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**February 2015**

National Aeronautics and  
Space Administration

**John C. Stennis Space Center**  
**Stennis Space Center, MS 39529-6000**

**John C. Stennis Space Center**  
**Confined Space Entry Program**

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**Approval/Concurrence**

*Signature on File*

*02/19/15*

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 Freddie Douglas III, Director  
 Safety and Mission Assurance Directorate

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 Date

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### Document History Log

Status/Change/Revision	Change Date	Originator/Phone	Description
Basic	07/2009	M. Jones, x8-1135	Initial Release
Rev B	07/2011	A. Rice, x8-2972	General admin changes. Six month extension to review/discuss comments received.
Rev B-1	12/2011	A Rice X8-2972	Pushed date to end of month for concurrence on incorporated comments.
Rev C	12/2011	A Rice X8-2972	Reorganized Chapter 4 and 5 for clarity and eliminated redundancy in requirements. No content change.
Rev D	10/2012	A Rice X 8-2972	4.2 (i) added different types of confined spaces, renumbered chapter 4, added a decision check sheet, page 20.
Rev E	12/2013	M. Murray, x8-1402	Changes were made to the document to allow for agreement with OSHA's final rule on the Globally Harmonized System of Hazard Communication.
Rev F	12/2014	R. Gargiulo, x8-3842	Clarified the terminology for NASA, NASA prime, NASA direct construction, and resident agencies. Added the audit of completed confined space entry permits, Section 7. Deleted the Form SSC-822, Confined Space Entry or Reclassification Field Audit Form; audits are embedded in the revised Form SSC-576, Confined Space Entry Permit.

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## 1.0 PURPOSE

This John C. Stennis Space Center (SSC) Common Work Instruction (SCWI) provides the general safety requirements for the protection of personnel who enter confined spaces at SSC.

## 2.0 APPLICABILITY

The requirements specified in this SCWI shall apply to all NASA affiliated Government, contractor, and construction contractor employees who enter confined spaces at SSC. This SCWI does not apply to tenant agencies or contractors not affiliated with NASA, NASA's Prime Contractors, or NASA Direct Construction Contractors. This program is applicable to industrial activities/operations, test operations, maintenance processes and construction projects at SSC.

## 3.0 REFERENCES

All references are assumed to be the latest version unless otherwise indicated.

- a. *29 CFR 1910.146, Permit-Required Confined Spaces*
- b. *NPR 1800.1C, NASA Occupational Health Program Procedures*
- c. *SCWI 3410.0003, Training/Certification Plan and Schedule Report*
- d. *SCWI-8715-0013, Lockout/Tagout program*
- e. *SPR 1400.1, Document Preparation, Numbering, and Management*
- f. *SPR 1440.1, Records Management Program Requirements*
- g. *SSP 8715.0001, Safety and Health Handbook*

## 4.0 RESPONSIBILITIES

NASA, NASA Prime Contractors, and NASA Direct Construction Contractors who enter confined spaces at SSC shall develop a written confined space entry program conforming to Occupational Safety and Health Administration (OSHA) requirements and this SCWI.

### 4.1. NASA SSC Safety and Mission Assurance Directorate

Safety and Mission Assurance Directorate (SMA) shall:

- a. Annually review this SCWI and the effectiveness of the SSC Confined Space Entry Program. Include a summary of this review in the Annual Voluntary Protection Program (VPP) Self-Evaluation.

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- b. Update and maintain this SCWI in accordance with *Stennis Procedural Requirement (SPR) 1400.1, Document Preparation, Numbering, and Management.*
- c. Direct the Synergy Achieving Consolidated Operations & Maintenance (SACOM)/Facility Operating Services Contractor (FOSC) training department to establish, schedule and maintain up-to-date training in confined space entry procedures for all NASA and NASA Prime Contractor employees involved in confined spaces on SSC property.
- d. Update and maintain all forms associated with the Confined Space Entry Program as identified in this SCWI.
- e. Provide technical assistance in decision-making aspects of confined space entry when requested.
- f. Review and approve NASA Direct Construction Contractors' confined space entry programs submittals to assess their level of compliance to 29 CFR 1910.146 and this SCWI.
- g. Randomly audit NASA Direct Construction Contractor confined space entry performance and document audit findings through the Construction Safety and Health Program.
- h. Ensure all applicable NASA SSC SMA personnel receive confined space entry training.
- i. Establish a working group with the applicable NASA Prime Contractors which will meet at a minimum annually to:
  - 1) Develop a list of common Oxygen (O<sub>2</sub>), toxic atmosphere and combustible gas meters for SSC use. The list will be maintained by NASA SMA.
  - 2) Select new/replacement O<sub>2</sub>, toxic atmosphere and combustible gas meters, as necessary.
  - 3) Assess the effectiveness and areas for improvement of the SSC Confined Space Program.

#### 4.2. NASA Prime Contractor Safety Organizations

The safety office for NASA Prime Contractors who enter confined spaces shall:

- a. Annually review their compliance with this SCWI and 29 CFR 1910.146. Include a summary of this review in the Annual VPP Self-Evaluation.
- b. Perform a quality assurance audit of each confined space entry permit as part of the annual review and take actions to correct discrepancies and improve compliance with this SCWI and 29 CFR 1910.146. The quality assurance audit is required to close/complete the work authorization document/Stennis Work Request (SWR).
- c. Develop criteria and a process for ensuring confined space supervisors, attendants and entrants are qualified and certified to perform their responsibilities as specified in this SCWI.
- d. Ensure compliance with requirements set forth in this SCWI by performing unscheduled, periodic spot inspections/audits of entry sites and correcting any unsafe conditions or non-compliances.

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- e. Provide equivalent or more stringent controls and oversight of established Confined Space Entry Program, while complying with all minimum requirements specified within this SCWI.
- f. Ensure their personnel involved in confined space entry are trained to the requirements of 29 CFR 1910.146 and this SCWI.
- g. Provide training and certifications for their personnel in the use of O<sub>2</sub>, toxic atmosphere, and combustible gas meters, which will be valid for a period not to exceed five (5) years.
- h. Classify all confined spaces as one of the following types (see the definitions). The SACOM/FOSC shall keep a master inventory of all SSC site permanent confined spaces on the NASA SSC portal page under Safety, Security and Health.
  - 1) Permanent Permit Required Confined Space
  - 2) SSC Monitored Confined Space

**4.3. NASA Direct Construction Contractors and Subcontractors to NASA Prime Contractors**

NASA Direct Construction Contractors and subcontractors to NASA Prime Contractors who enter SSC confined spaces shall:

- a. Develop and implement a written Confined Space Entry Program in accordance with the requirements of 29 CFR 1910.146 and this SCWI.
  - 1) The written Confined Space Entry Program (to include rescue/emergency services) must be reviewed and approved by a designated safety representative (NASA SSC SMA or the NASA Prime Contractor safety) prior to initiation.
  - 2) The program must include the necessary employee training.
- b. Classify all permit-required confined space entry operations as SAFETY CRITICAL. Permits are to be signed by the designated safety representative.

**4.4. NASA SSC Civil Service Employees**

All NASA SSC civil service employees shall:

- a. Comply with all requirements of this SCWI where applicable.
- b. Receive confined space awareness training during new employee safety and health orientation.

**4.5. Confined Space Entry Personnel**

Paragraphs 4.5.1 through 4.5.4 define the roles and responsibilities of the confined space entrants, supervisor, attendants and emergency response team.

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#### 4.5.1 Entrants

Personnel designated to enter into confined spaces shall:

- a. Complete training to recognize hazards in confined spaces, including the symptoms and/or warning signs of exposure to hazards and the consequences of the exposures. NASA and NASA Prime Contractor employees shall complete the training designated by the SSC Certification Board.
- b. Maintain communication and/or visual contact with the attendant.
- c. Obtain and use the proper Personal Protective Equipment (PPE) required for entry into the confined space and any external barriers needed for protection from hazards while in the confined space.
- d. Immediately evacuate the confined space if:
  - 1) Ordered by the attendant.
  - 2) The O<sub>2</sub>/combustible/toxic gas meter alarm indicates a hazard.
  - 3) A prohibited condition is detected.
  - 4) A symptom and/or warning sign of exposure to a hazardous or dangerous situation is detected.
- e. Understand all facets of the SSC Confined Space Entry Program.
- f. Understand the proper inspection, field calibration and limitations of atmosphere monitoring equipment used for the confined space entry.
- g. Maintain continuous atmospheric monitoring (through a personal and/or area monitor) in the immediate vicinity of the operations within the permit-required confined space.
- h. Sign the confined space entry permit confirming they understand the conditions and requirements for the entry, and understand their roles and responsibilities as an entrant.

#### 4.5.2 Entry Supervisor

Entry supervisors shall:

- a. Exercise overall approval and responsibility for entry into the permit required confined space and the work conducted within confined spaces.
- b. Verify confined space and meter certifications related to the confined space entry and operations are current for the entrants and attendant(s).

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- c. Request designated safety office personnel interpretation concerning whether a location meets the criteria of an OSHA permit-required confined space, prior to any confined space entry, if uncertainty or conflict exists.
- d. Notify the SSC Fire Department at least 24 hours in advance of proposed/planned permit-required confined space entry.
  - 1) If the SSC Fire Department is the designated Confined Space Entry Emergency Response Team, then
    - (a). Alert the SSC Fire Department immediately prior to permit-required entry operations. No entry into a permit-required confined space shall take place until the SSC Fire Department has been notified of the place, time, estimated duration and activity of the confined space entry operation. The SSC Fire Department is required to sign the SSC-Form 576, Confined Space Entry Permit.
    - (b). Ensure, through contact with the SSC Fire Department, certified rescue personnel will be available through the duration of the confined space entry.
  - 2) If the Confined Space Entry Emergency Response Team is a construction/maintenance contractor approved rescue team, then the SSC Fire Department will be notified 24 hours in advance so that they may provide backup emergency response support as necessary. The construction/maintenance contractor entry/rescue team is required to sign the SSC-Form 576, Confined Space Entry Permit, prior to entry.
- e. Determine the space has been effectively isolated (all sources of electrical, mechanical, chemical etc. and stored energy have been secured) per the Lockout/Tagout program, SCWI-8715-0013.
- f. Verify prior to entry all instruments used to perform atmospheric monitoring are calibrated within factory and pre-use specifications.
- g. Ensure the entry permit contains all the required information for the entry and all specified tests have been conducted.
- h. Ensure all procedures and practices are in place before entry is allowed, including proper means for summoning rescue.
- i. Ensure all equipment (including PPE, entry equipment, and rescue equipment if required for self-rescue) is in place, inspected and ready for use prior to entry into the space.
- j. Brief all persons participating in the confined space entry operation. This briefing shall include the task to be performed during the entry, potential hazards/risks, applicable safety precautions, rescue strategy to be used and an explanation of communications to be used.
- k. Ensure the permit requirements are maintained during the entry period by frequent onsite monitoring of the activities at the confined space.

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- l. Cancel/terminate the permit upon completion of the job. Conduct and document a debriefing with the entrants and the attendant upon completion of the job.
- m. Complete the following safety precautions when working with another contractor:
  - 1) Inform the other contractor of permit locations and programs.
  - 2) Inform the other contractor of common hazards.
  - 3) Inform the other contractor of precautions and procedures.
  - 4) Coordinate entry operations with the other contractor.
  - 5) Schedule a debriefing with the other contractor.
  - 6) If conflicts of requirements exist among contractors working on the same project, the most stringent requirements shall be followed.
- n. Ensure ventilation, if required, is provided and maintained during entry operations per Section 5.1.g and 5.1.h of this SCWI.
- o. Complete training to recognize hazards in confined spaces, including the symptoms and/or warning signs of exposure to hazards and the consequences of the exposures. NASA and NASA Prime Contractors shall complete the training designated by the SSC Certification Board or equivalent.

#### 4.5.3 Attendants

Attendants shall:

- a. Complete training to recognize hazards in confined spaces, including the symptoms and/or warning signs of exposure to hazards and the consequences of the exposures. NASA and NASA Prime Contractors shall complete the training designated by the SSC Certification Board or equivalent.
- b. Maintain a running log of entry and exit times of authorized personnel and equipment entering the confined space.
- c. Maintain the Form SSC-576, Confined Space Entry Permit, at the entry point throughout the duration of the task.
- d. Maintain communication and/or visual contact with the entrants at all times during the confined space entry.
- e. Understand all facets of the SSC Confined Space Entry Program.
- f. Not enter a permit-required confined space to attempt rescue. The attendant **shall not** enter the confined space to attempt rescue of an entrant(s).

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- g. Remain outside of the confined space at all times during the confined space entry, unless relieved by another authorized attendant.
- h. Order the evacuation of the confined space if:
  - 1) Conditions exist either internal or external to the space that could endanger the entrants.
  - 2) Conditions exist or develop that are not in compliance with the Form SSC-576, Confined Space Entry Permit.
  - 3) Any entrant exhibits symptoms or warning signs of exposure to hazardous or dangerous conditions that may affect the entrant's judgment or health.
- i. In the event of any emergency:
  - 1) Call the emergency response/rescue team (SSC Fire Department or contractor rescue team) using the contact numbers/means identified on the SSC-576, Confined Space Entry Permit.
  - 2) After notifying emergency response personnel, perform rescue operations **from outside** the confined space (if feasible/practical).
  - 3) Continue to monitor the worker(s) in the confined space and assist the rescue team performing external tasks if needed.
  - 4) Do not allow any unauthorized personnel to enter the confined space and direct any unauthorized personnel away from the confined space.
- j. Understand the proper use of the rescue equipment and how to perform necessary duties to activate an emergency rescue while remaining outside of the confined space.
- k. Understand the proper inspection, field calibration and use of the atmosphere monitoring equipment being used for the confined space entry.
- l. Maintain constant positive visual, voice and/or signal communications with the personnel inside of the confined space (entrants).
- m. Assist the entrant(s) in donning equipment and in safely entering the confined space.
- n. Maintain continuous atmospheric monitoring in the immediate vicinity of the operations and entrants within the permit-required confined space.
- o. Monitor the environment outside of the confined space and quickly notify the entrant(s) of the need to exit if a hazardous or dangerous external environmental condition develops.
- p. Complete the training required for authorized attendants, which should include the use of the retrieval winch and external rescue basics.

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#### 4.5.4 Confined Space Entry Emergency Response Team

The confined space entry emergency response team may consist of the SSC Emergency Response/Fire Department or the qualified rescue team for the construction/maintenance contractor entering the confined space. The confined space entry emergency response team shall:

- a. Understand and be trained in the use of PPE and confined space rescue equipment.
- b. Be familiar with location, configuration and rescue plan of the confined space for which they are providing emergency response/rescue support.
- c. Use appropriate retrieval systems or methods to facilitate rescue whenever an authorized entrant enters a permit-required space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems used by rescue teams shall meet requirements outlined in 29 Code of Federal Regulation (CFR) 1910.146.
- d. Ensure methods and procedures are in place to effectively rescue personnel in distress within confined spaces at SSC.
- e. Maintain certification in Basic First Aid and Cardiopulmonary Resuscitation (CPR).
- f. Understand the training required for authorized entrants and attendants.
- g. Determine whether rescue services can be on scene within four (4) minutes for rescue. If this is not possible, a constant presence by an emergency response team member shall be required.
- h. The SSC Emergency Response/Fire Department shall include annual simulated rescues from spaces that may require rescue operations.

## 5.0 CONFINED SPACE PROCEDURES

### 5.1. General Confined Space Procedures

- a. If not previously classified per paragraph 4.2 “h”, the confined space shall be considered a permit-required confined space until a safety evaluation of the space indicates otherwise. For a permit-required confined-space entry operation where the reclassification requirements of Section 5.4 of this SCWI are met, the space may be reclassified from a permit-required confined space to a SSC Monitored Confined Space or a non-permit-required confined space by following the instruction and completing Form SSC-821, Permit-Required Confined Space Reclassification Form, located in the Forms section of the SSC Intranet Portal.
- b. All permit-required confined space entry operations are classified as SAFETY CRITICAL. The confined space entry permit shall be signed/approved by the confined space supervisor, emergency rescue team lead, and applicable safety office prior to performing work in any tank, vessel or other confined space.

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- c. Signs shall be posted on permit-required confined spaces to notify exposed employees. The signs shall read, "Danger, Permit-Required Confined Space, Do Not Enter," or similar language. SSC Monitored Confined Spaces shall be posted with a sign stating, "SSC Monitored Confined Space," or similar language.
- d. Spaces not properly posted shall be reported immediately to NASA or applicable NASA Prime Contractor safety office. Report the confined space via a NASA close call or generate a Problem Report for proper resolution. Entry into a confined space, whether the space is posted or not, without appropriate preparation and properly completed confined space entry documentation is prohibited.
- e. The Confined Space Entry Permit-SSC Form 576 or Safe Atmosphere Verification Tag-SSC Form-579, shall be maintained at the entry point or made available by other equally effective means so the confined space entry supervisor, entrants and attendant(s) can confirm pre-entry preparations have been completed.
- f. When entrance covers are removed and a risk of falling into the space is evident, the opening shall be guarded by railing, temporary cover or other temporary barrier to prevent an accidental fall through the opening.
- g. When initial atmospheric testing indicates ventilation is required to remove contaminants and/or provide safe atmospheric conditions, continuous ventilation shall be provided during entry and throughout the duration of the entry operation. Continuous ventilation is also required if a hazard is being introduced into the space, such as welding or use of chemicals. General industry guidance is ventilation systems should provide 6-10 air exchanges per hour.
  - 1) **CAUTION:** Precautions shall be taken to ensure gas powered ventilation equipment is placed sufficiently away from the confined space opening to prevent carbon monoxide from entering the confined space.
  - 2) **CAUTION:** Precautions shall be taken to ensure the intake of ventilation equipment is placed sufficiently far away from sources of contamination such as gas powered equipment, chemicals, etc.
- h. When operations conducted inside the confined space have the potential to cause an Immediately Dangerous to Life and Health (IDLH) atmosphere, the entry supervisor shall ensure ventilation is used to maintain the atmosphere at a level suitable for human occupancy. (An example operation is welding. A Flame "Hot Work" Permit would also be required in this instance.)

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## 5.2. SSC-Specific Confined Space Procedures

- a. The NASA SSC Fire Department shall be the primary emergency response/rescue service provider. Non-SSC emergency response/rescue service providers may be employed only with concurrence from the NASA SSC Fire Department.
  - 1) The emergency response/rescue service provider shall sign the SSC-576 Confined Space Entry Permit approving the permit entry and associated rescue plan/procedures.
  - 2) Section 4 of the SSC-576 Confined Space Entry Permit outlines the emergency rescue plan and procedures. If the configuration or operations in the confined space present complex or unique challenges for emergency rescue (i.e. high angle rescue, obstructions, etc.), the approved, written rescue plan shall be attached to the SSC-576 Confined Space Entry Permit.
- b. To facilitate non-entry rescue, retrieval systems or methods shall be used whenever an authorized entrant enters a permit-required confined space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems or methods may also be used in SSC Monitored Confined Spaces if it adds an extra measure of safety for access or egress.
- c. Retrieval systems shall meet the following requirements:
  - 1) Each authorized entrant must use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, at all times.
  - 2) The other end of the retrieval line will be attached to a mechanical device (vertical entries) or to a fixed point outside of the permit space (horizontal entries) in such a manner that rescue can begin as soon as the attendant/rescuer becomes aware rescue is necessary. A mechanical device must be available to retrieve personnel from vertical type permit spaces more than five (5) feet deep.
- d. List of all permanent Permit-Required Confined Spaces and SSC Monitored Confined Spaces shall be maintained by the SACOM/FOSC on the SSC Intranet Portal. Temporary permit required confined spaces and non-NASA affiliated tenants/agencies confined spaces are not part of the SACOM/FOSC maintained list of confined spaces. The list of confined spaces shall be titled, "Permit-Required Confined Space Data Base," which can be found on the NASA SSC portal page under Safety, Security and Health.
- e. All SSC designated valve pits shall be SSC Monitored Confined Spaces, unless conditions in the confined space are evaluated as hazardous. If inherent hazards exist, the valve pit shall be properly marked with a Permit-Required Confined Space sign.
- f. NASA SSC classifies trenching and excavations as permit-required confined spaces only if they include any of the following: hazardous atmosphere, electrical hazards, hot materials, steam, engulfment, contents under pressure or creation of a hazardous work environment resulting from

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the type of work to be performed. If the above conditions do not exist, the trench/excavation is an SSC Monitored Confined Space. Classification of a permit-required confined space for trenching or excavation operations requires evaluation by the NASA or NASA Prime Contractor safety office.

- g. All permit-required confined space entries require a Form SSC-576, Confined Space Entry Permit with copies of the applicable Safety Data Sheets (SDSs). In addition, an activity hazard analysis shall be submitted to the NASA or NASA Prime Contractor safety representative as far in advance of the desired entry date as possible to allow for a thorough assessment of associated and potential hazards.
- h. Entry into any confined space where the internal temperature is less than 40 °F or greater than 120 °F must be specifically approved by the NASA or NASA Prime Contractor safety representative.
- i. Prior to a permit-required confined space entry, the responsible entry supervisor and the responsible safety representative/office shall conduct a briefing with all involved personnel on the applicable safety requirements, the chemical hazards identified in the SDSs (if applicable), emergency actions, and the identification and function of equipment to be used during the operation. No individual shall be allowed to enter or work within the permit-required confined space until this briefing has been conducted.

#### 5.2.1. **Confined Space Permit Procedures**

- a. SSC Form 576, Confined Space Entry Permit, shall be used for all SSC permit-required confined space entries by NASA, NASA Prime Contractors and their subcontractors, and NASA Direct Construction Contractors. The SSC Form 576 is located in the Forms section of the SSC Intranet Portal. For an SSC Monitored Confined Space, a SSC Form 579, Safe Atmosphere Verification Tag' shall be used.
- b. A new permit shall be generated in the event of work discontinuation due to problems associated with the confined space or a change in system configuration.
- c. The Confined Space Entry Permit or Safe Atmosphere Verification Tag shall be available at the entry/exit point throughout the duration of the job.
- d. Where there are multiple entry/exit points, each entry/exit point shall have an original Confined Space Entry Permit or Safe Atmosphere Verification Tag (no photocopies are allowed).
- e. For a permit-required confined space, the entry supervisor, attendant and entrant(s) shall verify all necessary precautions (to include coordination with emergency response/rescue) have been taken to ensure safety and then sign SSC Form 576, Confined Space Entry Permit.

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### 5.2.2. Testing of Atmospheres for Confined Space Entry

- a. The entry supervisor shall ensure trained personnel conduct and document the atmosphere sampling, analysis and verification for all confined spaces in the following order:
  - 1) O<sub>2</sub> content
  - 2) Flammable gases and vapors
  - 3) Potential toxic air contaminants

**Note:** The sampling process must occur in sequence (i.e., 1, then 2, then 3).

- b. The sampling process shall be performed again and documented if the confined space is left unattended for any length of time (e.g., breaks, lunch). This is to ensure no hazards have been introduced while the confined space was left unattended.
- c. Atmospheric readings obtained for permit-required confined spaces shall be recorded on the Confined Space Entry Permit. Atmospheric readings for a SSC Monitored Confined Space shall be recorded on the SSC Form 579, Safe Atmosphere Verification Tag. The person taking the atmospheric reading shall sign the permit or tag.
- d. The date the atmospheric readings are taken and the calibration due date, the model/serial number, and the NASA Equipment Control/Identification Number (ECN) of the meter shall be recorded. For NASA Direct Construction Contractors and subcontractors to NASA Prime Contractors, the date the atmospheric readings are taken, the calibration due date and the model/serial number of the meter shall be recorded.
- e. Testing of the confined space atmosphere shall be taken every three (3) feet to ensure potential heavier or lighter than air harmful gases can be identified. Heavier and lighter than air gases can produce localized O<sub>2</sub> deficient atmospheres.

### 5.2.3. Calibration of Testing Equipment

- a. Manufacturers' guidance/recommendations shall be used to determine the equipment schedule of laboratory/factory calibrated checks.
- b. NASA SSC O<sub>2</sub>/combustible/toxic gas meters will be laboratory calibrated once every six (6) months at a minimum. NASA Direct Construction Contractors and subcontractors to NASA Prime Contractors shall follow their company policies and written confined space program requirements with respect to the frequency of meter calibration.
- c. All personnel shall not use meters with an expired calibration date.
- d. Personnel using an O<sub>2</sub>/combustible/toxic gas meter shall determine whether the meter is calibrated for the type of gas/vapor being detected, considering the atmosphere in the space being sampled

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(i.e. a helium purged Gaseous Hydrogen (GH) line/area would require a meter calibrated for hydrogen detection in an oxygen deficient environment with a helium background).

- e. If the meter is not calibrated to the specific gas, the personnel shall use the appropriate conversion/response factor calculations provided by the manufacturer to determine the correct meter reading for the gas being checked.
- f. O<sub>2</sub>/combustible/toxic gas meters used to conduct atmospheric tests shall be field calibrated with a known calibration/span gas before each day's use. Prior to field use, the meter shall be "fresh air" calibrated. Any meter which fails the span/calibration gas or the fresh air calibration shall not be used for confined space entry and shall be tagged/sent for factory/laboratory calibration/repair.

### 5.3. Standard Operating Procedures

It is recognized certain tasks may be performed frequently requiring the constant application of the confined space permit and/or reclassification form. In such cases, a Standard Operating Procedure (SOP) process can be used in lieu of a permit or reclassification form. When using a SOP, the following shall apply:

- a. Include all applicable precautions, steps and requirements of either a confined space entry permit or reclassification form to comply with OSHA requirements and safe practices.
- b. Post/make readily available the SOP at the job site where the task is being performed.
- c. The SOP is not to be used for any other purpose and shall state which deviations or situations cancel it and require application of a Confined Space Entry Permit or Reclassification form (SSC-576 or SSC-821, respectively).

### 5.4. Reclassifying (Downgrading) Permit-Required Confined Spaces

Organizations who enter permit required confined spaces or have permit required confined spaces within their facilities or work areas, may temporarily reclassify a permit-required confined space to a non-permit-required confined space or SSC Monitored Confined Space provided they have met all of the following requirements:

- a. There is no hazardous condition and no reasonable potential for the occurrence of a hazardous condition, including actual or potential atmospheric hazards.
- b. Compliance with all requirements and stipulations established in OSHA 29 CFR 1910.146 for reclassifying permit-required confined spaces is met.
- c. Atmospheric readings are posted on Form SSC-579, Safe Atmosphere Verification Tag, which is posted at the space.

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- d. A written and approved procedure/analysis form detailing the decision-making process in reclassifying the permit space is prepared. SSC Form 821, Permit-Required Confined Space Reclassification Form, shall be used when reclassifying permit required spaces. This form is located in the Forms section of the SSC Construction Safety website. The form must be made available to each employee entering the space and must be available at the job site.

**NOTE:** Only the properly trained and qualified persons within the applicable safety organization (NASA, NASA Prime Contractor or the construction contractor safety) can approve the reclassification of a permit-required confined space. The applicable safety representative must perform a field review of the confined space and approve the reclassification by signing off on SSC Form 821, Permit-Required Confined Space Reclassification Form. The SSC-881 shall be retained for one year.

**NOTE:** There is a significant difference between “hazard elimination” and “hazard control.” If the space contains no hazards, an entrant is in no danger. If hazards are controlled rather than removed, an entrant could be in danger upon failure of a control system. Simply controlling hazards does not meet the criteria for reclassification.

## 6.0 TRAINING AND CERTIFICATIONS

- a. Personnel who enter confined spaces, or who are responsible for facilities/equipment with confined spaces shall take a confined space training course that meets or exceeds OSHA requirements.
- b. Contractors shall obtain training for their personnel and ensure all subcontractors have met OSHA and NASA training requirements.
- c. Initial and refresher training shall include the course content requirements as defined by 29 CFR 1910.146.
- d. Personnel shall be retrained as required by OSHA.
- e. Personnel designated to conduct atmospheric testing of confined spaces shall be trained in the requirements above and in the operation, limitations, calibration and care of specific testing equipment to be used. Individuals conducting atmospheric tests must be qualified to interpret the test results.
- f. Managers and/or supervisors shall maintain current training records, as well as training requirements, for each employee tasked to perform confined space entry activities.
- g. Documentation of training records shall be maintained and made readily available for audit or review.
- h. NASA Direct Construction Contractors shall provide training qualifications of personnel involved in confined space entry and shall submit these training certifications to NASA SMA with their

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safety and health plan and/or as a contract submittal prior to the confined space operations. Subcontractor's to NASA Prime Contractors shall provide the training qualifications of personnel involved in confined space entry and shall submit these training certifications to the applicable safety office with their safety and health plan and/or as a contract submittal prior to the confined space operations.

## 7.0 CONFINED SPACE ENTRY PERMIT AUDIT

At the completion of the permit required confined space entry by NASA or a NASA Prime Contractor, a quality assurance audit shall be performed on the terminated/cancelled confined space entry permit (SSC Form 576), to assess compliance with this SCWI. The quality assurance audit is required to close the associated work authorization document/Stennis Work Request. Any discrepancies or areas for improvement shall be addressed to improve the SSC Confined Space Entry Program and to comply with the annual program review requirements of 29 CFR 1910.146. A summary of the quality assurance audit and corrective actions/recommendations will be summarized in the Annual VPP Self Evaluation per paragraphs "4.1 a." and "4.2 a." of this SCWI. Sections 1 through 9 of the Confined Space Entry Permit, SSC Form 576, have a blocks which will be initialed/dated for the quality assurance audit review. If a discrepancy or an opportunity for improvement is noted during the quality assurance audit, the "corrective action required" block is checked and addressed in Section 10 of the SSC Form 576, Confined Space Entry Permit.

## 8.0 RECORDS AND FORMS

All records and forms are assumed to be the latest version unless otherwise indicated. Records are identified in the SSC Master Records Index. Records generated by this SCWI shall be maintained in accordance with applicable requirements of SPR 1440.1, Records Management Program Requirements.

- a. Form SSC-576, Confined Space Entry Permit
- b. Form SSC-579, Safe Atmosphere Verification Tag
- c. Form SSC-821, Permit-Required Confined Space Reclassification Form
- d. List of confined spaces found on the NASA SSC portal page under Safety, Security and Health.

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## 9.0 ACRONYMS

CFR	Code of Federal Regulations
CPR	Cardiopulmonary Resuscitation
ECN	Equipment Control Number
FOSC	Facility Operating Services Contractor
GH	Gaseous Hydrogen
IDLH	Immediately Dangerous to Life and Health
ITSC	Information Technology Service Contract
LEL	Lower Explosive Limit
LFL	Lower Flammability Limit
LSC	Laboratory Service Contract
MACC	Multiple Award Construction Contract
NPR	NASA Procedural Requirements
O <sub>2</sub>	Oxygen
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PPE	Personal Protective Equipment
SACOM	Synergy Achieving Consolidated Operations & Maintenance
SCWI	John C. Stennis Space Center Common Work Instruction
SDS	Safety Data Sheet
SMA	Safety and Mission Assurance Directorate
SOP	Standard Operating Procedure
SPR	Stennis Procedural Requirement
SSC	John C. Stennis Space Center
STEL	Short Term Exposure Limit
SWR	Stennis Work Request
TLV <sup>®</sup>	Threshold Limiting Value
VOC	Volatile Organic Compounds

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VPP

Voluntary Protection Program

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## 10.0 DEFINITIONS

- a. Acceptable Entry Conditions - The conditions that must exist in a confined space to allow entry into and work within the space.
- b. Attendant - An individual stationed outside of a confined space that monitors the entrants and performs other attendant's duties assigned.
- c. Applicable Safety Representative - An individual working within the safety and health discipline who has the qualifications and expertise to assess hazards and understands all the requirements of 29 CFR 1910.146.
- d. Competent Person (designated by the applicable safety organization) - The individual(s) designated, trained, and certified as competent by the applicable safety organization to carry out the duties and responsibilities of this SCWI, 29 CFR 1910.146, and applicable NASA Directives.
- e. Confined Space - A space that is:
  - 1) Large enough to physically enter and perform work.
  - 2) Not designed for continuous human occupancy.
  - 3) Has limited means of entry or exit.
- f. Confined Space Entry Emergency Response Team/Rescue Service - The organization designated to perform rescue operations in an emergency for a confined space.
- g. Entrant - An employee authorized to enter the confined space to perform an assigned duty as outlined in the written permit system and associated work authorization document.
- h. Entry - A term used to denote entry into a confined space. An entry shall be considered initiated as soon as any part of an employee's body breaks the plane of an opening of the confined space.
- i. Entry Permit - A Form SSC-576, Confined Space Entry Permit, authorizing a controlled entry into a permit-required confined space that contains or has the potential to contain hazards.
- j. Entry Supervisor - The person responsible for determining if acceptable entry conditions are present at a permit-required confined space, for authorizing entry, for overseeing entry operations, and for terminating entry as required by this SCWI.
- k. Hazardous Atmosphere - An atmosphere that may expose employees to the risk of death, injury, or illness from one or more of the following conditions:
  - 1) Combustible or flammable gases and/or vapors at concentrations in excess of 10% of their lower explosive limit.
  - 2) An oxygen concentration less than 19.5% or greater than 23.5% by volume.

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- 3) A toxic substance present in concentrations in excess of its dose or Permissible Exposure Limit (PEL), Threshold Limiting Value (TLV<sup>®</sup>), Short-Term Exposure Limit (STEL), ceiling limits, etc.)
- 4) Any other atmospheric condition IDLH.
- l. Hot Work Permit - NASA/SSC written authorization (Form SSC-68, Flame “Hot Work” Permit), to perform operations producing flames, sparks or sources of ignition.
- m. NASA: The organizations and federal employees who work for the National Aeronautical and Space Agency. This includes employees from SSC, other NASA centers, and NASA Headquarters.
- n. NASA Direct Construction Contractors: NASA direct construction contractors and their sub-contractors performing construction activities at SSC for NASA. This includes the Multiple Award Construction Contract (MACC) and other NASA directly funded construction contracts.
- o. NASA Prime Contractors: The contractor and their employees who work for the SSC prime support contracts. These include: SACOM, FOSC, Test Operations Contract (TOC), Laboratory Services Contract (LSC), Information Technology Services Contract (ITSC), Security Contract, and the SMA Services Contract.
- p. Non-Permit Confined Space - A confined space which has no inherent hazards and in which no hazards are introduced during the entry/work operations in the confined space.
- q. Permit-Required Confined Space - Any confined space requiring controls to prohibit unauthorized entry and has one or more of the following characteristics:
  - 1) Contains or has the potential to contain a hazardous atmosphere.
  - 2) Contains a material that has the potential for engulfing an entrant.
  - 3) Has internal configuration that could trap or asphyxiate an entrant.
  - 4) Contains any other recognized safety or health hazard.
- r. Confined Space Entry Emergency Response Team/Rescue Service - The organization designated to perform rescue operations in an emergency for a confined space.
- s. SSC Monitored Confined Space - A confined space, which does not have any inherent hazards or characteristics that would make it a “permit-required confined space,” but must have its atmosphere tested prior to entry. These include such confined spaces as valve pits and weight stations. An “SSC Monitored Confined Space” becomes a permit-required confined space if any hazards are introduced into the confined space as part of the operations (i.e. welding, painting

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with high Volatile Organic Compounds (VOCs) paints, etc.). Prior to entry of a SSC Monitored Confined Space, the atmosphere shall be verified and documented on a Form SSC-579, Safe Atmosphere Verification Tag.

- t. Temporary Onsite Contractors - Non-NASA affiliated contractors (contractors other than NASA Prime Contractors (and their subcontractors) and NASA Direct Construction Contractors), who provide preventive, routine and non-routine maintenance; construction; and/or surveillance activities on SSC real estate/fee area, facilities, systems and equipment. These include such entities as AT&T and Mississippi Power.
- u. Tenant/Resident Agencies - Private and Government (non-NASA) organizations and agencies who reside on SSC property. Tenant/resident agencies typically reside in facilities maintained by NASA and NASA's Direct Contractors.

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### APPENDIX A. - Permit-Required Confined Space-Decision Check Sheet

<i>As outlined in OSHA 29 CFR 1910.146 Appendix A Permit-Required Confined Space-Decision Check Sheet</i>				
		Yes	No	Comments
1	Does the workplace contain confined space as defined by 29 CFR 1910.146?			If "No" for Items 1A, 1B, and 1C, STOP and consult applicable OSHA standard  If "Yes" for 1A, 1B, or 1C continue to Step 2
	A. Is space large enough and so configured that an employee can bodily enter and perform assigned work?			
	B. Does space have limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry)?			
	C. Space not designed for continuous employee occupancy?			
2	Does the workplace contain a permit-required confined space as defined by 29 CFR 1910.146 (b)?  "Permit-required confined space" means a confined space that has one or more of the following characteristics			If "No" for Items 2A, 2B, and 2C, STOP and consult applicable OSHA standard  If "Yes" for 2A, 2B, or 2C continue to 2
	Contains or has a potential to contain a hazardous atmosphere?  "Hazardous atmosphere" means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes"			If "Yes" for any item for A thru D, inform employees as required by 1910.146 (c)(2) and go to step 3
	(1) Flammable gas, vapor, or mist in excess of 10 percent of its Lower Flammable Limit/Lower Explosive Limit (LFL/LEL);			
	(2) Airborne combustible dust at a concentration that meets or exceeds its LEL; NOTE: This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet (1.52 m) or less			

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	(3) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;			
	(4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit (PEL) is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, and which could result in employee exposure in excess of its dose or PEL; NOTE: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.			
	(5) Any other atmospheric condition that is immediately dangerous to life or health. NOTE: For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as Safety Data Sheets (SDSs) that comply with the Hazard Communication Standard, section 1910.1200 of this Part, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.			
	A. Contains a material that has the potential for engulfing an entrant			
	B. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or			
	C. Contains any other recognized serious safety or health hazard			
3	Will workplace be entered?			If "No" prevent employee entry as required. If "Yes" continue to Step 4. If entry will be performed by contractor, see Appendix A
4	Does workplace have known or potential hazards?			If "No" permit-required confined space doesn't apply. If "Yes" continue to Step 5
5	Can the hazards be eliminated? As stated in SCWI-8715-004, There is a significant difference			If "No" proceed as permit-required space. If "Yes"

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	between "hazard elimination" and "hazard control."			continue to Step 6
6	The cognizant, safety representative must perform a field review of the confined space and approve the reclassification by signing off on Form SSC-821, Permit-Required Confined Space Reclassification Form.  Note: NASA SSC SMA must be notified of the reclassification before entry is made.			Only the properly trained and qualified persons w/i the cognizant, safety organization can approve reclassification of a permit-required space.

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**APPENDIX B – SSC Form 576 - Confined Space Entry Form**



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AUTHORIZED ATTENDANT: I reviewed the confined space entry conditions/requirements and understand my Attendant roles & responsibilities.							
Printed Name	Signature	Training Expiration	Printed Name	Signature	Training Expiration		
AUTHORIZED ENTRANT(S): I reviewed the confined space entry permit conditions/requirements and understand my Entrant roles & responsibilities.							
Printed Name	Signature	Training Expiration	Printed Name	Signature	Training Expiration		
6. AUTHORIZED ENTRANT TRACKING <span style="float:right">QA Audit (initials/date) _____ <input type="checkbox"/> Corrective Action Required</span>							
Authorized Entrant	Time In	Time Out	Authorized Entrant	Time In	Time Out		
7. ATMOSPHERIC TESTING AND MONITORING EQUIPMENT <span style="float:right">QA Audit (initials/date) _____ <input type="checkbox"/> Corrective Action Required</span>							
Area Monitor/Meter	Model Number	Serial No/ECN	Calibration Due Date				
Personal Monitors							
8. ATMOSPHERIC TESTING AND MONITORING RECORD <span style="float:right">QA Audit (initials/date) _____ <input type="checkbox"/> Corrective Action Required</span>							
Continuous monitoring shall be recorded at least every 2 hours.							
Hazard (acceptable level)	Initial Reading Time: _____	Next Reading Time: _____					
Oxygen (19.5% - 23.5%)							
Flammable (<10% LEL)							
Carbon Monoxide (<35 ppm)							
Hydrogen Sulfide (H <sub>2</sub> S, 0 ppm)							
Other Hazard: _____							
Other Hazard: _____							
Testers Initials							
9. PERMIT CANCELLATION/TERMINATION <span style="float:right">QA Audit (initials/date) _____ <input type="checkbox"/> Corrective Action Required</span>							
I personally verified all equipment was removed, all persons exited the confined space and conducted a debrief. I certify this permit is canceled/terminated.							
Entry Supervisor Printed Name	Entry Supervisor Signature	Date/Time					
10. QUALITY ASSURANCE (QA) AUDIT & CORRECTIVE ACTION RECOMMENDATION FOR SECTIONS 1-9							
The QA audit of this entry permit noted the following discrepancies. See the recommended corrective actions/areas for improvement.							
1. Discrepancy: _____	Recommendation: _____						
2. Discrepancy: _____	Recommendation: _____						
3. Discrepancy: _____	Recommendation: _____						
4. Discrepancy: _____	Recommendation: _____						

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**APPENDIX C – SSC Form 579 - Safe Atmosphere Verification Tag**



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## APPENDIX D – SSC-Form 821 - Permit Required Confined Space Reclassification Form

 National Aeronautics and Space Administration John C. Stennis Space Center Stennis Space Center, MS 39029-6000		<b>PERMIT REQUIRED CONFINED SPACE RECLASSIFICATION FORM</b>		
<p>To reclassify a permit required confined space to a non-permit required space and allow entry without the application of confined space work requirements, this form must be completed to verify that no actual or potential atmospheric hazards exist and all hazards and potential hazards within the space have been identified and completely eliminated. The reclassification is valid only for the duration of the job. The space must be evacuated and reevaluated if any hazards develop during the entry. Once returned to normal service, the confined space reclassification is no longer valid and the confined space is considered to be permit required.</p> <p>All hazards must be eliminated to authorize reclassification. The implementation of hazard control measures such as respiratory protection or forced air ventilation requires the immediate reclassification from non-permit required to permit required, including all the safeguards inherent in that system.</p>				
Confined Space Location: _____		Purpose of Entry: _____		
Check which of the following two conditions apply to the reclassification:				
<input type="checkbox"/> Verification that the permit required confined space poses no potential or actual atmospheric hazards and that all hazards within the space have been eliminated without entry into the confined space.				
<input type="checkbox"/> It was necessary to enter the permit required confined space to eliminate all hazards or verify that all hazards have been eliminated utilizing an approved confined space work permit and following all permit requirements.				
<b>PREPARATION MEASURES TAKEN AND VERIFIED TO ELIMINATE HAZARDS</b>				
		<b>YES</b>	<b>N/A</b>	
1. Contents of the confined space have been removed to eliminate the hazard		<input type="checkbox"/>	<input type="checkbox"/>	
2. All chemical, utility, and outlet lines are isolated in a manner that eliminates hazards		<input type="checkbox"/>	<input type="checkbox"/>	
3. Lockout/tagout is implemented so as to eliminate hazards		<input type="checkbox"/>	<input type="checkbox"/>	
4. All walking surface slip and trip hazards are eliminated		<input type="checkbox"/>	<input type="checkbox"/>	
5. Atmospheric testing of oxygen level, LEL, and toxic concentrations have been conducted and it is verified that no actual or potential hazards exist (Document Readings Below)		<input type="checkbox"/>	<input type="checkbox"/>	
6. All man way and access opening obstruction hazards have been eliminated		<input type="checkbox"/>	<input type="checkbox"/>	
7. All sharp edges have been removed or guarded to eliminate hazards		<input type="checkbox"/>	<input type="checkbox"/>	
8. Physical barriers or barricades with tags are installed to eliminate potential hazards from objects or weather entering the space		<input type="checkbox"/>	<input type="checkbox"/>	
<b>LIST OTHER MEASURES TAKEN AND VERIFIED TO IDENTIFY AND ELIMINATE HAZARDS</b>				
<b>DESCRIBE THE STRATEGY NECESSARY TO IDENTIFY HAZARDS THAT DEVELOP DURING ENTRY</b>				
<b>LIST ATMOSPHERIC MONITORING RESULTS FROM STEP 5 ABOVE</b>				
<b>Agent</b>	<b>Limit</b>	<b>Test Results</b>	<b>Test Time</b>	<b>Tester's Initials</b>
Oxygen	19.5% - 23.5%			
Flammables	>0% L.F.L.			
Hydrogen Sulfide (H2S)	0 PPM			
Carbon Monoxide (CO)	0 PPM			
Other:				
I verify that all hazards have been eliminated and reclassify the above space as a non-permit required confined space.				
Cognizant Safety Office Representative: _____			Date: _____	

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