

Confined Space Entry

Short description

The purpose of this section is to ensure the protection of all Centennial employees and subcontractors from the hazards associated with entry into confined spaces.

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1 Objective and area of application

The objective of this section is to ensure that all Centennial employees and subcontractor personnel are protected from the hazards associated with entry into confined spaces. Centennial recognizes that certain environmental conditions within confined spaces are capable of causing death or serious physical harm to personnel who enter the space without properly evaluating the space and taking appropriate precautionary measures. Therefore, each entry into a confined space shall be evaluated by the entry supervisor or a competent person to determine the hazards involved and appropriate safety measures and controls that must be taken to ensure a safe entry.

Safe entry into a confined space is the responsibility of both the entry supervisor and the authorized entrant(s) who perform the work. The Centennial project superintendent, PSO and the confined space entry supervisor shall ensure that this procedure is followed and that all personnel understand and comply with the requirements of this procedure.

The hazards associated with entry into a confined space vary in degree (from least severe to the most severe) Non-Permit Required Confined Space (NPCS) and Permit Required Confined Space (PRCS) are defined as follows:

- A NPCS which does not contain any serious safety hazard
- A PRCS in which all hazards are eliminated prior to any entry
- A PRCS wherein the only hazard is atmospheric, and for which continuous, forced-air ventilation alone is sufficient to control
- A PRCS that contains or has the potential to contain, both atmospheric and non-atmospheric (physical) hazards

2 Superior and additional applicable documents

1000_GP_11_01_en_6.0 Global Policy on Health, Safety, Environment and Quality (HSEQ)

29 CFR 1910.146

29 CFR 1926.1200

ANSI Z117.1

This section of the HSEQ Manual applies to all Centennial employees and subcontractors who are performing work in Centennial facilities and project sites. There may be more stringent requirements than this section as defined by specific State, local or contact specific confined space requirements. If there is a conflict between this section and other applicable regulations, the more stringent will apply.

3 Definitions

The following definitions of terms are important for an understanding of this section.

Term	Definition
Centennial	All Centennial employees, joint venture employees, subcontractors and business partners
ACGIH	American Conference of Governmental Industrial Hygienists
Authorized entrant	An individual who has been trained in the hazards associated with the specific confined space and is authorized to enter
Acceptable entry conditions	The conditions that must exist in a confined space to allow entry and to ensure that personnel involved with an entry can safely enter into and work within the space
Attendant	An individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program
Confined space	A space that is large enough and so configured that an employee can bodily enter and perform assigned work, it has limited or restricted means for entry/exit or rescue and is not designed for continuous employee occupancy
Early warning system	Method used to alert authorized entrants and attendants of an engulfment hazard
Emergency	Any occurrence (including any failure of power, hazard control or monitoring equipment) or event internal or external to the permit space that could endanger confined space entrants
Engulfment	The surrounding and effective capture of a person by liquid or a finely divided solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing
Entry	The action by which any part of a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space whether or not such action is intentional or any work activities are actually performed in the space
Entry employer	Decides or directs an employee it directs to enter a permit space (proximity of the space)
Entry permit	The written or printed document that is provided to allow and control entry into a permit space
Entry rescue	Occurs when a rescue service or team enters a space to rescue one or more entrants

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Entry supervisor	The qualified person responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section
Flammable range	The percent of vapor or a substance in air necessary for combustion to occur
Hazard	A physical hazard or hazardous atmosphere
Hazardous atmosphere	An atmosphere that may expose employees to the risk of death, incapacitation and/or impairment of ability to self-rescue (that is, escape unaided from a confined space), injury, or acute illness from one or more of the following causes: atmospheric oxygen concentration below 19.5 percent or above 23.5 percent; flammable gas, vapor, or mist in excess of zero percent of its lower flammable limit (LFL); atmospheric concentration of any substance, which could result in employee exposure in excess of its permissible exposure limit (PEL); any other condition that is IDLH
Hot work	Any work involving electric or gas welding, cutting, brazing, burning or similar flame or spark producing operations. This includes, but is not limited to, acetylene torches, arc welding equipment, portable grinders, propane torches, explosion actuated tools, etc.
Immediately Dangerous to Life or Health (IDLH)	Any condition that would interfere with an individual's ability to escape unaided from a permit space and that poses a threat to life or that would cause irreversible health effects
Inerting	Displacing the atmosphere in a permit space by a non-combustible gas (such as nitrogen, carbon dioxide etc.) to such an extent that the resulting atmosphere is non-combustible
HSEQ	Health, Safety, Environment and Quality
Lower Flammable Limit (LFL)	The minimum concentration of a substance in air needed for an ignition source to cause a flame or explosion. Also known as the Lower Explosive Limit (LEL)
Limited or restricted means for entry or exit	A condition that has a potential to impede an entrant's movement into or out of a confined space. Such conditions include, but are not limited to, trip hazards, poor illumination, slippery floors, inclining surfaces and/or the use of ladders
Lock out	The placement of a lock out device on an isolating device ensuring the equipment cannot be operated until the lock out device is removed
Monitoring	The process used to identify and evaluate the hazards after an authorized entrant enters the space. This is the process of checking for changes after the initial completion of the initial testing or evaluation of the space
Non-entry rescue	Occurs when a rescue service or individual retrieves an individual(s) from a permit space without entering the space
NPCS	Non-permit required confined space

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OSHA	Occupational Health and Safety Administration
Oxygen deficient	Atmosphere in a confined space containing less than 19.5 percent oxygen by volume
Oxygen enriched	Atmosphere in a confined space containing more than 23.5 percent oxygen by volume
PEL	Permissible Exposure Limit
PSO	Project Safety Officer
PRCS	Permit required confined space
Physical hazard	Hazards that can cause death or serious physical damage. These include: explosives, mechanical, electrical, hydraulic and pneumatic, radiation, temperature extremes, noise, engulfment, inwardly converging surfaces or chemicals
Prohibitive condition	Any condition that is not allowed by the permit during the period when entry is authorized. A hazardous atmosphere is a prohibitive condition unless it can be demonstrated that PPE will provide effective protection for each entrant in the space
Qualified person	One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training or experience has successfully demonstrated his/her ability to solve or resolve problems relating to the subject matter, the work or the project
Rescue	An established emergency response procedure whereby both the rescue personnel and all necessary rescue equipment are available at the incident scene in a timely manner so that rescue can commence within 5 minutes of the start of an emergency (may include entry or non-entry rescue)
Restricted entry or exit	Requires the use of the hands for support or contortion of the body to enter into or exit from a confined space
Retrieval system	The equipment including a retrieval line, full body harness, wristlets (if appropriate), and a lifting device or anchor used for non-entry rescue of persons from confined spaces
SCBA	Self-Contained Breathing Apparatus
Serious physical damage	An impairment or illness in which a body part is made functionally useless. Such impairment or illness may be permanent or temporary and includes loss of consciousness
Supplied air respirator	A full-face piece self-contained breathing apparatus (SCBA) or airline full-face piece respirator connected to a Grade D or equivalent breathable compressed air source
Test or testing	The process by which the hazards are identified and evaluated
TLV	Threshold Limit Value
Upper Flammable Limit (UFL)	The highest concentration of a substance in air capable of producing ignition

Ventilate or ventilation	Controlling a hazardous atmosphere using continuous forced-air mechanical systems
HSEQ Director	Leads the HSEQ Team

4 Personnel Roles and Responsibilities

4.1 Authorized entrant

Authorized entrants are personnel who are granted permission to enter a confined space for the purpose of surveying or to perform assigned work and shall:

- Be familiar with and understand the hazards that may be faced during entry, including information on the mode, signs or symptoms and consequences of exposure
- Read and observe the entry permit requirements
- Remain alert to the hazards that could be encountered while in the confined space and be able to communicate with the attendant as needed to assess entrant status or be able to evacuate the space
- Observe pre-entry and any subsequent testing or monitoring of permit spaces
- Properly use all personal protective equipment that is required by the AHA, PRCS Entry Plan (attached as Appendix 1) and/or PRCS Entry Permit (Appendix 2)
- Immediately evacuate the confined space when:
 - Instructed to do so by the attendant or entry supervisor
 - Recognize signs or symptoms of hazardous exposure
 - An emergency condition exists
 - A prohibited condition exists
 - The evacuation alarm is signaled
- Alert Attendant(s) when a prohibited condition exists and/or when warning signs or symptoms of exposure exist

4.2 Attendant

Attendant(s) shall be stationed outside the permit required confined space and shall remain directly outside the space for the duration of entry operations. A single attendant may be assigned to more than one permit space provided that their duties may be effectively performed for each permit space.

The Attendant(s) duties and responsibilities shall include:

- Know the hazards, including information on the mode of exposure (e.g., inhalation or dermal absorption), signs or symptoms, and consequences of the exposure
- Is aware of possible behavioral effects of hazard exposure in authorized entrants
- Know the number and identity of entrants in the space at all times
- Monitor surrounding activities to ensure the safety of personnel
- Remain outside the space until relieved by another attendant
- Maintain effective and continuous communication with personnel during confined space entry, work, and exit
- Order authorized entrants to evacuate the confined space if he or she observes:
 - A condition which is not allowed on the entry permit

- The entrants acting strangely, possibly as a result of exposure to hazardous substances
 - A situation outside the confined space which could endanger personnel
 - A hazard within the confined space that has not been previously recognized or taken into consideration
- Immediately summon the entry rescue services if rescue becomes necessary
- Perform non-entry rescue duties
- Prevent unauthorized persons from entering the confined space and notify the entry supervisor of an unauthorized entry
- Perform no duties that may interfere with the primary duty of monitoring and protecting authorized entrants
- Never enter a permit space to attempt a rescue

4.3 Entry supervisor

The entry supervisor is a qualified person (such as a foreman or crew chief) who shall be responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required.

The entry supervisor shall have the following responsibilities:

- Be familiar with and understand the hazards that may be faced during entry, including information on the mode, signs or symptoms and consequences of exposure
- Determine if conditions are acceptable for confined space entry
- Verify appropriate entries have been made on entry permit, all tests have been conducted, all pre-entry conditions have been met and all procedures/equipment specified by permit are in place before endorsing permit and authorizing entry
- Authorize entry and manage all entry operations according to the PRCS Entry Permit (Appendix 2)
- Terminate entry and cancel permit when tasks are completed or when a condition not allowed by the permit arises
- Verifies that rescue services are available and that the means for summoning them are operable
- Serve as an Attendant, as long as the person is trained and equipped appropriately for that role
- Ensuring measures are in place to keep unauthorized personnel clear of the area
- Ensuring that necessary information on chemical hazards is kept at the worksite for the employees or rescue team
- Ensuring that non-entry or entry rescue means are available for immediate response
- Ensuring the rescue team members have current certification in first aid and cardiopulmonary resuscitation (CPR)

5 Confined space evaluation

Prior to the start of the project, the project superintendent or Project Safety Officer (PSO) and the entry supervisor or competent person will evaluate all areas of the worksite to determine if there are any potential confined spaces and potential permit required confined spaces that may require Centennial employee or subcontractor entry using the Confined Space Determination and Decision Flow Chart (Appendix 4). If one or more permit spaces are identified, the entry

supervisor or competent person shall inform all exposed and potentially exposed personnel of the hazards and post a sign at the permit space that reads "DANGER-PERMIT REQUIRED CONFINED SPACE, DO NOT ENTER". Prior to entry, the entry supervisor or competent person for confined space will ensure that acceptable entry conditions exist.

Acceptable entry conditions include:

- Oxygen levels within acceptable range (19.5%-23.5%)
- Flammable range including gas, vapor or mist concentration is 10% or less of the lower flammable limit (LFL/LEL)
- Concentrations of combustible dust are kept below the LFL/LEL and shall not obscure vision at distances of 5 feet or less
- Substances which have an OSHA PEL or ACGIH TLV, and which cause acute illness or would impair the entrant's ability to self-rescue, will be controlled within the space to a concentration equal to 50% of the PEL or TLV
- All electrical, mechanical and other kinetic hazards within the space shall be locked out, de-energized or safety blocked per HSEQ Manual section 13 (Hazardous Energy Control)
- Engulfment or entrapment hazards shall be eliminated or controlled

5.1 Atmospheric monitoring

Atmospheric testing and monitoring is required to confirm acceptable entry conditions into any confined space. Atmospheric monitoring will be accomplished using a calibrated and tested direct reading instrument.

Atmospheric testing equipment shall test for hazards in the following order:

- Oxygen
- Combustible gases and vapors
- Toxic gases and vapors

Acceptable atmospheric conditions shall meet the following criteria:

- Oxygen - greater than 19.5% and less than 23.5%
- Lower Flammable Limit (LFL)/Lower Explosive Limit (LEL) - less than 10%
- Carbon Monoxide (CO) - less than 35 ppm
- Hydrogen Sulfide (H₂S) - less than 10 ppm
- No other toxic or hazardous substance

If any other toxic or hazardous substance is present, or has the potential to be present, the proper monitoring equipment shall be obtained, calibrated according to manufacturer instructions and operated by an individual who has been trained in the correct use of the equipment.

The confined space shall be monitored to ensure that acceptable entry conditions are being maintained throughout the entry operation using Appendix 3 of this section (Continuous Atmospheric Monitoring Log). If conditions deteriorate during entry, all entrants shall evacuate the space immediately and the space reevaluated by the entry supervisor before any re-entry is permitted.

5.2 Non-permit required confined space (NPCS)

A non-permit required confined space (NPCS), by definition, does not present a hazard to an authorized entrants more severe than its limited or restricted means of entry and exit. Therefore, provided that the work to be performed does not create a potential for a hazardous or unacceptable condition, entry to a non-permit-required confined space may proceed as described below.

Prior to entry the entry supervisor or competent person shall:

- Review the work to see if personal protective equipment is needed
- Establish traffic control barriers at the entry point, if applicable
- Eliminate any condition that would make removal of the confined space entry cover unsafe
- Once the entry cover is removed, promptly guard the entry point with a temporary barrier to prevent an accidental fall through the opening and protect employees working in the space from foreign objects entering the space
- Ensure a safe means of communication is available
- Ensure appropriate lighting and/or equipment (e.g., ladders) for safe entry and exit by entrants is available

A NPCS shall be re-evaluated by an entry supervisor or competent person for confined space anytime there are changes in the task, activity or configuration of the NPCS.

Changes in use or configuration include, but are not limited to the following:

- Introduction of flammables, solvents, chemicals or gases into the space
- New equipment or a change in the type of equipment present
- Work processes such as cleaning or painting, etc.
- A change in the means of access/egress or dimensions of the space

5.3 Permit required confined space (PRCS)

A permit required confined space is a confined space, which after evaluation, has one or more of the following characteristics:

- Contains or has the potential to contain a hazardous atmosphere
- Material that could potentially engulf an authorized entrant
- A configuration that could entrap or asphyxiate an authorized entrant
- Any other serious safety or health hazard

5.3.1 PRCS Entry Plan

A PRCS Entry Plan shall be developed and submitted for approval by the PSO or PSM and SSR prior to any approved entry into a PRCS. The intent of the PRCS Entry Plan is to ensure that employees and subcontractors are protected from potential safety and health hazards associated with entry into a permit-required confined space. Individual plans are to be prepared for each specific permit-required confined space entered. Project site specific procedures may be developed based on the conditions of the PRCS; however, all PRCS Entry Plans must be approved by the PSO or PSM and SSR prior to entry into the space. If multiple subcontractors will enter the space performing different activities, each subcontractor shall submit a PRCS Entry Plan and associated AHAs for approval.

The PRCS Entry Plan will:

- Identify confined spaces and permit required confined spaces
- Describe procedures and practices necessary for safe permit space entry
- Describe reason for PRCS entry including work activities (i.e. hot work, surveying etc.)
- Identify protective and other equipment that will be needed
- Designate persons who are authorized as entrants, attendants and entry supervisors
- Evaluate hazards of the confined space including any IDLH conditions

Elements of the plan, at a minimum, must include:

- Methods used to prevent unauthorized entry
- Methods for PRCS evaluation
- Acceptable entry conditions and methods used to achieve acceptable entry conditions
- All equipment needed to safely perform all tasks in the space
- Means of communication (attendant(s) and all entrants)
- Personal protective equipment required for the space and specific task(s)
- Training records for all personnel:
 - Attendant(s)
 - Authorized entrant(s)
 - Entry Supervisor
- Methods used to maintain acceptable conditions throughout the entry
- Make, model and type of atmospheric monitoring equipment and ventilation equipment
- Record used for continuous atmospheric monitoring in the work area(s)
- Early warning system for any potential engulfment hazards
- Types of lighting, tools etc.
 - Intrinsically safe
 - Explosion proof
- Type of rescue
 - Entry (include training records for all rescue team members)
 - Non-entry (specify type of equipment)

5.3.2 Prevention of unauthorized entry

The following method will be used to prevent unauthorized entry into permit-required confined spaces:

- A sign that reads “DANGER - PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER” will be posted at the entrance to any PRCS on a Centennial project site

5.3.3 Permit system and implementation

The entry supervisor shall document the completion of preparation needed for a safe entry into a PRCS using the PRCS Entry Permit (Appendix 2) or other acceptable entry permit.

The PRCS Entry Permit, signed by the entry supervisor verifying that pre-entry preparations have been completed, and that the space is safe to enter, must be posted at the entrance or otherwise made available to entrants before they enter a PRCS. The Permit shall be a means of verification that the written procedures for entry into a PRCS have been followed.

5.3.4 Minimum contents of the PRCS entry permit

The permit shall, at a minimum, include the following:

- The PRCS to be entered
- The purpose of the entry
- Date and authorized duration of the permit
- Authorized entrants
- Name(s) of the attendant(s)
- Name of the entry supervisor
- Acceptable entry conditions
- The specific hazards of the space
- Procedures needed to isolate the permit space
- LOTO or isolation to control potential hazardous energy
- Steps necessary to control atmospheric hazards
- Barriers needed to protect entrants from external hazards
- Steps necessary to ensure acceptable entry conditions are present throughout the entry
- Results of atmospheric tests and monitoring
- Rescue and emergency services that can be summoned and the means for summoning those services
- Communication procedures used by authorized entrants and attendants to maintain contact during entry
- Any additional permits (i.e. hot work) that have been issued to authorize work in the permit space

5.3.5 Suspension or Termination of work

The duration of the permit shall not exceed the time required to complete the assigned task. The entry supervisor shall suspend or terminate the entry and cancel the permit when:

- The work listed on the permit has been completed
- A temporary condition (that does not change the configuration of the space and does not create new hazards) that is not allowed under the permit arises in or near the space
- A condition that is not allowed under the permit arises in or near the space that was not part of the initial plan
- The end of each shift or personnel change

Each canceled PRCS Entry Permit shall be sent to the PSM and HSEQ Director and kept on file for one year. Comments concerning problems with entry operations should be noted on the permit so that entry procedures can be evaluated and revised if necessary.

5.3.6 PRCS non-entry rescue

Retrieval systems shall be available and ready when an authorized person enters a permit space, unless such equipment increases the overall risk of entry, or the equipment would not contribute to the rescue of the entrant. Retrieval systems shall have a chest or full-body harness and a retrieval line attached at the center of the back near shoulder level or above the head. If harnesses are not feasible, or would create a greater hazard, wristlets may be used instead of the full body harness. See HSEQ Manual section 20 (Fall Protection) for guidance on fall protection equipment. The retrieval line shall be firmly fastened outside the space so that rescue can begin as soon as retrieval becomes necessary. A mechanical device shall be available to retrieve personnel from vertical confined spaces more than five (5) feet deep.

5.3.7 PRCS entry rescue team

A PRCS rescue team may be selected when non-entry rescue is not feasible. The PRCS entry rescue team requires specialized knowledge and training to perform rescue operations.

When selecting a rescue team or service for PRCS entry rescue, the following evaluations shall be completed:

- An initial evaluation to determine whether a potential rescue service or team is adequately trained and equipped to perform permit space rescues of the kind needed at the facility and whether such rescuers can respond in a timely manner
- A performance evaluation is conducted to determine if the planned methods of rescue are adequate to ensure timely and efficient rescue of authorized entrants

The following characteristics of a practice space should be considered when deciding whether a space is truly representative of an actual permit space:

- Internal configuration
 - Open- there are not obstacles, barriers, or obstructions within the space
 - Obstructed- the permit space contains some type of obstruction that a rescuer would need to maneuver around
- Elevation
 - Elevated- a permit space where the entrance portal or opening is above grade by 4 feet or more (this type of space usually requires knowledge of high angle rescue procedures because of the difficulty in packaging and transporting a patient to the ground from the portal)
 - Non-elevated- a permit space with the entrance portal located less than 4 feet above grade (this type of space will allow the rescue team to transport an injured employee normally)
- Portal size
 - Restricted- A portal of 24 inches or less in the least dimension. Portals of this size are too small to allow a rescuer to enter the space while using SCBA. The portal size is also too small to allow normal spinal immobilization of an injured employee
 - Unrestricted- A portal of greater than 24 inches in the least dimension
- Space access
 - Horizontal- The portal is located on the side of the permit space. Use of retrieval lines could be difficult
 - Vertical- The portal is located on the top of the permit space, so that rescuers must climb down, or the bottom of the permit space, so that rescuers must climb up to enter the space. Vertical portals may require knowledge of rope techniques, or special patient packaging to safely retrieve a downed entrant

5.3.8 Reclassification of a PRCS

Under certain conditions, the entry supervisor or competent person for confined space may temporarily reclassify a permit-required confined space to non-permit-required. The specific conditions necessary to allow this temporary reclassification are as follows:

- All hazards within the permit space are eliminated or isolated prior to entry

- The space does not contain atmospheric hazards (actual or potential) during entry. Any atmospheric hazard eliminated shall remain eliminated or isolated throughout the duration of the entry operation

NOTE: The use of continuous forced air ventilation to control an atmospheric hazard does not “eliminate” the hazard and thus does not constitute compliance with this procedure.

Reclassification of a PRCS to a NPCS will be documented by the entry supervisor or competent person on the Activity Hazard Analysis (AHA) and include all support documentation such as:

- Atmospheric monitoring records
- Ventilation methods
- Reconfiguring of the space
- Other methods used to eliminate hazards

5.4 Alternate entry procedures

The PRCS Entry Permit (Appendix 2) shall be used to document any entry into a confined space under alternate entry procedures. Alternate entry procedures shall only be used when the following conditions are met:

- Atmospheric testing shall be completed prior to entry
- All physical hazards in the space are eliminated or isolated through engineering controls so that the only hazard posed by the permit space is an actual or potential hazardous atmosphere
- Continuous forced air ventilation alone is sufficient to maintain the space as safe for entry and that, in the event the ventilation system stops working, entrants can exit the space safely
- Continuous monitoring and inspection is used during the duration of entry and documented on Appendix 3 or other equivalent form

Alternate entry procedures shall not be used if the permit space contains any other serious hazard, such as, heat, electrical, mechanical, engulfment, etc.

Performance requirements for entering a permit space using alternate entry procedures:

- Evaluate the space and eliminate any potential hazards to ensure that the cover to a confined space can be removed and the space entered safely
- Guard openings using temporary guardrails, covers and/or other physical barriers to spaces to prevent persons or objects from falling into them
- Engulfment hazards shall be continuously monitored upstream (sewer etc.)
- Prior to and during entry, the atmosphere shall be tested with a calibrated, direct-reading instrument for:
 - Oxygen
 - Flammability
 - Potential toxic atmospheric contaminants
- No hazardous atmosphere shall be present whenever any employee is inside the space
- Forced air ventilation shall be directed to ventilate the immediate areas where an employee is or will be present and must be continuously supplied while employees are in the space
- Safe atmospheric conditions shall be verified by continuous atmospheric monitoring

- If a hazard is detected, any authorized entrants shall be directed by the attendant to evacuate the space immediately, entry shall not be permitted until all atmospheric conditions are verified as acceptable and the space has been re-evaluated by the entry supervisor
- Authorized entrants shall be trained on the hazards, equipment and safe work practices necessary to make entry into the space and perform all required tasks

6 Training

Prior to entry, employees and subcontractors must be trained in the specific duties and hazards associated with the work, responsibilities and their assignments. This includes any Authorized Entrants, Attendants, Entry Supervisors, rescue team members, and other affected personnel who enter the confined space. Employees and subcontractors who are assigned duties that may require entry into NPCS or PRCS must receive training on confined space entry procedures, the permit system, and hazard recognition and control procedures. Training records shall be present at the PRCS for review and must be maintained for the duration of employment.

Training shall be provided to all affected personnel and, at a minimum, include:

- Hazards associated with confined spaces
- Specific hazards in immediate confined space
- Care, use and limitations of personal protective equipment
- PRCS permit system
- Emergency response procedures
- Duties of each team member
- Symptoms of over exposure
- Methods of alerting attendants
- Communications and alert signals
- Methods of rescue including
 - Self-rescue
 - Non-entry rescue
 - Entry rescue
 - Limitations of performing rescue (only if trained and equipped)

Retraining is required when:

- Changes in the workplace render previous training incomplete or obsolete
- Changes to assigned duties and/or responsibilities
- Changes in the types of confined space systems, procedures, atmosphere or equipment to be used render previous training incomplete or obsolete
- Inadequacies in an employee's knowledge or use of confined space systems or equipment indicate that the employee has not retained the requisite understanding or skill

7 Amendment history

Date	Version	Revised content
18.04.2014	1.0	Initial Preparation
08.01.2015	1.1	Revision to comply with OSHA and ANSI changes
01.01.2016	1.2	Clarification on PRCS Entry Plan approval and signature authority
01.01.2018	2.0	Updates to Paragraph 2 Superior Documents to add the Group Policy and Global Standards, Paragraph 3 Definitions (Centennial and HSEQ Director), Paragraph 5.3 PRCS Entry Plan (approval), Paragraph 5.3.5 Suspension or Termination of work (suspension) and Appendices 1-4 (logo)
01.01.2020	2.1	Updates to Paragraph 2 Superior Documents and Appendix 1 (Approvals)

8 Appendix

Appendix 1: PRCS Entry Plan (0206500_CP_11_21_en_A1.4)

Appendix 2: PRCS Entry Permit (0206500_CP_11_21_en_A2.3)

Appendix 3: Continuous Atmospheric Monitoring Log (0206500_CP_11_21_en_A3.1)

Appendix 4: Confined Space Determination and Decision Flow Chart
(0206500_CP_11_21_en_A4.3)

Permit Required Confined Space (PRCS) Entry Plan

0206500_CP_11_21_en_A1.4



Instructions: Complete the Permit Required Confined Space Plan below. Ensure that site specific and PRCS specific details are included.

Project Title:

Contract #:

Plan Author (print name):

Date (mm/dd/year):

PRCS Type (description):

Purpose of Entry

The purpose of this plan is to implement safety work practices regarding PRCS entry at (enter project title or PRCS location):

This plan shall be implemented to protect the employee(s) who enter and conduct work inside the PRCS

Definitions

Acceptable Entry Conditions	<i>Conditions which must exist in a confined space to ensure that employees can safely enter and work within the space.</i>
CS Entry	<i>Individual stationed outside a confined space who monitors the authorized entrants and who performs attendant's duties (i.e., constant communication, emergency notification, etc.) assigned.</i>
CS Entry Attendant	<i>An individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program.</i>
CS Authorized Entrant(s)	<ul style="list-style-type: none"><i>* Know space hazards, including information on the mode of exposure (e.g., inhalation or dermal absorption), signs or symptoms and consequences of the exposure;</i><i>* Use appropriate personal protective equipment properly (e.g., face and eye protection, and other forms of barrier protection such as gloves, aprons and coveralls);</i><i>* As necessary, maintain communication (i.e., telephone, radio, visual observation) with entrants to enable the attendant to monitor the entrants status as well as to alert the entrant to evacuate;</i><i>* Exit from permit space as soon as possible when ordered by an authorized person, when the entrant recognizes the warning signs or symptoms of exposure exist, when a prohibited condition exists, or when an automatic alarm is activated; and</i><i>* Alert the attendant when a prohibited condition exists or when warning signs or symptoms or exposure exist.</i><i>* Check that equipment is in good condition.</i>
CS Entry Supervisor	<i>Department head, foreman or supervisor responsible for determining, if acceptable, entry conditions are present at a permit space where entry is planned, for authorizing entry, for overseeing entry and for terminating entry.</i>
Confined Space	<i>Confined Space spaces or enclosures large enough and configured so as to allow one to bodily enter to perform assigned work with limited or restricted means of entry or exit (i.e., storage tanks, boilers, sewers, utility tunnels, vaults, manholes, degreaser pits, trenches, etc.) and not designed for continuous occupancy.</i>
Confined Space Entry Permit	<i>Written or printed document provided by an employer to allow and control entry into a permit required confined space.</i>

General Requirements

Primary Hazards (check all that apply, add detail if applicable):

- | | | |
|-----|----|---|
| Yes | No | Potential or existing hazardous atmosphere? (if yes, explain below) |
| Yes | No | Live electrical? (if yes, explain how energy will be isolated, LOTO, etc. [submit HECF/LOTO]) |
| Yes | No | Toxic environment? (if yes, explain below) |
| Yes | No | Converging wall or engulfment hazard? (if yes, explain below) |
| Yes | No | Unguarded machine parts or equipment? (if yes, explain below) |
| Yes | No | Other identified hazard(s)? (if yes, explain below) |

Access & Egress:

Type of access/egress (explain below):

If access/egress is gained via hatch or manhole cover, explain how the access/egress will be guarded:

- | | | |
|-----|----|--|
| Yes | No | Will the CS entry attendant be exposed to a fall hazard? (if yes, explain protection): |
|-----|----|--|

A No Access Zone, will be delineated around the guardrails (6 feet on all sides) using candle sticks and caution tape. No employee is allowed inside this area unless signing in on the entry / exit log or without first checking in with the entry attendant. The PRCS entry attendant shall guard the entrance from any unauthorized employee(s). Signage should be placed around the confined space entry point(s) to warn any individual of the confined space hazard.



Atmospheric Monitoring:

Gases inside confined spaces tend to settle into layers; the air monitoring shall be conducted first around the point(s) of access / egress. The atmospheric monitor will then be placed on a string or pole and the air quality will be tested inside the space from the point of access to the bottom and/or the work area inside the PRCS. When monitoring for atmospheric hazards, the air monitor should be lowered into the space in 2-3 foot intervals. At each interval, the air monitor should be allowed a 1 to 2 minute testing / assessing period. Once all readings are acquired and it is safe to enter, the entry permit will be completed, issued and a entry / exit log will be initiated allowing the authorized entrant(s) to enter the space. If the air monitor sounds an alarm, no entry into the space will be allowed. The confined space supervisor will assess the readings on the air monitor and consult an Industrial Hygienist on additional techniques to create and maintain an acceptable atmospheric condition inside the PRCS (i.e. additional ventilation or respiratory controls). While inside the PRCS, if at any time the air monitor alarm sounds, the entrant(s) will exit the space immediately and the entry permit will be terminated. An entry / exit log will be posted at the access/egress areas and must be signed by all authorized entrant(s) each time he or she enters / exits the space.

Atmospheric monitor make/model:

Atmospheric monitor serial number:

Has the atmospheric monitor been calibrated?:

Will an authorized entrant be wearing an atmospheric monitor?:

If no, where will the monitor be positioned? (explain):

Note: No access to the confined space shall be allowed without first testing the space for oxygen content (not below 19.5 percent or above 23.5 percent) then for combustible gases and vapors, and then for toxic gases and vapors. Per OSHA 1910.146(d)(5)(iii).

Ventilation:

Yes No Will ventilation be implemented during entry into the PRCS? (if yes, explain in detail):

Ventilation equipment make/model:

Fuel powered?:

Electrically powered?:

Note: Consider placement of ventilation equipment. Avoid placing ventilation equipment intake near running fuel powered equipment or exhaust or next to any other recognizable atmospheric/toxic hazard(s).

Ventilation output:

CFM (cubic feet per minute)

Note: Consider any bends in ventilation hose as this will decrease the CFM output (reference manufacturer's specs).

Volume of the PRCS (cubic feet):

Approx air exchanges per hour:

Calculation: (Ventilation output CFM x 60) / volume of PRCS = Air Exchanges Per Hour.

Note: Implementation of ventilation must be continuous in all PRCS

Work Activity

Describe the job tasks and type of work that will be conducted inside of the PRCS:

Yes No Will the job tasks performed inside of the PRCS create additional hazards? (if yes, explain):

Yes No Will engineering controls be implemented to control hazards? (if yes, explain):

Personal Protection Equipment (PPE)

List required PPE:

- | | |
|----|--------|
| 1- | 2- |
| 3- | 4- |
| 5- | Other- |

Yes No Will respiratory equipment be required/utilized? (if yes, explain/list type, make & model):

Note: All workers utilizing respiratory equipment shall supply and attach a copy of his/her medical clearance & fit test.

Lighting

Yes No Is the PRCS properly lit? (if no, explain lighting equipment that will be used):

Yes No Will explosion proof or intrinsically safe lighting be required?

Alternate Entry Procedures (Per OSHA 29 CFR 1926.1203[e])

Alternate Entry Procedures may be used provided that the following conditions are met:

- 1- The employer can demonstrate that forced air alone is sufficient to maintain that permit space safety for entry and that, in the event the ventilation system stops working, entrants can exit the space safely.
- 2- The employer develops monitoring and inspection data that supports the demonstrations required by 1926.1203(e)(1)(i) & (ii). (atmospheric monitoring log)
- 3- The demonstrations, inspections and data mentioned in items 1 & 2 above are made available to everyone entering the confined space.
- 4- Entry into the PRCS is done in accordance with 1926.1203(e)(2)

Yes No Will alternate entry procedures be implemented for this PRCS?:

Note: although an issued permit is not required when entering via alternate entry procedures, the permit shall be filled out to document atmospheric testing results and ventilation procedures. It is best practice to implement a permit even when entering PRCS using alternate entry procedures. See atmospheric testing and ventilation sections above.

Fall Protection

Yes No Will fall protection equipment be required inside the PRCS? (if yes, explain in detail):

Note: If fall protection equipment is used, please reference the separate fall protection plan for more details.

Fall Protection

What type of emergency rescue will be implemented? (choose all that apply):

Non-entry rescue (i.e. retrieval system)(if selected, explain system below)

Entry rescue (i.e. trained rescue team)(if selected, explain system below)

No emergency rescue (i.e. Alternate entry procedures will be used)

Communication Procedures

Communication between CS attendant and CS entrants will be established using the following methods (explain below):

Personnel

Authorized Entrants (print name):

1-	2-
3-	4-
5-	6-

PRCS Entry Attendant (print name):

PRCS Entry Supervisor (print name):

Plan Approval

PRCS Competent Person (print name):

Signature:

Date:

Centennial PSO/Supt (print name):

Signature:

Date:

Centennial SSR (print name):

Signature:

Date:

Permit Required Confined Space (PRCS) Entry Permit

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Introduction

Instructions: The information below shall be completed prior to worker entry into the permit required confined space (PRCS). This Permit is valid for only 1 work shift unless suspended and reissued. Reference the PRCS Plan for additional details and personnel qualifications / certifications.

PRCS to be entered (describe in detail):

Purpose for entry:

Date / time:

Duration of permit (hours / minutes):

Authorized Entrants (name) (reference the entry / exit log on last page for active tracking):

Entry Attendant (print):

Entry Supervisor (print):

(Signature):

Acceptable Entry Conditions

No access to the confined space shall be allowed without first testing the space for oxygen content (not below 19.5% or above 23.5% percent) then for combustible gases and vapors and last for toxic gases and vapors. Mechanical ventilation must be provided in all PRCS.

List any other specific entry conditions:

Hazards Specific To The PRCS

YES NO Potential or existing hazardous atmosphere (explain):

YES NO Live electrical (explain):

YES NO Toxic environment (explain):

YES NO Converging walls / engulfment (explain):

YES NO Unguarded machine parts / equipment (explain):

YES NO Other hazards (explain):

Isolation Methods

YES NO Ventilation (explain):

YES NO Electrical Lock out tag out (explain):

YES NO Equipment Lock out tag out (pumps/lines/mechanical/etc.) (explain):

YES NO Purging (explain):

YES NO Interting (explain):

YES NO Flushing (explain):

YES NO Other isolation methods (explain):

Atmospheric Monitoring

Reference the PRCS plan for methods on testing atmospheric conditions. Record atmospheric monitoring results on the confined space atmospheric monitoring log (HSEQ Procedures section 20, appendix 3) and attach it to this PRCS entry permit. Atmospheric monitoring during entry into a PRCS shall be continuous. The purpose for continuous atmospheric monitoring is to prevent exposing entrants to a hazardous atmosphere in the event that the ventilation equipment fails. If at any time the ventilation equipment fails or ceases to operate, entrants shall immediately exit the PRCS and the entry permit shall be canceled. **Note: PRCS entry permit is invalid without an attached and completed atmospheric monitoring log**

Communication Methods

Communication between the attendant and authorized entrant(s) must be established and maintained. List communication methods:

Equipment Implemented

Personal protective equipment (PPE) (explain):

Testing equipment (explain):

Communication equipment (explain):

Alarm systems (explain):

Rescue equipment (explain):

Lighting equipment (explain):

Other equipment (explain):

Is all equipment located in the space required to be intrinsically safe or explosion proof? YES NO

Rescue And Emergency Services

Select the type of emergency rescue which will be implemented: Entry rescue Non-entry rescue

List the methods for summoning entry rescue team:

List any specific emergency contact numbers for summoning rescue team / services:

Anticipated response time of rescue services:

Note: Reference the PRCS plan for more emergency rescue details

Additional Permits / Additional Considerations

Hot work permit required: YES NO Energized electrical work permit required: YES NO

List any other necessary information regarding worker safety:

Permit Implementation / Activation

I have reviewed the work authorized by this permit and the information pertaining to each item. I have reviewed the requirements detailed in the PRCS entry plan. Safety procedures / requirements for entering this PRCS have been reviewed and are understood by all personnel involved.

Entry Supervisor (print):

Signature:

Date/time:

Note: A copy of this permit whether issued or canceled must remain on site for record-keeping purposes

Entry / Exit Log

This entry / exit log is to be used by the entry attendant and is meant to track / record the authorized entrant(s) both located within and outside of the PRCS. This is an active / real-time log and should be continuously updated as work progresses and maintained until the entry supervisor closes / cancels the PRCS entry permit.

[illegible]

Continuous Atmospheric Monitoring Log

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Instructions: Use the monitoring log below to accurately record the atmospheric conditions inside the applicable confined space. If multiple confined spaces are being tested, indicate the space by number or name. If continuous atmospheric monitoring is being performed, record the atmospheric conditions every hour (best practice).

Air Monitor Make / Model:

Calibrated: Yes No

Serial Number:

Monitoring Performed By (print name):

Date:

Note: Acceptable atmospheric levels

Oxygen [19.5% - 23.5%] **Explosive** [<10% LEL / LFL] **Carbon Monoxide** [0-35 PPM] **Hydrogen Sulfide** [0-10 PPM]

Initial Test

Time:

Notes:

% O₂:

% Lower Flammable Limit:

Parts Per Million (PPM) CO:

Parts Per Million (PPM) H₂S:

Other:

Consecutive Tests (after ventilation has been established, if applicable)

Time:

Notes:

% O₂:

% Lower Flammable Limit:

Parts Per Million (PPM) CO:

Parts Per Million (PPM) H₂S:

Other:

Time:

Notes:

% O₂:

% Lower Flammable Limit:

Parts Per Million (PPM) CO:

Parts Per Million (PPM) H₂S:

Other:

Time:

Notes:

% O₂:

% Lower Flammable Limit:

Parts Per Million (PPM) CO:

Parts Per Million (PPM) H₂S:

Other:

Time:

Notes:

% O₂:

% Lower Flammable Limit:

Parts Per Million (PPM) CO:

Parts Per Million (PPM) H₂S:

Other:

Completed atmospheric monitoring log(s) must be kept on the project site for record-keeping purposes.

Confined Space Determination & Decision Flow Chart

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