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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

Original Signature on File

Gary Benton, Director

Date

Safety and Mission Assurance Directorate

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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.
Rev F-1	7/2015	R. Gargiulo, X8-3842	Added a sub-bullet to paragraph 4.2 to ensure all resident prime contractors provide

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Status/Change/ Revision	Change Date	Originator/ Phone	Description
			SACOM a current listing of their confined spaces. Removed references to FOOSC and TOC. (Admin Changes)
Rev G	3/2017	R. Gargiulo, x8-3842	Removed references to subcontractors as the program requirements pertain to the prime contractor and their subcontractors. Clarified differences & requirements for entry into SSC Monitored & Permit Required confined spaces. Added the requirement to coordinate confined space entries and/or reclassifications with operations and/or facility management. Revised the SSC form 576, Confined Space Entry Permit to consolidate the post entry audit.
Rev H	3/2018	M. Rewis, x8-2663	Section 5.2.1, Language was added to assure the following be conducted: "a sniff around the closed lid area before the lid or cover is opened."; 6.e, Requirements added for personal O ₂ monitoring training, if so equipped; 6.i, Requirement added addressing medical examinations Per NPR 1800.1, "NASA Occupational Health Program Procedure".
Rev I	4/2019	M. Rewis, x8-2663	Global: Reference to Stennis Work Request removed; Section 4.2.h, added reference to SSC Monitored Confined Spaces and non-permit required confined space, moved requirement to classify confined spaces to precede confined space types; 4.2.i, added

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			“permanent”; 4.5.2.d, added “cognizant”; 4.5.2.1, added requirement to notify fire department when entry is complete; 4.5.3.b, removed need for equipment log; 4.5.4, clarified approval process through DDMS; 4.5.4.g, clarified requirements for non-entry rescue (and added definition); 4.5.4.h, required contractor evidence of simulated rescue; 5.2.1.d added SSCS Hotline as confined space concern reporting option; 5.2.c, added need for mechanical backup for rescue equipment; 5.2.f, added trench classification schema; 5.2.i, added requirement to sniff check around lid; 5.2.1.d, added “time”; 5.2.e, added “at least” and “explosive”; 5.3.b, added “Safety Office”; 5.4.Note, added “lockout/tagout”.
Rev J	5/2021	M. Rewis X8-2663	Removed “affiliated” from 2.0; modified 4.1.c to reflect the need for surveillance for confined space training activity for all NASA Contracts whose activity involves confined space entry; added notification requirement to include “prime contractor” to 4.5.2.d; added the need for an emergency rescue device at each point of entry to 5.2.j.5; added “before entry” to 5.4 Note; Removed “Competent Person”, “Temporary Onsite Contractors” from the Glossary.

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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 Permit Required and SSC Monitored confined spaces at SSC.

2.0 APPLICABILITY

The requirements specified in this SCWI shall apply to all NASA Government, contractor, and construction contractor employees who enter Permit-Required and SSC Monitored confined spaces (hereafter referred to as “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 1800.1, *NASA Occupational Health Program Procedures*
- c. SCWI 3410.0003, *Training/Certification Plan and Schedule Report*
- d. SPR 1400.1, *Document Preparation, Numbering, and Management*
- e. SPR 1440.1, *Records Management Program Requirements*
- f. 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.

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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.
- b. Update and maintain this SCWI in accordance with *Stennis Procedural Requirement (SPR) 1400.1, Document Preparation, Numbering, and Management*.
- c. Assure contract surveillance of NASA Contractor training departments to establish, schedule and maintain up-to-date training in confined space entry procedures for all 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 NASA Direct Construction Contractors' confined space entry programs submittals to assess their level of compliance to 29 CFR 1910.146 and this SCWI. Approve or reject (with comments) contractor confined space programs based upon the assessment.
- 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 (O₂), toxic atmosphere and combustible gas meters for SSC use. The list will be maintained by NASA SMA.
 - 2) Select new/replacement O₂, toxic atmosphere and combustible gas meters, as necessary.
 - 3) Assess the effectiveness and areas for improvement of the SSC Confined Space Program.

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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.
- 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.
- 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 O₂, toxic atmosphere, and combustible gas meters, which will be valid for a period not to exceed five (5) years.
- h. SACOM shall keep a master inventory of all SSC site permanent permit required confined spaces and SSC Monitored Confined Spaces (items 1 and 2 below) on the NASA SSC portal page under Safety, Security and Health. All confined spaces will be classified as one of the following types (see the definitions):
 - 1) Permanent Permit Required Confined Space
 - 2) SSC Monitored Confined Space
 - 3) Non-permit required confined space (not in inventory)

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- i. Provide SACOM a current listing of the permanent confined spaces they manage on an annual basis, or as confined spaces are added or eliminated from their inventory.

4.3. NASA Direct Construction Contractors

NASA Direct Construction 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 NASA SSC SMA prior to initiation.
 - 2) The program must include the necessary employee training.
- b. Classify all permit-required confined space entry operations as SAFETY CRITICAL. Therefore, permits are to be signed by the Contractor's 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.

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 entrants shall complete the training approved by the SSC Certification Board.

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- b. Maintain constant 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 O₂/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.

NOTE: For the four situations above which require the immediate evacuation of the confined space, the cause and corrective action shall be determined and implemented/corrected.

- e. Understand the proper operation, field calibration and limitations of atmosphere monitoring equipment used for the confined space entry.
- f. Maintain continuous atmospheric monitoring (through a personal and/or area monitor) in the immediate vicinity of the operations within the permit-required confined space.
- g. 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 permit-required confined space, prior to any confined space entry, if uncertainty or conflict exists.
- d. Notify the SSC Fire Department and the cognizant prime contractor Safety office of the place, time, estimated duration and activity for the proposed/planned permit-required confined space entry at least 24 hours in advance.
 - 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. The SSC Fire Department is required to sign the SSC-Form 576, Confined Space Entry Permit.
 - (b). Ensure certified rescue personnel will be available through the duration of the permit-required 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.
 - (a). The SSC Fire Department shall coordinate on the permit for a construction/maintenance contractor Confined Space Entry Emergency Response Team
 - (b). 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 SSC or factory and pre-use specifications. The calibration date shall be entered on the permit.
- g. Ensure the entry permit contains all the required information for the entry and all specified tests have been conducted.

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- 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 confined space team “self-rescue”) is in place, inspected and ready for use prior to entry into the permit-required confined space.
- j. Brief all persons participating in the permit-required 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.
- l. Cancel/terminate the permit upon completion of the job. Conduct a debriefing with the entrants and the attendant upon completion of the job and document this on block 9 of the permit. The SSC Fire Department (Rescue Team) shall be contacted when the permit is cancelled or the job is complete for the day, and no more entries are planned.
- 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 permit-required 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 Contractor supervisors shall complete the training approved by the SSC Certification Board or equivalent.

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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 Contractor attendants shall complete the training approved by the SSC Certification Board or equivalent.
- b. Maintain a running log of entry and exit times of authorized personnel entering the permit-required confined space.
- c. Maintain the Form SSC-576, Confined Space Entry Permit, at the entry point throughout the duration of the task.
- d. Maintain constant communication and/or visual contact with the entrants at all times during the permit-required confined space entry.
- e. The attendant **shall not** enter the permit-required confined space to attempt rescue of an entrant(s).
- f. Remain outside of the confined space at all times during the permit-required confined space entry, unless relieved by another authorized attendant.
- g. Order the evacuation of the permit-required 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.
- h. 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.

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- 2) After notifying emergency response personnel, perform rescue operations **from outside** the confined space (if feasible/practical). The attendant **shall not** enter the confined space to perform rescue.
- 3) Continue to monitor the worker(s) in the permit-required confined space and assist the rescue team performing external tasks if needed.
- 4) Do not allow any unauthorized personnel to enter the permit-required confined space and direct any unauthorized personnel away from the confined space.
- i. Understand the proper use of the rescue equipment and how to perform necessary duties to activate an emergency rescue while remaining outside of the permit-required confined space.
- j. Understand the proper operation, field calibration and use of the atmosphere monitoring equipment being used for the permit-required confined space entry.
- k. Maintain constant positive visual, voice and/or signal communications with the personnel inside of the confined space (entrants).
- l. Assist the entrant(s) in donning equipment and in safely entering the permit-required confined space.
- m. Maintain continuous atmospheric monitoring in the immediate vicinity of the operations and entrants within the permit-required confined space.
- n. Monitor the environment outside of the permit-required confined space and quickly notify the entrant(s) of the need to exit if a hazardous or dangerous external environmental condition develops.
- o. Complete the training required for authorized attendants, which should include the use of the retrieval winch and external rescue basics.

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 an approved rescue team for the construction/maintenance contractor entering the permit-required confined space. The maintenance/construction contractor will develop a written rescue plan and then have the SSC Fire Chief review and concur with the rescue plan before it is turned in as a transmittal in the Design and Data Management System

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(DDMS). Construction/maintenance contractor rescue teams' certifications shall be approved in DDMS as a transmittal of the contractors confined space program submittal. 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 permit-required 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 permit-required confined spaces at SSC.
- e. Maintain certification in Basic First Aid and Cardiopulmonary Resuscitation (CPR) per SSC Fire Department requirements. For approved construction/maintenance contractor rescue teams, at least one member of the on-site team shall have Basic First Aid and CPR.
- f. Understand the training required for authorized entrants and attendants.
- g. Determine whether rescue services can be on scene (or rescue can begin through non-entry rescue) within four (4) minutes for rescue. If this is not possible, a constant presence by an emergency response team member shall be required. Non-entry rescue is an acceptable initial Emergency Response. The Fire Department shall be contacted prior to initiating rescue response.
- h. The SSC Emergency Response/Fire Department shall include annual simulated rescues from similar size and shape spaces that may require rescue operations. The construction/maintenance contractor shall provide evidence of simulated rescue.

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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 confined 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 confined 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 a permit-required confined space.
- 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, Contact Safety Prior To Entry” or similar language.
- d. Spaces not properly posted shall be reported immediately to the NASA Safety Office or the applicable NASA Prime Contractor Safety office. Report the confined space lacking proper posting via the SSC Hot Line (call 8-SAFE), Close Call reporting System, or Problem Report. Entry into any 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. The Safe Atmosphere Verification Tag-SSC Form 579 is used for SSC Monitored Confined Space entries.

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- f. When entrance covers are removed and a risk of falling into the space is evident, the opening shall be guarded by barricade, 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 being drawn into/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, running vehicles, 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.)

5.2. SSC-Specific Confined Space Requirements

- 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 permit-required confined space present complex or unique challenges for emergency rescue (i.e., high

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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 full body harness.
 - 2) The retrieval line shall be attached at the center of the entrant's back near shoulder level or for multiple entrants, positioned at the point of work for ready retrieval.
 - 3) 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. Should the device be powered, then a mechanical backup will be in place.
- d. A list of all permanent Permit-Required Confined Spaces and SSC Monitored Confined Spaces shall be maintained by SACOM on the SSC Intranet Portal. Temporary permit required confined spaces and non-NASA affiliated tenants/agencies confined spaces are not part of the SACOM 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 the type of work to be performed. If the trench/excavation does not meet the criteria to be classified as a confined space, it will be classified as an

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atmospherically monitored trench/excavation. If conditions change, the trench/excavation may be re-classified to a confined space or permit required confined space at any time. Classification of a permit-required confined space for trenching or excavation operations requires evaluation by the NASA, NASA Prime Contractor or NASA Direct Construction Contractor safety.

- 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) (if hazardous materials are used in the confined space). In addition, an activity hazard analysis and/or Safe Plan of Action 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/or 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. The atmosphere around the lid of the confined space will be tested prior to opening it.
- j. Confined space entry permitting:
 - 1) SSC Form 576, Confined Space Entry Permit, shall be used for all SSC permit-required confined space entries by NASA, NASA Prime Contractors, 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, an SSC Form 579, Safe Atmosphere Verification Tag shall be used.
 - 2) Prior to entry into an SSC Monitored Confined Space, the atmosphere shall be verified and documented on a Form SSC 579, Safe Atmosphere Verification Tag, to ensure the atmosphere is safe for entry. An SSC Monitored Confined Space is a confined space, which does not have any inherent hazards or characteristics that

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would make it a “permit-required confined space,” but must have its atmosphere tested prior to entry. 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 with high Volatile Organic Compounds (VOCs) paints, etc.). Notify the appropriate safety office at least 24 hours in advance of a planned entry into an SSC Monitored Confined Space to ensure a safe atmosphere test is made just prior to the planned entry.

- 3) A new permit shall be generated in the event of work discontinuation due to problems associated with the permit-required confined space or a change in system configuration.
- 4) The Confined Space Entry Permit or Safe Atmosphere Verification Tag shall be available at the entry/exit point throughout the duration of the job.
- 5) Where there are multiple entry/exit points, each entry/exit point in use shall have an original Confined Space Entry Permit or Safe Atmosphere Verification Tag (no photocopies are allowed), attendant, and assigned emergency/rescue team (as necessary based upon hazards/risks) and emergency rescue device.
- 6) 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.

5.2.1. 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 Permit-Required and SSC Monitored confined spaces in the following order:
 - 1) O₂ 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).

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- 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 an 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 confined space permit or Safe Atmosphere Verification tag.
 - 1) If the NASA Direct Contractor performs the atmospheric test for a construction/maintenance contractor, the construction/maintenance designated safety representative shall also sign the Safe Atmosphere Verification Tag.
- d. The date and time 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, the time and 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 at least 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 O₂ deficient or explosive atmospheres.
- f. Initial atmospheric testing includes a sniff around the closed lid area before the lid or cover is opened. This prevents staff from being exposed to unsafe atmospheric conditions once the lid or cover is removed.

5.2.2. Calibration of Testing Equipment

- a. Manufacturers' guidance/recommendations shall be used to determine the equipment schedule of laboratory/factory calibrated checks.
- b. NASA SSC O₂/combustible/toxic gas meters will be laboratory calibrated once every six (6) months at a minimum. NASA Direct Construction Contractors shall follow their company policies and written confined space program requirements with respect to the frequency of meter calibration.
- c. Personnel shall not use meters with an expired calibration date.

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- d. Personnel using a O₂/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 (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. O₂/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 Permit-Required or SSC Monitored confined space entry and shall be tagged/sent for factory/laboratory calibration/repair.

5.3. Standard Operating Procedures

It is recognized certain confined space entry tasks may be performed repetitively and/or on an ongoing basis. Such repetitive, routine confined space entries would require 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. The SOP shall be signed/approved by the NASA Safety Office or NASA Prime Contractor safety office. For NASA Direct Construction Contractors, the SOP shall be submitted for NASA approval.
- c. Post/make readily available the SOP at the job site where the task is being performed.
- d. 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).

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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 an SSC Monitored Confined Space provided they have met all of the following requirements:

- There is no hazardous condition and no reasonable potential for the occurrence of a hazardous condition, including actual or potential atmospheric hazards.
- Compliance with all requirements and stipulations established in OSHA 29 CFR 1910.146 for reclassifying permit-required confined spaces is met.
- Atmospheric readings are posted on Form SSC-579, Safe Atmosphere Verification Tag, which is posted at the space.
- SSC Form 821, Permit-Required Confined Space Reclassification Form, shall be used when reclassifying permit-required confined 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 NASA Direct Construction Contractor safety) can approve the reclassification of a permit-required confined space. The reclassification shall be coordinated with test operations and/or facility management to ensure the facility configuration and/or planned operations or facility maintenance have been properly addressed. 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 before entry. The SSC-821 shall be retained with the work authorization documentation 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 (lockout/tagout) does not meet the criteria for reclassification.

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6.0 TRAINING AND CERTIFICATIONS

- a. Personnel who enter Permit-Required or SSC Monitored 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 Permit-Required and/or SSC Monitored 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. Entrants shall also be trained in the operation and alarms/signals of personal O₂ monitors, if required for confined space entry.
- 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 safety and health plan and/or as a contract submittal prior to the confined space operations. Subcontractors 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.
- i. NASA and NASA Prime Contractors shall have a medical examination per NPR 1800.1 Appendix C, Table A3 Certification Examinations, "B. Permit-Entry Confined Space/Tank Entry". The certification and training may also include training, fit testing,

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and a medical examination for respiratory protection if required for the confined space entry.

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. Sections 1 through 9 of the Confined Space Entry Permit, SSC Form 576, shall be reviewed to ensure the permit was properly completed. Section 10 of the SSC Form 576, Confined Space Entry Permit, will be initialed and dated by the person performing the quality assurance audit. If a discrepancy or an opportunity for improvement is noted the “corrective action required” block is checked and addressed in Section 10 of the SSC Form 576, Confined Space Entry Permit. The quality assurance audit is required to close the associated work authorization document. 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.

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.

- Form SSC-576, Confined Space Entry Permit
- Form SSC-579, Safe Atmosphere Verification Tag
- Form SSC-821, Permit-Required Confined Space Reclassification Form
- 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
DDMS	Design and Data Management System
ECN	Equipment Control Number
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 ₂	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
TLV [®]	Threshold Limiting Value
VOC	Volatile Organic Compounds
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. Applicable Safety Representative - An individual assigned by the organization/company who works 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.
- c. Attendant – A trained and certified individual stationed outside of a confined space that monitors the entrants and performs other attendant's duties assigned.
- d. 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.
- e. Confined Space Entry Emergency Response Team/Rescue Service - The organization designated to perform rescue operations in an emergency for a confined space.
- f. 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.
- g. 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.
- h. 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.
- i. 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.
- j. Hazardous Atmosphere - An atmosphere that may expose employees to the risk of death, injury, or illness from one or more of the following conditions:

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- 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.
 - 3) A toxic substance present in concentrations in excess of its dose or Permissible Exposure Limit (PEL), Threshold Limiting Value (TLV[®]), Short-Term Exposure Limit (STEL), ceiling limits, etc.)
 - 4) Any other atmospheric condition IDLH.
- k. Hot Work Permit - NASA/SSC written authorization (Form SSC-68, Flame “Hot Work” Permit), to perform operations producing flames, sparks, or sources of ignition.
 - l. NASA: The organizations and federal employees who work for the National Aeronautical and Space Administration. This includes employees from SSC, other NASA centers, and NASA Headquarters.
 - m. 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.
 - n. NASA Prime Contractors: The contractor and their employees who work for the SSC prime support contracts. These include: SACOM, Laboratory Services Contract (LSC), Information Technology Services Contract (ITSC), Security Contract, and the SMA Services Contract.
 - o. Non-Entry Rescue – activities performed under the duties of the attendant to assist in rescue of the entrant without entering the confined space. This would include but is not limited to using a tripod and winch with cable attached to the entrant’s harness.
 - 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.

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- 3) Has internal configuration that could trap or asphyxiate an entrant.
- 4) Contains any other recognized safety or health hazard.
- r. 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 with high Volatile Organic Compounds (VOCs) paints, etc.). Prior to entry of an SSC Monitored Confined Space, the atmosphere shall be verified and documented on a Form SSC-579, Safe Atmosphere Verification Tag.
- s. 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 a confined space as defined by 29 CFR 1910.146?			<p>If "No" for Items 1A, 1B, and 1C, STOP and consult applicable OSHA standard</p> <p>If "Yes" for 1A, 1B, or 1C continue to Step 2</p>
	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			<p>If "No" for Items 2A, 2B, and 2C, STOP and consult applicable OSHA standard</p> <p>If "Yes" for 2A, 2B, or 2C continue to 2</p>
	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 through D, inform employees as required by 1910.146 (c)(2) and go to step 3
	(1) Flammable gas, vapor, or mist at or above 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, 1910.1200, 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?			<p>If "No" prevent employee entry as required</p> <p>If "Yes" continue to Step 4</p> <p>If entry will be performed by</p>

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				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 between “hazard elimination” and “hazard control.”			If “No” proceed as permit- required space If “Yes” 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 within the cognizant, safety organization can approve reclassification of a permit- required space.