

1. CONFINED SPACE ENTRY

Many BCUA wastewater, solid waste and collection system workplaces contain spaces which are considered "confined". Serious exposure to physical or chemical hazards, including asphyxiation, may exist in confined spaces.

The following procedures must be used when entering a "permit-required confined space". For detailed BCUA written procedures and requirements refer to Additional Reference J - "Confined Space Entry Program".

A. General

"Confined space" means a space which by design has limited openings for entry and exit, unfavorable natural ventilation which could contain or produce dangerous air contaminants, could contain a hazardous atmosphere, and which is not intended for continuous employee occupancy. A confined space includes, but is not limited to, a tank, vessel, pit, ventilation duct work, vat, boiler, sewer, underground utility vault, manhole, meter pit, siphon chamber, regulator chamber, diversion chamber, and any other underground structure.

b. Training

All personnel assigned to work on permit-required confined space entry must receive specialized training, and be able to demonstrate required skills.

c. Pre-Planning and Permits

- Consider all manholes and confined spaces potentially dangerous and hazardous before entry, until proven safe.
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- If there is no sign posted identifying the space, and you are not sure if it is a confined space, ask your supervisor.
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- Evaluate all information known about the confined space and the tasks planned for entry. Pre-plan all operations with those both directly and indirectly involved.
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- An Entry Permit is to include the signature of the authorizing Supervisor or person in charge of entry and names of all assigned employees.
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- Post the completely filled-out permit, by the entry access point or as near to it as possible. For field operations work, the vehicle being used should be considered for this purpose.
- Have barriers, signs, permit, and attendant present at the access point prior to entry.
- Conduct a pre-entry briefing on safety and health work tasks with the entry team.

d. Isolation and Lockout/Tag out

- All equipment, machinery and lines must be isolated, locked out, and tagged out. See Additional Reference H - "Lockout/Tag out Program" for detailed written procedures and requirements.
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- Sources requiring isolation include but are not limited to, mechanical, electrical, hydraulic, pneumatic, chemical, thermal, and gravity.

e. Opening and Air Monitoring Tests

- Prior to and during entry there shall be no smoking, open flames, or use of spark-producing equipment.
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- Avoid sparks or use non-sparking tools when opening a manhole cover.
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- Conduct air monitoring tests for oxygen levels, combustible gases, and toxic gases, in that order. Perform tests with a calibrated direct-reading instrument. Enter readings on the Permit.
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- Use a remote probe during air monitoring tests. Test the atmosphere every 4 feet in the direction of travel and to each side, from top to bottom.
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- The minimum oxygen concentration must be 19.5 percent, the maximum 23.5 percent. The maximum level of combustible gas is 10 percent LEL. The maximum level for hydrogen sulfide is 10 parts per million.

f. Ventilation

- Continuous ventilation must be provided.
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- Ventilation must be provided by an explosion-proof blower where a combustible or flammable atmosphere is potentially present.
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- Wind direction must be checked and the blower placed in a position that prevents blower engine exhaust gases from entering the confined space.

g. Entry

- Before entry is made, a communication system must exist between the entrant and attendant, and the attendant and rescue units.
- All personal protective equipment and safety equipment must be inspected prior to entry and worn by the entrant.
- No vertical confined space entry must be made without adequate fall protection and retrieval protection for the entrant.
- No one may place their feet inside the area marked by the retrieval equipment supports except an entrant in a harness and attached to the retractable lifeline.
- The entry permit shall specify who is responsible for monitoring the atmosphere throughout the entire entry and work operation for oxygen deficiency, combustible gases, and hydrogen sulfide.
- Entrants must leave a confined space immediately if experiencing dizziness, lightheadedness, or breathing difficulties.

- When two workers enter a confined space, each should carry their own emergency escape pack. If not, at least one must carry a five-minute supplementary air escape pack (ESCBA). The person carrying the air pack must be the last one to exit the space in an emergency.
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- The attendant must maintain continuous communication with all authorized entrants.
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- At no time must an entrant in a confined space be left unattended.

h. Communications and Rescue

At times it may be difficult to converse verbally with a worker in a manhole. The following hand signals are recommended:

- 1. HELP - Moving arm over head.**
 - 2. DANGER or TROUBLE - Pull a finger across the throat in a cutting motion.**
 - 3. NO - Wave head or forefinger side to side.**
 - 4. YES - Form circle with thumb and 1st finger, extend other fingers, same for O.K.**
 - 5. COLD - Hugging or self-embracing.**
 - 6. DIRECT ATTENTION - Point to desired area, such as ear, mouth.**
 - 7. PAIN - Clenching of fist, wringing action.**
 - 8. a) I INTEND TO GO UP - Thumbs up.
b) I INTEND TO GO DOWN - Thumbs down.**
 - 9. QUESTION OR REPETITION - Palm of hand up and down.**
- Other communication devices which should be used when the attendant cannot see the entrant include:
 - **Walkie-talkies**
 - **Noisemakers (whistles, horns, alarms)**
 - **Emergency air horns**
 - **Rope tugs**
 - An in-plant rescue team must consist of personnel equipped with the personal protective equipment, including respiratory protective equipment, necessary for entry into a confined space, and with the rescue and retrieval equipment the employer has provided for rescue from a confined space.

- The in-plant rescue team must be trained:
 - **As an entrant, attendant, and supervisor in-charge.**
 - **In the correct performance of the rescue functions assigned to them using the retrieval and rescue equipment furnished.**
 - **In the proper wearing and use of any personal protective equipment, including respirators, that they may need to use during an actual rescue.**
- A rescue team must practice, at least annually, removing simulated victims such as dummies, mannequins, or real people through representative openings and portals which have the same size, configuration and accessibility as the confined space from which an actual rescue would be required.
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- At least one member of each rescue team must hold current certification in basic first-aid and cardiopulmonary resuscitation.

Closure

Responsibility and closure of a manhole or confined space must be performed by the person in-charge of entry.