

CONFINED SPACE



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1. INTRODUCTION

The entry into a confined space is potentially one of the most dangerous activities associated with any hazardous substance operation. Due to the unique conditions that can exist, great care must be taken both before and during this type of work procedure.

This program is written to follow OSHA Regulation 29CFR1910.146, and designed to assist the employees of **H2 Enterprises, LLC (H2)** for performing pipeline construction while inside identified confined spaces. As a rule, **H2** does not perform Confined Space work. If required, the following program will be followed. **H2** Project Safety Coordinators will supervise Confined Space work. They have been trained in Confined Space Supervision, Permit Evaluation and Air Quality and Atmospheric Testing.

Since asphyxiation is the leading cause of death in confined spaces due to situations involving IDLH (immediately dangerous to life and health) atmospheres that are poorly ventilated as compared to more open areas, all efforts will be devised to control oxygen deficient/combustible/toxic environments that may be encountered prior to or during work activities. **Total energy isolation is required before any entry will be allowed.**

2. DEFINITIONS

An enclosed area/object can meet the OSHA definition of a confined space since its design features display one or more of the following characteristics:

- Space large enough for an employee to bodily enter and perform work.
- Has limited or restricted means for entry and exit.
- Is not designed for continuous employee occupancy.

An enclosed area/object can also meet the definition of a permit confined space since its particular design characteristics meet one or more of the following guidelines:

- Contains or has the potential to contain a hazardous atmosphere.
- Contains a material that has the potential for entrant engulfment.
- Has an internal configuration such that an entrant could be trapped or asphyxiated, such as sloping walls and floors that converge to a point of constriction.

Acceptable entry conditions refer to conditions that must exist in a permit space to allow employees to enter and to ensure they can safely complete their work while in that confined space.

Attendant refers to a person stationed outside the permit space who monitors the authorized entrants and performs the duties assigned to them by this written program. (This position may also be called a “lookout” or “hole watch”.)

CONFINED SPACE



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Section:	22	Revision Number:	00
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Authorized Entrant refers to an employee who is authorized under this written program to enter a permit space.

Emergency refers to an event that could endanger an authorized entrant whether it occurs inside or outside the permit space.

Entry refers to the entrance of a person into a permit-required confined space. Entry is considered to begin when the feet or head breaks the plane of entry into the space.

Entry Permit refers to the written document that controls entry into a permit confined space and contains all pertinent information required by the OSHA Standard.

Entry Supervisor refers to the person designated with the responsibility to determine acceptable entry conditions and to authorize, supervise or terminate any entry.

Hazardous Atmosphere refers to an atmosphere which may expose a person to the risk of death, incapacitation, injury, acute illness or impaired ability to escape unaided from an emergency. An atmosphere is considered hazardous if it contains one or more of the following:

- Atmospheric oxygen concentration below 19.5% or above 23.5%.
- Flammable gas, vapor, or mist more than 10% of its lower explosive limit (LEL).
- Airborne combustible dust at a concentration that meets or exceeds its LFL, lower flammability limit, or (if the dust obscures vision at 5 feet).
- Atmospheric concentration of any substance where employee exposure would exceed any listed toxic dose or permissible exposure limit.
- Any other atmospheric condition that is immediately dangerous to life and health.

IDLH (immediately dangerous to life and health) refers to a condition that threatens loss of life, adverse health effects or impaired ability to escape unaided from an emergency.

Oxygen Deficient Atmosphere refers to an atmosphere that contains less than 19.5% oxygen content.

Oxygen Enriched Atmosphere refers to an atmosphere that contains more than 23.5% oxygen content.

Retrieval System refers to equipment which non-entry personnel can use to retrieve persons from a permit space in the event of emergency.

Testing refers to a process used to identify and evaluate a potentially hazardous atmosphere with monitoring instruments.

CONFINED SPACE



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Section:	22	Revision Number:	00
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3. MANAGEMENT/EMPLOYEE RESPONSIBILITIES

The Director, HSE or any other trained, designated confined space entry supervisor is responsible for the overall implementation of this program or the requirements of any host-facility program, while working on contracted projects at host-facilities. Due to the extremely severe consequences possible if improper confined space entries are made, all employees will comply with the provisions of this program that apply to their own actions or conduct.

4. IDENTIFICATION

The identified confined space vessel will be revealed to all employees using a red/white hazard-warning sign with black letters stating:

DANGER
PERMIT-REQUIRED CONFINED SPACE
DO NOT ENTER

5. HAZARD EVALUATION

Testing or monitoring conditions prior to entry will be conducted by the host-facility unit operator, designated safety or environmental personnel, or responsible supervisor, using a calibrated, direct-reading, gas monitor. The tests shall be performed in this order:

1. Oxygen concentration (19.5% - 23.5% range)
2. Flammable gases/vapors (less than 10% of LEL)
3. Potential toxic concentrations (less than listed PEL's)

The results shall be recorded on the entry permit and entry into the confined space will not be allowed unless the defined acceptable entry conditions are met. Continuous or intermittent monitoring of the permitted space may be implemented depending on the potential atmospheric conditions that may be experienced during operations. All potential hazardous energy and materials shall be isolated before entry is permitted. Space shall be completely protected against the release of energy or material into the confined area.

NOTE: Employees or their representatives are entitled to request additional monitoring at any time.

The instrument probe or line must extend into the confined space at least 4 feet so that the person performing the test is not entered the space. Since gases can stratify in layers in a confined space, testing will be performed at multiple levels of the space to be entered.

If an instrument reading ever indicates an unusual, unexpected, or unacceptable atmospheric condition, it is never to be ignored, or assumed to be due to instrument error. If a bad reading is recorded, all necessary measures will be taken to correct the situation (re-calibrate instrument,

CONFINED SPACE



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ventilate space, etc.) H2 employees will not be expected to enter confined spaces until it is deemed safe to do so, and the acceptable entry conditions recorded on the entry permit.

Lighting sources to be used in the permit confined space shall be explosive-proof and specifically approved by a recognized agency such as Underwriter Laboratory or the Mine Safety and Health Administration.

Any electrically-operated tool taken inside the permit space shall be double insulated, inspected for defects and connected to an approved ground fault circuit interrupter (GFCI) that has been inspected and tested prior to use.

All ladders used for entry/exit into the permit confined space must meet all applicable codes and standards as outlined in 29CFR1910.25 or .26, and inspected prior to use. They must not interfere with rescue or retrieval systems, ventilation methods and work operations.

6. VENTILATION

If the atmospheric entry conditions cannot be met as defined in this written program, continuous forced-air ventilation methods will be utilized always to eliminate the encountered hazardous atmosphere. An oxygen source with a concentration greater than 23.5% is not allowed as a ventilation or air dilution method.

If ventilation is unsuccessful, as demonstrated by unacceptable re- testing results, or even if acceptable conditions are ever unable to be consistently maintained during actual entry operations, authorized entrants will be required to wear appropriate respiratory protective equipment in compliance with OSHA Regulation 29CFR1910.134, the Respiratory Protection Standard.

This equipment selection will be based on the atmospheric test results which will indicate the proper level of respiratory protection to be worn.

7. ENTRY PERMITS

The authorized entry supervisor shall prepare the entry permit, recording all testing results on the permit. This system will provide the best assurance that confined space entry takes place only after all actions and conditions necessary for the protection of authorized entrants have been performed. When entry operations have been completed, the entry supervisor shall write "canceled" across the permit. The entry permit will identify the following information:

- **Permit space** (name/location of space to be entered)
- **Purpose** (specify job/type of work to be performed in that space)
- **Date/duration of entry** (current date and length of time allowed)
- **Entrant names** (roster of authorized personnel for space entry)

CONFINED SPACE



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Section:	22	Revision Number:	00
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- **Attendant name(s)** (at least one, but may rotate with entrants)
- **Entry Supervisor** (authorized for entry, also)
- **List of hazards** (observed or present)
- **Hazards control/isolation** (methods of elimination)
- **Acceptable entry conditions** (oxygen, combustible, toxics)
- **Test results** (initial/periodic monitoring & initials of tester)
- **Rescue provisions** (services to call, emergency #'s)
- **Communication methods** (phone, 2-way radio, voice, signals)
- **Tools/Equipment needed** (PPE, harnesses, retrieval lines, alarms)
- **Space specific information** (special precautions unique to the space)
- **Additional permits** (hot work, lockout/tagout)
- **Authorization for permit** (proper signatures of authority)

8. TRAINING

Whether you're an entrant, attendant, entry supervisor or part of the support personnel, training is mandatory. Most confined space accidents and fatalities are the result of the wide range of possible hazards to be encountered, as well as the lack of training, so this will be an important part of the **H2** confined space program. Training will be provided:

- Before any employee is assigned any duties.
- Before any assigned duties are changed.
- Whenever there is a change in operations affecting the space.
- Whenever an employee demonstrates deficiencies or deviations from the initial training provided.

Written certification to include employee's name, trainer signature/initials, and dates of training will be provided upon completion of required levels of training as provided by outside contract training resources, or **H2** Management, and maintained in the Safety Files at the main office. **Only trained and authorized employees able to perform the following duties are listed on Attachment A at the back of this program.**

9. DUTIES OF AUTHORIZED ENTRANTS

The Employer shall ensure that all authorized entrants:

CONFINED SPACE



Doc. Type:	Program	Effective Date:	5/1/2017
Section:	22	Revision Number:	00
Status:	Issued	Last Revised:	5/1/2017

- Know the hazards that may be faced during entry, including information on the mode, signs, or symptoms and consequences of exposure.
- Properly use equipment as required.
- Communicate with the attendant as necessary to enable the attendant to monitor the entrant(s) status and to alert entrant(s) of the need to evacuate the space as required.

Authorized Entrants must alert the attendant when:

- They recognize any warning sign or symptoms of exposure to a dangerous situation.
- They detect a prohibited condition.

Authorized Entrants must exit from the permit space as quickly as possible when:

- An order to evacuate is given by the attendant or the entry supervisor
- They recognize any warning sign or symptom of exposure to a dangerous situation.
- They detect a prohibited condition.
- An evacuation alarm is activated.

10. DUTIES OF ATTENDANTS

The employer shall ensure that all attendants:

Know the hazards that may be faced during entry, including information on the mode, signs, symptoms and consequences of the exposure.

Are aware of possible behavior effects of hazard exposure in authorized entrants.

Continuously maintain an accurate count of authorized entrants in the permit space and ensure that the means used to identify authorized entrants accurately identifies who is in the permit space.

Remain outside of the permit space during entry operations until relieved by another attendant. If an attendant is trained and equipped for rescue, they may attempt non-entry rescue if they have been relieved by a properly outfitted and trained attendant. Any unauthorized personnel will be prohibited from attempting any type of rescue.

Communicate with authorized entrants as necessary to monitor entrant status and alert entrants of the need to evacuate the space as required.

Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and order the authorized entrants to evacuate the permit space immediately under any of the following conditions:

- If they detect a prohibited condition
- If they detect the behavioral effects of hazard exposure in an authorized entrant

CONFINED SPACE



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Section:	22	Revision Number:	00
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- If they detect a situation outside the space that could endanger the authorized entrants
- If they cannot, for any reason, effectively and safely perform all the duties required.
- Summon rescue and other emergency services as soon as they determine that authorized entrants may need assistance to escape from permit space hazards. By whatever means are available (voice, radio, phone) the attendant shall notify their immediate **H2** supervisor and the Project Safety Coordinator for all emergencies.
- Take the following actions when unauthorized people's approach or enter a permit space while entry is underway:
 1. Warn the unauthorized persons that they must stay away from the permit space.
 2. Advise the unauthorized persons that they must exit immediately if they have entered the permit space.
 3. Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space.
 4. Perform non-entry rescue as specified by the employer's rescue procedure.
 5. Perform no duties that might interfere with their primary duty to monitor and protect the authorized entrants.

H2 Management does not allow more than one confined space to be monitored by the attendant at any one time and if an emergency arises, that person will contact the entry supervisor by voice, radio or messenger for assistance.

11. DUTIES OF ENTRY SUPERVISORS

The employer must ensure that all entry supervisors:

1. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
2. Verify that all tests specified by the permit have been conducted and all procedures and equipment specified by the permit are in place before signing the permit and allowing entry to begin.
3. Terminate the entry and cancel the permit as required.
4. Verify that rescue services are available and the means to summon them are operable.
5. Remove unauthorized individuals who enter or attempt to enter the permit space during entry operation.
6. Determine whenever responsibility for permit space entry operation is transferred, and at intervals dictated by the hazards and operations performed within the space, that entry

CONFINED SPACE



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operations remain consistent with terms of the entry permit and acceptable entry conditions are maintained.

7. Coordinate entry operations for multi-employer's so that employees of one employer do not endanger the employees of any other employer.

12. ENTRY PROCEDURES

No employee of H2 will be allowed to enter a permit confined space unless the following procedures are adhered to:

1. The confined space must be properly tested for acceptable ranges of oxygen content, flammable atmosphere, and toxic concentrations present, using a calibrated, direct-reading, gas-monitoring instrument, operated by a trained supervisor. (There can be no longer than a 2-hour time-gap between tests performed and any confined space entry.)
2. The permit space shall be identified by appropriate signs, and the external area barricaded to ensure that no unauthorized persons, equipment, or vehicles present a danger to authorized entrants.
3. No smoking or flammable/combustible materials are allowed within this barricaded area. A properly inspected, charged ABC dry chemical fire extinguisher is required to be outside the permit space, ready to use. No welding gas tanks are allowed inside the permit space, and all hoses, regulators, leads, electrode holders or other welding/cutting equipment will be inspected prior to entry into the permit space. Equipment found to be defective will not be allowed for use.
4. Communication methods will be by voice/visual contact, or 2-way radios that are required to be intrinsically-safe in design.
5. Properly inspected, approved entry/exit means will be secured into position, following all established safe, ladder- use guidelines.
6. Ventilation equipment will be activated and provide continuous forced air from clean air sources, so that proper air exchanges for the enclosed space is maintained always for permit space occupancy.
7. Approved, properly-rated (12Volt explosion-proof) light sources, or intrinsically-safe flashlights will be provided for safe illumination while working inside a permit space.
8. Appropriately selected personal protective equipment will be donned prior to vessel entry, and worn always while inside the permit space. Defective equipment shall not be used, but instead discarded, and replaced. (Examples are hard hats, splash/impact goggles, face-shields, safety glasses, respirators, protective clothing, leather work boots, ear plugs and gloves.)



CONFINED SPACE



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Section:	22	Revision Number:	00
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9. After the space, has been tested and declared safe for entry, the entry permit shall be completed, conditions explained to all authorized personnel, signed by all authorized personnel, and posted at a conspicuous location on the vessel.
10. The attendant shall be assigned to their appropriate duties, the entrants may then enter inside the confined space, and the entry supervisor accountable for maintaining safe operations.
11. Permits will be canceled upon completion of work or for emergency evacuation due to dangers occurring inside or outside the space that could directly affect the life or health of an entrant.
12. If an emergency occurs and evacuation of the space is required, the space will be re-evaluated to determine the cause, extent, and nature of the hazard encountered. The hazard will be eliminated before entry is again permitted, after inspection and testing is satisfactory.
13. Upon job completion or evacuation, the word "CANCELLED" shall be written across the permit, noting date and time. (Cancellation reason to be listed only if a dangerous incident, injury or hazard occurred.)
14. Permits or copies will be retained for a period of at least one year by the Director, HSE and maintained at the main office, and at a minimum, reviewed annually to determine if any changes in the written program or procedures would be required if injuries, near-misses, employee complaints or entry problems occur.

13. RESCUE AND EMERGENCY SERVICES

H2 employees will rely upon the rescue efforts of an in-house trained rescue team, contracted professional rescue personnel or local outside rescue service response, when they are required. The authorized entry supervisor will be notified by the attendant that emergency rescue operations are required.

At least one standby person must be trained and immediately available to perform rescue and emergency services. They shall be equipped and trained with PPE and rescue equipment necessary for making rescues from permit spaces.

The in-house trained rescue team, contracted rescue professionals or identified outside rescue services will be notified to respond to the permit space to assist in retrieving an injured entrant. A documented, simulated rescue attempt will be performed by this crew as part of their established training regimen and at least annually thereafter if confined spaces are still required to be entered.

A quick survey of the rescued entrant will determine if first aid is required or professional medical assistance will be contacted. The trained rescue team members, authorized attendant(s) and entry supervisor(s) will be trained and certified to perform CPR and emergency

CONFINED SPACE



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first aid treatment before rendering assistance to rescued personnel. The entry supervisor will direct **H2** Management to dial 911 emergency medical services, if the need arises.

14. CONCLUSION

By reading, understanding and practicing the safety guidelines that have been outlined in this written program, you will be able to appreciate the benefits of complying with this regulation.

They have been designed to protect your health and safety while performing confined space entry job tasks. Follow these written procedures, never take short-cuts and be aware of the hazards that can be encountered in confined spaces.

Non-compliance by any **H2** employee with any part of this described program will result in disciplinary action as outlined in the Company's Corrective Action and Disciplinary Program found in this manual.