INTEGRAL SKILLS

CONFINED SPACE

RIIWHS202E Enter and work in confined spaces

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MODIFICATION HISTORY

Version	Date	Nature of Amendment
1	7 Feb 19	Creation
2	27 Oct 20	Updated to Version 'E'

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INTRODUCTION

This unit describes a participant's skills and knowledge required to enter and work in confined spaces in the Resources and Infrastructure Industries.

This unit is appropriate for those working in operational roles undertaking work in confined spaces.

Licensing, legislative, regulatory and certification requirements that apply to this unit can vary between states, territories, and Industry sectors. Relevant information must be sourced prior to application of the unit.

PERFORMANCE EVIDENCE

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- enter and work in confined spaces on at least two occasions, including:
  - o obtaining the required entry permit and instructions for performing work in confined spaces
  - o interpreting and applying workplace procedures
  - o applying tagging and lock out procedures
  - o selecting, wearing and caring for personal protective equipment
  - o using atmospheric monitoring devices prior to entering the confined space
  - o entering the confined space
  - o working in the confined space
  - o using atmospheric monitoring devices during confined space activity
  - o applying safe materials handling methods
  - o exiting the confined space
  - o removing tagging and lock out.

During the above, the candidate must:

- locate and apply relevant legislation, documentation, policies and procedures and confirm that the work activity is compliant
- implement the requirements, procedures and techniques for entering and working in confined spaces
- work effectively with others to enter and work in confined spaces in a way that meets all required outcomes

- communicate clearly and concisely with others to receive and clarify work instructions and to determine coordination requirements prior to commencing and during work activities.

KNOWLEDGE EVIDENCE

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- key legislation relevant to enter and work in confined spaces
- key policies, procedures and documentation required to enter and work in confined spaces, including:
    - entry and exit procedures, risks and regulations
    - site and equipment safety requirements
    - site isolation and site control responsibilities and authorities
    - safety data sheets
    - incidence and emergency response documentation
- principles and techniques for identifying and responding to:
    - areas that constitute confined spaces
    - types of air contaminants and toxic gases
    - limitations of breathing apparatus
    - relevant hazards and emergencies
- equipment types, characteristics, technical capabilities and limitations
- principles and techniques for using confined space and industry terminology
- techniques for coordinating and communicating job activities with others.

ASSESSMENT CONDITIONS

Mandatory conditions for assessment of this unit are stipulated below. The assessment must:

- include access to:
    - personal protective equipment
    - equipment related to entering and working in confined spaces
    - relevant documentation
- be conducted in a safe environment; and,

- be assessed in the context of this sector's work environment; and,
- be assessed in compliance with relevant legislation/regulation and using policies, procedures and processes directly related to the industry sector for which it is being assessed; and,
- confirm consistent performance can be applied in a range of relevant workplace circumstances.

Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated work environment* provided it is realistic and sufficiently rigorous to cover all aspects of this sector's workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.

WHAT IS A CONFINED SPACE

The NSW Work Health and Safety Regulation 2017 defines a confined space as an enclosed or partially enclosed space that:
- Is not designed or intended primarily to be occupied or entered by a person.
- Is, or is designed or intended to be, at normal atmospheric pressure while any person is in the space.
- Is or is likely to be a risk to health and safety from:
  - An atmosphere that does not have a safe oxygen level.
  - Contaminants, including airborne gases, vapours and dusts that may cause injury from fire or explosion.
  - Harmful concentrations of any airborne contaminants.
  - Engulfment.

Confined spaces may include:

- Culverts and storm water systems.
- Pipes and live or inactive sewer mains.
- Shafts, ducts and access chambers.
- Pits, trenches and gullies.
- Environmental traps and tanks.
- Box girders and bridge voids.
- Storage tanks, process vessels, boilers, pressure vessels, silos and other tank-like compartments.
- Tank cars.

Shipboard spaces entered through a small hatchway or access point such as:
- Cargo tanks.
- Cellular double bottom tank.

A person is deemed to have entered a confined space when their head (i.e. the breathing zone) or upper part of the body is within the boundary of the confined space. (Note that inserting an arm for atmospheric testing is not considered an entry into a confined space). Working in confined or enclosed spaces can be extremely dangerous and can lead to serious injury, illness or death for individuals or whole groups of workers.

A confined space can increase a worker's risk of being overcome by fumes, gases or lack of oxygen, damage to hearing through increased noise or vibration, extreme temperatures and injury through falls and slips.

It is very important that you have the ability to correctly identify a confined space in order to take appropriate actions such as obtaining permits and using safety equipment.

HOW TO DETERMINE WHETHER A SPACE IS A CONFINED SPACE

A confined space is determined by the structure and a specific set of circumstances. The same structure may or may not be a confined space depending on the circumstances when the space is entered. Entry to a confined space is considered to have occurred when a person's head or upper body enters the space.

A space may become a confined space if work that is to be carried out in the space would generate harmful concentrations of airborne contaminants.

Temporary control measures such as providing temporary ventilation or achieving a satisfactory pre-entry gas test will not cause a confined space to be declassified. For a confined space to be declassified as a non-confined space, it needs to have undergone sufficient changes in structure and use to eliminate all inherent hazards that define a confined space.

The following flowchart will help to determine whether a space is a 'confined space' for purposes of the WHS Regulations.

Appendix A provides a table to further illustrate how a confined space is determined.

Is the space **enclosed or partially enclosed?**
The risks of confined spaces are associated with how much of the space is enclosed, rather than the size of the space.

No →

Yes ↓

Is the space **not designed or intended to be occupied by a person?**
Spaces with poor ventilation, inadequate lighting and restricted means of entry or exit are generally not designed for human occupancy. The entry or exit to the space could be restricted if the size of the opening and/or its location makes it physically difficult to get in and out of and difficult to remove an injured or unconscious person from the space.

No →

Yes ↓

Is the space **designed or intended to be at normal atmospheric pressure while a person is in the space?**
Where a space is not normally at atmospheric pressure (for example a boiler) it must be brought to atmospheric pressure before a person enters the space, as part of the risk control process.

No →

Yes ↓

Is the space **likely to pose a risk to health and safety from one or more of the following:**
- an atmosphere that does not have a safe oxygen level (a safe oxygen level means an oxygen content in air of between 19.5% – 23.5%)
- contaminants, for example airborne gases, vapours and dusts, that may cause injury from fire or explosion
- harmful concentrations of any airborne contaminants (if the contaminants are present at a concentration above the relevant exposure standard or if they are likely to cause impairment, loss of consciousness or asphyxiation)
- engulfment, for example:
  - any liquid including oil or water in which a person can drown, or
  - any solid including fly ash, grain, sawdust and sand that can flow and form a temporary cavity or bridge, which may collapse and surround a person, cutting off their air supply.

No →

Yes ↓
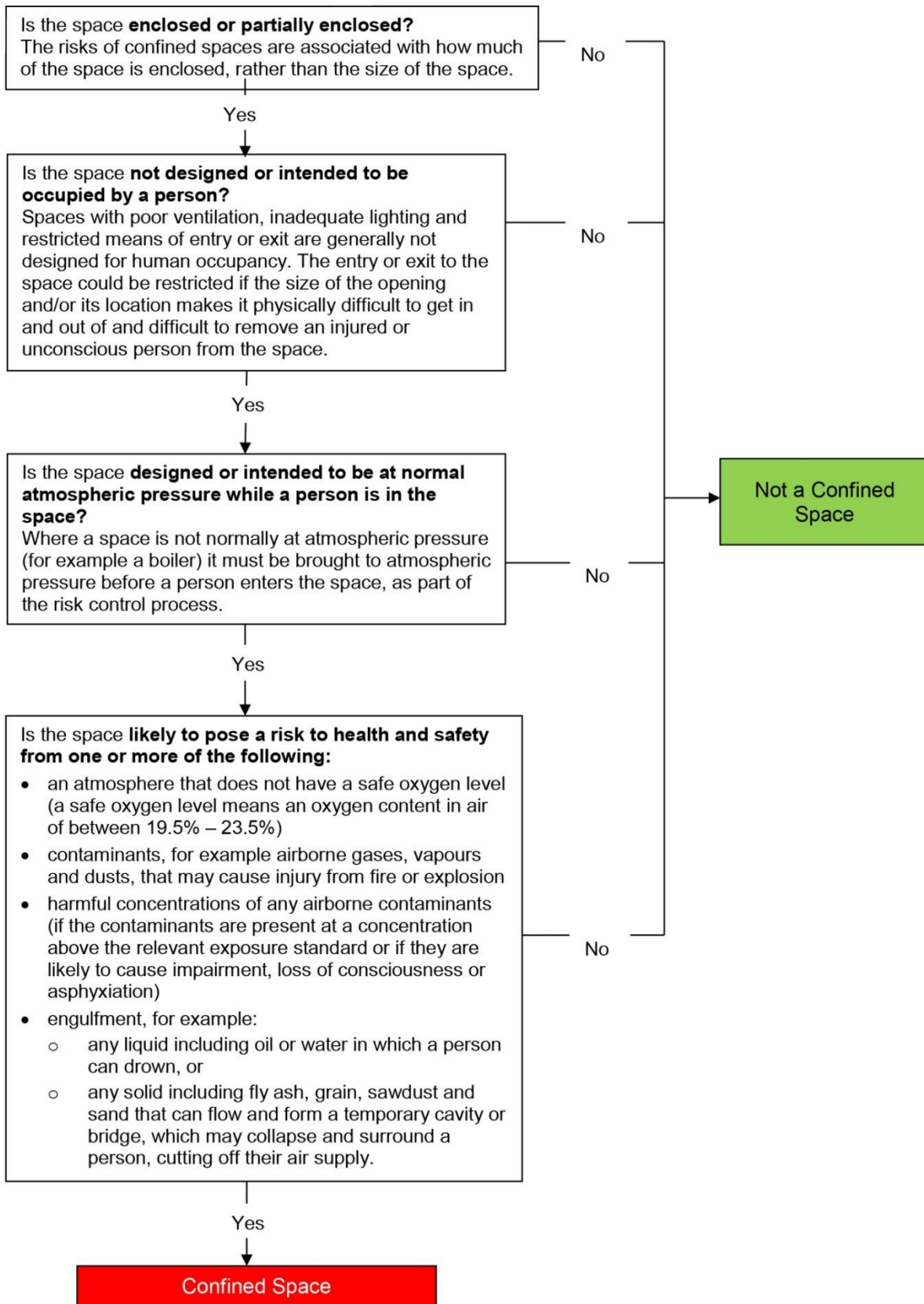
Not a Confined Space

Confined Space

Figure 1 – Confined Space identification flow

CONFINED SPACE OPERATIONS

The need to enter a confined space can be for any number of reasons including (but not limited to) repair work, installing pumps, cleaning, inspections and rescuing other workers. In order to assess the dangers involved it is important that you know the purpose for entering the confined space. You also need to determine the required skills and knowledge as well as the need for a work permit.

WORKING IN ACCORDANCE WITH POLICIES, PROCEDURES AND LEGISLATION

All confined space operations need to be conducted in accordance with policies, procedures and applicable legislation.

Policies, procedures and legislation exist to ensure that all work is completed in a way that is safe and achieves the required outcomes efficiently without causing harm to personnel/workers, equipment, work area or the environment.

Procedures and legislation can include:
- Codes of Practice.
- Regulations.
- Australian Standards (AS2865).
- Environmental Protection Agency (EPA) guidelines.
- Licence and certification requirements.
- Permits and internal permit control systems.
- Isolation techniques (mechanical and electrical).
- Atmospheric testing and action taken to provide safe entry to the confined space.
- Training and information provided to personnel/workers to determine that the situation is safe and work may proceed.
- Communication procedures in accordance with organisational requirements

TRAINING AND COMPETENCY

All persons working in confined spaces, or carrying out associated tasks must be trained and assessed as competent to do so. Confined spaces workers must be re-assessed regularly to maintain a sufficient level of skill and knowledge to carry out work in confined spaces.

COMPLIANCE DOCUMENTATION

Before you begin your task ensure that you access the relevant documentation and plan your work. Part of this is identifying any compliance documentation.

Compliance documentation is essential to all aspects of operations on every worksite.

From work instructions through to quality and environmental requirements, compliance documentation sets out the what, when, how and who of everything that needs to be done in the safest, most effective way.

Interpretation of compliance documentation will allow you to make the right decisions for each situation or task. Interpretation means understanding what is required of you and how you are expected to perform the tasks.

Applying documentation involves following all instructions given by these documents at all times – they are designed to keep you safe.

Statements containing the words "must", "shall" or "will" are often used within these documents to indicate that there are mandatory (legally must be applied) requirements. Each project site will have different compliance documentation that must be referred to.

This may include:
- Legislative, organisation and site requirements and procedures.
- Occupational Health and Safety (OHS)/ Workplace Health and Safety (WHS) legislation, codes of practice and guidance material.
- Manufacturers' guidelines and specifications.
- Australian Standards.
- Codes of Practice.
- Equal Employment Opportunity and Disability Discrimination legislation.
- Licence and certification requirements.
- Internal permit control systems.
- Mechanical and electrical isolation processes.
- Company policy and permit control systems.

Compliance documentation may be provided by:
- WHS authorities and ASCC/NWHSC.
- Environment Protection Authority (EPA).
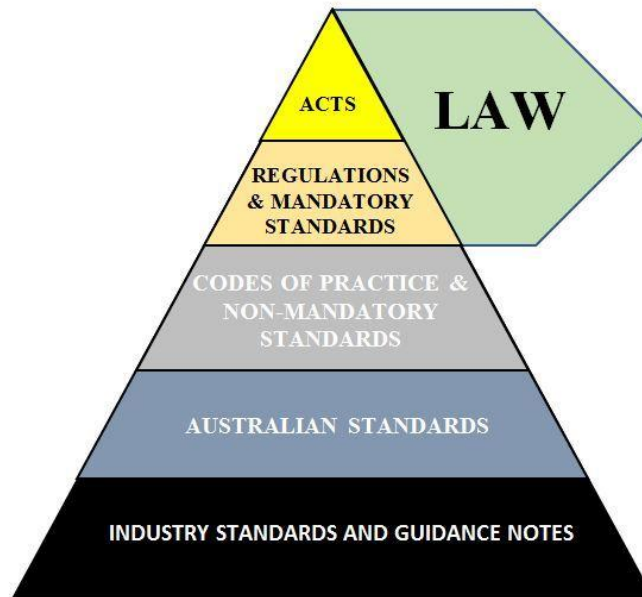- Employment and workplace relations legislation.

Figure 2 – Legislation Hierarchy

WHS LEGISLATION AND REGULATIONS

Workplace Health and Safety (WHS) are laws and guidelines to help keep your workplace safe.

These can be broken down into four main types:

- Acts & Regulations.
- Codes of Practice.
- Australian Standards.
- Regulations.

Legislation/Acts	Acts of Parliament and laws to protect the health, safety and welfare of people at work. For example the Work Health and Safety Act (the WHS Act) 2011.
Regulations	More details or information on particular parts of the Act.
Codes of Practice/Compliance Codes	Practical instructions on how to meet the terms of the law. For example the Code of Practice "Managing the Risk of Falls in Workplaces".
Australian Standards	The minimum levels of performance or quality for a hazard, work process or product. For example AS/NZS 1891

Table 1 – Legislation Descriptions

HARMONISATION OF WORKPLACE HEALTH AND SAFETY LEGISLATION

In 2011, Safe Work Australia developed a single set of WHS laws to be implemented across Australia. These are known as 'model' laws. For the model WHS laws to become legally binding, the Commonwealth, states and territories must separately implement them as their own laws.

The model WHS laws include:
- The model WHS Act.
- The model WHS Regulations.
- Model Codes of Practice.

These elements are supported by the National compliance and enforcement policy, which sets out principles of how WHS regulators monitor and enforce compliance with their jurisdictions' WHS laws. WHS regulators in the Commonwealth and in each state and territory are responsible for regulating and enforcing the laws in their jurisdictions.

The model WHS laws have been implemented in the Australian Capital Territory, New South Wales, the Northern Territory, Queensland, South Australia, Tasmania and the Commonwealth. Some jurisdictions have made minor variations to make sure the legislation is consistent with their relevant drafting protocols and other laws and processes.

MODEL WHS ACT

The Model WHS Act forms the basis of the WHS Acts that have been implemented in most jurisdictions across Australia.

The main object of the Act is to provide for a balanced and nationally consistent framework to secure the health and safety of workers and workplaces. It does this by:
- Protecting workers and other persons from harm by requiring duty holders to eliminate or minimise risk.
- Providing for fair and effective representation, consultation and cooperation.
- Encouraging unions and employer organisations to take a constructive role in promoting improvements in WHS practices.
- Promoting the provision of advice, information, education and training for WHS.
- Securing compliance with the Act through effective and appropriate compliance and enforcement measures.
- Ensuring appropriate scrutiny and review of actions taken by persons with powers or functions under the Act.
- Providing a framework for continuous improvement.
- Maintaining and strengthening national harmonisation of WHS laws and facilitating a consistent national approach to WHS.

CODES OF PRACTICE AND AUSTRALIAN STANDARDS

Model Codes of Practice are practical guides to achieving the standards of health and safety required under the model WHS Act and Regulations.

To have legal effect in a jurisdiction, a model Code of Practice must be approved as a code of practice there. To determine if a model Code of Practice has been approved in a particular jurisdiction, check with your local WHS regulator.

An approved code of practice applies to anyone who has a duty of care in the circumstances described in the code. In most cases, following an approved code of practice would achieve compliance with the health and safety duties in a jurisdiction's WHS Act and Regulations. Like regulations, codes of practice deal with particular issues and do not cover all hazards or risks that may arise. Health and safety duties require you to consider all risks associated with work, not only those risk that regulation and codes of practice exist for.

While approved codes of practice are not law, they are admissible in court proceedings. Courts may regard an approved code of practice as evidence of what is known about a hazard, risk or control and may rely on the relevant code to determine what is reasonably practicable in the circumstances.

DUTY OF CARE

Employers/PCBUs, self-employed persons, persons in control of the workplace, Supervisors, Designers, Manufacturers, Suppliers, Workers and Inspectors, have a legal responsibility under duty of care to do everything reasonably practicable to protect others from harm by complying with safe work practices. This includes activities that require licences, tickets or certificates of competency or any other relevant state and territory OHS/WHS requirements.

ORGANISATIONAL AND SITE REQUIREMENTS

During your site induction your employer will tell you where to find the compliance documentation relevant to your site and duties.

All work needs to be conducted in accordance with organisational policies and procedures and site requirements.

Procedures exist to ensure that all work is completed in a way that is safe and achieves the required outcomes efficiently without causing harm.

MANUFACTURERS GUIDELINES AND SPECIFICATIONS

These requirements will be documented in operator's manuals, equipment specifications and work instructions.

Designers and manufacturers have a responsibility to ensure that structures, plant and equipment meet strict criteria for the safe operation and protection of workers while also meeting relevant environmental standards.

ENVIRONMENTAL PROTECTION REQUIREMENTS

When entering and working in confined spaces, you should always aim to reduce environmental risk and waste.

To do this you need to:
- Identify the environmental management plans, requirements and constraints.
- Confirm any aspect of the environmental protection requirements that may be unclear.
- Apply and comply with the project environmental protection requirements of all tasks undertaken in and around the worksite.

Some environmental requirements are:
- Organisational/project environmental management plans – These outline the steps and processes required to prevent or minimise harm to the environment due to work operations.
- Waste/clean-up management – This covers the disposal of site waste materials and rubbish as well as the recycling and re-use of waste materials.
- Water quality protection – This can include methods for directing run-off away from the stormwater system or other waterways. Spills of chemicals or other materials and the use of spill kits are included.
- Noise, vibration and dust management – These plans aim to limit or avoid creating noise pollution and vibration for people in and around the worksite. Dust management includes the use of screens, tarpaulins and other dust suppression methods.

The NSW Environmental Protection Authority (EPA) can investigate and issue fines for sites that do not meet the state and federal environmental protection arrangements that are in place.

If you have concerns, questions or queries about the exact requirements you must meet, you should speak to your supervisor, the site environmental officer or contact the NSW EPA for more information.

REVIEW TECHNICAL INFORMATION BEFORE YOU START

Before starting you need to make sure you obtain all the relevant technical information appropriate for your worksite. This will enable you to conduct your work in the safest and most efficient way. This may include:

- Identification and description of the work site (e.g. site details).
- Assessment of conditions and hazards (e.g. hazard report).
- Work requirements from work orders and supervisor instructions.
- Identifying equipment defects (e.g. fault reports or isolation systems).
- Accessing diagrams or plans.
- Safety Data Sheets.
- Consignment notes (items and weights).

SAFE WORK PRACTICES

Safe work practices are methods that must be implemented to make sure a job is carried out as safely as possible. Safe work practices are governed by legislative requirements and workplace procedures and relate to such things as drugs and alcohol at work, requirements to safely enter and work in confined spaces, including safety devices, general requirements for use of personal protective equipment and clothing just to name a few.

The scope of tasks and the safe work practices you are going to apply should be referred to, and documented, when completing Safe Work Method Statements (SWMS) or Job Safety and Environment Analysis (JSEA).

This will provide a guideline for how to carry out all tasks safely in accordance with WHS requirements.

RISK MANAGEMENT INVOLVES THE FOLLOWING STAGES

- Identification of risks or hazards.
- Assessing the risk/hazard which involves analysis and evaluation.
- Identifying ways to address the risk/hazard to reduce the risk.
- Re-assessing the risk/hazard.

Consultation, communication, monitoring and review should be planned for and carried out at every stage of the risk management process.

Controlling a hazard should be a team effort and it's important that everybody not only has input, but knows what they need to do and how/if they need to change their work processes to suit.

Monitoring and review are an important part of the risk management process and should be planned for at every stage. Monitoring and review involves regular surveillance and checking and clearly identifying the responsibilities of those involved.

It is important that monitoring and review results are recorded, reported and stored for future reference.

RISKS AND HAZARDS

If you can remove or at least control a hazard you can reduce the risk involved. Each worksite has its own specific risks and hazards. Always check to see what systems and procedures are in place before conducting a risk assessment at a worksite, as they may affect the outcomes of the risk assessment.

It is important that personnel/workers with the required relevant skills are involved in the risk identification process.

You should also check records of injuries and incidents, safety tags and talk to other workers. Safety Data Sheets (SDS) can be useful tools in identifying potential hazards so make sure you check the SDS documents for your site.

If you find that there is no documentation or guideline in place to resolve an identified risk, you need to assess the risk and identify a feasible course of action to deal with it.
It is important that all records, policies and procedures are kept up to date so that the most relevant information is available and used.

Talk to others to find out if the risk has already been addressed, and what techniques are available to you to resolve, these can include:
- Safety officers.
- Site engineers (where applicable).
- Supervisors.
- Colleagues.
- Managers who are authorised to take responsibility for the workplace or operations.

These people may also have information about site hazards. It is important to communicate with other personnel and safety officers before starting on a worksite to ensure that any workplace policies or site-specific procedures are followed.

COMMON CONFINED SPACE HAZRADS

Unsafe Oxygen Levels
Levels of oxygen within a confined space which are too high (above 23.5%) or too low (below 19.5%) are a major hazard.

There are a number of reasons why oxygen levels inside a confined space may fall below a safe level including:

- The combustion of flammable materials (e.g. welding or cutting).
- Slow bacterial reactions of organic substances (e.g. sewerage).
- Reaction of inorganic substances (e.g. rust).
- Oxygen absorbed by materials (e.g. grain in silos).
- Oxygen displaced by another gas (e.g. nitrogen used to remove toxic fumes).
- High oxygen consumption rate (e.g. many people working in a small confined space).
- Leakage from oxygen lines, pipes, and fittings can raise the level of the atmosphere becoming a fire, explosion or breathing hazard.

Fires and Explosions

'Hot work' such as welding and thermal/oxygen cutting can create hazards such as excessive heat, sparks and the risk of fires or explosions.

Fires and explosions can be caused by:

- Open flames (e.g. welding torches)
- Hot surfaces (e.g. steam lines)
- Frictional sparks (e.g. a metal tool striking another object)
- Incorrectly installed wires or overloaded fittings
- Static electricity sparks (e.g. from synthetic clothing)
- A spark or heat produced by electrical equipment (e.g. a mobile phone, flashlight)
- Combustible/flammable dusts can often be found in a confined space such as a storage bin or grain silo.

Atmospheric Hazards

A safe atmosphere must be ensured, as far as is reasonably practicable, during work in a confined space.

A safe atmosphere in a confined space is one that:

- Has a safe oxygen level.
- Is free of airborne contaminants or any airborne contaminants are in concentrations below their allowable exposure standard (if any).
- Any flammable gas or vapour in the atmosphere is at concentrations below 5% of its LEL.

A safe atmosphere can be achieved within the confined space using methods such as cleaning, purging and ventilation.

Hazardous dusts, gases, fumes, mists and vapours can arise in a confined space because of:

- The work processes being undertaken (e.g. spray painting producing mists).
- Spills or leaks from pipes or machinery.

- Disturbance of materials.
- The storage or transfer of materials (e.g. grain).
- Gases in stormwater drains and sewers.
- Chemical reactions between substances.
- Exhaust gases from pumps or other machinery being drawn into the confined space by ventilation fans.

Appendix B has a Gas Chart that shows various gases and detection methods.

Residue left in confined spaces such as empty tanks and containers can cause a build-up of toxic or explosive gasses. Toxic gases can quickly overcome and kill an unprotected worker. **Confined spaces must be monitored for dangerous gases or unsafe oxygen levels.**

Layering of Gases

When there is no ventilation, gases will layer depending on their relative density to the air. It is important to be aware of this when gas testing as not to miss remote pockets or layers.
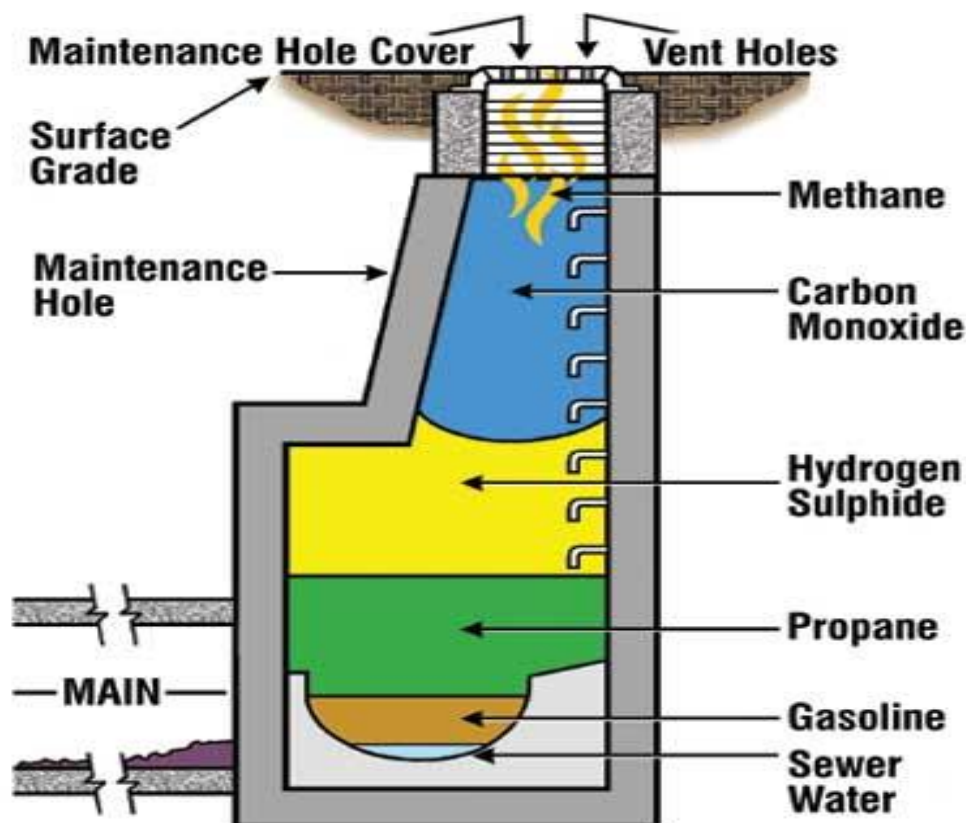

Figure 3 – Gas density layering

Hazardous Chemicals (HAZCHEM)

Figure 4 – HAZCHEM sign example

It is important to understand the HAZCHEM code system when inspecting a worksite. The HAZCHEM Code consists of either two or three characters – a number followed by either one or two letters.

The number indicates the type of medium used:

        1 = the use of solid streams of water.

        2 = the use of a water fog or fine water spray.

        3 = the use of a water-based foam.

        4 = the use of a dry agent such as a dry chemical powder.

You may use a higher number classification than the one indicated but not a lower one (e.g. a 2 would mean you could use water fog/fine water spray, water-based foam or a dry agent, you could NOT use solid streams of water).

The first letter indicates the risk of violent reaction or explosion, type of Personal Protective Equipment (PPE) to be worn and whether the substances should be contained or diluted.

Violent Reaction

P, S, W, Y = A violent reaction or explosion may occur.

Personal Protective Equipment (PPE)

P, R, W X = a full chemical protection suit and breathing apparatus should be worn.

S, T, Y, Z = breathing apparatus only needs to be worn.

Dilute or Contain

P, R, S, T = Substance should be diluted.

W, X, Y, Z = Substance should be contained.

White letters on a black background indicate that breathing apparatus should be worn only if the substance is involved in a fire.

There may be a letter E after the first letter. This indicates that evacuation of other personnel/workers in the area should be considered.

OTHER HAZARDS

Some materials stored in or around a confined spaces (e.g. grains, sawdust, or soil) can engulf (completely surround and trap) a person in seconds. If they are not rescued immediately they will die within a few minutes.

It is important not to forget about psychological hazards such as stress and claustrophobia (fear of confined spaces).

Other common hazards that you may find while working in or around confined spaces include:
- Underground services such as water and waste pipes, electrical cables and gas pipelines.
- Excavations.
- Traffic.
- Uncontrolled introduction of substances.
- Environmental hazards (e.g. inadequate lighting, heat and cold).
- Biological hazards such as viruses, bacteria or fungi.
- Limited head spaces or overhangs.
- Noise, rotational equipment or vibration.
- Sharp edges, protrusions or obstructions.
- Equipment or product mass.
- Mechanical hazards (e.g. injury from moving mechanical parts).
- Electrical hazards
- Slippery surfaces, spills or leaks.
- Manual handling hazards
- Restricted access and egress (entry and exit).

Once a risk has been identified, check for any existing procedural documentation, workplace procedure or workplace policy which describes how to eliminate or control the risk.

It is important that all records, policies and procedures are kept up to date so that the most relevant information is available and used.

Talk to other workers, your manager, supervisor, team leader or health & safety representative to find out if the risk has already been addressed, and what techniques are available to you to resolve it.

If you find that there is no documentation or guideline in place to resolve an identified risk, you need to assess the risk and identify a feasible course of action to deal with it.

TASK RELATED HAZARDS

There may be other factors that you need to consider when planning out the task that are not necessarily site hazards, but hazards relating to the way the task is carried out.

When planning out the task some of the things that you may consider are:
- Adequate and safe communication.
- Access and egress to the work area.
- Location and specific details of the task.
- Permits that may be required for the task.
- Equipment requirements and availability.

PRE—WORK HAZARD ASSESSMENT E.G. SWMS/JSEA'S ETC

A Risk Assessment to identify hazards is to be undertaken prior to commencing work. Such Risk Assessments as an example may include:
- Personal Risk Assessments;
  - Take 5, and
  - SLAMS.
- Group Risk Assessments;
  - Safe Work Method Statements (SWMS), and
  - Job Safety and Environment Analysis (JSEA's).

SWMS/JSEA's may also have been used in the development of as Safe Work Procedures (SWP) and Standard Operating Procedures (SOP). They detail the steps required to carry out a task as well as how specific hazards and risks related to a task will be managed.

They fulfil a number of objectives:
- They outline a safe method of work for a specific job.
- They provide a documented set of steps/processes that workers must read and understand before starting the job.
- They assist in meeting legal responsibilities for the risk management process, hazard identification, risk assessment and risk control.
- They assist in effectively coordinating the work, the materials required, the time required and the people involved to achieve a safe and efficient outcome. They are a quality assurance tool.

How do you complete a SWMS/JSEA?
Each organisation will have different forms and documents to manage risk, some called SWMS, JSEA, JSA etc. The fundamental steps remain the same as follows:
- Break the job down into its basic steps.
- Identify the workplace hazards associated with each step.
- Identify controls to eliminate or control those hazards.

- Rate / rank the risk with the controls in place, this is called the residual risk.
- Once agreement to the hazards and risk ratings has been achieved, the residual risk must be as low as reasonably achievable.
- Each person signs the SWMS/JSEA acknowledging that they have understood its contents.
- Put controls in place.
- Proceed with job, monitoring the controls for effectiveness and looking for new hazards.

The SWMS/JSEA must be available for inspection at any given time and must be reviewed as conditions change.

Risk / Hazard Assessment

Risk/Hazard Assessment has 2 stages:

(1) Risk/Hazard Analysis.

Risk analysis is used to determine the seriousness of a hazard based on how likely it is to happen and the consequences if it does happen. The risk level of each identified hazard should be worked out. Risk analysis comprises of 3 factors Likelihood, Consequence and Risk level.

Using a table similar to the one below, you can analyse how high the risk level is.

Likelihood	Consequence				
	Insignificant	**Minor** First Aid required	**Moderate** Medical attention and time off work	**Major** Long term illness or serious injury	**Severe** Kill or cause Permanent Disability or Illness
Almost certain	M	H	H	VH	VH
Likely	M	M	H	H	VH
Possible	L	M	H	H	VH
Unlikely	L	L	M	M	H
Rare	L	L	M	M	M

Table 2 – Likelihood vs Consequence Matrix

(2) Risk/Hazard Evaluation.

Risk evaluation is based upon the outcomes and results of the risk analysis.

Risk evaluation involves making decisions about:

- Have all the hazards been controlled.
- Is the residual risk acceptable.
- Is it safe to proceed.

Your evaluation should be used to determine how soon you should act to remove or control the hazard to achieve an acceptable level of risk.

You can do this using a table similar to the one shown below:

Risk Level	Action
Very High	Act immediately: The proposed task or process activity must not proceed. Steps must be taken to lower the risk level to as low as reasonably practicable using the hierarchy of risk controls.
High	Act today: The proposed activity can only proceed, provided that: 1. The risk level has been reduced to as low as reasonably practicable using the hierarchy of risk control. 2. The risk controls must include those identified in legislation, Australian Standards, Codes of Practice etc. 3. The risk assessment has been reviewed and approved by the Supervisor. 4. A Safe Working Procedure or Safe Work Method has been prepared. 5. The supervisor must review and document the effectiveness of the implemented risk controls.
Medium	Act this week: The proposed task or process can proceed, provided that: 1. The risk level has been reduced to as low as reasonably practicable using the hierarchy of risk controls. 2. The risk assessment has been reviewed and approved by the Supervisor. 3. A Safe Working Procedure or Safe Work Method has been prepared.
Low	Act this week: The proposed task or process can proceed, provided that: 1. The risk level has been reduced to as low as reasonably practicable using the hierarchy of risk controls. 2. The risk assessment has been reviewed and approved by the Supervisor. 3. A Safe Working Procedure or Safe Work Method has been prepared.

Table 3 – Hazard Evaluation Level example

Note: Any hazard with a residual risk level of high or very high should have further risk treatment measures (controls) in place to reduce the risk to an acceptable level. They will also require a higher level of approval in most cases and a higher level of risk management processes.

RISK/HAZARD TREATMENT

Once hazards have been identified, risk treatment options (controls) need to be considered and applied. Risk treatment involves selecting one or more controls to modify and reduce a risk and then implementing the control. Controls act as a barrier or layers preventing the unwanted event from happening. Every control has its limitations or holes in each layer and can be likened to a piece of Swiss cheese, the more layers / controls the more effective.
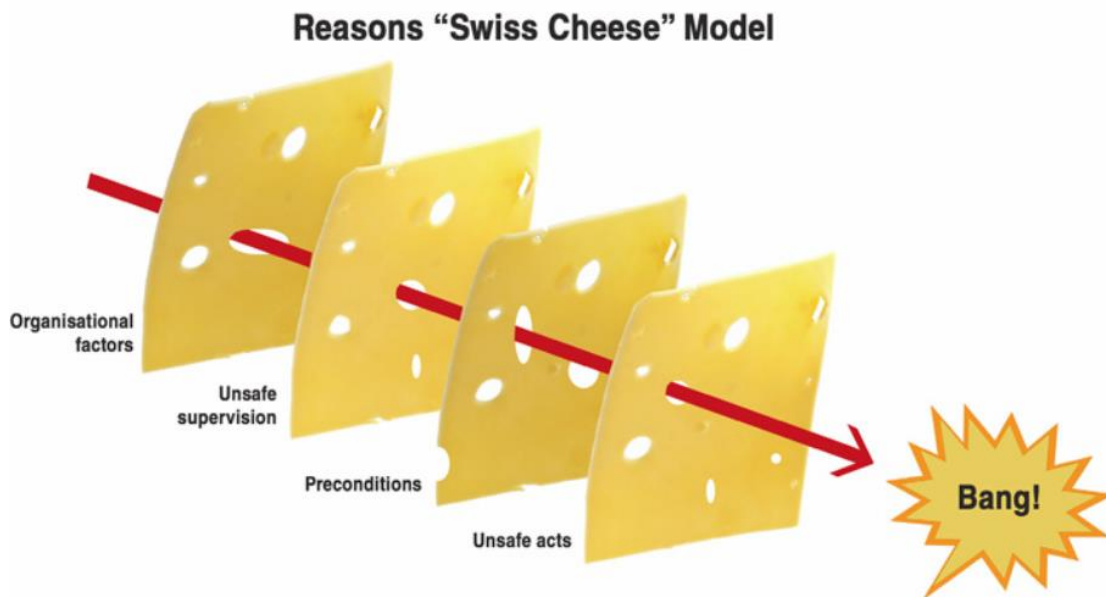

Figure 5 – "Swiss Cheese" model

Hierarchy of Control

Control measures can be ranked from the highest level of protection and reliability to the lowest. The WHS Regulations require duty holders to work through this hierarchy to choose the control that most effectively eliminates or minimises the risk in the circumstances. This may involve a single control measure or a combination of two or more different controls.
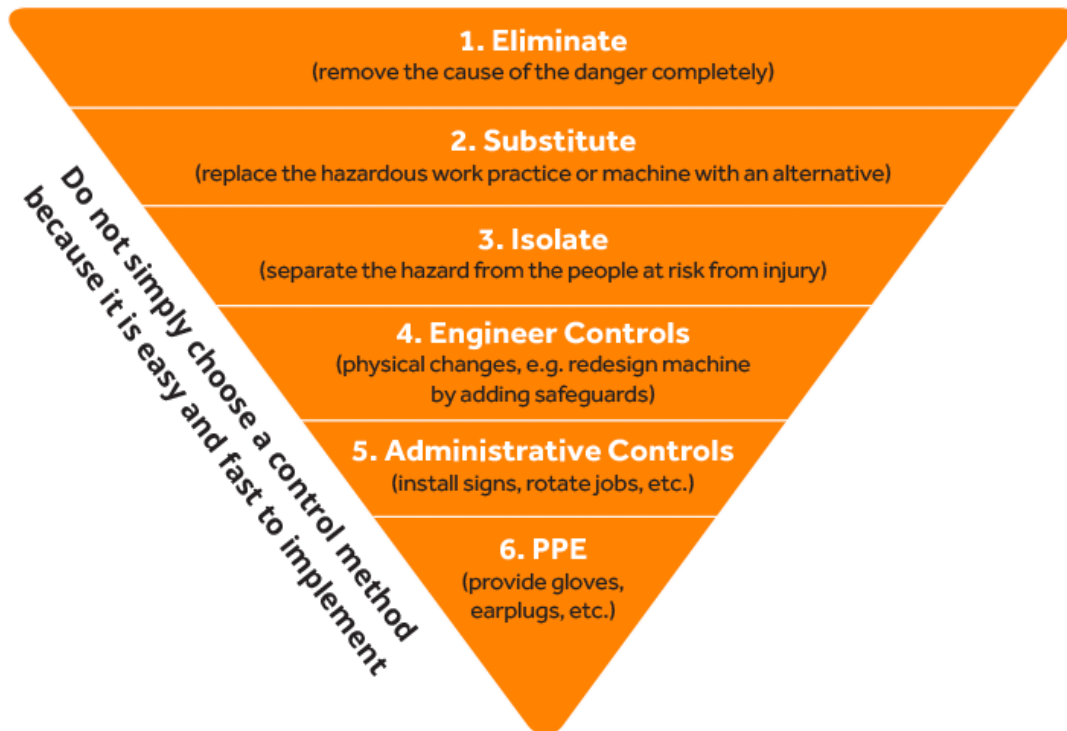
The hierarchy of control is as follows:

Figure 6 – Hierarchy of Control

It is important to consider all of the options available when deciding on the best course of action as not all options are feasible or possible under some circumstances. You may also need to use a number of control strategies in conjunction to reduce the risk level to an acceptable level.

The risk treatment plan should clearly identify the order in which to implement the individual risk treatments.

The risk treatment plan should be complete and adhere to workplace policies and procedures. Risk treatment plans should be discussed with appropriate personnel/workers and included within the management process of the organisation.

SPECIFIC CONTROL STRATEGIES FOR TRAFFIC

If the work area is going to be shared with pedestrians, site personnel/workers, vehicles or mobile plant, you will need to make sure you have selected appropriate control measures. These may include:

- Setting up pedestrian and vehicle exclusion zones.
- Setting up warning signs and barriers.

Figure 7 – Confined Space signage example

SAFETY REQUIREMENTS

It is important that you understand all safety requirements needed to perform your allotted tasks. Sources of safety information can include:

- Site safety plans.
- Organisational policies and procedures.
- Federal state and local statutory/regulatory authorities.
- Australian Standards.
- Verbal or written and graphical instructions.
- Signage and labels.
- Work schedules, plans and specifications.
- Work bulletins and memos.
- Charts, diagrams, maps and engineer's drawings.
- Safety Data Sheets (SDS).
- Regulatory and legislative requirements relating to work in confined spaces.
- Manufacturers' specifications and instructions.
- Safe Operating Procedures (SOP)/Job Safety Analysis (JSA)/Safe Work Method Statements (SWMS).

SAFETY DATA SHEETS

A Safety Data Sheet (SDS) is a document containing important information about a hazardous chemical (which may be hazardous substance and/or dangerous goods) and must state:

- A hazardous substance's product name.
- The chemical and generic name of certain ingredients.
- The chemical and physical properties of the hazardous substance.
- Health hazard information.
- Precautions for safe use and handling.
- The manufacturers or importer's name, Australian address and telephone number.

The SDS provides employers/PCBUs, self-employed persons, workers and other health and safety representatives with the necessary information to safely manage the risk from hazardous substance exposure.

IMPLEMENT CONTROL STRATEGIES

Control strategies need to be implemented before starting the task, or as soon as a hazard is identified during operation.

You should consult with other workers and management to ensure the implementation is done correctly and does not have a negative bearing on other trades, procedures or workers. Once the risk control measure is in place you will need to review the level of risk to determine if more needs to be done to lower the risk level.

The acceptable level of risk is determined by an organisation's policies and procedures, goals and objectives towards safety.

Discuss this with your supervisor or health and safety representative if you are not sure about whether or not the risk has been reduced enough to carry out the work.

If you determine the risk to be at an unacceptable level, the work must not be carried out until the situation can be reviewed by an authorised person.

MONITORING AND REVIEWING THE RISK MANAGEMENT PROCESS

Monitoring and review are an important part of the risk management process and should be planned for at every stage. Monitoring and review involves regular surveillance and checking. All responsibilities regarding monitoring and review should be clearly defined.
Monitoring and review should:

- Be used to detect any changes, including changes to risks, which may require revision of treatments, or the emergence of new risks.
- Ensure that treatments and controls are effective and efficient.
- Aim to improve risk assessment through obtaining further information.
- Be used to analyse events and changes that have occurred through the implementation of the process and any lessons that may be learned from this.

REPORTS AND RECORDS

Make sure you record any action you've taken and talk to your supervisor and OHS/WHS officer about the control strategies in place.

Reports and records could include:

- Risk Assessment Reports.
- Incident Reports.
- Job Safety Analysis (JSA).
- Safe Work Method Statements (SWMS).

DESIGN, MANUFACTURE, SUPPLY AND MODIFICATION OF CONFINED SPACES

All confined spaces should be designed and manufactured to minimise the need to enter the confined space and the risks associated with working in the confined space.

Any entry points need to be big enough to allow persons to be rescued in an emergency situation. Any modification to the confined space must not affect the safe means of entering, working in, or exiting the confined space.

INFORMATION AND INSTRUCTIONS

Make sure you collect all necessary information and instructions when planning to work in a confined space. Instructions can include:

- Plans.
- Specifications.
- Operational details.
- Instructions issued by authorised organisational or external personnel/workers.
- Project quality requirements.

PROJECT QUALITY REQUIREMENTS

All civil construction and mining tasks and activities need to meet project quality requirements. These are based on project plans and specifications as well as client expectations. Project quality requirements will detail exactly what you are expected to achieve and the standards you are expected to reach.

Project quality requirements may include:

- Dimensions and tolerances of tasks.
- Material standards.
- Work standards.
- Documentation requirements.
- Project specifications and drawings.
- Client standards and expectations.

OBTAIN A CONFINED SPACE WORK PERMIT

There is a range of important information to consider when applying for a permit such as:

- Sites under which permit activities must be applied.
- Work instructions and agreed/site procedures.
- Type of permit to be executed.
- Types of tools and equipment to be employed.
- Size of work team.
- Scope and urgency of work.
- Persons in the confined space/rotation of people in confined space.
- Risk control measures.
- Confirmation that work has been completed and that persons have left the confined space when appropriate.

The permit must be kept until the work has been completed or for at least 2 years if a notifiable incident occurs.

To obtain a confined space work permit you will need to have adequate language, literacy and numeracy skills to complete the permit documentation: This includes:

- The ability to read and correctly interpret complex Piping and Instrumentation Diagrams/Drawings (P&ID).
- The ability to speak clearly and unambiguously in English.
- The ability to explain, describe and verify complex needs and issues.
- The ability to complete workplace forms.
- Numeracy skills are needed to differentiate between high and low pressures and temperatures, voltages or masses.

Appendix C contains an example of a Confined Space Entry Permit.

TYPES OF WORK THAT REQUIRE A PERMIT

There are a number of different types of work that require a permit. These include:

- Working in a confined space.
- Working at heights.
- Cold work/general permit to work – issued for work that WILL NOT generate any source of ignition, such as flame, spark or temperature sufficient to ignite flammable material.
- Hot work – issued for work that WILL generate any source of ignition, such as flame, spark or temperature sufficient to ignite flammable material vehicle entry.
- Excavation – issued for the penetration of any ground surface with mechanical excavating equipment.
- Operation of plant.
- Other special permits such as plumbing/gas/electrical work.

CONDITIONS OF THE PERMIT

The conditions of the permit should reflect the hazards and hazard controls that have been identified. A confined space permit should include details of:

- Location, description and duration of work to be done.
- Hazards that may be encountered.
- Atmospheric test and monitoring requirements and results.
- Hot work.
- Authorisation.
- Isolation, lock-out, tagging out processes.
- Hazard control measures (e.g. signs and barriers).
- Personal protective equipment and clothing.
- Other precautions (e.g. signs, barricades).
- Size of work crew.
- Stand-by personnel/workers and emergency response and rescue arrangements.
- Other requirements as determined by risk assessment and in accordance with legislative requirements and relevant Australian Standard AS 2865-2009.

Once issued, you must confirm that the details in the work permit reflect the identified hazards, risk assessment and implemented hazard control measures. The permit should meet the requirements of AS2865 or other appropriate standards.

IMPLEMENTATION OF PERMIT HAZARD CONTROLS

Before commencing work you should implement the hazard control strategies outlined in the confined spaces work permit. Some of these strategies could include:

- Placing a stand-by person outside the confined space.
- Applying isolation, tagging and lock-out procedures for liquid, gas, electric current or other stored energy, as well as erecting barriers and signage.
- Purging gases and ventilation of the confined space.
- Using protective equipment and apparatus.
- Any other requirements outlined in the confined space entry permit, AS2865 or other relevant sources.

DEVIATION FROM A WORK PERMIT

The permit may have to be re-issued or re-applied for if work conditions such as the identification of new hazards are identified. Other problems that can arise while carrying out work requiring a permit may include:

- Provision of the wrong permit/need for additional permits.
- Incorrect information being supplied with the permit.
- Errors being made in the understanding of permit data.
- Failure to correctly correspond to the requirements of the permit.
- Failure to seek clarification when anomalies occur.
- Variation in job scope from that specified in the permit.

STAND-BY PERSONNEL/WORKERS

All necessary safety procedures and standards should be followed including hazard identification and control prior to entering a confined space. All personnel should be conversant in the emergency procedures put in place, all rescue personnel appropriately trained and rescue equipment positioned close to the point of entry. A standby person should remain close by to the confined space.

A standby person should:

- Be fully trained and competent.
- Be in continuous communication and (if possible) visual contact with those inside the confined space.
- Be ready to immediately initiate emergency response procedures.
- Be continually monitoring hazards both inside and outside the confined space.
- Maintain clear access and egress (entry and exit).
- Not be involved in any other work while personnel/workers are within the confined space.

The stand-by person should not attempt to enter the confined space unless properly trained and equipped to deal with an emergency. There should also be another stand-by person outside the confined space to help them if they should require assistance.

Figure 8 – Entry using a tripod

CONFIRM INCIDENT/EMERGENCY RESPONSE PLAN

An emergency response plan must be in place before any confined space operations are carried out.

The emergency response plan is one part of a larger confined spaces management program coordinated by your supervisor. It includes the roles and responsibilities of all workers involved in the confined spaces work (as per legislation) and the identification and designation of areas of responsibility (who is responsible for different parts of the work), including the stand-by person.

Note: Training may need to take place to ensure all workers are capable of reacting as required in the case of an incident.

Before starting any confined spaces work you need to make sure the emergency response plan is appropriate for the work situation and that the stand-by person is fully aware of all required emergency response procedures.

If the emergency response plan does not meet the requirements of the situation, people's lives are at greater risk in the event of an incident or emergency. When determining the appropriateness of the plan you may need to check the skills/training of personnel/workers involved (e.g. first aid, fire-fighting, use of specialist safety and rescue equipment).

It is also important to make sure that:

- The entry/exit openings are large enough to allow for emergency access and that they are not obstructed.
- All necessary equipment, plant and PPE are correctly maintained and available in case of an emergency.
- You know your role in an incident/emergency and how to react.

COMMUNICATION

Being able to communicate effectively in the workplace is extremely important, especially in dangerous situations such as working in confined spaces.

For the safety of all personnel/workers involved in confined space operations it is vital that you can:

- Speak clearly;
- Are able to explain, describe and verify complex needs, issues and situations.

Effective communication also means understanding the language, jargon and systems of the site, as well as industry terminology which can vary between states and individual sites.

While you may not need to apply some of the more technical terms or phrases you should be able to recognise what they are referring to when you come across them in the documentation.

If you are unsure of the meaning of any words, phrases or other terminology, you should seek clarification at your tool box talk or site meeting, or by asking your supervisor.

Effective communication is particularly important in situations where you or a fellow worker is in immediate or potential danger.

Remember: Confined space environments can change in seconds and being able to communicate events as they occur provides you with the best possible chance of survival in life threatening situations.

Communication Equipment

Communication equipment can include mobile phones or two-way radios.

Fixed frequency two-way radios are a system that stops other radios using a selected frequency.

SIGNAGE AND BARRICADES

You should always separate a confined space from other personnel/workers by using appropriate signage and barriers to prevent unauthorised entry. Signage may include:

- Site safety signage.
- Temporary signage for the benefit of motorists and pedestrians.
- Barricades.
- Erect signs that show entry is allowed only after signing the entry permit.

ENVIRONMENTAL PROTECTION REQUIREMENTS

Our environment is important to us. Any work done in a confined space should not have a negative effect on the environment. Some environmental requirements are:

- Organisational/project environmental management plans.
- Waste management.
- Water quality protection.
- Noise, vibration, dust and clean-up management.

Contact the EPA for more information on how to work safely without impacting on the environment and remember, before any work is carried out you must make sure the relevant environmental protection requirements are in place according to site procedures.

Check the confined spaces work permit for details of what is required to maintain the lowest possible impact on the environment.

SAFETY EQUIPMENT

Examples of safety equipment include:

- Lifting and lowering gear.
- Ventilation equipment.
- Fire suppression equipment.
- Personal Protective Equipment.
- Breathing apparatus and respiratory equipment.
- Atmospheric testing and monitoring equipment.

It is vital that any safety equipment is inspected regularly, calibrated and tagged correctly (if applicable).

Note: Ensure you adhere to manufacture specifications for the selection and use of breathing apparatus and respiratory equipment. Not all breathing apparatus or respiratory equipment is suitable for all conditions and environments.

Figure 9 – Tripod

Figure 10 – Ventilation

Figure 11 – Half respiratory mask

Figure 12 – Gas tester

Figure 13 – Isolation hasp and locks

Figure 14 – Self Contained Breathing Apparatus (SCBA)

REPORT FAULTS

If you find anything wrong during your checks you must:

- Tag and isolate the damaged or defective item to stop anybody using it.
- Record the problem in the logbook or on the inspection checklist. Give as much detail as possible.
- Report the fault to your supervisor or other authorised person.

LIFTING AND LOWERING DEVICES

Lifting and lowering devices include safety belts, harnesses, tripods, ropes and lifelines.

FIRE SUPPRESSION EQUIPMENT

Fire suppression equipment could include fire blankets and fire extinguishers.

PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) may include:

- Eye protection (e.g. goggles).
- Ear protection.
- Gloves.
- High visibility clothing.
- Hard hats.
- Safety footwear such as steel capped boots.
- Respirators and masks.

Correctly Fitting Personal Protective Equipment

There is no purpose in wearing PPE if it does not fit, or is worn incorrectly. Let's face it we all come in different shapes and sizes and PPE come in a variety of brands and sizes. Correct fit and comfort are just as important as technical effectiveness and the wearer must be shown how to fit it.

When using respirators or masks correct fit of a mask requires contact with smooth skin – this makes masks unsuitable for men with beards or moustaches. Even a one day growth of a beard has been shown to allow nearly 1% penetration of a full face-piece.

This is unacceptable with very toxic or carcinogenic substances. Small beards or moustaches which fit inside the face-piece are also unacceptable as they may cause an exhalation valve to fail if a hair lodges in it.

Glasses must not be worn inside a face-piece unless they are specially designed for the purpose, as the ear pieces will prevent a good seal.

These face-pieces are also unsuitable for people who wear contact lenses. Workers who wear glasses or contact lenses should be supplied with air-supplied hoods or helmets.

Respiratory Equipment

Where the hierarchy of hazard control measures cannot provide a concentration of oxygen in the confined space greater than 19.5%, or any airborne contaminant cannot be safely reduced or removed, workers must be equipped with supplied-air respiratory protection and PPE. All respiratory equipment should supply air at a pressure of at least 170L/min and have an oxygen level between 19.5% and 23.5 %.

Respiratory protection devices include:

- Air purifying respirators.
- Self-contained compressed air breathing apparatus (SCBA).
- Supplied airline breathing apparatus.
- Escape breathing apparatus.

Before you use any kind of breathing apparatus you need to make sure it is in proper safe working order and that you are competent and authorised to use it.

All equipment inspections should adhere to procedures such as;

- Relevant workplace procedures.
- Work instructions.
- Temporary instructions.
- Relevant industry and government codes and standards.

Check with your supervisor if you are unsure about any workplace procedures. You should check the following items before using any breathing apparatus:

- Serviceability and integrity of components (check for damage, wear, leaks, cracks, tears, functionality).
- Cylinder pressure (check the manufacturers specifications for correct air pressure).
- Integrity of air flow system (make sure there is a proper supply of air).
- Serviceability of any ancillary equipment (harness, regulator, pressure gauge).
- Seals (rubber must be in good condition).
- Inlet and exhaust valves (correct operation, particularly for blockage or sticking – sweat and saliva often cause them to clog up).

Atmospheric Testing and Monitoring Equipment

Each gas testing instrument needs to be:

- Calibrated according to the manufacturer's instructions. Instruments that are out of calibration or that fail field checks cannot be used for atmospheric testing until they are properly calibrated.
- Calibrated by the manufacturer annually.
- Field checked immediately prior to use. The field check needs to include checking with a test gas as per the manufacturer's instructions.

Atmospheric testing and monitoring equipment includes:

- Instruments used for pre-entry testing appropriate to the hazards.
- Continuous monitors appropriate for the hazards.
- Other devices used to test the confined space atmosphere as required by the permit conditions.

Figure 15 – Atmospheric Testing

CONDUCT ATMOSPHERIC TESTING

The air inside a confined space should be tested before any workers enter. If work stops for a long period of time (e.g. over an hour) the space will need to be tested again. The person conducting the atmospheric testing must be appropriately trained and have written authority. Before a person enters a confined space make sure:

- The confined space contains an oxygen level between 19.5% and 23.5%.
- The atmospheric contaminants in the confined space are reduced to a safe level.
- There are no temperature extremes.
- The concentration of flammable gases in the atmosphere is below 5 per cent of its Lower Explosive Limit (LEL).

The Lower Explosive Limit (LEL) is the concentration of flammable material in the air below which a flame will not ignite when in contact with an ignition source.

What if Readings Pose an Unacceptable Risk

If initial testing shows that the space is contaminated in any way you will need to take action. This could be done a number of ways such as:

- Purging the atmosphere by blowing air through the space; or
- Extracting toxic gases with a suitable exhaust system; or
- A combination of blowing and exhausting.

Care should be taken to prevent people outside the confined space from being exposed to gas while the atmosphere inside the confined space is being purged. Care must also be taken when purging flammable gases.

Do not use pure oxygen or gasses with a higher oxygen level of 21% for purging purposes. Ventilation such as exhaust fans can be used to remove hazardous gases and contaminants. Any purging of a confined space needs to be followed up with proper ventilation procedures. Alternatively, people can enter the space if they wear an approved air-supplied respirator (self-contained breathing apparatus), so long as there are no flammable gases present in the confined space. Testing should be done prior to entering the confined space and needs to be done on a continuous basis while confined spaces operations are conducted, or in accordance with the confined spaces permit.

Confirm Atmospheric Testing Results before Entering the Confined Space

Always confirm that the results from the atmospheric testing show that the confined space is safe for entry before you begin work.

If the test results are inconsistent or inconclusive you must make sure further testing is completed with different and/or re-calibrated equipment.

Confirming the Confined Space Is Ready For Entry

Before entering the confined space check the following:

- Isolations are complete and appropriate.
- Isolation provides positive isolation.
- Atmosphere is safe (or if necessary relevant measures are in place to ensure safe entry into an unsafe atmosphere).
- Safe entry and exit methods are in place.
- Access points are large enough for people (including emergency personnel/workers) and equipment to pass through. Access points should also be adequately provided with ladders, platforms or walkways, should not be obstructed by equipment and should be adequate in number for emergency rescue and ventilation requirements.
- Other items to ensure compliance with procedures, permits, relevant legislation and AS2865 are in place.

If you find that the confined space is not ready for entry you must report the deficiencies to an authorised person so that they may be fixed. You may also refuse to enter the confined space until the situation is corrected.

Figure 16 – Barricade example

RESCUE EQUIPMENT

It is vital that you have a plan in place and adequate incident response equipment on hand to cover any incidents that may occur, with all rescue personnel/workers trained in their use. Anybody involved in an emergency response must be made aware of the conditions and the number of people in the confined space before attempting to enter it. Rescue equipment, first aid kits, fire suppression equipment and spill kits should also be set up and ready for use near the confined space.

Figure 17 – Confined Space Equipment examples

EMERGENCY RESPONSE

- It is important to stay calm and focused in a crisis to ensure a positive outcome.
- Immediately raise the alarm if there is an emergency.
- If all procedures, equipment and personnel/workers are prepared, a rescue can be attempted without delay.
- It may be necessary for a trained person to apply first aid.
- Emergency services may need to be telephoned. Dial 000 immediately.

Figure 18 – Entering a Confined Space

ENTER THE CONFINED SPACE

No person may enter a confined space unless:
- The risk assessment has been reviewed.
- They have written authority to enter the confined space.
- The written authority includes any risk control measures or precautions necessary (including the number of standby people required) for the safe entry and execution of the work.
- They are made aware of, understand and comply with the written authority.
- A record of their presence in the confined space is made.
- Signs and protective barriers are erected to prevent unauthorised access.
- Appropriate and sufficient arrangements have been made for emergency response and rescue of persons in the confined space.

Preparations for entry to a confined space should accord with Australian standards and local procedures. All tagging and lock-out requirements listed in the work permit must be applied before the confined spaces work may begin. Once all the preparation has been completed you may begin entering the confined space.

WORK IN CONFINED SPACE

You should always comply with permit conditions while working in a confined space and follow all safety procedures while carrying out work in the confined space. If permit conditions and requirements are deviated from the permit may be revoked. Any deviations should be reported and corrected and the permit re-authorised and re-issued by an appropriately qualified and competent person.

Common safety procedures for carrying out work in confined spaces are:

- Ensure gas monitoring is carried out prior to entry.
- Ensure all isolations are in place and effective.
- Stay in constant effective communication with other personnel/workers including the stand-by person.
- Use communication equipment correctly. Where necessary you may have to rely on hand signals. Make sure you have worked out these hand signals before entering the confined space to work.
- There should be constant monitoring of equipment and changes in the environment (including atmosphere) while work is being carried out. Damage to equipment, changes in the atmosphere and movement of workers can all create new hazards.
- New hazards that arise while you are working within a confined space may require you to implement new hazard controls and request the re-issue of a permit.
- If you are using a gas monitor and the alarm sounds all personnel/workers should leave the confined space immediately.
- Do not work past the time allowed for the work to be done within the confined space. Keep an eye on the amount of time the work is taking. The allocated time will be shown on the confined spaces work permit.
- Complete confined space entry logs, ensuring that all entry and re-entry of persons working within the confined space are accurately recorded.

Figure 19 – Entering a Confined Space

Figure 20 – Working in a Confined Space

CHANGES TO RISK LEVEL DURING CONFINED SPACE OPERATIONS

If there is a change to the risk level during the confined space operation you will need to take appropriate action depending on the situation.

This may include:

- Organising for the re-validation or re-issue of the work permit to reflect the change to the situation.
- Evacuating the confined space according to procedures.
- Undertaking further testing of the confined space atmosphere and environment.
- Raising the alarm with other personnel/workers and isolating the confined space (depending on the circumstances).
- Initiating the emergency/incident response plan and carrying out your own role and responsibilities according to procedures.
- Any other relevant action as determined by your supervisor.

EXIT CONFINED SPACE

Exit the confined space safely and take appropriate measures to address hazards created by sharp edges or when exiting a confined space at height. Wherever possible use fixed ladders, platforms and walkways to exit from the confined space.

Figure 21 – Exiting from a Confined Space

RETURN THE CONFINED SPACE TO SERVICE

Once the confined space work has been completed in accordance with the work permit you will need to:

- Conduct an inspection of the confined space.
- Recover all tools, equipment and materials from the confined space.
- Replace or close the access cover as required.
- Remove hazard control measures including tagging and lock-out systems as required.
- Complete confined space entry log.
- Notify the appropriate personnel/workers that the work in the confined space has been completed.

INSPECTION AND SITE CLEAN UP

The confined space must be inspected to ensure that all tools, equipment and materials have been recovered, and that there has been no damage done to the environment. Also check to make sure that no personnel/workers remain in the confined space.

The work area will need to be adequately cleared and cleaned after work has been completed. Make sure you wear effective PPE whilst doing this.

Dispose of, or recycle leftover materials in accordance with project environmental management plans.

DOCUMENTATION

You will need to complete all appropriate documentation, including the confined space entry log, withdrawal of permits, and any records related to use and servicing of equipment. Generally the withdrawal from a confined space operation requires the following information to be signed off:

- Names of all workers who have exited from the confined space.
- Date and time of all exits from the confined space.
- All workers and equipment are accounted for.
- All equipment has been checked and stored in accordance with procedures.

The person in direct control of the confined space operation will need to make the final sign-off of the withdrawal of written authority (confined spaces work permit) once all of the above information has been confirmed.

You should also report any issues that may have arisen such as:

- Feedback on the work and methods of improving the work process.
- Signs and symptoms of operational stress.
- Equipment malfunctions.
- Wear and tear of equipment and tools.
- Condition of safety and rescue equipment.
- Observations of the condition of the confined space.

CLEAN WORK AREA

As part of returning the confined space to serviceable the work area must be clean which includes:

- All materials, recyclable, hazardous waste etc. removed and disposed of as per site procedures.
- Tools, equipment and materials should be cleaned, checked, maintained and stored in accordance with manufacturers' recommendations and standard work practices.
  - Cleaned by removing all dirt, mud moisture or other contaminants, in accordance with manufacturers' specifications.
  - Checked for any damage – If anything is wrong, apply tagging and lock-out procedures and report it to your supervisor.
  - Maintained in line with manufacturers' recommendations or your worksite procedures/standard work practices, e.g. greasing of metal surfaces or lubricating moving parts.
  - Stored correctly in the appropriate location – Most equipment will have designated storage instructions to ensure the items are kept free from damage and can be easily found the next time they are needed.

The procedures for cleaning, maintenance and storage should be followed regardless of the type of equipment and tools being used. Keeping them in the best possible condition prolongs their working life and ensures they are safe to use.

REMOVING HAZARD CONTROLS AND SECURING ACCESS

If hazard control measures (e.g. barriers and signs) are no longer required they should be removed, cleaned and stored away according to procedures. The access cover of the confined space must also be replaced or closed, as required.

APPENDIX A: CONFINED SPACE DETERMINATION (EXAMPLES)

Description of the space and activity	Confined Space criteria						Confined Space?
	A	B	C	D			If the answer to A, B, C and at least one of D is yes, then the space is a confined space.
	Is the space enclosed or partially enclosed	Is the space not designed or intended to be occupied by a person	Is the space designed or intended to be, at normal atmospheric pressure while any person is in the space	Does the space present a risk from:			
				Harmful airborne or flammable contaminants	An unsafe oxygen level	Engulfment	
Sewer with access via a vertical ladder	✔	✔	✔	✔	✔	✔	Yes
Dislodging grain from a silo with sole access through a manhole at the top	✔	✔	✔	✔	✘	✔	Yes
Cleaning spilled cadmium pigment powder in a shipping container	✔	✔	✔	✔	✘	✘	Yes
Inspecting a fuel tank in the wing of an aircraft	✔	✔	✔	✔	✘	✘	Yes
Dislodging a sludge blockage in a drain pit	✔	✔	✔	✔	✔	✔	Yes
Internal inspection of a new, clean tank prior to commissioning	✔	✔	✔	✘	✘	✘	No
Internal inspection of an empty cement silo through a door at ground level	✔	✘	✔	✘	✘	✘	No
Stocktake using an LPG forklift in a fruit cool store	✔	✘	✔	✔	✘	✘	No
Installing insulation in a roof cavity	✔	✔	✔	✘	✘	✘	No

APPENDIX B: GAS CHART

Name & Symbol	Properties	Effects on Humans	Flammable Limits	Occurrence	Detection
Oxygen O_2	• Colourless • Odourless • Tasteless • VD 1	• 21% in air essential to life. • Limits in CS 19.5% to 23.5%	Flammable above 23.5%	• Air. • Deficiency due to oxidation, bacterial action or displacement	Electronic
Nitrogen N_2	• Colourless, • Odourless • Tasteless • VD 0.97	• Toxic in concentrations in excess of 79% therefore will not support life	Non-flammable	• Air. • Used as an inert purging agent.	Electronic
Carbon Dioxide CO_2	• Colourless, • Slight pungent smell • Soda water taste • VD 1.53	• 0.03% in air • >0.5% increases respiration • Toxic above 5% • Exposure Standard 0.5%	Non-flammable	• Fermentation • Engine Exhausts • Combustion • Breathing	Electronic Tube Detector
Carbon Monoxide CO	• Colourless, odourless • Tasteless • VD 0.97	• Highly insidious poison displacing Oxygen from the red blood cells. • Exposure Standard 200ppm	12.5% - 75%	• Engine Exhausts • Combustion • Compressors	Tube Detector Electronic
Methane CH_4	• Colourless, • Odourless, • Tasteless • VD 0.55	• Non-poisonous but will not support life	5% - 15%	• Bacterial Action • Rotting Vegetation • Sewer Lines	Electronic
Sulphur Dioxide SO_2	• Colourless • Acrid taste • Suffocating odour • VD 2.26	• Extremely poisonous • Exposure Standard 2ppm	Non-flammable	• By-product from plastic and Paper manufacturing • Burning of sulphides	Tube detector
Hydrogen Sulphide H_2S	• Colourless • Odour of rotten eggs • VD 1.19	• Poisons the central nervous system • Standard 10ppm	4.5% - 45%	• Stagnant waters • Sewage treatment	Tube detector Electronic
Chlorine Cl_2	• Greenish Yellow • Choking Smell • VD 2.49	• Reacts with mucous membranes @ 1,000ppm • Fatal Exposure Standard 0.5ppm	Flammable reaction with some organic materials	• Bleach Pool Chemicals HCl Manufacture	Electro-chemical cell Tube detector

APPENDIX C: CONFINED SPACE ENTRY PERMIT (EXAMPLE)

CONFINED SPACE ENTRY PERMIT

(PRINT CLEARLY ON PERMIT USING INK)

JSEA No:			Permit No:	
Confined Space No:		Location:		
Work to be performed:				

- If you answer **NO** to any of the following questions, you must **NOT** continue without seeking advice from your Supervisor.
- If there is no work instruction available for the tasks being performed, then refer to your Supervisor for instructions.

DETAILS OF RELATED PERMITS				
Hot Work:	☐ Yes	☐ No	Permit No:	
Excavation:	☐ Yes	☐ No	Permit No:	
Other:			Permit No:	

ATMOSPHERIC TESTING

☐ Continuous ☐ Initial ☐ Periodic Time intervals, every…………………………mins

Date	Time	Oxygen Between 19.5 -23.5%	Flammables < 5% of its LEL	Carbon Monoxide < 30ppm	Hydrogen Sulphide < 10ppm
/ /	:				
/ /	:				
/ /	:				
/ /	:				
/ /	:				
/ /	:				

	If **NO** to any question do not enter confined space and contact supervisor	Yes	No	N/A
1	Have all hazards been identified and the risks assessed?			
2	**Isolation** - consider isolation from location/method and energies / consider fixing locks/tags to isolation points			
3	**Ventilation** - set up appropriate ventilation system to ensure safe atmosphere			
4	**Atmospheric tests** - only calibrated instruments to be used/ensure tests are within the required parameters			
5	**Emergency response** - Are emergency response procedures available and understood/implement emergency plan and rescue procedures and rehearse before entry			
6	**Safety equipment** - equipment may include tripods, harnesses, retrieval ropes, communication equipment, lighting/only use Australian Standard compliance equipment			
7	**Personal protective equipment** - Australian Standards compliance only to be used			
8	**Hot work** - clear area of combustibles/ensure appropriate fire extinguishers available before permitting hot work to commence			

If **NO** to any question do not enter confined space and contact supervisor		Yes	No	N/A
9	**Use of plant & working at heights** - ensure appropriate access & egress and equipment is fit for purpose			
10	**Other controls** - ensure notices & barricades are fixed/erected as required e.g. Prohibition and Danger signage			
11	Is the completed written risk assessment JSEA attached?			

OPEN CONFINED SPACE PERMIT

PERMIT HOLDER

- All hazards have been identified and control measures are in place and effective.
- Initial Atmospheric testing is complete.
- The Confined space is safe to enter.

Permit holders Name:			
Signature:		Date:	/ /

AUTHORISED PERSON

Authorised Peron Name:			
Signature:		Date:	/ /

Permit Valid from:			Permit valid to:		
Time:		Date:	/ /	Time:		Date:	/ /

STANDBY PERSON

Date	Time In	Time Out	Name	Company	Signature
/ /	:	:			
/ /	:	:			
/ /	:	:			
/ /	:	:			

ENTRY LOG

Date	Time In	Time Out	Name	Company	Signature
/ /	:	:			
/ /	:	:			
/ /	:	:			
/ /	:	:			
/ /	:	:			
/ /	:	:			
/ /	:	:			
/ /	:	:			
/ /	:	:			

CLOSE CONFINED SPACE PERMIT

PERMIT HOLDER

- All work has been completed.
- All personnel are out of the confined space and accounted for.
- All control measures have been removed (including isolations).

Permit holders Name:			
Signature:		Date:	/ /

AUTHORISED PERSON

Authorised Peron Name:			
Signature:		Date:	/ /

APPENDIX D: CONFINED SPACE EMERGENCY PLAN (EXAMPLE)

CONFINED SPACE EMERGENCY PLAN

(PRINT CLEARLY ON PERMIT USING INK)

Site Name:			
Confined Space No:		**Location:**	
Plan Developed By:			**Date:**

EMERGENCY COMMUNICATION REQUIREMENTS

Emergency Phone Number: 000 or 112 from digital Phones or

Site Phone No:		Site Radio Channel:

POTENTIAL RESCUE SITUATIONS

☐ Engulfment   ☐ Height   ☐ Hazardous Atmosphere
☐ Hazardous Chemicals   ☐ Fire   ☐ Electrical
☐ Other please specify:

Will entry and exit to the work area impact on an emergency rescue? If YES must be addressed in rescue plan	☐Yes ☐ No

EMERGENCY EQUIPMENT REQUIREMENTS

☐ Harness   ☐ Breathing Apparatus   ☐ Basket stretcher
☐ Tripod/ davit / anchor point   ☐ Lighting   ☐ Rescue Strop
☐ Hazardous chemical suit   ☐ Ventilation equipment   ☐ First aid kit
☐ Life / rescue line   ☐ Oxygen (oxy –viva)   ☐ Roll-up stretcher
☐ Polycarbonate slide sheet   ☐ Fire-fighting equipment   ☐ Satellite phone
☐ Crane   ☐ Defibrillator
☐ Other specialist equipment – please specify:

RESCUE – ADDITIONAL COMMENTS

BRIEFING REQUIREMENTS
☐ Participants in the rescue party have been briefed on the rescue plan prior to work commencing. ☐ Rescue equipment checked

CONFIRMATION SIGNATURES		
Name:	Signature	
Name:	Signature	
Name:	Signature	
Name:	Signature	
Name:	Signature	
Name:	Signature	
Name:	Signature	
Name:	Signature	
Name:	Signature	
Name:	Signature	