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| Parent Procedure(s):  | * CMS/332 Confined Spaces Procedure
 |

1. **INTRODUCTION**

Entry into, and working within an enclosed, restricted or confined space can be a hazardous activity. Gas or fumes can build up in an area that is not well ventilated and can create the danger of fire or explosion, or expose any worker within a confined space to toxic levels of a hazardous substance. In addition to these hazards, other typical hazards such as insufficient oxygen, manual handling, noise, accidental operation of mechanical equipment and electric shock can also place workers in dangerous situations.

1. **PURPOSE**

The purpose of this document is to provide guidance to management, supervisors, employees and contractors of GWMWater so that they may avoid hazards that may otherwise be experienced when entering a confined space and thereby prevent collapse, injury or death from these hazards.

1. **MAJOR HAZARDS**

The major or more common hazards associated with confined spaces work include:

**3.1 Oxygen deficiency in the confined space**

If the oxygen content of the atmosphere in the confined space is less than 19.5%, a person cannot breathe well enough to work, and may get into breathing difficulties. The lack of oxygen may have arisen because it has been consumed by people, machines, chemical reactions, fire or because it may have been driven out by other gases entering the space (Normal air contains 20.9% oxygen).

**3.2 The presence of atmospheric contaminants in the confined space, such as:**

 **3.2.1 Noxious gases**

Construction and maintenance operations can produce noxious gases. These gases may be exhaust fumes, paint fumes, epoxy resin fumes or from many other sources. Gases can also be produced by chemical or biological reactions or formed naturally by decomposing organic matter. Waste water is a primary example.

 **3.2.2 Explosive gases**

These can be produced by a number of activities, particularly those where petroleum products, paints and plastic solutions and solvents are used. Naturally occurring explosive gases may be formed by decomposing organic matter.

 **3*.2.3* Dust**

Some maintenance operations in pipe removal require cleaning down with angle grinders and steel brushes which produces large quantities of dust. Dust inhalation can cause permanent lung damage.

A table listing the confined spaces that have been identified as those most frequently encountered by staff and contractors at GWMWater and the potential hazards is included as Appendix 1.

**4 OPERATING SEQUENCE**

**4.1 Confined Space Identification**

To determine whether a particular space is a confined space the four elements in the definition of a confined space must be met. To help make this determination the Confined Space Identification Checklist can be used (CMS/134 - Confined Space Identification Checklist).

**4.2 Pre-Entry**

It is preferable that where possible, work be performed from outside of the confined space. Please note, that entry to a Confined space is considered to have occurred when a part of the body enters the Confined space and there is a risk the person may be overcome or incapacitated by the conditions within the space. Reference Worksafe Victoria Compliance code – section 7.

**4.2.1 Responsible Person**

The responsible person shall ensure that the confined space work has been thoroughly investigated planned and understood by all persons participating in such works. Consideration shall be given to:

1. Worker Selection (evaluate aptitude and fitness for task and confined space entry)
2. Employee training and understanding of:
3. Emergency entry and exit procedures
4. Respiratory protective equipment (must be onsite)
5. First aid including cardio-pulmonary resuscitation (CPR)
6. Lockout procedures
7. Safety Equipment
8. Rescue drills
9. Fire protection
10. Communications
11. Formulate emergency rescue plan by ensuring standby persons are readily available and rescue equipment is in safe working order (Refer Appendix 2 Safety Equipment List)
12. Initiate safe work practices
13. Signpost work area
14. Isolate confined space
15. Evaluate confined space environment
16. Determine need for ventilation and gas detection equipment in accordance with Occupational Health and Safety Regulations 2017

 **4.2.2 Risk Assessment**

A risk assessment shall be undertaken by a competent person before work associated with the confined space is carried out. The assessment shall be in writing CMS/142 - Job Risk Assessment Form Confined Space Entry & CMS/127 - Confined Space Risk Assessment Form  and take into account at least the following:

1. the nature and inherent hazards of the confined space
2. the work required to be done, including the need to enter the confined space
3. the range of methods by which the work can be done
4. the hazards involved and associated risks involved with the actual method selected and equipment proposed to be used
5. appropriate control measures to be implemented to reduce the risk of the identified hazards
6. emergency response procedures
7. the competence and fitness of the persons to undertake the work

The risk assessment and SWMS shall be revised whenever there is evidence to indicate that it is no longer valid. Where multiple similar confined spaces in which similar work is performed are present and the risk factors are identical, a generic risk assessment may be appropriate. A copy of the completed risk assessment and SWMS must be on site during work and attached to the Work order for the job.

**4.2.3 Confined Space Entry Permit**

When the Works Supervisor or Responsible Person is satisfied that the work can be completed safely and without risks to health, written approval in the form of a Confined Space Entry Permit (CMS/133 - Confined Space Entry Permit) must be completed to allow the work to be carried out and added onto the Work order for the job. Confined Space Entry Permits are also available electronically.

Permit forms are available via the Wetnet, Regional co-ordinators or OH&S Officers.

 **4.2.4 Confined Space Entry Team**

There must be sufficient people in the working party to enable safe completion of the works to be undertaken and timely extraction of all persons in the confined space should an emergency situation arise. The number of people required should be determined during the risk assessment process.

The absolute minimum for entry into a confined space is two employees, one competent person to enter and one competent person to be the standby person.

 **4.3 CONSIDERATIONS DURING WORK IN A CONFINED SPACE**

**4.3.1 One Surface Person (Standby Person)**

One person must remain at the entrance to the confined space in the role of standby person. This person must not enter the confined space under any circumstances.

**4.3.2 Signs and Protective Barriers**

The responsible person, prior to any person entering a confined space and during occupancy, will ensure appropriate signs or protective barriers are erected to prevent entry of unauthorised persons. This includes other openings that may be open for ventilation requirements.

**4.3.3 Atmospheric Assessment (Gas Detection)**

Atmospheric testing and monitoring is to be carried out consistent with the hazards identified in the risk assessment. Testing is to be done using a portable gas detector and the results are to be recorded on the entry permit. No person should enter a confined space unless:

1. There is a safe level of oxygen;
2. Atmospheric contaminants are reduced to below the relevant exposure standard;
3. The concentration of flammable contaminant is the atmosphere is below 5% of its LEL

When using an electronic gas detector to assess a confined space you must:

1. Test the space (Test at top, middle & low sections of the space)
2. Ventilate the space
3. Test the space again and record readings on permit; and
4. Continuously monitor atmosphere while in the space.

In the event of an alarm on the gas detector, check the reading and evacuate the space immediately.

**4.3.4 Ventilation**

The confined space shall be ventilated by natural, forced or mechanical means to establish and maintain a safe breathing atmosphere. This ventilation shall be continued throughout the period of occupancy as a safeguard against the unexpected release of contaminants. The space is to be ventilated for at least 10 minutes prior to entry.

**4.3.5 Self Contained Breathing Apparatus**

Self-contained breathing apparatus must be available on site in case of an emergency. It must have been checked by a competent person to ensure that it is fully functional and that it has a suitable amount of air for emergency purposes.

**4.3.6 Communication**

There must be regular and continuous communication between the surface and the person below by using:

1. Voice
2. Signals on a safety line eg. one pull - stop
3. Approved communication equipment where appropriate (e.g. two way radios used for when the standby person does not have direct line of sight to the person(s) in the space).

It is essential to maintain communication between the surface and the work site so that emergency response procedures can be activated when someone indicates distress.

**4.3.7 Personal Protective Equipment and other Safety Equipment**

The responsible person will ensure that where it is not practicable to provide a safe oxygen level, or atmospheric contaminants cannot be reduced to safe levels, no person will enter the confined space unless they are equipped with suitable personal protective equipment. This includes air supplied respiratory protective equipment.

The responsible person will provide suitable equipment including where necessary;

1. Personal protection
2. Rescue
3. First Aid
4. Fire Suppression

The responsible person will ensure that the equipment is appropriate to the work to be carried out in the confined space and that it is maintained in a proper working condition. Personal protective equipment and rescue equipment must be selected and fitted to suit the individual.

Harnesses, Tri-pods and Rescue equipment expire and can no longer be used after 10 years in service. This equipment must be formally checked annually by a competent person as well as doing the usual pre-start inspection.

**4.3.8 Hot Work in and around a Confined Space**

The responsible person will ensure that prior to any Hot Work being completed; a Hot Work Permit for Confined Spaces Form will be completed (CMS/3019 - Hot Work Permit for Confined Spaces).

 **5 PREPARE FOR EMERGENCIES AND RESCUE**

**5.1 Emergency and rescue training and equipment must be provided**

Prior to Confined Space Entry (CSE) the managers and supervisors must ensure that:

1. Personnel are trained, competent and equipped for emergencies and rescue
2. Equipment required for rescue must be checked, compliant with applicable Australian and International standards, and made available for immediate use
3. Asset modifications necessary for rescue must have been implemented

 **5.2 Emergency and rescue plan is required**

 Prior to Confined Space Entry (CSE), an applicable emergency and rescue plan must be:

1. Identified, planned and established
2. Communicated to members of the CSE Team and any other relevant persons
3. Rehearsed on a 12 monthly basis
4. Attached to the CSE permit
5. Rescue Plan Stages – To be recorded on the Entry Permit
* Stage 1 – Self rescue – Worker climbs out of space using installed equipment.
* Stage 2 – Stand by person recovery – Stand by person winches or hauls out worker/s using installed equipment.
* Stage 3 – Third party emergency rescue – Dial ‘000’ & request Fire Brigade.

**5.3 Third party emergency and rescue capabilities must be verified prior to CSE**

If the emergency and rescue plan involves an external party (e.g. Emergency Services) the Responsible person must confirm that the external party has a satisfactory response capability prior to CSE.

In determining whether the external party has a satisfactory response capability, the Responsible Person must consider the response timeframe, available personnel and equipment, and emergency response procedures of the external party. This may require a prior visit to the CSE location and a rescue rehearsal by the external party.

 **5.4 General emergency response procedures**

The responsible person will ensure that appropriate rescue and first aid procedures and provisions are planned, established and documented on the risk assessment. The following are general emergency response procedures which can be used to develop the site specific plans.

**5.4.1 Person(s) Working In the Confined Space**

If you detect or suspect a dangerous gas, feel eye irritation, headache, dizziness, shortness of breath or generally feel ill, immediately signal distress to the surface person: call out, tug on the safety line or use a radio and if possible, immediately evacuate the space.

If the gas detector sounds its alarm evacuate the space immediately and then determine why the gas detectors alarm has sounded. Do not stay in the space as by the time you have worked out why it is alarming it could be too late.

There will be instances where the use of a safety line is impracticable for entry into a confined space. If the entry person is not connected to a safety line then self-rescue breathing apparatus must be used and the person must immediately exit the space.

**5.4.2 Person(s) Working Outside the Confined Space**

If someone working in the confined space gives a distress signal, take these steps:

1. Bring the distressed person up as quickly as possible -
2. DO NOT ENTER THE CONFINED SPACE UNLESS YOU ARE WEARING SELF CONTAINED BREATHING APPARATUS (NOT SELF RESCUE EQUIPMENT) AND THERE IS A THIRD PERSON ON SITE WHO CAN INACT THE NEXT STEP.
3. Keep the safety line taut so the distressed person has to exert as little effort as possible. Get another person on the surface to help you if required.
4. Contact emergency services (000) or contact the office who will contact them for you and then administer first aid. If you have not been able to arrange emergency services, transport the person to the nearest hospital as quickly as possible.
5. If not done so already notify the Corporate/Regional Office of the incident who will then notify the relevant manager/supervisor in charge of the works.
6. Do not disturb the site or structure conditions until an inspection has been made, as directed, by the Area Manager or Regional Manager.

 **5.5 COMPLETION OF WORKS**

The responsible person must ensure that:

1. All persons and equipment have been removed from the confined space
2. Ensure the confined space entry permit has been completed
3. Ensure the work area has been left in a safe condition for staff, contractors and the public.

**6 CALIBRATION OF GAS MONITORS/DETECTORS**

The portable multi-gas monitors must be calibrated every six months in accordance with the manufacturer’s instructions or at more regular intervals depending on frequency of use. To get the unit calibrated return it to the Resources Coordinator.

Batteries must always be fully charged, as you are not allowed to enter a confined space without being able to detect and continuously monitor for hazardous atmospheres. Battery charging should only occur for the time required to fully recharge and not left on charge continuously, because this will damage the life of the battery.

Gas monitor equipment must be stored in storage box supplied, when not in use or being serviced.

**7 TRAINING**

All persons including contractors who are required to work in, be a standby person for or design confined spaces shall attend an accredited training session in Confined Space Entry and First Aid/CPR. The training will cover such things as:

1. Risk Assessment and Entry Permits
2. Entry Procedures
3. Use of Entry Equipment such as harness, tripods, durahoists, davit arms, etc
4. Gas Detection
5. Self Rescue and Self contained breathing apparatus (SCBA)
6. First Aid/CPR

All trained persons shall have their competency reassessed every 12 months but not more than every three years to ensure their ongoing competency to perform the activities relevant to their entry and the work associated with confined spaces.

**8 CONTRACTORS AND VISITORS**

**8.1 Contractors**

Contractors, including sub-contractors, must have safe systems of work that controls the risks presented when working within a confined space, in accordance with the Occupational Health and Safety Regulations 2017.

The contractor will provide evidence, prior to the commencement of work, that their employees and any sub-contractors involved with the confined space entry work have received appropriate accredited training and are competent.

**8.2 Visitors**

Any person who is not a member of the confined space entry team is, for the purposes of this procedure, a visitor. This may include

1. Specialist observers
2. Consultants
3. Individuals conducting inspections to assist with the preparation of quotes or tender bids
4. Servicing of equipment

Where such a person is required to enter a confined space, or requests the authority to provide access, the individual shall:

1. As a minimum, have completed a general confined spaces induction training within the last 12 months
2. Not assume roles for which a person fully trained in confined space entry is required (eg standby person)
3. Be briefed on the content of the Confined Space Entry Permit, the site/task specific risk assessment and the emergency response plan. It is the responsibility of the responsible person to ensure that this is completed prior to entry.
4. Be fit for the task
5. Be allowed to enter the confined space only in the company of the confined space entry team and under direct supervision of the responsible person.

**9 RESPONSIBILITIES**

All GWMWater tasks involving confined space entry will be carried out in accordance with the Victorian Occupational Health and Safety Regulations 2017, the WorkSafe Compliance Code 2019 and the Australian Standard AS 2865 – 2009 Safe Working in a Confined Space. This guidance note has been developed in accordance with these documents.

**9.1 Operational Managers shall:**

1. Ensure that all appropriate actions are taken to implement this procedure
2. Ensure that resources are made available to enable initial training and the regular refresher training to be carried out.
3. Hold supervisors under their direct accountability for meeting the objectives of this procedure.
4. Ensure that documented hazard identification, risk assessment and risk control studies are conducted for all work in confined spaces.

**9.2 Supervisors shall:**

1. Ensure that all available information on Confined Space Entry is made available to all staff
2. Ensure that confined space entry training is carried out as required
3. Ensure appropriate operation and/or maintenance of the plant, equipment or assets associated with the confined space.
4. Ensure equipment listed in appendix 2 is available
5. Ensure that entry permits and atmospheric test results for their area of responsibility are retained in accordance with the OH&S (Confined Spaces) Regulations
6. Ensure that new employees receive training before they perform the roles of entry or standby person.
7. Ensure all personnel required to work in confined spaces are suitably fit.

**9.3 Authorised Person shall:**

1. Ensure all personnel required to enter or work in a confined space have read, understood and signed Confined Space Entry permit, SWMS, Risk assessment, which complies with the Confined Spaces Regulations and this procedure
2. Issue of a Confined Space Entry Permit
3. Plan and supervise work including signposting and barricading of the work area
4. Evaluate proposed operations and work procedures, particularly those that may cause a change in conditions in the confined space
5. Determine the requirements for atmospheric testing to be undertaken and the parameters to be assessed before the entry permit is issued
6. Implement a system to know when personnel are in - or have exited ­the confined space
7. Ensure isolation measures are not removed until all persons have left the space
8. Verify training and competency to work in confined spaces of employees and contractors
9. Arrange stand-by personnel and rescue arrangements and necessary equipment
10. Ensure all members of his/her work team are in a suitable condition to enter and work in a confined space and are not suffering from any functional or respiratory disability
11. Conduct awareness training for visitors.

**9.4 Stand-By Person**

1. Remain immediately outside the entrance to the confined space at all times.
2. Maintain visual, audible or tactile communication with the work team inside the structure.
3. Have a means of communication to contact emergency services or other back-up.
4. Be competent in the application of the emergency response plan.
5. Initiate appropriate emergency procedures.

**9.5 Competent Person**

Comply with all requirements as defined by this procedure.

**10 RELATED DOCUMENTATION/FORMS**

1. Confined Space Entry Procedure
2. Confined Space Identification Checklist
3. Confined Space Entry Risk Assessment
4. Confined Space Entry Permit
5. Confined Space Entry Flow Chart
6. Hot Work Permit For Confined Spaces
7. Safe Work Method Statement ( SWMS ) for High Risk Construction Works
8. CMS/3564 High Risk Work Rescue Plan Form

**11 REFRENCES**

1. *Occupational Health and Safety Act 2004*
2. Occupational Health and Safety Regulations 2017
3. AS/NZS2865-2009 Safe Working in a Confined Space
4. Victorian Worksafe Compliance Code for Confined Spaces 2019

**APPENDIX 1**

**List of hazards commonly encountered in GWMWater work locations**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Hazard** | **Elevated Water Storage** | **Sewer manhole** | **Sewer Pump Station** | **Trench** |
| Hazardous Substances | Chlorine ResidualsFoul gas from silt | Gases & liquids from sewersfats & deposits | Gases & liquids from sewersfats & deposits |  |
| Unsafe oxygen level | Rust build upChlorine gasWeldingPetrol driven pumps | Replacement of oxygen by other gases | Replacement of oxygen by other gases | Fumes - petrol motors, pumps |
| Mechanical Hazard | Internal laddersdrills, pumps & welders | Internal laddersVentilation equipmentPump equip | Internal laddersVentilation equipmentPump equip | Water pumpsBackhoes diggers working near edge |
| Electrical Hazard | Power toolsLeads | Lights, pumps and ventilation power supply | Lights, pumps and ventilation power supply | Power toolsLeads |
| Manual Handling | lifting/carrying equipment | Lifting carrying equipment | Lifting carrying equipment | lifting/carrying equipment |
| Environmental Hazard | heat/cold stress | Heat/cold stress | Heat/cold stress | Unstable soilsFlooding from dams, rain, burst water mainsOther services - phone, electricity gas, storm water |
| Biological Hazard |  | E-Coli exposure | E-Coli exposure |  |
| Slips trips & falls | Wet, damp conditions | Wet damp conditions | Wet damp conditions | Entry/exitwet conditions |
| Flammable hazard |  | Methane | Methane |  |
| Noise | Equipment | Equipment | Equipment | Mechanical equipment |
| Traffic Hazard | Roadways, walkway locations | Roadways, walkway locations | Roadways, walkway locations | Roadways, walkway locations |

**Note:** There are likely to be additional hazards and confined spaces in our workplace that staff should be aware of. Any such confined space should be the subject of a risk assessment by the responsible person before entry.

##### APPENDIX 2

**Safety Equipment for Confined Space Entry**

The following equipment in the quantities indicated should be held at or be readily available:

|  |  |
| --- | --- |
| Equipment  | Quantity |
| First Aid Kit | 1 Per Vehicle |
| PPE - Safety Helmets, Steel Cap Boots, Gloves, etc | All persons - as issued |
| Safety Lines | 1 Per Crew |
| Self Rescue Breathing Apparatus  | As Required in each Area |
| Approved Safety Torch | 1 Per Vehicle |
| Approved Spotlight with Leads | 1 Per Vehicle |
| Approved Lightweight Tripod or Durahoist (Draeger, Miller, or similar approved type) | 1 Per Area |
| Approved Personal Winches | 1 Per Tripod |
| Approved Portable Multi-Gas Monitor Device | 1 Per Area |
| Mechanical Blowers (ventilation) | 1 Per Area |
| Traffic Warning Signs, Barricades, Flashing Lights, Witches Hats, Flags to AS 1742.3 2019 | As Required in each Area |
| Portable Airline System or Self Contained Breathing Apparatus | 1 Per Area |
| Fire Extinguisher - Dry Chemical | 1 Per Vehicle |