ENVIRONMENTAL HEALTH AND SAFETY

Permit-required Confined Space for General Industry 29 CFR 1910.146

Objectives

Everyone should be able to define:

- Confined space
- Permit-required confined space
- Non- permit space
- Entry

Purpose and Application

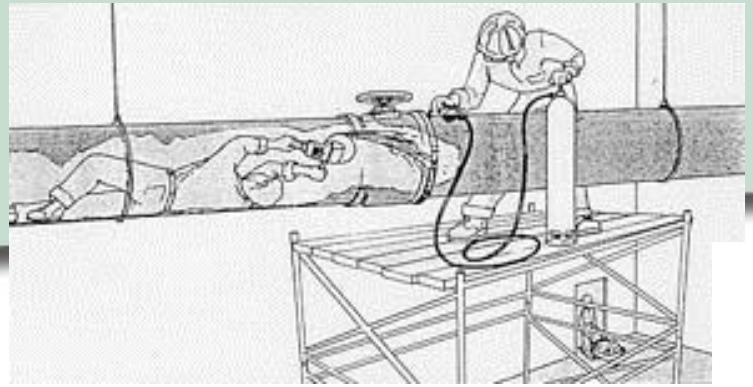
- To promote safe work practices and provide a safe work environment.
- Contains requirements for practices and procedures to protect employees in general industry from the hazards of entry into permit-required confined spaces (PRCSs).
- Does not apply to agriculture, construction or shipyard employment.

Hazard Awareness

- Seven workers die at Corona Brewery in Mexico in April 2013 during tank cleaning and maintenance.
- Four of the deaths were rescuers
  - atmospheres including carbon dioxide produced during fermentation, inert atmospheres, and ammonia from refrigeration systems created significant confined space entry hazards.
- A confined space death occurred just two years earlier at Napa California when a worker was overcome by nitrogen and argon gases inside a wine tank.
- Midwest, US: Five members of the same family died in a manure pit. A dairy farmer, his two sons, his grandson, and his nephew were all overcome during a rescue attempt of one of the sons.

Hazard Awareness

- A welder entered a steel pipe (24 inch diameter) to grind a bad weld at a valve about 30 feet from the entry point.
- Before he entered, other crew members decided to add oxygen to the pipe near the bad weld.
- He had been grinding intermittently for about five minutes when a fire broke out enveloping his clothing.
- Another crew member pulled him 30 feet to the pipe entrance and extinguished the fire.
- However, the welder died the next day from his burns.



Confined Space

A space that is:

- is large enough for entry; and
- has limited or restricted means for entry or exit; and
- is not designed for continuous employee occupancy

Restricted entry and exit means physical impediment of the body, e.g., required use of the hands or a contortion of the body to enter into or exit from the confined space".

Confined Space

While OSHA is concerned that spaces that are too small for complete bodily entry may pose hazards for employees, the Agency did not intend to cover such spaces under the permit space standard.

- A space that cannot be entered is not confined; therefore, it does not pose hazards related to the difficulty of exiting the space

Questions to Ask

- Does the person have to use their hands to enter or exit the space?
- Is the person in an awkward posture when entering or exiting the space?
- Is a person's entry into or exit from the space slowed down or impeded by physical obstructions (such as pipes, ductwork, walls, holes in the floor, flanges, etc.)?
- Would an employee be forced to enter or exit in a posture that might slow self-rescue or make rescue more difficult?

210
DANGER
CONFINED SPACE
ENTER BY
PERMIT ONLY

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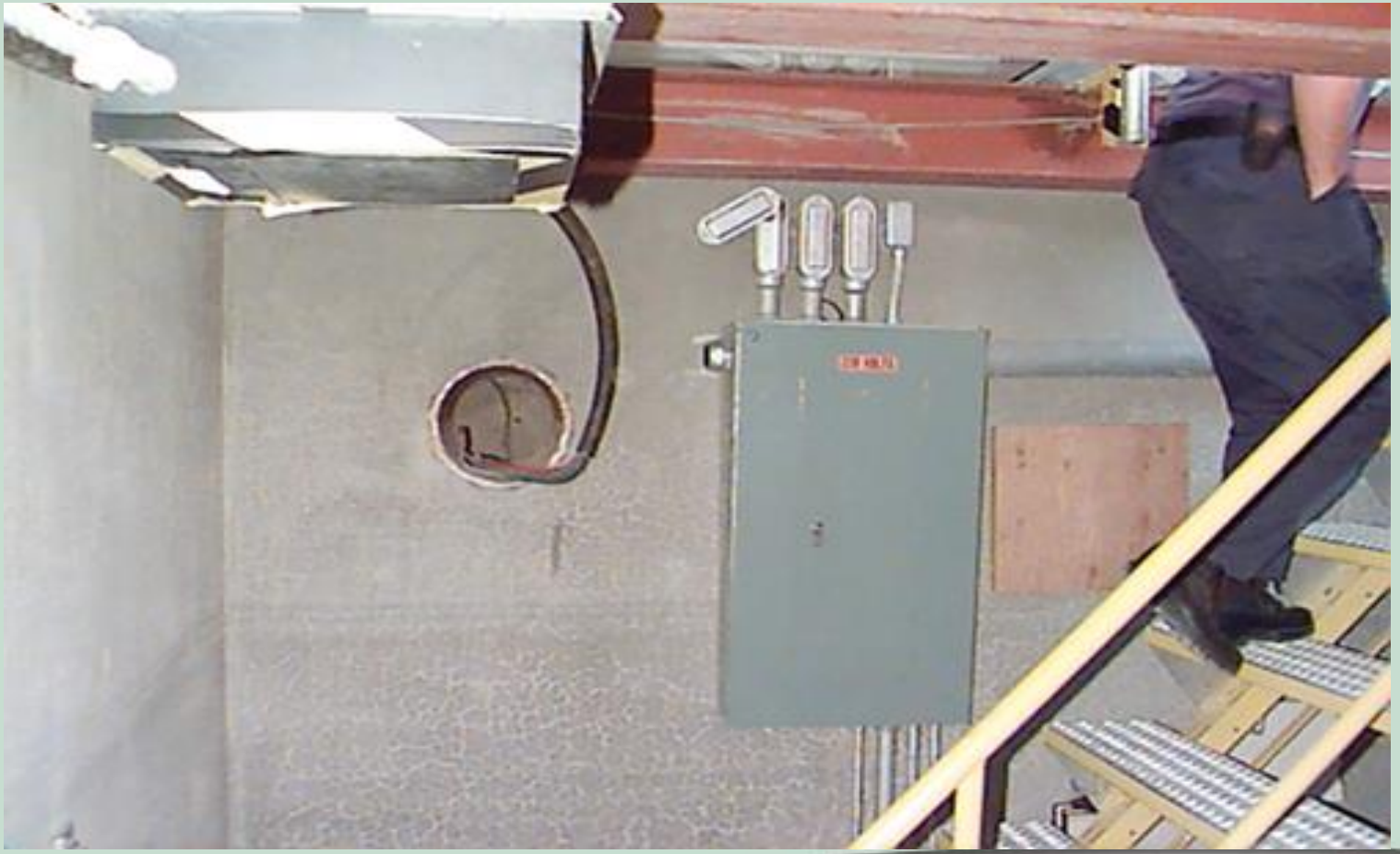
Elevator Pit

Dust Collector

Is this a Confined Space?



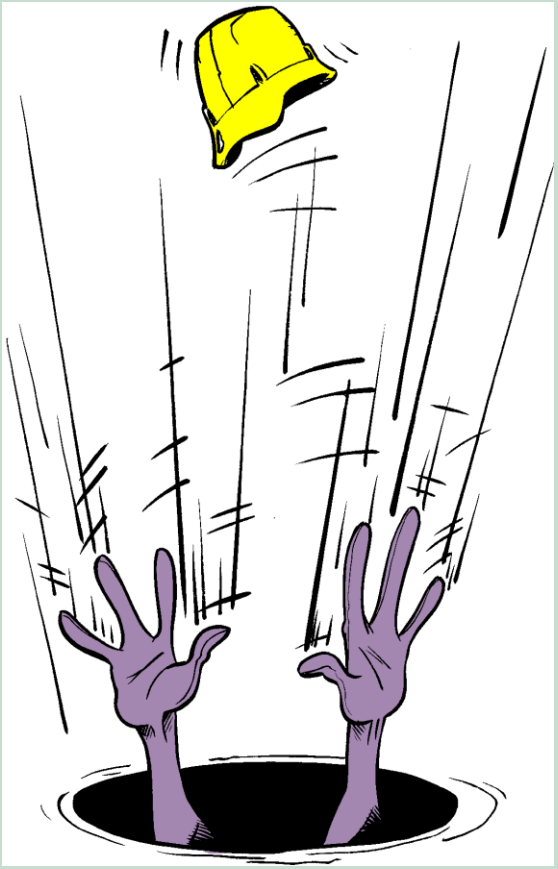
To Underground Tunnel

Two Options for Entering Confined Spaces:

- Permit-required confined space entry
  - for hazardous or potentially hazardous confined space work
- Non-permit confined space entry
  - for non-hazardous confined space work

Entry

- The action by which a person passes through an opening into a permit-required confined space, and includes ensuing work activities in that space.
- Considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.



Hmmmmmmmmm?

Entry (cont)

- Before any entry to a confined space the supervisor shall document that it is safe to do so.
- The duration of the entry shall not exceed the time allowed to complete the task as identified on the permit

What is a “permit-required” confined space ?

What is a “permit-required” confined space ?

A confined space that has ONE or more of the following characteristics:

1. Contains or has a potential to contain a hazardous atmosphere; or
2. Contains a material that has the potential for engulfing an entrant; or
3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
4. Contains any other recognized serious safety or health hazard.

Permit-Required Confined Space

A confined space that has one or more of the following characteristics:

- Hazardous atmosphere
  - -Flamm G/V >10% LFL
  - -Comb. Dust > LEL
  - -Oxygen Def < 19.5%
  - -Oxy Enrichment > 23.5%
  - - > IDLH
  - - > PEL, acute
- Steam
- Corrosives, etc.
- Engulfment
- Entrapment
- Energy sources
  - -Electrical
  - -Mechanical
  - -Hydraulic
  - -Pneumatic, etc.

Permit-Required Confined Space Entry Procedure - examples

- Isolate the space
  - Sign postings, tape, LOTO, etc..
- Ventilate the space
  - Fans, forced air
- Interviews, meetings, job safety analysis
- Test the atmosphere
  - LEL, CO, H2S, O2
- Complete the pre-entry checklist
- Complete the permit
- Enter the space

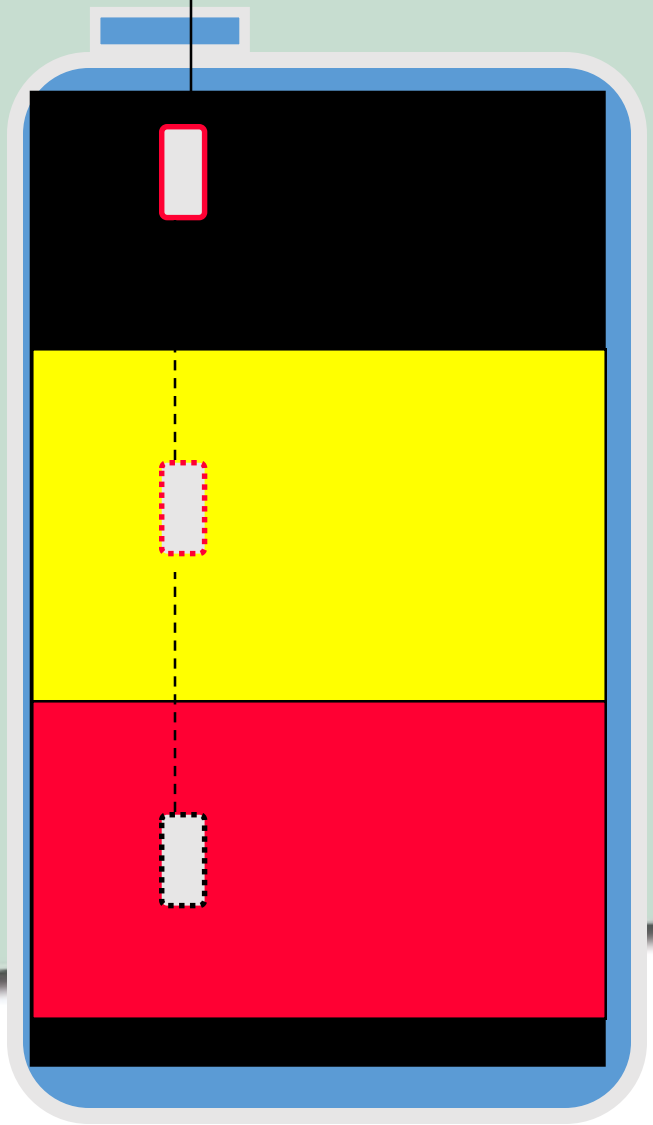
Test the Atmosphere

- **Check for Oxygen Content:**
  - At least 19.5% and less than 23.5%
- **Check for Combustibles:**
  - Less than 10% of the LEL
- **Check for Hydrogen Sulfide**
  - Les than 10ppm
- **Check for Toxic Gasses:**
  - Most commonly carbon monoxide (PEL <3 ppm)
  - or any other hazardous materials as determined by the use of the space.

Test the atmosphere

Always test the air at various levels to be sure that the entire space is safe.

Good air near the opening does NOT mean there is good air at the bottom!



Good Air

Poor Air

Deadly Air

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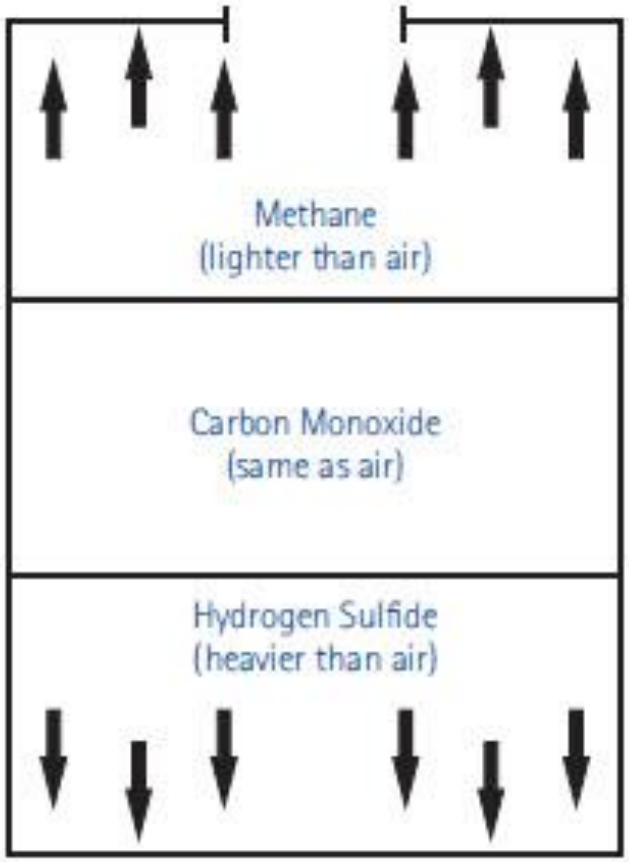
Confined Space Entry Equipment



Confined Space Entry Equipment

Harness and a Tripod

Non-Permit Confined Space

A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

Examples of Non-Permit Confined Spaces

- Examples MAY include:
  - Attics
  - Crawl space under buildings
  - Vaults
  - Motor control cabinets
  - Dropped ceilings

So what does all this mean?

Prior to entering ANY confined space you should determine it's classification through:

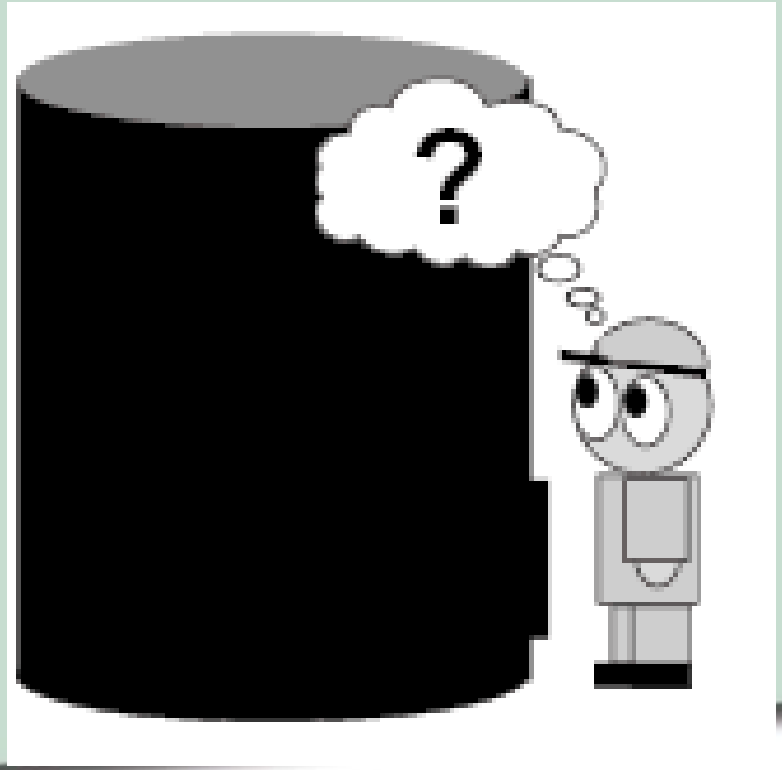
1. Information collection;
2. Atmosphere testing
3. Corrective measures taken to reduce or eliminate the hazard

NEVER take someone's word for it!

UNE Program

- Identify permit and non-permit required confined spaces
- Prevent unauthorized access
- Establishing requirements for working in PCS
  - Equipment, permits, hazards
- Employee's Roles
  - Entrant, attendant
- Review / Records
  - Training, post operations

Entry



Pre- Entry Permit Completion

- Checklist must be filled out whenever workers enter a permit required space. A copy of the safe entry procedure must be available at the entry point to the confined space.

	OK	Action Needed
• Did you survey the surrounding area to show it to be free of hazards such as drifting vapors from tanks, piping, or sewers?	-----	----------
• Does your knowledge of industrial or other discharges indicate this area is likely to remain free of air contaminants while occupied?	-----	----------
• Are you certified in operation of the gas monitor to be used?	-----	----------
• Has a gas monitor functional test been performed this shift on the gas monitor to be used?	-----	----------

Pre-Entry Permit (cont.)

- Did you test the atmosphere of the confined space prior to entry? ----- ----------

  (a) Was oxygen content between 19.5 percent and 23.5 percent ? ----- ----------

  (b) Was flammable vapor less than 10 percent of LEL/LFL? ----- ----------

  (c) Were tests for toxic materials less than TLV/PEL? ----- -----

Pre-Entry Permit (cont.)

- Have all sources of hazards been isolated from the confined space? ----- ----------
  (a) Have all pipes been blanked? ----- ----------
  (b) Have electrical and mechanical hazards been locked and blocked? ----- ----------

- Is all rescue equipment called out in the safe entry procedure available outside the confined space? ----- ----------

- Will the atmosphere be continuously monitored while the space is occupied, if required by entry procedure? ----- ----------

- Have the facility emergency and rescue services been notified that a confined space entry is about to be made? ----- ----------

NOTICE: If any of the above questions are answered "Action Needed," do not enter the confined space until the conditions are corrected.

Permitted Confined Space Entry Permit

- Sample Permit

Duties: Entrant

- Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- Properly use equipment as required/needed;
- Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space if any conditions change within the space;
- Alert the attendant whenever: (i) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or (ii) The entrant detects a prohibited condition;
- Exit from the permit space as quickly as possible whenever: (i) An order to evacuate is given by the Permit Confined Space attendant or the Permit Confined Space Entry Supervisor, (ii) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, (iii) The entrant detects a prohibited condition, or (iv) An evacuation alarm is activated.

Duties: Attendant

- Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- Is aware of possible behavioral effects of hazard exposure in authorized entrants;
- Continuously maintains an accurate count of authorized Permit Confined Space Entrants in the permit space;
- Remains outside the permit space during entry operations until relieved by another attendant;
- Communicates with authorized Permit Confined Space Entrants as necessary to monitor entrant status and to alert entra vacuate the space;

Duties: Attendant (cont.)

- Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized Permit Confined Space Entrants to evacuate the permit space immediately under any of the following conditions; (i) If the attendant detects a prohibited condition; (ii) If the attendant detects the behavioral effects of hazard exposure in an authorized Permit Confined Space Entrant; (iii) If the attendant detects a situation outside the space that could endanger the authorized entrants; or (iv) If the attendant cannot effectively and safely perform all the duties required under paragraph (i) of this section;

- Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway: (i) Warn the unauthorized persons that they must stay away from the permit space; (ii) Advise the unauthorized persons that they must exit immediately if they have entered the permit space; and (iii) Inform the authorized entrants and the Permit Confined Space Entry Supervisor if unauthorized persons have entered the permit space;

- Performs no duties that might interfere with the Permit Confined Space attendant's primary duty to monitor and protect the authorized entrants.

Duties: Supervisor

- Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- Verifies, by checking that the appropriate entries have been made on the Permit Confined Space Entry Certification, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the Certification are in place before endorsing the Certification and allowing entry to begin;
- Terminates the entry and cancels the Certification as required;
- Removes unauthorized individuals who enter or who attempt to enter the confined space during entry operations; and
- Determines, whenever responsibility for a Permit Confined Space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, which entry operations remain consistent with terms of the Permit Confined Space Entry Certification and that acceptable entry conditions are maintained

Questions

- True/False
  - An attendant is allowed to leave the entrants but only for three minutes or less?
- True / False
  - An entrant does not need to know the symptoms of overexposure when performing work in a confined space?

What happens after the entry is complete?

Entry Completion

- Upon completion of work in a Permit Confined Space, we follow these procedures to close off the space and cancel the certification:
  - The Permit Confined Space Entry Supervisor checks entry portals to verify closure
  - The Permit Confined Space Entry Supervisor debriefs the entrant that all task were completed, all parameters of the certification were correct, no new hazards were discovered
  - The Permit Confined Space Entry Supervisor debriefs the attendant to verify all procedures were followed
  - The Permit Confined Space Entry Supervisor will notify the Safety Manager immediately if any conditions were not appropriate or any new hazards were discovered

Rescue & Emergency Services

- UNE will only perform non-entry rescue as long as it is non-life threatening.
- Do this by
  - Retrieval System (mechanical means)
- Any emergency that would require entry, UNE will notify the Fire Dept. prior to performing work.
  - If a contractor is hired to perform the work they will supply their own rescue team.

Training

- Every employee who faces the risk of confined space entry is provided with training
- When changes occur to UNE's program or facility – retraining will occur.

Review

- Retain all certifications from the past 12 months as part of the confined space program
- Review these certifications from any entries within the last 12 months
- If no entry occurred within the last 12 month period then no review is necessary.