Chapter 6: Confined Space

Quick Start Summary

Who needs to know about these requirements

The requirements of the Confined Space program apply to workers (as entrants and attendants), confined space entry supervisors, confined space owners, area and building managers, line management, field construction and service managers, and the program manager.

Why

Work in confined spaces poses risks of exposure to hazardous and oxygen-deficient atmospheres and to hazardous energy; engulfment, and injuries such as bumps, scrapes, and lacerations.

What do I need to know

A confined space is classified as either a non-permit-required confined space (NPRCS) or a permit-required confined space (PRCS), depending on the type of hazards present. Requirements for entering depend on the classification. Certain PRCSs may be temporarily declassified or entered under an alternate procedure by eliminating hazards before entry.

Every entry must be formally authorized (by a confined space entry supervisor) using the appropriate form. The forms document conditions, controls, and authorization and are used to confirm the classification. Information from completed forms is used to update the site-wide inventory of confined spaces.

Known classified spaces must be assigned an owner, who in turn is responsible for posting warning signs. Entrants, attendants, and entry supervisors must be qualified. Every confined space entry requires the presence of at least two qualified persons (the two-person rule).

When

These requirements take effect 15 September 2017.

Where do I find more information

SLAC Environment, Safety, and Health Manual (SLAC-I-720-0A29Z-001)

- Chapter 6, “Confined Space”

Or contact the program manager.
Chapter 6

Confined Space

1 Purpose

The purpose of this program is to ensure personnel work safely in and around confined spaces by ensuring that entry into any confined space is planned and documented as required in order to identify and control hazards. It covers classifying and posting spaces, selecting entry methods, and authorizing and performing entries. It applies to workers (as entrants and attendants), confined space entry supervisors, confined space owners, area and building managers, line management, field construction and service managers, and the program manager.

2 Roles and Responsibilities

Functional roles and general responsibilities for each are listed below. More detailed responsibilities and when they apply are provided in the procedures and requirements.

The roles may be performed by one or more individuals and one individual may play more than one role, depending on the structure of the organizations involved. Responsibilities may be delegated.

2.1 Entrant

- Is current in required training
- Knows the hazards that may be encountered during the entry, as well as symptoms and health effects if overexposure occurs
- Operates any equipment required for the safety of the entry operation
- Maintains communication with the attendant
- Notifies the attendant of any indication of a dangerous situation or prohibited condition and exits immediately
- Exits the confined space as quickly as possible as instructed by the attendant or the confined space entry supervisor

2.2 Attendant

- Is current in required training
- Knows hazards that may be encountered during the entry, as well as behavioral/physiological symptoms and health effects if overexposure occurs
- Monitors activities inside and outside the space to determine if it is safe for entrants to remain
- Maintains an accurate account of entrants in the permit-required space
- Maintains communication with entrants to monitor work activities and sound the alert if evacuation becomes necessary
- Remains outside the space during the entry operation until relieved by another attendant
- Performs no other activities that may interfere with the primary job of monitoring safety and condition of entrants currently in the confined space
- Performs non-entry rescue, if necessary

### 2.3 Confined Space Entry Supervisor

- Is designated by the confined space program manager in consultation with line management
- Is current in required training
- For all NPRCS, temporary declassification and alternate entries, reviews the entry form and confirms that conditions qualify, if valid
- Together with the confined space program manager, profiles newly discovered or created confined spaces
- For all permit entries, supervises confined space entries as follows
  - Identifies hazards that may occur during a specific entry and signs, symptoms, and consequences of a potential exposure
  - Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before signing the permit’s pre-entry certification and allowing entry
  - Verifies that non-entry rescue procedures are in place
  - Ensures that atmospheric test equipment is adequate for the anticipated hazards and has been properly calibrated
  - Remains outside the space during entry operation until relieved by another confined space entry supervisor
  - Terminates the entry and closes the permit when the entry operations covered by the entry permit have been completed or a condition that is not allowed under the entry permit arises in or near the permit space
  - Prevents unauthorized individuals from entering the permit space during entry operations
  - Determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained
- Forwards all closed permits to the confined space program manager
Chapter 6: Confined Space

2.4 Confined Space Owner
- Ensures confined spaces are properly posted
- Reports any changes in the confined space profile to the confined space program manager

2.5 Area / Building Manager
- Designates confined space owners

2.6 Supervisor / Line Management
- Approves designation by the confined space program manager of confined space entry supervisors
- Ensures that training remains current
- Provides all required equipment for confined space entry

2.7 Field Construction Manager / Service Manager / Point of Contact
- Makes information in the confined space inventory available to subcontractors
- Ensures subcontractors comply with SLAC requirements and applicable regulations, including 29 CFR 1926 Subpart AA for construction subcontractors

2.8 Confined Space Program Manager
- Develops program requirements and training
- Designates confined space entry supervisors in consultation with line management
- Maintains confined space designations in the Competent and Qualified Persons and Engineers list
- Along with confined space entry supervisors, surveys and profiles confined spaces to determine classification (NPRCS or PRCS), hazards, and controls
- Advises confined space entry supervisors
- Maintains the confined space inventory
- Retains completed forms and closed permits for one year, except those used by subcontractors
- Reviews the closed permits and other forms at least annually to identify any program deficiencies
- Reviews subcontractor programs to ensure their programs are OSHA or Cal/OSHA compliant

3 Procedures, Processes, and Requirements

These documents list the core requirements for this program and describe how to implement them:
- Confined Space: Entry Procedures (SLAC-I-730-0A21C-007). Describes process for classifying and carrying out confined space entries
4 Training

4.1.1 Entrant and Attendant

Entrants and attendants must complete the following courses before performing any confined space work:

- ESH Course 144, Confined Space (ESH Course 144)
- ESH Course 144PRA, Confined Space Practical (ESH Course 144PRA)

To remain qualified the following refresher training must be completed every three years:

- ESH Course 144R, Confined Space Refresher (ESH Course 144R)

Personnel, and their supervisors, who plan to enter and work in the Hutch 6 Target Chamber as a NPRCS (non-permit-required confined space) and who do not need to enter any other confined spaces are required to take this course:

- ESH Course 147, Hutch 6 Target Chamber Confined Space Training (ESH Course 147)

4.1.2 Confined Space Entry Supervisor

Confined space entry supervisors must complete the entrant and attendant training above and

- ESH Course 146, Confined Space Entry Supervisor (ESH Course 146) (retraining every three years)

4.1.3 ESH Coordinator and Line Management

No course is required for ESH coordinators, line management, or anyone who provides safety oversight without performing work in a permit-required confined space. The following course is recommended, however, to establish hazard awareness:

- ESH Course 144, Confined Space (ESH Course 144)

5 Definitions

*Atmosphere, potentially hazardous.* An atmosphere that has the potential to cause death, incapacitation, impairment of ability for self-rescue, acute illness, delayed illness, or effects that can result in injury

*Attendant.* Person designated to remain outside the confined space to monitor conditions for any health or safety impacts and perform any attendant’s duties specified on a form or permit

*Condition, acceptable entry.* Condition that must exist in a permit space to ensure that work can be conducted safely within the space
Concentration, oxygen. Normal ambient air contains 20.9 percent oxygen by volume. Deviations – both below this concentration, called deficiency, and above it, called enrichment – constitute a hazard to worker safety. Deviant oxygen conditions include

- Oxygen-deficient atmosphere. Atmosphere in which the oxygen by volume is below 19.5 percent.
- Oxygen deficiency. Any measured oxygen concentration less than what is present in normal ambient air. It can be due to the intrusion of an unknown material that dilutes or displaces the available oxygen or by the presence of an oxygen-consuming process such as oxidation (rust), chemical reactions (including combustion), absorption (on wet activated carbon), or biological action.
- Oxygen enrichment. Any measured oxygen concentration that is greater than what is present in normal ambient air. If the concentration exceeds 20.9 percent, check for an oxygen source inside the confined space such as a leaking welding hose or a chemical reaction.
- Oxygen-rich atmosphere. An oxygen concentration in the space of greater than 23.5 percent oxygen by volume.

Condition, prohibited. Any condition in permit-required confined space that is not allowed by the permit during the period when the entry is authorized.

Contractor, controlling. The employer that has overall responsibility for construction at the work site.

Employer, entry. Any employer that decides that an employee it directs will enter a confined space.

Employer, host. Any employer that owns or manages the property where the construction work is taking place.

Engulfment. The surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be inhaled to cause death by filling or plugging of the respiratory system or than can exert enough force on the body to cause death by strangulation, constriction, or crushing.

Entrant. A person who has been determined to be physically capable to perform work in a confined space and has the appropriate training for that entry.

Entry (into a confined space). When any part of a person’s body passes through the plane of the opening of the space.

Monitoring, air. The process by which the atmospheric hazards that may confront entrants of a permit space are identified and evaluated.

Owner, confined space. A building or area manager, or a person designated by such, responsible for placing the required posting and reporting a change in confined space conditions.

Permit, entry. The document that specifies authorized personnel, required equipment, and air monitoring data for entry into a permit-required confined space.

Rescue, non-entry. Rescue/retrieval of an entrant from a confined space that is achieved without entry into the space by rescuers. This involves the use of equipment such as a retrieval line, a full-body harness, and a lifting device or anchor (usually a tripod with mechanical advantage winch).

Rule, two-person. Rule that people must work in teams of two in defined situations; also known as the buddy system.
Space, confined. A space with all of these three characteristics:

1. It is large enough and so configured that a person can bodily enter and perform assigned work
2. It has limited or restricted means for entry or exit
3. It is not designed for continuous human occupancy

Confined spaces are divided into two categories based on their inherent hazard potential. See also Non-permit-required confined space (NPRCS) and Permit-required confined space (PRCS).

Space, non-permit-required confined (NPRCS). A confined space that does not contain or have the potential to contain any atmospheric or other hazard capable of causing death or physical harm. A non-permit-required confined space may become a permit-required confined space if hazardous materials are brought into the space or if hazardous activities are conducted in the space.

Space, permit-required confined (PRCS). A confined space that has one or more of the following characteristics:

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

Supervisor, confined space entry. The person responsible for determining if acceptable entry conditions are present for entry, for authorizing entry, overseeing entry operations, and closing any permit-required confined space operations.

System, retrieval. System for conducting non-entry rescue of persons from confined spaces. This system includes mechanical retrieval or extraction devices (a rated tripod, davit, or other anchorage plus winch) and full body harness. Wristlets may be used to aid in a difficult extraction but should not be used to support a person’s weight.

Ventilation, forced air. Introduction of air into a confined space before and during entry. Certain circumstances may require local exhaust ventilation to remove contaminants from the space generated at a point source, such as removing fumes from welding in a confined space.

Work, Hot. Any work that involves burning, welding, soldering, or similar fire-producing operations, as well as work that produces a source of ignition, such as drilling, grinding, and space heating.

6 References

6.1 External Requirements

The following are the external requirements that apply to this program:


### 6.2 Related Documents

**SLAC Environment, Safety, and Health Manual** (SLAC-I-720-0A29Z-001)
- Chapter 8, “Electrical Safety”
- Chapter 11, “Excavation Safety”
- Chapter 36, “Cryogenic and Oxygen Deficiency Hazard Safety”
- Chapter 45, “Fall Protection”
- Chapter 51, “Control of Hazardous Energy”

**Other SLAC Documents**
- Competent and Qualified Persons and Engineers
- Hot Work Permit-Fire
Chapter 6: Confined Space

Entry Procedures

1 Purpose

The purpose of these procedures is to ensure that entry into any confined space is planned and documented as required in order to identify and control hazards. They cover the entry method selection, planning, and documentation of entry into confined spaces of both classifications: non-permit-required confined space (NPRCS) and permit-required confined space (PRCS). They apply to workers (as entrants and attendants), confined space entry supervisors, confined space owners, area and building managers, line management, field construction and service managers, and the program manager.

2 Procedures

Requirements for entering a confined space depend on the hazards present as determined by information in the confined space inventory and by observation. The first step is to determine the applicable entry method as described in Section 2.1. (For a description of the inventory, see Section 2.5.4.)

All entries must be reviewed and confirmed as described below and in the required form or permit. To ensure entry conditions are acceptable, forms are good for one day only. For work lasting more than one day, a separate form is needed for each day’s work. Completed forms must be kept at or near the entrance to the space during the entry.

Note: A signed and approved hot work permit is required for any spark or flame-producing activities to be done in the space. Proper lock out/tag out procedures must be in place where applicable, and must be performed by authorized persons properly trained as described in Chapter 51, “Control of Hazardous Energy.”

The two-person rule applies to all confined space entries; that is, every confined space entry requires the presence of at least two qualified persons:

- For NPRCS entries, the minimum qualification is that both workers are current in the training required at the attendant or entrant level.
- All PRCS entries must be supervised by a confined space entry supervisor and carried out by workers who are current in the training required at the attendant or entrant level.

Additional requirements for all types of entry are described in Section 2.5.
2.1 Determining the Applicable Entry Method

The four possible methods of confined space entry are non-permit-required (NPRCS) and three variants for spaces classified as a permit-required confined space (PRCS): alternate entry, temporary declassification, and permit required. The required method depends on the confined space classification (NPRCS or PRCS), identified hazards listed in the confined space inventory, and hazards introduced by the work to be done. Each type of entry requires a specific procedure and a form or permit as described below. (For an overview, see Figure 1.)

2.1.1 Non-permit-required Confined Space Entry

Non-permit required confined space (NPRCS) entry applies when no recognized hazards are present. The confined space entry supervisor must confirm that no hazards exist and none will be introduced (see Section 2.2). The entry is documented using the Confined Space: Non-permit-required Confined Space Entry Form.

Note The NPRCS entry supervisor may reclassify the entry if hazardous materials or activities are involved.

2.1.2 Permit-required Confined Space Entry

A permit-required confined space (PRCS) entry applies when hazards are present. The applicable form or permit requires that all hazards are listed and it specifies the required controls that mitigate or eliminate each hazard.

Entry into a confined space classified as a PRCS may qualify for an alternate procedure or a temporary declassification if hazards can be eliminated as described below. If hazards exceed the stated conditions, a permit is required.

2.1.2.1 Alternate Entry

A PRCS for which the only identified hazard is an actual or potential hazardous atmosphere qualifies for the alternate entry procedure (Section 2.3) if it can be demonstrated by air monitoring that continuous forced air ventilation alone is sufficient to remove the hazardous atmosphere and maintain the space safe for entry. A confined space entry supervisor must complete the Confined Space: Alternate Entry Form (or equivalent subcontractor’s SLAC-approved form) to verify these conditions.

2.1.2.2 Temporary Declassification

A PRCS may be temporarily declassified if both these conditions apply:

1. No actual or potential atmospheric hazards are present
2. All hazards within the space can be eliminated from outside the space for the duration of the entry

A confined space entry supervisor temporarily declassifies a PRCS by signing a completed Confined Space: Temporary Declassification Form (or equivalent subcontractor’s SLAC-approved form) (see Section 2.3). All hazards must remain completely eliminated for the duration of the entry. Evacuation and reassessment is mandatory if any change in conditions introduces a hazard.
2.1.2.3 Permit Required

If entry conditions do not qualify for the alternate entry or a temporary declassification, entry into the PRCS must follow the entry procedure for PRCS (Section 2.4) and be controlled by a Confined Space: Entry Permit (or equivalent subcontractor’s SLAC-approved permit) that is administered and carried out by a confined space entry supervisor.

2.1.3 Confined Space Entry Method Selection Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Person</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Confined space entry supervisor / entrant / attendant or, for work involving subcontractors: field construction manager (FCM) / service manager (SM)</td>
<td>If the confined space is identified with a posting: uses identifying information to check the confined space inventory for profile information. If the space is listed in the inventory but not posted: contacts the listed confined space owner to request that a posting with identifying information is put in place. If the work space is not posted and not listed: determines if this is a new confined space – it is large enough to enter and perform work, have limited means of access/egress, and is not designed for continuous human occupancy? If all three attributes apply, a profile must be created: contact the confined space program manager.</td>
</tr>
</tbody>
</table>
| 2.   | Confined space entry supervisor | Determines or confirms applicable entry method (for an overview, see Figure 1):  
- If the listed classification is NPRCS and no new hazards are identified in the space or from the work to be performed: the procedure in Section 2.2 applies.  
- If new hazards associated with the space are identified, contact the confined space program manager to reclassify the space.  
- If the listed classification is PRCS and if the hazards are atmospheric only and it can be controlled by forced air ventilation: the procedure in Section 2.4 applies  
- If the listed classification is PRCS and hazards other than atmospheric are present, determines if a temporary declassification applies. If so, the procedure in Section 2.4 applies  
- If none of the above apply, use the procedure in Section 2.4 |
| 3.   | Confined space program manager | Updates confined space inventory when new confined spaces or hazards are reported |
| 4.   | Confined space owner | Ensures that identifying information is available at the confined space location as described in Confined Space: Posting Requirements |

1 29 CFR 1910.146, paragraph (c)(7), states that if all hazards associated with a permit-required confined space can be eliminated before entry, then the space can be reclassified as a non-permit-required confined space (NPRCS) for the time necessary to accomplish the work and the hazards remain eliminated.
### Figure 1 Entry Method Selection Process

<table>
<thead>
<tr>
<th>Space Type</th>
<th>Hazard Type</th>
<th>Applicable Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work is to be performed in a confined space (CS)?</td>
<td>Only hazard is atmospheric and it can be controlled by forced air ventilation</td>
<td>Non-permit Required Confined Space Entry Form</td>
</tr>
<tr>
<td>CS identifying information posted at site?</td>
<td>No actual or potential atmospheric hazards exist and all hazards assoc. with CS can be eliminated from outside the CS</td>
<td>Alternate Entry Form</td>
</tr>
<tr>
<td>CS information is in inventory?</td>
<td>Yes</td>
<td>Temporary Declassification Form</td>
</tr>
<tr>
<td>Contact CS program manager for information and/or to add new confined space to inventory</td>
<td>Yes</td>
<td>Entry Permit</td>
</tr>
<tr>
<td>Classified as non-permit required confined space (NPRCS)?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Classified as permit required confined space (PRCS)?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
<td></td>
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<tr>
<td>No</td>
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<tr>
<td>Yes</td>
<td>No</td>
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<tr>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Hazard Type

- Only hazard is atmospheric and it can be controlled by forced air ventilation
- No actual or potential atmospheric hazards exist and all hazards assoc. with CS can be eliminated from outside the CS
-Hazards exceed requirements for alternate entry or temporary declassification

Applicable Form

- Non-permit Required Confined Space Entry Form
- Alternate Entry Form
- Temporary Declassification Form
- Entry Permit

Note: Complete applicable form before beginning work.

Send completed form to CS program manager after work is completed.
### 2.2 Entry Procedure for Non-permit-required Confined Space (NPRCS)

<table>
<thead>
<tr>
<th>Step</th>
<th>Person</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Entrant / attendant</td>
<td>Completes <strong>Confined Space: Non-permit-required Confined Space Entry Form</strong> (or equivalent subcontractor's SLAC-approved form) to establish that the confined space still qualifies as non-permit required and that no hazardous work(^1) will be performed.</td>
</tr>
<tr>
<td>2.</td>
<td>Confined space entry supervisor / confined space program manager</td>
<td>Before any confined space work is begun, confirms NPRCS entry conditions by signing the form or determines that another entry method applies.</td>
</tr>
</tbody>
</table>
| 3.   | Entrant / attendant | Takes precautions, as necessary:  
  - Installs vehicular and pedestrian traffic controls as needed  
  - Posts warning signs and any required permit at the work location  
  - Takes measures to prevent hazards near the confined space  
  - Dons any required personal protective equipment |
| 4.   | Entrant / attendant | Performs authorized work:  
  - One person must remain outside the confined space  
  - If a hazardous condition is encountered, evacuates immediately and reports to supervisor |
| 5.   | Confined space entry supervisor | Sends entry form to the confined space program manager (Mailstop 22) once work is completed. |
| 6.   | Confined space program manager | Reviews form, updates **confined space inventory** as necessary, and keeps form on file for a minimum of one year. |

\(^1\) Hazardous work includes painting, cleaning with acids or solvents, welding, brazing, torch cutting, sanding with power tools, sandblasting, breaking utility lines, using cryogenic gases, conducting work that involves reduction-oxidation reactions, or operating valves capable of releasing material, such as water or gas, in a quantity sufficient to engulf a person or cause a hazardous atmosphere.

### 2.3 Entry Procedure for Alternate Entry and Temporarily Declassified Confined Spaces

<table>
<thead>
<tr>
<th>Step</th>
<th>Person</th>
<th>Action</th>
</tr>
</thead>
</table>
| 1.   | Confined space entry supervisor | Confirms that entry conditions qualify for the selected entry method (as determined in Section 5.1) by signing the applicable form (or equivalent subcontractor's SLAC-approved form):  
  - **Confined Space: Alternate Entry Form**  
  - **Confined Space: Temporary Declassification Form** |
| 2.   | Confined space entry supervisor | Ensures that hazards and controls are understood by the entrant(s) and attendant(s) |
3. **Entrant / attendant**
   - Secures the work site
     - Installs barriers and/or controls vehicular and pedestrian traffic as needed
     - Posts warning signs and any required permits at the work location
     - Takes measures to prevent hazards near the confined space

4. **Entrant / attendant**
   - Ensures hazard is controlled before entry
     - For alternate entry, ensures atmospheric testing is conducted as necessary to determine that entry conditions remain acceptable, and ensures forced air ventilation is in place if required (see completed form)
     - For temporary declassification, ensures hazards are eliminated as specified on completed form¹

5. **Entrant / attendant**
   - Performs work as long as hazards are controlled as specified on the form
     - Any change that introduces hazards requires that the space be vacated
     - New hazards must be re-assessed and a new entry method may apply; no entry is allowed until all hazards are eliminated

6. **Entrant / attendant**
   - Sends completed form to the confined space program manager (Mailstop 22) once the work is finished

7. **Confined space program manager**
   - Reviews form, updates confined space inventory as necessary, and keeps form on file for a minimum of one year

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¹ Specified hazard elimination activities may include
- Flushing chemicals
- Verifying a safe pH
- Isolating incoming fluid or gas lines
- Removing or locking out any exposed mechanical and electrical energies

### 2.4 Entry Procedure for Permit-required Confined Space (PRCS)

<table>
<thead>
<tr>
<th>Step</th>
<th>Person</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Confined space entry supervisor</td>
<td>Determines if non-entry rescue can be performed. If it cannot, entry is prohibited; contacts the confined space program manager</td>
</tr>
<tr>
<td>2.</td>
<td>Confined space entry supervisor</td>
<td>Determines control measures for hazards associated with the confined space entry</td>
</tr>
<tr>
<td>3.</td>
<td>Confined space entry supervisor</td>
<td>Verifies that all required equipment, attendants, and entrants are available</td>
</tr>
<tr>
<td>Pre-entry</td>
<td></td>
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</tr>
<tr>
<td>4.</td>
<td>Confined space entry supervisor</td>
<td>Documents the pre-entry process with the Confined Space: Entry Permit (or equivalent subcontractor's SLAC-approved permit)</td>
</tr>
<tr>
<td>5.</td>
<td>Confined space</td>
<td>Ensures that the confined space's atmosphere is ventilated as necessary and tested</td>
</tr>
</tbody>
</table>
Step | Person | Action
--- | --- | ---
| entry supervisor | prior to entry using properly calibrated monitoring equipment. (For assistance with obtaining monitoring equipment, contact the confined space program manager or ESH coordinator.) Results for the following must be recorded on the permit  
- Oxygen  
- Flammability (percent of lower explosive limit)  
- Hydrogen sulfide  
- Carbon monoxide  
- Any other suspected or known atmospheric hazard  
If at any time the oxygen concentration falls below 19.5 percent, the cause of the deficiency must be determined and controls must be in place before entry is allowed. If entry is necessary to correct the deficiency, self-contained breathing apparatus must be worn.  
*Note: the entrant has the right to witness atmospheric testing.*
| 6. Confined space entry supervisor | Secures the work site as appropriate  
- Installs barriers and/or controls vehicular and pedestrian traffic as needed  
- Posts warning signs and any required permit(s) at the work location  
- Takes measures to prevent hazards near the confined space
| 7. Confined space entry supervisor | Conducts pre-entry briefing for all personnel involved in the entry that includes at minimum these topics  
- Work to be performed  
- Anticipated hazards, including signs, symptoms and consequences of exposure  
- Hazard control measures  
- *Prohibited conditions* (specified in the permit)  
- Non-entry rescue procedures; generally these involve using a full-body harness with a retrieval line attached to a mechanical device or fixed point. (Wristlets may be used to aid in a difficult extraction; however, wristlets should not be used to support the person's weight.)
| 8. Confined space entry supervisor | Verifies that  
- All control measures, procedures, and equipment specified by the permit are in place  
- Entry conditions are acceptable
| 9. Confined space entry supervisor | Signs the pre-entry certification section of the permit

### Confined space entry

| 10. Entrant | Enters the permit-required confined space only if  
- Listed on the permit  
- Entry conditions are acceptable  
- All control measures and specified non-entry rescue provisions are implemented
| 11. Confined space entry supervisor | Verifies that acceptable entry conditions are maintained and that entry operations remain consistent with terms of the permit and the hazards associated with the planned
<table>
<thead>
<tr>
<th>Step</th>
<th>Person</th>
<th>Action</th>
</tr>
</thead>
</table>
| 12.  | Attendant | Maintains communication with the entrant(s) and performs no other duties that might interfere with his or her ability to observe and protect the entrant(s)  
- Controls entry by remaining at the work site and keeping an accurate accounting of entrants on the permit  
- Does not become an entrant unless he/she is both listed as an entrant and has been replaced by a qualified attendant. |
| 13.  | Entrant | Maintains communication with the attendant. Maintains readiness to exit if ordered by attendant. |
| 14.  | Attendant | Orders entrant(s) to evacuate the space if one or more of the following occurs:  
- Detects a prohibited condition  
- Observes any behavioral effects of exposure to any hazard  
- Identifies a nearby situation that may endanger the entrant(s)  
- Becomes unable to effectively and safely perform all required duties |

**Post-entry / documentation**

| 15.  | Confined space entry supervisor | Conducts a post-entry debriefing with entrants and attendants |
| 16.  | Confined space entry supervisor | Closes the permit by signing the permit closure section of the permit as warranted  
- At the completion of the job  
- At the end of the work shift  
- When a change occurs in work conditions or methods that requires additional controls  
- When a change occurs that affects acceptable entry conditions  
If the permit is closed due to a new hazardous condition, a new permit is required. |
| 17.  | Confined space entry supervisor | Forwards the permit to the confined space program manager at Mailstop 22 |
| 18.  | Confined space program manager | Reviews the closed permit, updates the confined space inventory if necessary, and maintains permits for at least one year from date of entry |

### 2.5 Additional Requirements

#### 2.5.1 Preventing Unauthorized Entry

Confined space owners must post an identifying sign at the entrance of each confined space as specified in Confined Space: Posting Requirements.

The following are additional measures that can be taken to prevent unauthorized persons from entering a PRCS:

- Engineering controls such as  
  - Locking or bolting the entrance
Making access to the entrance difficult without the use of tools, heavy equipment, or several workers
- Welding the entrance shut

- Administrative controls such as ensuring personnel are trained to recognize hazards or PRCS conditions

2.5.2 Equipment

Owners of equipment used for confined space entry – such as air monitors, full body harnesses, lifelines, tripods, hoists, respirators, and any other types of personal protective equipment (PPE) – will develop and follow a maintenance schedule, and the equipment will carry inspection and calibration information when appropriate.

2.5.3 Rescue

All permit-required entries must have a non-entry rescue plan and retrieval system in place before entry. No entry for which entry rescue is required will be authorized, as there is no active confined space entry rescue team at SLAC. When rescue is needed, the following actions will be taken:

1. Perform non-entry rescue
2. Call 911
3. Call SLAC Site Security (ext. 5555)
4. Notify supervisor
5. Prevent entry into space

2.5.4 Confined Space Inventory

2.5.4.1 Inventory Maintenance

The confined space program manager will maintain the confined space inventory, which includes all identified confined spaces and provides the basis for entry method selection.

Each confined space profile includes
- A profile (confined space owner, dimensions, location, and description)
- Hazards and controls
- Classification (PRCS or NPRCS)

The program manager must keep the inventory current by reviewing forms and permits for all confined space entries.

Upon creation or discovery of a new or suspected confined space
- The building or area manager designates a confined space owner and notifies the confined space program manager.
- The confined space program manager evaluates the confined space and adds it to the inventory.
The confined space owner identifies the confined space with the posting appropriate to the space classification (see Confined Space: Posting Requirements).

3 Forms

The following forms (or equivalent subcontractor’s SLAC-approved forms) are required by this procedure:

- **Confined Space: Entry Permit** (SLAC-I-730-0A21J-002). Form for documenting entry into confined space that does not qualify for temporary declassification or alternate entry
- **Confined Space: Alternate Entry Form** (SLAC-I-730-0A21J-010). Form for documenting entry into confined space in which the only hazard is atmospheric
- **Confined Space: Non-permit-required Confined Space Entry Form** (SLAC-I-730-0A21J-006). Form for documenting entry into non-permit required confined space
- **Confined Space: Temporary Declassification Form** (SLAC-I-730-0A21J-009). Form for documenting entry into confined space in which there is no actual or atmospheric hazard and all hazards associated with the confined space can be eliminated from outside the space
- **Confined Space Inventory**

4 Recordkeeping

The following recordkeeping requirements apply for this procedure:

- Active forms must be kept at or near the entrance to the space during entry. SLAC forms must be sent to the confined space program manager (Mailstop 22) once work is completed; subcontractors maintain their own forms.
- The confined space program manager (or subcontractor) will compile all closed permits and all completed non-permit-required confined space entry, alternate entry, and temporary declassification entry forms and retain them for a minimum of one year for use in program assessments.

5 References

- **SLAC Environment, Safety, and Health Manual** (SLAC-I-720-0A29Z-001)
  - Chapter 6, “Confined Space”
    - Confined Space: Posting Requirements (SLAC-I-730-0A21S-051)
  - Chapter 29, “Respiratory Protection”
  - Chapter 51, “Control of Hazardous Energy”

Other SLAC Documents

- **Hot Work Permit-Fire**
Other Documents


Chapter 6: Confined Space
Entry Permit

This form is available in the following formats:
1. Adobe Acrobat (pdf) (attached)
2. Microsoft Word (docx)

A generic version, for use by construction subcontractors who do not have their own equivalent form, is also available:
1. Adobe Acrobat (pdf)
2. Microsoft Word (docx)
Chapter 6: Confined Space

Entry Permit

Product ID: 163 | Revision ID: 2038 | Date Published: 28 September 2018 | Date Effective: 28 September 2018
URL: http://www-group.slac.stanford.edu/esh/eshmanual/references/confinedPermit.pdf | docx

Applicability. This permit establishes that all hazards have been identified and controlled and it lists the confined space (CS) entry supervisor and authorized entrants and attendants. For more information, see Confined Space: Entry Procedures (SLAC-I-730-0A21C-007).

Instructions. This permit must be completed and signed by the CS entry supervisor (Pre-entry Certification) before anyone enters the space and kept at or near the entrance to the space during entry. Once the work is completed, the CS entry supervisor must close the permit by signing the Permit Closure and sending it to the CS program manager (M/S 22); the closed permit must be retained for a minimum of one year. To ensure entry conditions are acceptable, this permit is good for one day only. For work lasting more than one day, a separate permit is needed for each day's work.

Permit Conditions

<table>
<thead>
<tr>
<th>Reason for entry:</th>
<th>Entry date:</th>
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<tbody>
<tr>
<td>Entrant:</td>
<td>Acceptable entry conditions:</td>
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<tr>
<td>Entrant:</td>
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<td>Entrant:</td>
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<td>Attendant:</td>
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<td>Attendant:</td>
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<td>Location:</td>
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<td>Space description:</td>
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</tbody>
</table>

Known and potential hazards:

Additional required permits (for example hot work, radiological work permit, penetration permit):

Requirements Checklist (check all that apply)

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Personal protective equipment and personal monitors</th>
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</thead>
<tbody>
<tr>
<td>Non-entry rescue equipment</td>
<td>Gloves:  □ Leather □ Impervious □ Chemical resistant</td>
</tr>
<tr>
<td>□ Full body harness □ Tripod / hoist □ Lifeline</td>
<td>□ Other:</td>
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<tr>
<td>Area security: □ Warning signs □ Barricades</td>
<td>Face / eye protection: □ Face shield □ Goggles □ Safety glasses</td>
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<td>□ Ladder</td>
<td>□ Footwear</td>
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<tr>
<td>□ Fall protection equipment</td>
<td>□ Coveralls</td>
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<td>□ Ventilation fan or blower</td>
<td>□ Head protection</td>
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<td>□ Fire extinguisher</td>
<td>□ Radiation dosimeter(s)</td>
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<tr>
<td>□ Air purifying respirator: specify cartridge type:</td>
<td>□ Pocket ion chamber (PIC)</td>
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<td>□ Other:</td>
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### Pre-entry Checklist

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<tr>
<th>Item</th>
<th>Control of hazardous energy</th>
<th>Communication:</th>
<th>Lighting:</th>
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<tr>
<td>Verify adequate confined space training</td>
<td>☐</td>
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<td>Pre-entry briefing on specific hazards and control methods</td>
<td>☐</td>
<td>☐ Radio</td>
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<td>Notify subcontractors of permit and hazard conditions</td>
<td>☐</td>
<td>☐ Rope signals</td>
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<td>Non-entry rescue and procedure in place</td>
<td>☐</td>
<td>☐ Hand signals</td>
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<tr>
<td>Notify affected departments and persons of service interruption</td>
<td>☐</td>
<td>☐ Verbal</td>
<td>☐</td>
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<tr>
<td>Lines blocked or broken</td>
<td>☐</td>
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<tr>
<td>Drain space</td>
<td>☐</td>
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<td>Other:</td>
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### Personnel Entry and Exit Record (to be completed as needed before and during work)

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Notes:
Air Monitoring Results

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<th>Device</th>
<th>Sequence or serial number</th>
<th>Calibration due date</th>
<th>Pre-use check performed by</th>
<th>Notes</th>
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Attendant will sample air: [ ] Initially  [ ] Every ______ minutes  [ ] Continuously

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<tr>
<th>Time</th>
<th>Sampled by</th>
<th>O₂ (19.5–23.5%)</th>
<th>LEL/LFL &lt;10%</th>
<th>CO (&lt;25 ppm)</th>
<th>H₂S (&lt;10 ppm)</th>
<th>Stratification</th>
<th>Other:</th>
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Pre-entry Certification (must be signed by the confined space entry supervisor before entry)

I hereby certify that all required hazard controls are in place, that air monitoring is being conducted as required and results show that the atmosphere is acceptable for entry, and that all required information is documented on this permit.

Name:

Signature: Date:

Permit Closure (must be signed by the confined space entry supervisor after work is completed)

The work was done in accordance with this permit. A copy of this permit will be forwarded to the confined space program manager (M/S 22).

Name:

Signature: Date:
This form is available in the following formats:
1. Adobe Acrobat (pdf) (attached)
2. Microsoft Word (docx)

A generic version, for use by construction subcontractors who do not have their own equivalent form, is also available:
1. Adobe Acrobat (pdf)
2. Microsoft Word (docx)
Chapter 6: **Confinned Space**  
Alternate Entry Form

**Applicability.** This form applies to the entry of a permit-required confined space (PRCS) in which the only hazard is atmospheric and this hazard can be controlled and the space maintained safe for entry with continuous forced air ventilation (per 29 CFR 1910.146, c, 5). If conditions do not meet these requirements or for more information, see Confined Space: Entry Procedures (SLAC-I-730-0A21C-007).

**Instructions.** This form must be completed before anyone enters the space and kept at or near the entrance to the space during the entry. Forms must be sent to the confined space program manager (M/S 22) once work is completed and retained for a minimum of one year. To ensure entry conditions are acceptable, this form is good for one day only. For work lasting more than one day, a separate form is needed for each day's work.

### Confined Space

<table>
<thead>
<tr>
<th>Reason for entry:</th>
<th>Entry date:</th>
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<tbody>
<tr>
<td>Location:</td>
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<tr>
<td>Space description:</td>
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<tr>
<td>List all known atmospheric hazards associated with the confined space:</td>
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<tr>
<td>List all potential atmospheric hazards that will be introduced by the planned work:</td>
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<tr>
<td>Forced air ventilation required?</td>
<td>Yes</td>
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### Air Monitoring Results

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<tr>
<th>Device</th>
<th>Sequence or serial number</th>
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<th>Pre-use check performed by</th>
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<tr>
<th>Time</th>
<th>Sampled by</th>
<th>O₂ (19.5–23.5%)</th>
<th>CO (LEL/LFL &lt;10%)</th>
<th>H₂S (&lt;10 ppm)</th>
<th>Stratification</th>
<th>Other:</th>
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Sample form, see URL at top of page.
### Personnel Entry and Exit Record (to be completed as needed before and during work)

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</table>

**Notes:**

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**Confirmation** *(must be signed by the confined space entry supervisor before work begins)*

I confirm that the named PRCS and the planned work qualify for alternate entry.

Name: [Signature] Date:
Chapter 6: **Confined Space**

Non-permit-required Confined Space Entry Form

Product ID: 158 | Revision ID: 2039 | Date Published: 28 September 2018 | Date Effective: 28 September 2018

URL: [http://www-group.slac.stanford.edu/esh/eshmanual/references/confinedFormNPRCS.pdf](http://www-group.slac.stanford.edu/esh/eshmanual/references/confinedFormNPRCS.pdf) | docx

This form is available in the following formats:
1. Adobe Acrobat (pdf) (attached)
2. Microsoft Word (docx)

A generic version, for use by construction subcontractors who do not have their own equivalent form, is also available:
1. Adobe Acrobat (pdf)
2. Microsoft Word (docx)
**Chapter 6: Confined Space**

Non-permit-required Confined Space Entry Form

Product ID: 158 | Revision ID: 2039 | Date Published: 28 September 2018 | Date Effective: 28 September 2018


**Applicability.** This form applies to spaces that are listed as a *non-permit required confined space (NPRCS)* in the confined space inventory. It establishes that there are no existing hazards associated with this confined space and that the planned work will not introduce any. If entry conditions do not meet requirements or for more information, see Confined Space: Entry Procedures (SLAC-I-730-0A21C-007).

**Instructions.** This form must be completed before anyone enters the space and kept at or near the entrance to the space during entry. Forms must be sent to the confined space program manager (M/S 22) once the work is completed and retained for a minimum of one year. To ensure entry conditions are acceptable, this form is good for one day only. For work lasting more than one day, a separate form is needed for each day’s work.

**Confined Space**

<table>
<thead>
<tr>
<th>Reason for entry:</th>
<th>Entry date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td></td>
</tr>
<tr>
<td>Space description:</td>
<td></td>
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</table>

Evaluate if new hazards will be created by the planned work (a NPRCS entry requires that the answer to all three questions be "no")

- Will any activities that could create a hazard be conducted inside the confined space, such as welding or breaking a line? [ ] No [ ] Yes
  - If yes, describe:

- Will any chemicals that could create a hazard be brought into the space? Examples include solvents and adhesives. [ ] No [ ] Yes
  - If yes, specify:

- Are there any conditions in or around this space that could adversely affect anyone who enters it? [ ] No [ ] Yes
  - If yes, describe:

**Air Monitoring Results**

<table>
<thead>
<tr>
<th>Attendant will sample air</th>
<th>Initially</th>
<th>Every _____ minutes</th>
<th>Continuously</th>
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</table>

<table>
<thead>
<tr>
<th>Device</th>
<th>Sequence or serial number</th>
<th>Calibration due date</th>
<th>Pre-use check performed by</th>
<th>Notes</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Sampled by</th>
<th>O₂ (19.5–23.5%)</th>
<th>CO (LEL/LFL &lt;10%)</th>
<th>H₂S (&lt;10 ppm)</th>
<th>Stratification</th>
<th>Other:</th>
</tr>
</thead>
</table>

Sample form, see URL at top of page
Personnel Entry and Exit Record *(to be completed as needed before and during work)*

<table>
<thead>
<tr>
<th>Attendant name</th>
<th>Entrant name</th>
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Notes:

**Confirmation** *(must be signed by the confined space entry supervisor before work begins)*

I confirm that there are no existing hazards associated with this confined space and that the planned work will not introduce any.

Name:  

Signature:  

Date:
Chapter 6: **Confined Space**

Temporary Declassification Form

Product ID: 161 | Revision ID: 2040 | Date Published: 28 September 2018 | Date Effective: 28 September 2018


This form is available in the following formats:
1. Adobe Acrobat (pdf) (attached)
2. Microsoft Word (docx)

A generic version, for use by construction subcontractors who do not have their own equivalent form, is also available:
1. Adobe Acrobat (pdf)
2. Microsoft Word (docx)
Chapter 6: Confined Space
Temporary Declassification Form

Applicability. A permit-required confined space (PRCS) qualifies for temporary declassification only if both of these conditions are met: a) no actual or potential atmospheric hazards exist and b) all hazards associated with the confined space can be eliminated from outside the space for the duration of the entry (per 29 CFR 1910.146, (c), 7). If these conditions are not met by the planned confined space entry or for more information, see Confined Space: Entry Procedures (SLAC-I-730-0A21C-007).

Instructions. This form must be completed before anyone enters the space and kept at or near the entrance to the space during entry. Forms must be sent to the confined space program manager (M/S 22) once work is completed and retained for a minimum of one year. To ensure entry conditions are acceptable, this form is good for one day only. For work lasting more than one day, a separate form is needed for each day's work.

Confined Space

Reason for entry: ___________________________ Entry date: ___________________________

Location: ___________________________

Space description: ___________________________

Hazard Elimination

<table>
<thead>
<tr>
<th>List all known and potential hazards</th>
<th>Describe how each hazard will be eliminated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associated with the space:</td>
<td></td>
</tr>
<tr>
<td>Introduced by planned work:</td>
<td>Sample form, see URL at top of page</td>
</tr>
<tr>
<td>Chemical:</td>
<td></td>
</tr>
</tbody>
</table>

Air Monitoring Results

Attendant will sample air □ Initially □ Every ______ minutes □ Continuously

<table>
<thead>
<tr>
<th>Device</th>
<th>Sequence or serial number</th>
<th>Calibration due date</th>
<th>Pre-use check performed by</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Time | Sampled by | O₂ (19.5–23.5%) | CO (LEL/LFL <10%) | H₂S (<10 ppm) | Stratification | Other: |
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<thead>
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<th></th>
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</tbody>
</table>
## Personnel Entry and Exit Record (to be completed as needed before and during work)

<table>
<thead>
<tr>
<th>Attendant name</th>
<th>Entrant name:</th>
<th>Entrant name:</th>
<th>Entrant name:</th>
<th>Entrant name:</th>
<th>Entrant name:</th>
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Notes:

### Confirmation (must be signed by the confined space entry supervisor before work begins)

I confirm that the named PRCS and the planned work qualify for temporary declassification.

Name: ____________________________  Date: ____________________________

Signature: ____________________________
Chapter 6: Confined Space

Posting Requirements

1 Purpose

The purpose of these requirements is to ensure that workers are alerted to the potential hazards of a confined space before any work is conducted in it. They cover the posting of new and existing confined spaces. They apply to area and building managers and confined space owners.

2 Requirements

The confined space owner is responsible for posting a confined space warning appropriate to the space’s classification: non-permit-required confined space (NPRCS) and permit-required confined space (PRCS). Requirements and recommendations are listed in Table 1.

A listing of all identified confined spaces is in the confined space inventory. If a new confined space is identified, contact the confined space program manager.

Important All manholes at SLAC are considered to be confined spaces. These locations may not have signage. Communication regarding these locations will be covered in confined space training.
Table 1 Confined Space Posting Requirements and Recommendations

<table>
<thead>
<tr>
<th>Classification</th>
<th>Example Posting (use this or a similar sign)</th>
<th>Required</th>
<th>Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-permit-required (NPRCS)</td>
<td><img src="image" alt="DANGER sign" /></td>
<td>▪ Include a warning in standard colors (DANGER in red and black on a white background)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Include requirements, such as permit or procedure</td>
<td>▪ Include the confined space number on, adjacent to, or above the warning sign; check the inventory or contact the confined space program manager to verify the space number</td>
</tr>
<tr>
<td>Permit-required (PRCS)</td>
<td><img src="image" alt="DANGER sign" /></td>
<td>▪ The posting must be placed on or near the confined space entrance and be clearly visible and no smaller than 3.5 by 5 inches</td>
<td></td>
</tr>
</tbody>
</table>

3 Forms

The following are forms required by these requirements:

▪ Confined Space Inventory

4 Recordkeeping

The following recordkeeping requirements apply for these requirements:

▪ None

5 References

SLAC Environment, Safety, and Health Manual (SLAC-I-720-0A29Z-001)

▪ Chapter 6, “Confined Space”
  – Confined Space: Entry Procedures (SLAC-I-730-0A21C-007)