by a railing, temporary cover, or other temporary 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.
- Before an employee enters or re-enters the space, the internal atmosphere shall be tested, with a calibrated direct-reading instrument, for the following conditions in order: {1} oxygen content, {2} flammable gases and vapors, and {3} potential toxic air contaminants. Any employee who enters the space shall be given the opportunity to observe this testing.
- The atmosphere within the space shall be periodically tested as necessary to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere. Any employee who enters the space shall be given the opportunity to observe this testing.
- If a hazardous atmosphere develops within the space, persons in the space shall exit immediately. The space shall be evaluated to determine how the hazardous atmosphere developed and re-entered if necessary, following the requirements for entering permit required confined spaces.

- The space shall be reevaluated, and reclassified if necessary, in the event that changes in the use or configuration have increased hazards to the occupants.

*If other non-atmospheric hazards exist, alternate procedures may not be used for entry into permitted confined spaces. These hazards include: engulfment, fall, unguarded or unprotected mechanical or electrical energies, or chemical hazards.*

### 3.2.2 Reclassifying a Permit-Required Confined Space.

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A permit-required confined space may be reclassified as a non-permit required confined space according to the following requirements:

- If the space contains no actual or potential atmospheric hazards, and if all hazards within the space are eliminated without entry into the space, it may be reclassified as a non-permit required confined space for as long as the non-atmospheric hazards remain eliminated.

*Note: Use of forced ventilation alone does NOT constitute eliminating a hazard. Section 3.2.1 (alternate entries into confined spaces) covers situations where forced ventilation alone will control all hazards in the space.*

- If it is necessary to enter the space to eliminate hazards, permit-required confined space entry procedures shall be used.
- If the space is reclassified, the pre-existing hazards and methods used to eliminate them must be documented on the Pre-Entry Hazard Assessment Checklist, and made available to any person entering the space.
- If a hazardous atmosphere develops within the space, all persons in the space shall exit immediately. Re-evaluate the space to determine how the hazardous atmosphere developed. If it is necessary to re-enter the space, follow the requirements for permit required confined spaces.

### 3.2.3 Methods of Eliminating Physical Hazards

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- Engulfment hazards can be eliminated by using positive isolation methods (blanking or blinding, a double block and bleed system, or misaligning/removing sections of lines or pipes).
- Fall and/or drowning hazards can be eliminated by using a fall protection device, removing standing water/liquids inside the space, cleaning oil slicks on walking surfaces, etc.
- Electrical and mechanical hazards can be eliminated by locking or tagging out all sources of energy, and/or blocking or disconnecting all mechanical linkages.
- Fire or explosion hazards can be eliminated by removing the ignition source and the fuel source of a potential fire or explosion.
- Chemical hazards can be removed by removing the chemical and/or flushing the space to remove any residual contaminant.

## 4.0 PERMIT REQUIRED CONFINED SPACE REQUIREMENTS

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### 4.1 Completing Entry Permits

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Confined-space entry permits (Appendix E) are required before entry into a permit-required confined space. If a confined space is vacated for any reason or length of time, or if the covers are placed back over confined space(s), a re-test of the atmosphere must be conducted to ensure it is safe to reenter the space. Results of test shall be noted on the entry permit.

Once the entry supervisor has signed the permit, it is posted in an easily visible location at the confined space entrance. The entry supervisor's signature, or that of another individual trained and authorized to conduct atmospheric testing, verifies that the space is safe to enter. Therefore, the entry supervisor shall ensure that the following conditions are met:

- the permit is completely filled out
- tests specified on the permit are conducted
- all procedures and equipment specified on the permit are in place and operating
- Rescue services, and the means for summoning them, are available (if means for non-entry rescue are not available, the fire department or a trained rescue team must be made available with a capability of initiating an entry rescue within four minutes).

Each permit will be valid for the maximum duration of one work shift (8 hours), or the length of time it takes to complete the work, whichever is less. If another crew needs to enter the confined space at shift change, its entry supervisor must complete a new permit for the duration of the new shift.

The entry supervisor (e.g., the person who signs the permit and authorizes entry into a confined space) must brief entrants, attendants, and atmospheric monitors (if other than the entry supervisor) about their responsibilities and the hazards and controls for safe entry. In addition, proper use of emergency equipment shall be demonstrated to entrants, attendants, and atmospheric monitors.

*Note: The space must be re-evaluated for hazards, in the presence of any authorized entrant (or that employees' representative), upon request, if that entrant (or representative) has reason to believe the evaluation may not have been adequate.*

The completed entry permit shall be made available at the time of entry to all authorized entrants by posting it at the entry portal or by another equally effective means.

Copies of the permit shall be provided to the Safety Officer within five working days, and shall be retained for at least 1 year to facilitate the annual review of the Confined Space Entry Program.

## 4.2 Atmospheric Testing and Monitoring

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Tests for oxygen deficiency or enrichment, flammability, and toxicity must be conducted by a trained and qualified atmospheric monitor. Because work in confined spaces can create a hazardous atmosphere, these tests shall be performed before entry into a confined space, and also continuously during entry into a confined space or at intervals frequent enough to ensure a safe atmosphere.

*Note: Oxygen readings below ambient oxygen levels may indicate the presence of a potential unknown atmospheric hazard.*

Atmospheric tests must be performed in the following order: oxygen deficiency, flammability, and, if necessary, toxicity (i.e., chlorine, ammonia, ozone, volatile hydrocarbons). Some flammability instruments require an adequate amount of oxygen to work properly. Use of sampling lines or containers is required to avoid exposure to personnel during the initial testing operations. It is also important to ensure that sampling is representative of the total atmosphere in the space (e.g., sample at different levels within a deep tank). If the prescribed tests indicate a dangerous situation, do not allow anyone to enter the confined space, ventilate the space, and immediately contact the Safety Officer for guidance.

*Note: Any employee who enters the space shall be given the opportunity to observe this testing.*

Atmospheric tests shall be recorded on the Pre-Entry Hazard Assessment Checklist (Appendix F) or the Confined Space Entry Permit (Appendix E) if permit-entry procedures are used.

Instruments must be inspected and calibrated by an instrument technician monthly. The calibration is logged, and a sticker with the calibration and due dates for the next calibration should be affixed to the equipment. (A sticker is not necessary if the instrument electronically records the last calibration date). Instruments used for confined space entry shall have been calibrated within one month previous to their use. Ozone detection instruments are calibrated according to manufacturer's instructions (usually annually).

*Note: Equipment that is out of calibration or that functions erratically shall not be used.*

## 4.3 Purging and Ventilating Confined Spaces

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If a confined space contains a hazardous atmosphere, or potential hazardous residue, purge the area with fresh air before entry, and continuously ventilate when working in the confined space. Below are some precautions to observe when purging and ventilating a confined space.

- Remove any residue using proper wash down techniques. Starting from the top, flush the space with water or steam to ensure proper cleaning. If entry is required into the space, all personnel must wear suitable protective equipment.
- Provide a continuous supply of (fresh) forced air as close as possible to the work area before and during work in the confined space. Take care to place the inlet upwind and least 25 feet away from the confined space and any other potential source of contamination (e.g., vehicle/generator exhaust).
- Retest for atmospheric hazards after completing the purging and ventilating procedures.

*Despite a purge, a confined space which contained hazardous materials, such as an ozone contactor chamber, may produce enough gas from its pores and from scale collected on its surface to generate a hazardous atmosphere.*

*Purging with fresh air is always mandatory whenever there is an atmospheric hazard or potential atmospheric hazard. The CCWD Confined Space Evaluation forms (found on the District server under “\Safety\Confined Spaces\”) contain information on purging times and ventilation rates for particular confined spaces.*

#### **4.4 Suitable Personal Protective Equipment**

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Suitable personal protective equipment varies depending on the job. Such equipment may include protective clothing; respiratory protection; gloves specifically designed for the material being handled; and protection for eyes, face, head, and feet. Contact your supervisor or the Safety Officer for assistance in determining the proper selection.

To obtain a respirator, an annual medical clearance is required. Contact Human Resources-Risk for the physical examination and the Safety Officer for fit testing and respirator selection.

Adequate lighting is required when entering or servicing confined spaces. Flashlights and/or extension lamps approved for the environment (e.g., explosion proof) must be provided.

All portable power tools and lamps used inside confined spaces must be properly grounded and GFCI-equipped.

Electrical or pneumatic equipment must be non-sparking (explosion proof) if flammable atmospheres may exist.

#### **4.5 Isolating the Area (Lock and Tag)**

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Isolation is the process whereby a permit-required confined space is removed from service and protected from the release of energy and material into that space.

Open chemical or gas lines within the permit-required space must be isolated by blanking or blinding; by misaligning or removing sections of lines, pipes, or ducts; or by using a double-block-and-bleed system. Water engulfment or drowning hazards from large open water lines must also be eliminated by blanking, blinding, or by using a double block and bleed system.

Before beginning work in these spaces, disconnect lines (or take other precautions) to prevent harmful materials from entering into these areas. For example, take the lines apart, cap the ends, and/or insert a blank between the flanged connections (ensure that the blank is strong enough to handle the pressure buildup if a pump is accidentally turned on). As an added precaution, lock and tag any pumps that discharge into the space before entry.

Isolate and lock and tag any other hazardous energy sources (e.g., electrical and mechanical hazards, water lines or pipes, and compressed air) to prevent possible injury to entrants. For more information, see the Lock and Tag Procedures found in the District Safety & Health Manual.

## 4.6 Controlling Ignition Sources (Hot Work)

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Unnecessary ignition sources, including lit cigarettes, are prohibited in confined spaces. When welding or cutting equipment are required to be used in confined spaces, additional precautions must be provided or taken:

- adequate local exhaust ventilation
- a fire extinguisher
- proper personal protective equipment (e.g., flame-resistant clothing, welding hood, gloves)

## 4.7 Attendant

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At least one attendant shall be stationed outside the entrance to the confined space for the duration of the entry.

Two-way communication must be maintained between the attendant and authorized entrants inside the confined space at all times.

## 4.8 Rescue

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During permit-required confined space entry, a harness and retrieval system must be set up whenever possible so that a non-entry rescue can be performed. If a non-entry rescue cannot be reasonably performed, an entry rescue plan must be developed. See Appendix C, “Rescue Planning” for guidance on entry preparations and rescue plans for common confined space entries.

Prior to entry into any permit-required confined space, a rescue plan shall be developed by the entry team that will ensure proper, timely rescue for all entrants based upon the likely hazards to be encountered. Non-entry rescue provisions shall be applied to all permit-required confined space entries unless it can be demonstrated that those provisions increase the overall risk of entry.

Authorized entrants shall wear a full body harness with retrieval line at the center of the entrant's back, near shoulder level, or above the entrant's head so that the entrant will present the smallest possible profile during any necessary removal. Wristlets may be used in lieu of the full body harness if the use of a full body harness is infeasible or creates a greater hazard and the use of wristlets is the safest and most effective alternative. The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device must be considered for vertical permit spaces more than 5 feet deep. Authorized attendants must be trained and familiar with the use of all non-entry rescue equipment.

The authorized entry supervisor shall designate, prior to entry, a group/service that will be utilized if entry rescue is deemed necessary. The determination of whether this service is brought in to “stand-by” at the point of entry or whether the service is “on-call,” is to be based upon the most likely potential hazard that would warrant an emergency exit situation. The entry

team is responsible for making this determination prior to the entry and shall include the details within the written permit.

The entry supervisor must evaluate the abilities and characteristics of any group/service which is to be designated as an entry rescue resource. Example evaluation criteria and example scenarios of when a “stand-by” rescue service may be warranted versus an “on-call” can be found in Appendix G, “Rescue Services Evaluation Tool”.

Each member of any group/service designated to perform entry rescue shall have at a minimum the following characteristics:

- Trained as Permit-Required Confined Space Entrants. The rescue service shall be informed of the hazards they may confront when called on to perform rescue.
- Trained in the use of rescue equipment such as SCBA, rescue boards, fall arrest devices, mechanical advantage, air monitoring equipment, PPE, etc.
- Trained in First Aid/CPR
- Trained in elevated high-angle rescue techniques, if applicable to the spaces to be entered
- Must have practiced making a permit-required confined space rescue at least once in the prior year (may include an actual rescue)
- Must have the expertise and the processes in place to maintain rescue equipment in a safe manner

If an injured entrant is exposed to a substance for which a Material Safety Data Sheet (MSDS) or other similar written information is required to be kept at the worksite, that MSDS or written information shall be made available to the first responders and the medical facility treating the exposed entrant. 9-1-1 must be contacted for all confined space entry emergencies.

## 5.0 CONTRACTORS AND CONSTRUCTION SITES

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This Confined Space Entry Program applies to all contractors on District property. This program also applies to all construction sites on District property.

Contractors working at District facilities shall be informed that the workplace contains confined spaces and that entry into those spaces is only allowed through compliance with the District Confined Space Entry Program.

Contractors working in or near a confined space at District facilities shall be notified of the District's experience with the space including the hazards identified and any precautions or procedures implemented for the protection of employees in or near that space.

When contractors and District employees are working simultaneously as authorized entrants into a confined space, specific procedures shall be developed and implemented so that the employees of one employer do not endanger the employees of any other employer.

Contractors working in a confined space at District facilities shall be debriefed at the conclusion of the work regarding any issues and hazards confronted or created during the course of the work.

Contractor responsibilities:

- Complying with the District's and any site-specific confined space entry program
- Obtaining available information regarding hazards or entry operations
- Coordinating entry operations with the District
- Informing the District of the confined space entry program that the contractor will follow and of any hazards confronted or created during entry operations, either during a debriefing or during the entry operation.

## 6.0 DUTIES

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### 6.1 Entry Supervisors

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Entry supervisors are responsible for all personnel who enter or work in the confined space (the entry supervisor may or may not be a line supervisor). In cases where they serve as an atmospheric monitor or attendant, entry supervisors shall also adhere to the requirements of the atmospheric monitoring personnel and attendants. An entry supervisor's duties are:

- Know the hazards that may be faced during entry including information on the mode, signs or symptoms, and consequences of exposure.
- Verify by checking that the appropriate entries have been made on the permit, that all tests specified on the permit have been conducted and that all procedures and equipment specified on the permit are in place, before endorsing the permit and allowing entry to begin.
- Ensure that MSDS information for all chemicals known to be present or encountered is available, and has been reviewed by the entry team prior to entry.
- Ensure that the entry team is trained, certified, and equipped according to this procedure and site confined space requirements, if applicable, prior to allowing entry to begin.
- Ensure that entry operations remain consistent with the terms of the entry permit, and that acceptable entry conditions are maintained.
- Terminate the entry and cancel the permit when the entry operation has been completed or when a potentially hazardous condition arises in or near the permit space.
- Verify that rescue services are available and that the means for summoning them are operable.
- Remove unauthorized individuals who enter or attempt to enter the confined space during entry operations. If the individuals will not leave the space, terminate the entry.
- Determine that entry operations remain consistent with the terms of the entry permit and that acceptable entry conditions are maintained when responsibility for the entry is transferred, and when dictated by hazards and operations.
- Provide a copy of the entry permit to the Safety Officer upon completion of the work.

## 6.2 Attendants

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Attendants must comply with the requirements below for confined space entry. In cases where they may serve as atmospheric monitors, attendants shall also adhere to the requirements of the atmospheric monitoring personnel. (See Appendices B, C, and D.). Duties of attendants are:

- Know the hazards that may be faced during entry including information on the mode, signs or symptoms of exposure.
- Be aware of possible behavioral effects of hazard exposure on entrants.
- Maintain a continuous and accurate count of all authorized entrants in the confined space and ensure that the means used to identify the entrants accurately identifies who is in the space.
- Remain outside the confined space during entry operations until another authorized person relieves him/her as the attendant.
- Maintain two-way communication at all times with entrants to monitor entrant status and to alert authorized entrants of the need to evacuate the space.
- Monitor activities inside and outside the confined space to determine if it is safe for entrants to remain in the space.
- Order authorized entrants to exit the space as quickly as possible whenever the attendant detects a potentially hazardous condition, behavioral effects of hazard exposure in an entrant, or a situation outside the space that could endanger entrants, or whenever the attendant, for any reason, can no longer perform the duties required in this section.
- Execute the rescue plan required by the entry permit and the site emergency rescue procedures as soon as it is determined that an emergency exit from the space is necessary.
- Take the following actions when unauthorized persons approach or enter the confined space while entry is underway:
  - Warn the unauthorized persons that they must stay out of the space.
  - Advise the unauthorized persons that they must exit immediately if they have entered the space
  - Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the confined space.
  - If the unauthorized persons do not exit the space, evacuate the authorized entrants, notify the entry supervisor and terminate the entry.
- Perform no duties that might interfere with the primary duty to monitor and protect the authorized entrants.

*\*Note: An attendant may be assigned to monitor more than one permit space provided that the duties in this section can be effectively performed for each space that is monitored.*

### 6.3 Personnel Entering Confined Space (Entrants)

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Any person entering a confined space (entrant) has the following duties:

- Know the hazards that may be faced during entry including information on the mode, signs or symptoms, and consequences of exposure.
- Properly use any protective and/or rescue equipment necessary for safe entry into and rescue from confined spaces.
- Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert them if they need to evacuate the space.
- Alert the attendant when the entrant recognizes any warning signs or symptoms of exposure to a dangerous condition, or when the entrant detects a potentially hazardous condition.
- Exit from the confined space as quickly as possible whenever the attendant or entry supervisor orders evacuation, whenever an entrant recognizes any warning sign or symptom of exposure to a hazardous substance, whenever an entrant detects a potentially hazardous condition, and whenever an evacuation alarm is activated.
- Complete the required confined space entry training.

### 6.4 Atmospheric Monitoring Personnel

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Atmospheric monitoring personnel have the following duties:

- Identify the hazards associated with the confined space by examining:
  - past and current uses of the area
  - the physical characteristics and configurations
  - the potential hazards in the area, including oxygen deficiency, flammability, or toxicity
  - the biological and mechanical hazards in the area
- Complete the required confined space entry and atmospheric testing training.
- Perform operational testing of equipment before each use in accordance with the manufacturer's recommendations for that equipment to ensure that it functions properly. This includes a "field test."
- Perform the tests indicated on the confined-space entry permit, including any additional tests that may be necessary. Record the results on the confined space entry permit.
- Ensure that the confined space monitoring procedures test for atmospheric contaminants that are representative of all areas of the confined space.
- Report to and work with the Safety Officer, entry supervisor, area supervisor, and entrants to resolve any issue pertaining to the atmospheric test results.

Pay particular attention to contaminants that may be absorbed through the skin.

*Note: An Oxygen level less than ambient, or an LEL greater than zero, may indicate the presence of a potential unknown atmospheric hazard.*

## 7.0 RESPONSIBILITIES

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### 7.1 Area Supervisor

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With assistance from Operations & Maintenance and the Safety Officer, the area supervisor shall ensure the following:

- Identify the hazards associated with the confined spaces in his/her responsible area by examining the following aspects of these spaces:
  - past and current uses of the area
  - the physical characteristics and configurations
  - the potential hazards in the area, including oxygen deficiency, flammability, or toxicity
  - the biological and mechanical hazards in the area
- Shut down and secure equipment that is used in the confined space.
- Isolate, and lock and tag equipment in accordance with established procedures. If the confined space to be entered affects or can be affected by interconnecting or adjacent equipment or personnel, coordinate the equipment preparation and isolation with the owners and have them endorse (by signature) the confined-space entry permit.

In addition, the area supervisor shall do the following:

- Maintain a list of non-permit and permit-required confined spaces in their area.
- Review confined space hazard information provided by the Safety Officer, and submit corrections for hazards not mentioned or accounted for in the identification and evaluation survey, as appropriate.
- Post confined spaces with appropriate signs as necessary. Consult the Safety Officer for sign specifications.
- Notify the Safety Officer about significant modifications to confined spaces that may affect classification and/or procedures for entry.
- Identify operations and activities in the area that may potentially affect entry into confined spaces.
- Monitor operational conditions and revoke permits if unsafe conditions or practices arise.
- Take appropriate measures to remove unauthorized personnel who are in or about to enter confined spaces.

### 7.2 Planning, Engineering & Construction

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Construction managers and inspectors shall do the following:

- Complete the confined space entry training (if required to enter confined spaces).

- Know the hazards associated with confined spaces; recognize the signs and symptoms of exposure, including behavioral effects; and understand the consequences of exposure to the hazards in these spaces.
- Contact the Safety Officer for a preoperational review of contractor activities before initiating confined space operations.
- Cancel the permit authorization whenever unacceptable conditions exist, or upon completing permitted activities.
- If unexpected hazards arise, ensure that all personnel leave the area immediately and notify the Safety Officer so that a re-evaluation of the space can be performed before reentry.
- Debrief contractors regarding any hazard that was encountered or created during the work and the appropriate corrective action acted upon concluding entry.
- Audit contractor's compliance with procedures for confined spaces entry.
- Ensure that contractor's personnel and/or subcontractors are trained and qualified to enter, and perform atmospheric testing of permit-required confined spaces by means of contractual agreements.

### 7.3 Safety Officer

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The Safety Officer shall do the following with the area supervisors:

- Identify the hazards for each confined space by examining:
  - past and current uses of the area
  - the physical characteristics and configurations
  - the potential hazards in the area, including oxygen deficiency, flammability, or toxicity
  - the biological and mechanical hazards in the area
- Develop programmatic procedures and provide employees with regulatory interpretations relative to confined space entry.
- Provide technical guidance on the procurement and operation of confined space equipment.
- Assist in monitoring and evaluating airborne contaminants, particularly toxics.
- Evaluate physical hazards including thermal effects (heat and cold), noise, and vibration.
- Develop special procedures for handling hazards created by unique operational activities including procedures for the following specialized activities:
  - cleaning and decontaminating work areas and equipment
  - performing hot work operations in double walled vessels
  - rendering an atmosphere inert
- Provide the area supervisor with specifications for posting the entrances to confined spaces.
- Assist with the development and presentation of training courses.
- Maintain a database of all non-permit and permit-required confined spaces, and provide the information in that database upon request. The database shall be located on the CCWD shared server under the "Safety" folder and Safety Website.

Conduct an annual compliance audit with confined-space entry and testing procedures.

## 8.0 TRAINING

All personnel involved in confined space activities must complete required training (see Table 1) before entering a confined space. Entrants, attendants, entry supervisors, area supervisors, and atmospheric monitors must complete course work in Confined Space Entry. All atmospheric monitors, which may include entrants, attendants, and/or entry supervisors, must complete a Confined Space Atmospheric Testing course. These courses are offered by the Safety Officer and require retraining every two years (biennially), and must be documented by the Human Resources Information System training database. Equivalent course work from outside consulting/training firms are acceptable. Send copies of the course certificate to the Safety Officer to be entered into the training database. Contractors are responsible for providing training documentation before commencing work on District property.

Depending on the nature of the entry into the confined space, other required training may include standard first aid, CPR, and respiratory protection. Additional training needs can be identified by the Safety Officer.

Employees who fail to follow or are unfamiliar with confined space entry procedures will have their confined space authorization immediately suspended. These employees will require retraining before any entry into a confined space is allowed.

**Table 1. Training Requirements for Permit-Required Confined Space Entry\***

<i>Program Roles</i>	<i>Confined Space Entry</i>	<i>Atmospheric Testing</i>	<i>Lock/Tag</i>	<i>Respiratory Protection</i>	<i>CPR/ First Aid</i>	<i>Rescue Drill</i>
Managers/ Supervisors	O	O	O			
Area Supervisors	O	O	O		O	O
Entry Supervisor	X	O	X	O	O	O
Atmospheric Monitor	X	X	X	O	O	O
Entrant	X	X	X	X when required	O	O
Attendant	X	X	X	X when required	X	X when required
Rescue Team	X	X	X	X when required	X	X

\* If an employee assumes more than one role, all training for additional roles must be completed.

O = Recommended

X = Required

# Appendix A

## Definitions

## APPENDIX A

### DEFINITIONS

**Acceptable entry conditions** means the conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required space entry can safely enter into and work within the space.

**Attendant** means an individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program.

**Authorized entrant** means an employee who is authorized by the employer to enter a permit space.

**Blanking or blinding** means the absolute closure of a pipe, line or duct by 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.

**Checklist** refers to a written document that is developed as part of the safe work practice that lists items or actions which must be completed prior to entering a non permit-required confined space.

**Confined space** means a space that: (1) Is large enough and so configured that an employee can bodily enter and perform assigned work; (2) Has limited or restricted means for entry or exit; and (3) Is not designed for continuous employee occupancy.

**Confined space program** means the employer's overall program for controlling and, where appropriate, for protecting employees from, confined space hazards and for regulating entry into permit spaces.

**Double block and bleed** means the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

**Elevated High Angle Rescue** means specific techniques used to package and transport injured employees from spaces greater than 4 feet in depth.

**Emergency** means any occurrence or event internal or external to the permit space that could endanger entrants.

**Engulfment** means that surrounding and effective capture of a person by a liquid or finely divided solid substance that can be aspired 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** means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuring 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.

**Entry permit** means the written or printed document that is provided by the employer to allow and control entry into a permit space and that contains the information specified. Refer to Appendix C.

**Entry supervisor** means the person 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.

**Hazardous atmosphere** means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness for one or more of the following causes:

- (1) Flammable gas, vapor, or mist in excess of 10 percent of its lower explosive limit (LEL).
- (2) Airborne combustible dust at a concentration that meets or exceeds its LEL.

- (3) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.
- (4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in 29 CFR 1910 could result in employee exposure in excess of that dose or limit.
- (5) Any other atmospheric condition that is immediately dangerous to life or health (IDLH).

**Hot work** means operations capable of providing a source of ignition.

**Hot work permit** means the employer's written authorization to perform operations capable of providing a source of ignition.

**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.

**Inerting** means the displacement of the atmosphere in a permit space by a noncombustible gas to such extent that the resulting atmosphere is noncombustible.

**Isolation** means 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; or blocking or disconnecting all mechanical linkages.

**Line breaking** means 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 volume, pressure, or temperature capable of causing injury.

**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.

**Oxygen deficient atmosphere** means an atmosphere containing less than 19.5 percent oxygen by volume.

**Oxygen enriched atmosphere** means an atmosphere containing more than 23.5 percent oxygen by volume.

**Permit-required confined space** means a confined space that has one or more of the following characteristics: (1) Contains or has the potential to contain a hazardous atmosphere, (2) Contains a material that has the potential for engulfing an entrant; (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; (4) Contains any other recognized serious safety or health hazard. An example permit is shown in Appendix C.

**Permit-system** means the employer's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

**Prohibited condition** means any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

**Rescue service** means the personnel designated to rescue employees from permit spaces.

**Retrieval system** means the equipment used for non-entry rescue of persons from permit spaces.

**Testing** means the process by which the hazards that may confront entrants of a permit space are identified and evaluated; either through atmospheric monitoring or chemical sampling analysis.

## Appendix B

### Primary Responsibilities for Attendants

## **Appendix B**

### **Primary Responsibilities for Attendants**

*Attendants must carefully read, understand, and be thoroughly familiar with the instructions in this appendix before beginning work in confined spaces. (NOTE: The circumstances and conditions of the job will determine the safety requirements. However, the steps below are basic to all jobs.)*

Following are the primary responsibilities for attendants:

1. Ensure the safety of personnel working in confined spaces.
2. Maintain an accurate count of all persons working in confined spaces.
3. Maintain the conditions and requirements listed on the confined-space entry permit.
4. Notify everyone to evacuate the confined space if you observe a hazardous condition.
5. Dial 9-911 from District phones and 911 from all other phones to obtain help if an emergency arises. Do not attempt to enter the confined space during an emergency. If possible, an attendant may rescue a victim from a confined space using a retrieval system, and without additional help, if such rescue does not require entering the confined space.
6. Provide rescue team incident commander (Fire Dept.) with the confined-space entry permit, including any information about the events up to the emergency.
7. Maintain effective and continuous contact with entrants. If entrants are out of hearing range and line of sight, radios shall be used for communication.
8. Do not leave your assignment while personnel are inside the confined space, except to get help in an emergency. If other duties require you to leave your assignment, have all personnel vacate the confined space.
9. Consult your supervisor if you have any questions regarding the job.
10. Be alert. Try to anticipate and prevent any condition that would be hazardous to life and health.
11. Prevent the fouling of air lines and/or lifelines.
12. Make sure that you have been trained in proper use of respiratory equipment or lifelines if required to use them.
13. Clean and return special equipment to its original location upon completing the job.

**Appendix C**  
**Rescue Planning**

## Appendix C

### Confined Space Rescue Planning

Persons who have tried to rescue individuals from confined spaces have themselves become victims because of failure to plan for rescue and follow proper procedures. It is essential that all persons involved with the rescue of personnel from confined spaces know exactly what to do in such situations.

#### Planning for Non-Entry Rescues

If possible, an attendant may rescue a victim from a confined space using a retrieval system and without additional help if the rescue does not require the attendant to enter the space. For rescue planning purposes, the entrant must remain attached to the retrieval line at all times.

#### Guidelines for Confined Space Entry Preparations and Rescue Planning for Common Activities

Additional measures may need to be taken based on hazards. Consult the Safety Officer if recommended procedure is not feasible.

Space Type	Activity	Potential Hazards	Recommended Procedure
A. Non-permit vaults 4' - 10' deep	Inspection, sampling, turning valves, minor repairs using non-powered hand tools	Atmospheric	<ol style="list-style-type: none"> <li>1. Complete Pre-Entry Hazard Assessment Checklist</li> <li>2. Remove any water from vault to less than 3" depth</li> <li>3. Verify atmosphere with gas monitor</li> <li>4. Place guard rails around the opening or have an attendant standby.</li> <li>5. Use a ladder</li> </ol>
B. Non-permit vaults > 10' deep, access only by ladder	Inspection, sampling, turning valves, minor repairs using non-powered hand tools	Atmospheric fall	<ol style="list-style-type: none"> <li>1. Complete Pre-Entry Hazard Assessment Checklist</li> <li>2. Remove any water from vault to less than 3" depth</li> <li>3. Verify atmosphere with gas monitor</li> <li>4. Use an extension/straight ladder when needed.</li> <li>5. Use fall protection/ retrieval system.</li> <li>6. Attendant standby with ability to contact 911.</li> </ol>
C. Vaults > 4' deep access only by ladder (permit entry)	Major repairs by Maintenance	Atmospheric engulfment, drowning, high pressure, electrical	<ol style="list-style-type: none"> <li>1. Complete Confined Space Entry Permit</li> <li>2. Remove any water from vault to less than 3" depth</li> <li>3. Use gas monitor to check atmosphere</li> <li>4. Use mechanical ventilation as needed, exhaust ventilation during welding/cutting,</li> <li>5. Double block &amp; bleed to eliminate engulfment hazard; lockout/tagout as needed.</li> <li>6. Place an extension/straight ladder when needed.</li> <li>7. Use fall protection/retrieval system unless use of a retrieval system poses greater hazard.</li> <li>8. Attendant standby for non-entry rescue. Entrant cannot detach from lifeline unless additional rescue personnel standing by for entry rescue</li> </ol>

D. Drain Pit > 5' deep (permit entry)	Grounds maintenance	Atmospheric fall, engulfment	<ol style="list-style-type: none"> <li>1. Complete Confined Space Entry Permit,</li> <li>2. Remove any water from pit to less than 3" depth</li> <li>3. Place an extension/straight ladder when needed.</li> <li>4. Verify atmosphere with gas monitor</li> <li>5. Isolate space from drain line</li> <li>6. Use fall protection/ retrieval system.</li> <li>7. Attendant standby for non-entry rescue. Entrant cannot detach from lifeline unless additional rescue personnel standing by for entry rescue</li> </ol>
E. Contra Loma Tunnel (non-permit)	Inspection	Atmospheric fall	<ol style="list-style-type: none"> <li>1. Complete Pre-Entry Hazard Assessment Checklist</li> <li>2. Ventilate space using fixed blower for at least 20 minutes before entry.</li> <li>3. Attendant standby with ability to contact 911.</li> <li>4. Verify atmosphere with gas monitor</li> <li>5. Verify two-way communication.</li> </ol>
F. Buried Treated Reservoir (permit entry)	Cleaning	Atmospheric fall, high pressure	<ol style="list-style-type: none"> <li>1. Remove water from space as needed.</li> <li>2. Complete Confined Space Entry Permit</li> <li>3. Verify atmosphere with gas monitor</li> <li>4. Isolate space</li> <li>5. Use fall protection/retrieval system.</li> <li>6. Attendant standby for non-entry rescue</li> <li>7. Ensure two-way communication.</li> <li>8. At least one rescuer standing by for entry rescue</li> </ol>
G. Buried Treated Reservoir (permit entry)	Epoxy coating, sealants	Atmospheric fall, chemical contaminant	<ol style="list-style-type: none"> <li>1. Remove water from space as needed.</li> <li>2. Complete Confined Space Entry Permit</li> <li>3. Verify atmosphere with gas monitor &amp; VOC detector</li> <li>4. Use mechanical ventilation (blower)</li> <li>5. Isolate space</li> <li>6. Use fall protection/retrieval system</li> <li>7. Attendant standby for non-entry rescue</li> <li>8. Ensure two-way communication</li> <li>9. Two rescuers standing by for entry rescue with SCBAs</li> </ol>
H. Buried Treated Reservoir (permit entry)	Inspection	Atmospheric fall	<ol style="list-style-type: none"> <li>1. Remove water from space as needed.</li> <li>2. Complete Confined Space Entry permit</li> <li>3. Isolate space</li> <li>4. Verify atmosphere with gas monitor</li> <li>5. Use fall protection/ retrieval equipment</li> <li>6. Attendant standby</li> <li>7. Ensure two-way communication</li> <li>8. At least one rescuer standing by for entry rescue</li> </ol>
I. Above-ground reservoir tank (permit entry)	Cleaning (side-entry)	Atmospheric high pressure	<ol style="list-style-type: none"> <li>1. Remove water from space as needed.</li> <li>2. Complete Confined Space Entry Permit</li> <li>3. Verify atmosphere with gas monitor</li> <li>4. Isolate space,</li> <li>5. Entrants wear harnesses</li> <li>6. Have tether available for retrieval system</li> <li>7. Attendant standing by</li> </ol>
J. Above-ground reservoir tank (permit entry)	Epoxy coating, sealant (side entry)	Atmospheric chemical contaminant	<ol style="list-style-type: none"> <li>1. Remove water from space as needed.</li> <li>2. Complete Confined Space Entry Permit</li> <li>3. Verify atmosphere with gas monitor &amp; VOC detector</li> <li>4. Use mechanical ventilation (blower)</li> <li>5. Isolate space</li> <li>6. Entrants wear harnesses</li> <li>7. Attendant standing by</li> </ol>

			8. Two rescuers standing by for entry rescue with SCBAs
K. Above-ground reservoir tank (permit)	Inspection	Atmospheric	<ol style="list-style-type: none"> <li>1. Remove water from space as needed.</li> <li>2. Complete Confined Space Entry Permit</li> <li>3. Isolate space</li> <li>4. Verify atmosphere with gas monitor</li> <li>5. Attendant and at least one rescuer standing by for entry rescue</li> </ol>
L. Open Canal dewatered > 4' deep (non-permit)	Cleaning	Heavy equipment, slip/fall	<ol style="list-style-type: none"> <li>1. Conduct a pre-task tailgate meeting and document a Pre-Entry Hazard Checklist.</li> <li>2. Follow O&amp;M Lattice Crane SOP</li> <li>3. Remove water and isolate the canal.</li> <li>4. Secure a straight or extension ladder for access</li> <li>5. Entrants wear harnesses,</li> <li>6. Have rescue board available,</li> <li>7. Attendant/rescue personnel standing by</li> </ol>
M. Canal under-crossings, siphons, box culverts (permit)	Cleaning	Atmospheric drowning, heavy equipment, slip/fall	<ol style="list-style-type: none"> <li>1. Remove water from space as much as possible</li> <li>2. Complete Confined Space Entry Permit</li> <li>3. If depths &gt; 4' of water remain: entrants wear life jackets. If &lt; 4' depth, entrants wear harnesses.</li> <li>4. Verify atmosphere with gas monitor, entrants carry gas monitors during entry</li> <li>5. Attendant monitors entrant (line-of-sight), rescue personnel available</li> <li>6. Have rescue board available</li> <li>7. If atmosphere is hazardous (carbon monoxide level &gt; 25 ppm, hydrogen sulfide &gt; 10 ppm, or LEL &gt; 10%, or oxygen &lt; 19.5%), no entry without a High Hazard plan.</li> </ol>
N. Sediment basin, launders (permit)	Cleaning	Fall, engulfment	<ol style="list-style-type: none"> <li>1. Remove water from space,</li> <li>2. Complete Confined Space Entry Permit</li> <li>3. Isolate space</li> <li>4. Use retrieval system</li> <li>5. Attendant stands by; at least one rescuer available for entry rescue</li> </ol>
O. Sediment basin (permit)	Major Repairs by Maintenance	Fall, engulfment	<ol style="list-style-type: none"> <li>1. Remove water from space</li> <li>2. Complete Confined Space Entry Permit</li> <li>3. Isolate space</li> <li>4. Attendant stands by; at least two rescuers available for entry rescue</li> <li>5. Have a rescue board available</li> </ol>
P. Corrosive chemical secondary containment basins > 4' deep, access only by ladder (permit or non-permit)	Inspection (non-permit)  Repairs by Maintenance, line breaking, cleaning (permit)	Chemical exposure (alum, sulfuric acid, fluoride, caustic, hypochlorite )	<ol style="list-style-type: none"> <li>1. From outside the containment, survey area for uncontained chemicals, leaks, etc.</li> <li>2. Wear appropriate PPE</li> <li>3. Take a sample of any uncontained liquid</li> <li>4. If the pH sample is &lt;3.5 or pH &gt; 11 or if corrosive liquid is freely flowing, have the liquid removed.</li> <li>5. If the liquid chemical hazard cannot be removed, notify the treatment plant and maintenance supervisor of hazard. Barricade or tape off the entrance to the basin and place sign/tag describing the hazard. Follow the permit procedure for entries: conduct a pre-task hazard analysis meeting, review the MSDS, monitor atmosphere, complete Confined Space Entry Permit, have retrieval system available, and an</li> </ol>

			<p>attendant and rescue personnel standby.</p> <p>6. Entries without uncontained chemical hazards present are to be performed with an attendant observing the work area. Entrants must: notify the treatment plant supervisor, be familiar with the MSDS, complete a Pre-Entry Hazard Checklist, and wear required PPE.</p> <p>7. For line breaking activities, follow the O&amp;M Line Breaking SOP and permit procedure. Monitor and ventilate the atmosphere as needed.</p>
Q. Ozone contactors (permit)	Maintenance	Ozone exposure	<p>1. Isolate space.</p> <p>2. Ventilate space for at least 24 hours. Place temporary guard rails around open, unattended hatches.</p> <p>3. Follow the O&amp;M Line Breaking SOP and the permit procedure: conduct a pre-task hazard analysis meeting, review the MSDS, monitor the atmosphere, and complete Confined Space Entry Permit.</p> <p>4. Use gas monitor and portable ozone monitor.</p> <p>5. Entrants wear harnesses. Enter using SCBAs if ozone levels above 0.1 ppm. Do not enter if ozone levels are above 5 ppm.</p> <p>6. Attendant and at least two rescue personnel standing by with two SCBAs for entry rescue</p>
Non-routine entries	-	-	Develop High Hazard Work Plan as per High Hazard SOP

### **Emergencies**

A person who has collapsed or appears to be having difficulty while working in a confined space could be experiencing a heart attack or other illness. In such instances:

1. Dial 9-911 (District phone) or 911 (Nextel, public phone) to obtain help. Do not attempt to enter the confined space during an emergency.
2. Attempt to retrieve the person(s) from the confined space using a harness retrieval system or other equipment. Do not enter the confined space or attempt a rescue.
3. Using the retrieval system, remove the victim from the area immediately.
4. Render whatever first aid you are qualified to provide once the victim is outside the confined space, until medical help arrives. Immediately check for injuries and life-threatening conditions.

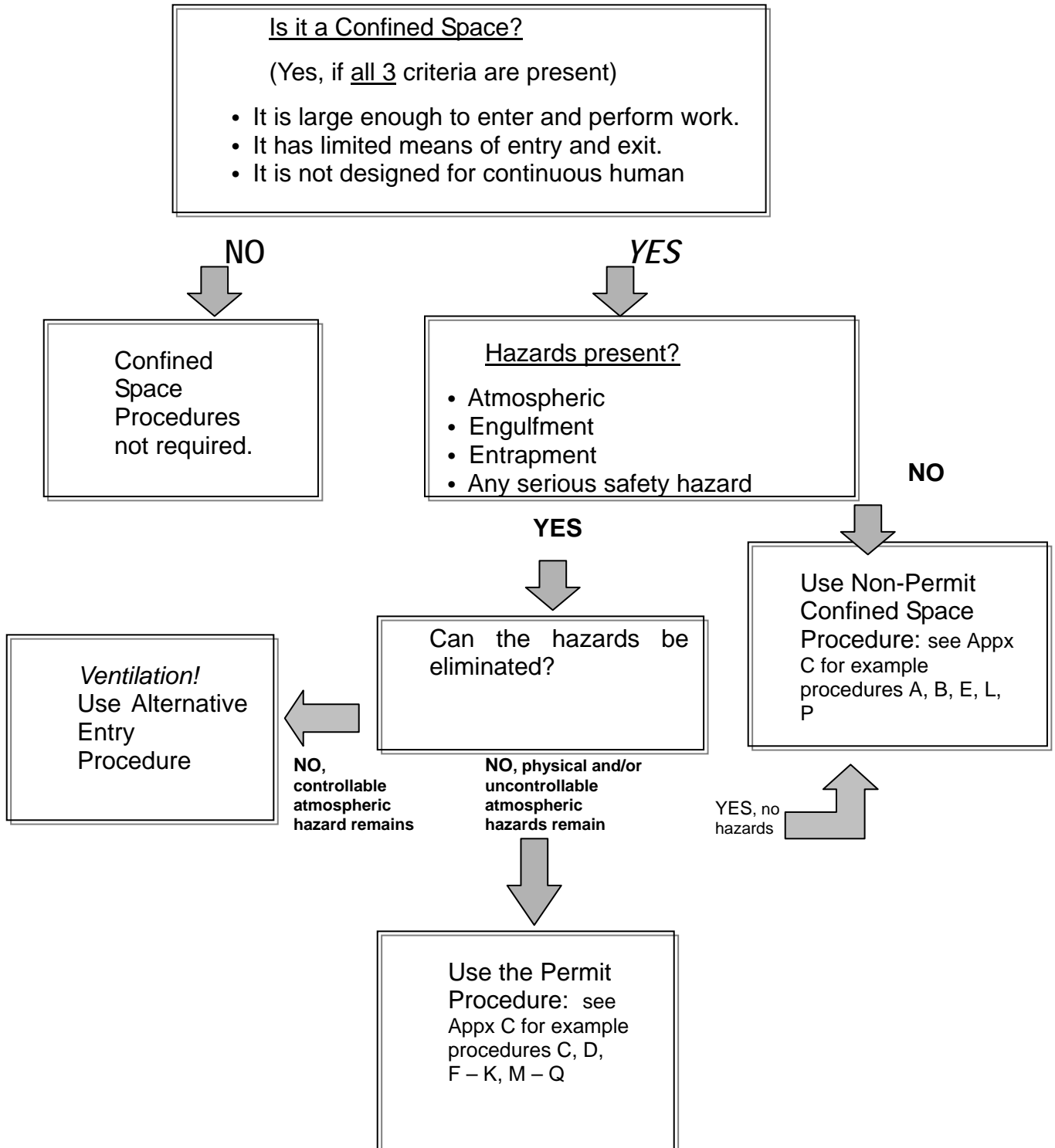
NOTE: The attendant shall assist the Fire Department rescue team upon request.

## Appendix D

### Confined Space Decision Flow Chart

## Appendix D

### CONFINED SPACE CLASSIFICATION FLOWCHART



## Appendix E

### Confined Space Entry Permit



**Appendix F**  
**Pre-Entry Hazard Assessment Checklist**

## PRE-ENTRY HAZARD ASSESSMENT CHECKLIST

<b>CONFINED SPACE No.:</b> _____ <b>LOCATION:</b> _____ <b>DATE &amp; TIME:</b> _____			<b>DESCRIPTION OF WORK:</b> _____ <b>WILL THIS WORK CREATE A HAZARD? YES ___ NO ___</b>		
HAZARDS			MITIGATION/CONTROL		
Y	N	ATMOSPHERIC (Measured)	Initial Reading	Describe what has been done to reduce or control the atmospheric or physical hazard.	Post Reading
Y	N	Oxygen Enriched >23.5%			
Y	N	Oxygen Deficient <19.5%			
Y	N	Flammability >10% LEL			
Y	N	Carbon Monoxide >25 PPM			
Y	N	Hydrogen Sulfide >10 PPM			
Y	N	Ozone > 0.1 PPM			
Y	N	Chlorine >0.5 PPM			
Y	N	Ammonia or Other			
Y	N	ENGULFMENT MATERIAL(Present)			
Y	N	ENTRAPMENT CONFIGURATION			
Y	N	OTHER SAFETY OR HEALTH	Document isolation points below		
Y	N	Overhead Hazards			
Y	N	Electrical			
Y	N	Mechanical			
Y	N	Hydraulic, Pneumatic			
Y	N	Temperature			
Y	N	Darkness			
Y	N	Infection/Bio-hazard			
Y	N	Hot Work/Welding			
Y	N	Traffic			
Y	N	Hazardous Material			
Y	N	Fall/Slip			
Y	N	Falling Objects			
Y	N	Other			

PLEASE CHECK APPROPRIATE BOX, SIGN AND POST THIS FORM AT THE JOB SITE

- Atmospheric hazards have been eliminated with the use of continuous forced air ventilation. Entry will be conducted without a permit, an attendant or rescue team under alternate procedures.
- All hazards have been eliminated and this space is classified as a non-permit confined space.

Entrant Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Title: \_\_\_\_\_ Time: \_\_\_\_\_

**Appendix G**  
**Rescue Services Evaluation Tool**

## APPENDIX G

### RESCUE SERVICES EVALUATION TOOL

Any rescue service designated by the Confined Space Entry program, must be evaluated to ensure competency and ability to perform the needed services. The criteria for the rescue service is outlined in section 4.8. This Appendix is designed to be a tool to assist in this evaluation process of prospective entry-rescue services.

1. What are the needs with regard to response time (time for the rescue service to receive notification, arrive at the scene, and set up and be ready for entry)? For example, if entry is to be made into an IDLH atmosphere, or into a space that can quickly develop an IDLH atmosphere (if ventilation fails or for other reasons), the rescue team or service would need to be standing by at the permit space. On the other hand, if the danger to entrants is restricted to mechanical hazards that would cause injuries (e.g., broken bones, abrasions) a response time of 10 or 15 minutes might be adequate.
2. How quickly can the rescue team or service get from its location to the permit spaces from which rescue may be necessary? Relevant factors to consider would include: the location of the rescue team or service relative to the employer's workplace, the quality of roads and highways to be traveled, potential bottlenecks or traffic congestion that might be encountered in transit, the reliability of the rescuer's vehicles, and the training and skill of its drivers.
3. What is the availability of the rescue service? Is it unavailable at certain times of the day or in certain situations? What is the likelihood that key personnel of the rescue service might be unavailable at times? If the rescue service becomes unavailable while an entry is underway, does it have the capability of notifying the employer so that the employer can instruct the attendant to abort the entry immediately?
4. Does the rescue service meet all the requirements of section 4.8 of the Confined Space Entry Program? If not, has it developed a plan that will enable it to meet those requirements in the future? If so, how soon can the plan be implemented?
5. For off-site services, is the service willing to perform rescues at the employer's workplace? (CCWD cannot rely on a rescuer who declines, for whatever reason, to provide rescue services.)
6. Is an adequate method for communications between the attendant, employer and prospective rescuer available so that a rescue request can be transmitted to the rescuer without delay? How soon after notification can a prospective rescuer dispatch a rescue team to the entry site?
7. For rescues into spaces that may pose significant atmospheric hazards and from which rescue entry, patient packaging and retrieval cannot be safely accomplished in a relatively short time (4 minutes), consider using airline respirators (with escape bottles) for the rescuers and to supply rescue air to the patient. If using SCBA, does the prospective rescue service have an ample supply of replacement cylinders and procedures for rescuers to enter and exit (or be retrieved) well within the SCBA's air supply limits?

8. If the space has a vertical entry over 5 feet in depth, can the prospective rescue service properly perform entry rescues? Does the service have the technical knowledge and equipment to perform rope work or elevated rescue, if needed?

9. Does the rescue service have the necessary skills in medical evaluation, patient packaging and emergency response?

10. Does the rescue service have the necessary equipment to perform rescues, or must the equipment be provided by the employer or another source?