



**National Aeronautics and  
Space Administration  
John C. Stennis Space Center  
Stennis Space Center, MS 39529-6000**

**SCWI-8715-0008**

**Rev. G.3**

**August 2023**

**John C. Stennis Space Center**

**Construction Safety and Health Program**

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## Document History Log

Status/Change/ Revision	Change Date	Originator/ Phone	Description
Basic	10/15/09	Mike Rewis/ 8-2663	Initial release. Program reformatting and modification from SSP-8715-0001, Safety and Health Handbook. Introduction of a revised Contractor Qualification form and evaluation. Included all safety and health requirements formally stated in the Contractor Specifications.
Rev A	10/15/10	Mike Rewis/ 8-2663	Changes were made to: change the mishap category criteria; emphasize the need for Construction Project Hazard Analysis to be approved before initiation of work; require a Traffic Control Plan in concert with the Manual of Traffic Control Device for certain specific activities; soils to be considered type C unless otherwise adjudicated; change the name from Greater New Orleans Industrial Education Council (GNOIEC) to the Gulf Coast Safety Council (GCSC); emphasize the need for Stennis Safety Orientation in addition to the Basic Orientation Plus, remove of Appendix A – Emergency Numbers, owing to the rate of change of these numbers, (as well as the practice of handing the numbers out at the construction precons.). General admin changes.
Rev B	10/15/11	Mike Rewis/ 8-2663	Changes were made to: Better define applicability; define documentation precedence; strike all references to “near miss”; better define the requirements for daily inspection, and add reference to a daily inspection form; better organize safety plan requirements; require high visibility apparel when working close to SSC thoroughfares; clarify requirements following an excavation related incident; reference the use of vacuum excavator

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			trucks; add a section on ladder safety; and define consultant.
Rev C		R. Gargiulo/ 8-3842	Modified Paragraph 9.3 to require high visibility shirt/vest/garments for construction crews. Added paragraph 9.32 sanitation requirements and 9.33 powered industrial trucks.
Rev D.	02/25/13	M. Rewis	Added to 9.25.2 Excavations that expose buried slip joint PVC pipes require the contractor to shore the buried pipe for the protection of the pipe from undermining and lateral movement.
Rev E.	11/22/13	M. Murray/ 8-1402	Changes were made to the document to allow for agreement with OSHA's final rule on the Globally Harmonized System of Hazard Communication. Additionally, guidelines were added for the application of dedicated safety support on construction projects.
Rev E.1	04/22/14	K. Robinson	6.3.2.a clarified to say OSHA authorized trainer. Admin change
Rev F	11/21/14	M. Rewis	3.0, added reference to Heat Stress Work Instruction; 4.3.8, added language requiring line level employees to participate in inspections; 4.7 added language requiring employees to follow manufacturer's instructions; 6.7.2, added "Five Why's" as a means to derive accident Root Causes; 6.7.4 added language requiring annual data rollup for the Mishap Exposure Report; 9.5, added language clarifying fire watch duties; 9.16.1, added language requiring hazard assessment of roll off containers before human entry; 9.16.4, added language to prohibit the crushing of aerosol cans. General change to "contracting officer's representative from "contracting officer's technical representative; 9.35 added Heat Stress Prevention Section

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Rev G	3/5/2020	M. Scott/8-1537	Updated signatures. The numbering scheme has been updated to reflect the revised changes. Updated references in Section 3 and placed them in alphabetical order. References to the Facility Operating Services Contract (FOSC) were removed. Redacted procurement sections in previous document were removed. Changed direct construction contractor mishap training requirements to be completed within twenty-four (24) hours of appointment to support an investigation in Section 4.1.6. Removed mishap training requirements for prime contractors in Section 4.2 that were contradictory to SPLN-8621-0003. Removed "Selection and Analysis Section (previously Section 5). Changed/updated minimum training requirements in Section 5.3 (SSC orientation and OSHA 10&30 Hour) Updated/clarified general mishap notification requirements in Section 5.7. Clarified the difference between NMIS close calls and CCRS close calls in Section 5.7. Revised requirements for Contractor's Safety and Health Plans in Section 7 (general requirements are in Section 7.1 and specific requirements are in Section 7.2). Removed subcontractor past performance submission requirements in Section 7.4. Updated sub elements in specific requirements overview in Section 8 – referenced other SSC policies, removed, added, and/or consolidated where appropriate. Updated forms list in Section 9. Updated definitions list in Appendix A. Updated acronym and abbreviation list in Appendix B.
Rev G.1	7/18/2022	M. Scott/8-1537	Updated references, made administrative changes to formatting and text punctuation.
Rev G.2	9/16/2022	M. Scott/8-1537	Made submission requirements for SSC Form 1627 consistent in Sections 5.7.1 and

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			5.7.2. Clarified “initial” vs. “final” versions of the form.
Rev G.3	7/10/2023	M. Scott/8-1537	Updated references. Replaced all references to the Safety, Health, and Environmental Tracking System (SHEtrak) with the System for Tracking Audits/Assessments and Reviews (STAR). Updated the link to the construction safety website. Updated the acronym list to include STAR.

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## 1.0 PURPOSE

This John C. Stennis Space Center (SSC) Common Work Instruction (SCWI) communicates and specifies the requirements of the National Aeronautics and Space Administration (NASA) SSC Construction Safety and Health Program.

This SCWI is to be used in conjunction with all Federal, State, and local safety and health regulations applicable to a contractor's scope of work. Where more stringent safety and occupational health standards are set forth in these requirements and regulations, the more stringent standards shall apply.

## 2.0 APPLICABILITY

1. This SCWI shall be applicable to all construction contractors and subcontractors.
2. This SCWI shall be applicable to onsite prime contractors that perform construction-type work or other work as specified within this document.
3. This SCWI is applicable to service contractors of all tiers engaged in construction-type activities.
4. This SCWI shall not be applicable to consultants (performing non-construction-type activities), third-party establishments, such as utility and municipal services, and visitors (to include delivery vehicle drivers).

## 3.0 REFERENCES

The following publications form a part of these specifications to the extent indicated by their references. The exclusion of a publication from this section shall not relieve the contractor from complying with the publication reference elsewhere. All references are assumed to be the latest version unless otherwise indicated.

1. 14 Code of Federal Regulations (CFR), Aeronautics and Space
2. 29 CFR 1904, Recording and Reporting Occupational Injuries and Illnesses
3. 29 CFR 1910, Occupational Safety and Health Standards
4. 29 CFR 1926, Safety and Health Regulations for Construction
5. American National Standards Institute (ANSI) A300, American Standard for Tree Care Operations – Tree, Shrub, and Other Woody Plant Management
6. ANSI/ASSE A10.11-1989 (R1998) Safety Requirements for Personnel and Debris Nets – American National Standard for Construction and Demolition.
7. ANSI Z133 American Standard for Arboricultural Operations – Safety Requirements
8. ANSI B 15.1-1958, Safety Code for Mechanical Power Transmission Apparatus
9. EM 385-1-1, US Army Corps of Engineers Safety and Health Requirements Manual
10. Manual on Uniform Traffic Control Devices (MUTCD)
11. National Fire Protection Agency (NFPA) 70 National Electrical Code
12. NFPA 101, Life Safety Code

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13. NASA Procedural Requirement (NPR) 1800.1, NASA Occupational Health Program Procedures
14. NPR 8621.1, NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping
15. NPR 8715.1, NASA Occupational Safety and Health Programs
16. NPR 8715.3, NASA General Safety Program Requirements
17. NFPA 70E, Standard for Electrical Safety in the Workplace
18. SCWI-1800-0003, Bloodborne Pathogens Control Program
19. SCWI-1800-0005, Hazard Communication
20. SCWI-1840-0001, Respiratory Protection Program
21. SCWI-8500-0002, Hearing Conservation Program
22. SCWI-8500-0018-ENV, Lead and Other Hazardous Coatings Hazard Control Program
23. SCWI-8500-0019-ENV, Asbestos Hazard Control Plan
24. SCWI-8500-0020-ENV, Integrated Contingency Plan
25. SCWI-8700-0002, Health Physics Program
26. SCWI-8700-0004, Ionizing Radiation Program
27. SCWI-8700-0005, Nonionizing Radiation Program
28. SCWI-8715-0001, Lightning Warning System
29. SCWI-8715-0002, Personal Protective Equipment
30. SCWI-8715-0003, Fall Protection Program
31. SCWI-8715-0004, Confined Space Entry Program
32. SCWI-8715-0005, Safety, Health, Housekeeping and Essential Item Inspections
33. SCWI-8715-0006, Electrical Safety Program
34. SCWI-8715-0010, Process Safety Management (PSM) Program
35. SCWI-8715-0012, Work in Hazard Classification Areas
36. SCWI-8715-0013, Control of Hazardous Energy Lockout/Tagout and Non-Service/Maintenance Hazardous Energy Isolation
37. SCWI-8715-0014, Heat Stress Program
38. SCWI-8715-0016, Close Call Reporting System (CCRS)
39. SCWI-8838-0002, Hot Work Permit Procedure
40. SOI-8080-0040, Test Area Access Control
41. SSC Policy Directive (SPD) 1800.1, SSC Smoke Free Workplace
42. SPLN-8621-0003, Mishap Preparedness and Contingency Plan
43. SPLN-8838-0001, Fire Protection/Prevention Program Plan
44. SSC Procedural Requirement (SPR) 8715.1, Safety and Health Program Requirements
45. SPR 1400.1, Document Preparation, Numbering, and Management
46. SPR 1440.1, Records Management Program Requirements
47. SSC Plan (SSP) 1740-0057, Flammable Liquid Storage Cabinets
48. SSC Technical Standard (SSTD) 8070-0119-MISC, Dig Permit Standard
49. SWI-8834-0001, Lifting Devices and Equipment Management Instructions

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## 4.0 ROLES AND RESPONSIBILITIES

### 4.1 NASA SSC Direct Construction Contractors

NASA SSC Direct Construction Contractors shall:

1. Understand and comply with the requirements and expectations of the NASA SSC Construction Safety and Health Program, which is required under NASA SSC SPR 8715.1.
2. Understand the construction related elements of the Occupational Safety and Health Administration (OSHA) Voluntary Protection Program (VPP).
3. Maintain safety and health programs to a level where OSHA compliance responsibilities are achieved and not compromised.
4. Provide the NASA SSC Safety and Mission Assurance (SMA) Directorate all required documentation requested in the NASA SSC Contract Specifications.
5. Address safety and health findings in a timely manner and meet target dates set by NASA SSC.
6. Ensure at least one (1) employee is trained in the Mishap Investigation Board Orientation (posted to the Construction Safety Site at <https://constructionsafety.ssc.nasa.gov/>) per contract. This course shall be taken within twenty-four (24) hours after being named to perform or support an accident investigation.
7. Manage all subcontractors in a manner consistent with this NASA SSC SCWI.
8. Audit/inspect contractor activities for safety and health compliance at least weekly throughout the duration of the work. During the weekly audits/inspections include representative workers/craftsmen from each prime and subcontractor on the construction site/project. (Line level personnel will be required to participate in weekly inspections, to promote hazard recognition and reporting. During these sessions, employees will be asked about the use of new tools or PPE that might help them do their job safer and easier.)
9. Implement the safety and health provisions of this specification so that:
  - a. All employees involved in a project go home as healthy as they arrived.
  - b. The construction work site is free of recognizable hazards as well as OSHA and NASA violations.
  - c. Mishaps are minimized to the greatest extent possible with the ultimate goal of zero.

### 4.2 NASA SSC Prime Contractors

NASA SSC Prime contractors shall:

1. Comply with the applicable sections of this SCWI when employees or their contractors engage in construction type work as identified in 29 CFR 1926.
2. Establish effective selection and evaluation systems for contractors of all tiers that perform construction type work.
3. Ensure that contractor employees have the appropriate background and orientation training specified in this SCWI.

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4. Perform weekly inspections of construction contractors or construction type work performed and complete corrective actions—suspend the job until all OSHA compliance or imminent danger findings are effectively corrected or mitigated.
5. Ensure that personnel assigned to investigate a mishap or close call has completed all training requirements in SPLN-8621-0003 prior to performing the investigation.
6. Maintain safety and health programs to a level where OSHA compliance responsibilities are achieved and not compromised.
7. Manage all subcontractors in a manner consistent with NASA SSC requirements and with this SCWI.

#### 4.3 SMA Directorate

SMA shall:

1. Update and maintain this SCWI in accordance with SPR 1400.1.
2. Ensure compliance with applicable sections of NPR 8715.3.
3. Identify actions necessary to improve the safety and health programs or plans prior to starting work onsite.
4. Assure the appropriate mishap and close call reporting, investigating, and evaluation criteria are incorporated into contracts.
5. Meet requirements of NPR 8621.1 regarding Mishap Investigations.
6. Audit/inspect contractor activities for safety and health compliance at least weekly throughout the duration of the work. During the weekly audits/inspections, include representative workers/craftsmen from each prime and subcontractor on the construction site/project.
7. Measure and evaluate contractor performance and compliance.
8. Maintain the System for Audits/Assessments and Reviews (STAR) for follow-up and recordkeeping purposes.
9. Develop annual VPP Safety and Health goals and communicate those goals to contractors to promote continuous improvement.
10. Maintain the SSC Construction Safety Web Site at <https://constructionsafety.ssc.nasa.gov/>

#### 4.4 Center Operations Directorate

The NASA SSC Center Operations Directorate shall:

1. Participate with SMA in performing a thorough evaluation of construction contractor safety and health evaluations.
2. Assist in the audit of construction contractor activities when necessary to evaluate safety and health compliance.
3. Maintain an action tracking system for follow up and recordkeeping purposes.

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#### **4.5 Project Contracting Officer's Representative (COR)**

The NASA SSC COR shall:

1. Meet requirements of NPR 8621.1 regarding Mishap Investigations.
2. Provide appropriate follow-up actions acceptable to NASA SMA Directorate and Center Operations Directorate for any modifications or additional requirements that vary from the original contract scope of work.

#### **4.6 Office of Procurement**

The Office of Procurement shall:

1. Ensure compliance with applicable sections of NPR 8715.3.
2. Ensure contract compliance with contract terms and conditions for NASA SSC safety and health policies and procedures.
3. Serve as the primary contact for resolution of contractual issues concerning safety and health requirements.

#### **4.7 All Employees**

All employees shall:

1. Have the right and responsibility to stop an unsafe act or condition.
2. Use the "Close Call" process found in SCWI-8715-0016 to report safety and health violations and risks involving observed actions of contractors.
3. Stay away from construction areas and be cognizant of tags, signs, barricades, and other postings, unless granted proper authority and possess the appropriate PPE.
4. Follow all safety and health requirements necessary to complete a job safely.
5. Report injuries and illnesses immediately to their respective supervisor.
6. Follow manufacturer's requirements and/or instructions on the proper storage, inspection and use of equipment, fall protection (active and passive), products, tools, and PPE.

### **5.0 MANAGEMENT AND OVERSIGHT**

SPR 8715.1 provides the management and oversight structure for contracts issued to contractors performing work at NASA SSC.

#### **5.1 Management**

1. Construction contractors shall use this SCWI as the primary document to reference NASA SSC requirements. Depending upon the type of contract, construction contractors may also

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be asked to reference other NASA SSC safety and health work instructions that are applicable to their type of work.

2. All contractors shall understand the OSHA requirements applicable to the work being performed and all OSHA regulatory requirements, as well as, performance standards that are incorporated by reference, applicable to their business.
3. The SMA Directorate shall assign individuals to be responsible for construction safety. NASA SSC SMA may utilize the services of outside consultants to assist in auditing and program development.
4. Contractors shall provide a management and oversight process to all of their subcontractors so that regulatory compliance is achieved and injury/illness performance goals are met.

## 5.2 Requirements

1. The contractor shall take all necessary safety and health measures in performing work under the contract and its specifications and shall submit all required documents.
2. The contractor shall be subject and adhere to:
  - a. All applicable Federal, State, and local laws, regulations, ordinances, codes, and orders relating to safety and health.
  - b. Compliance with safety and health standards, specifications, issuances, reporting requirements, and provisions in SPR 8715.1 and in this SCWI. The contractor may be required to comply with additional, specific NASA SSC safety and health work instructions as applicable.
3. During the performance of work under a contract, the contractor shall comply with prescribed procedures for the control and safety of persons visiting the project site. The contractor is responsible for protecting personnel and for familiarizing each subcontractor with safety and health requirements.
4. The contractor shall advise the Contracting Officer (CO) or designee of any special safety restrictions established so that government personnel can be notified of these restrictions.
5. The contractor shall immediately take corrective action after receipt of notice from the CO or designee concerning any noncompliance.
6. The contractor shall ensure authorized Government representatives of the CO have access to examine the sites or areas where work under this contract is being performed to determine the adequacy of the contractor's safety and health measures.
7. Corrective actions shall immediately be implemented and documented in writing by the prescribed target dates resulting from investigation, inspection, audit, and/or close call reports.
8. The contractor shall maintain copies of the following, so they are onsite and readily available for review by all employees, subcontractors, the CO, and the Government's safety and health representatives:
  - a. The contractor's general safety and health plan.
  - b. Revised sections of the safety and health plan.

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- c. Each subcontractor's safety and health plans, permits, required forms, training records, Safety Data Sheets (SDS), OSHA regulations (29 CFR 1910 and 1926), and other safety and health program documents.
9. The contractor shall ensure:
  - a. Each new employee receives safety and health orientation specific to the construction site and completes the SSC orientation requirements (see Section 5.3) prior to starting assigned work activities on that site.
  - b. All employees are initially and regularly trained in job safety and health.
  - c. All employees that demonstrate unsafe work practices or have returned to the construction site after an extended period receives a refresher training/orientation.
  - d. All training shall be documented, and copies filed on the construction site for review.
10. The contractor's personnel shall attend all OSHA required safety and health training applicable to the project/task/work.
11. All employees and subcontractors have the authority and responsibility to stop any work, job, or process that is judged to be immediately dangerous to life and health.

### 5.3 Minimum Construction Training Requirements

#### 5.3.1 Employee SSC Orientation

*(Note: Items 1-3 in this section apply to all SSC NASA Prime Contractor organizations to the extent specified by their respective contracts. Construction subcontractors hired by NASA Prime contractors shall meet these requirements. Training records of these subcontractors do not need to be submitted to NASA but must be made available upon request).*

1. All construction project managers, superintendents, supervisors (i.e., foremen, crew chiefs), safety and health professionals, and construction employees shall complete the "SSC Construction Contractor Safety Orientation" training posted to the Construction Safety Site at (<https://constructionsafety.ssc.nasa.gov/>). The Contractor shall maintain training records (sign-in sheets with employee signature) and the training shall be kept current to within three (3) years.
2. All construction project managers, superintendents, supervisors, and safety and health professionals shall complete OSHA thirty (30) hour construction training. Non-managerial construction employees shall complete OSHA ten (10) hour construction training in lieu of the OSHA thirty (30) hour construction training. This training will be kept current to within three (3) years.
3. All contractor and subcontractor employees shall complete the minimum training requirements prior to starting work. A monthly training report in addition to SSC Orientation Training records referenced in 5.3.1.1, shall be submitted through the submittal process. Initial submissions shall be prior to the commencement of work and subsequent submission shall arrive no later than two (2) working days after the close of each calendar month in which the contractor/subcontractor is working on site at SSC.



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4. Access control requirements for SSC Propulsion test facilities and test support areas require that prior to working in A, B or E test facilities or test support areas, personnel must also complete a safety orientation for that facility. Each facility safety orientation is approximately one (1) hour in duration and is provided at no expense to the contractor employees. These orientations shall be coordinated through the construction project COR or designee. Upon completion of the orientation, a test complex badge will be issued by NASA Security or designees and shall be worn at all times, unless prevented by safety concerns. For more information on test complex access and training, refer to SOI-8080-0040 (SSC Test Access Control).

#### 5.3.2 Regulatory (Minimum Requirements)

1. Contractors shall maintain evidence that additional applicable OSHA required training and task specific training has been completed prior to working on the jobsite. The ability to provide this information to show compliance with this section shall be presented upon request. Training shall be considered current within two (2) years but if a more stringent frequency requirement exists, the most stringent shall apply. Acceptable evidence of training includes any or all of the following:
  - a. Current OSHA card showing course topic signed by an OSHA authorized trainer.
  - b. Current attendance records for training performed by a qualified representative of the contractor.
  - c. Current attendance records for training performed by a qualified third-party organization/person.
2. Training records shall include the subject, date, length of training, instructor, course name, and outline of the training.
3. OSHA training frequencies shall be maintained per regulatory requirements.
4. OSHA ten (10) and thirty (30) Hour Training shall not exceed three (3) years.

### 5.4 Construction Project Hazard Analysis (CPHA)

#### 5.4.1 Basic Requirements

1. A CPHA shall be completed and approved by the COR (or designee) prior to any work commencing on all projects.
2. The CPHA shall include details on the specific scope of work under the contract and shall be revised and resubmitted whenever conditions change (e.g., job scope). The CPHA is not to replace the daily Activity Hazard Analysis (AHA), as defined below.
3. The CPHA shall be included in the contractor's Safety and Health Plan for review and acceptance by the contractor's designated safety and health professional.

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#### 5.4.2 Format

1. The CPHA shall conform to Form SSC-853, SSC CPHA and include major definable features of work on the project.
2. If another form of CPHA is used, it shall contain the following information:
  - a. Name of contractor or subcontractor conducting construction activities.
  - b. General description of construction activity (e.g., pile-driving, pouring foundation, structural assembly of building).
  - c. Description of the task and basic job steps.
  - d. Date of Project Hazard Analysis.
  - e. Location of construction activity (e.g., SSC (Project) Area).
  - f. Estimated start date of construction activities at SSC.
  - g. Numerical identification for each phase of work.
  - h. Description of each phase of work associated with each individual position (e.g., arc welding, electric hand tools, acetylene and oxygen cutting, painting, fuel-powered hand tools, compressed air, excavation, and backfill).
  - i. Description of all of the hazards to which the employee or other employees in the area are exposed for each phase of work (e.g., flammability, falls from heights, fumes, paint spills, electric shock, maintenance of the leads).
  - j. Description of the precautionary action taken to ensure the identified hazard does not cause an accident, for example:
    - a) Storing hazardous material in well-ventilated area free from excessive heat, sparks, open flames, or direct rays of the sun.
    - b) Inspecting electrical cord before use and using Ground Fault Circuit Interrupter.
    - c) Storing excavated material and retaining it at least two (2) feet from the edge of the excavation and at a distance to prevent excessive loading on the face of the excavation.
3. Contractor/subcontractor signature.

### 5.5 Activity Hazard Analysis

#### 5.5.1 Basic Requirements

1. An AHA, which may also be known as a Job Hazard Analysis, Job Safety Analysis, or Safe Plan of Action, shall be completed prior to commencement of daily work activities.
2. Specific safety and health measures necessary to mitigate hazards identified by the AHA shall be documented on the AHA form.
3. All construction workers shall review and sign off on the AHA before task initiation.
4. The AHA shall be updated as conditions or the job scope change.

#### 5.5.2 Format

1. The AHA shall conform to Form SSC-814.

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2. If another form of AHA is used, it shall contain the following information:
  - a. Name of contractor or subcontractor conducting construction activities
  - b. Date of AHA
  - c. A definable feature of work/description of construction activity (e.g., pile-driving, pouring foundation, structural assembly of building)
  - d. Description of the task and basic job steps
  - e. Description of the potential hazards and corrective actions to be taken
  - f. Responsibility of the person(s) who will take corrective action
  - g. Location of construction activity (e.g., SSC (Project) Area)
  - h. Estimated start date of construction activities at SSC
  - i. Identification for each definable feature of work
  - j. Permits required, fire protection precautions, PPE required
  - k. Barricades needed, electrical hazards identified, work platforms required
  - l. Emergency procedures
  - m. Each contractor/subcontractors' employee signature
  - n. Special instructions

## 5.6 Required Meetings

### 5.6.1 Preconstruction Meetings

Preconstruction meetings will be held prior to the commencement of work to review all necessary information related to the project, including safety and health plans.

### 5.6.2 Monthly Meetings

1. The project superintendent or equivalent, and a designated safety representative is required to attend a mandatory safety meeting with NASA SMA held on the first Thursday of each month. These meetings will be used to address various safety topics.
2. The project superintendent or designated safety representative shall ensure attendance is documented.
3. Location of these monthly meetings will be communicated during the preconstruction meeting process.

### 5.6.3 Weekly Meetings

1. Construction contractor management shall support safety program initiatives. The contractor shall meet with their employees on a weekly basis to discuss all applicable safety and health lessons learned, challenges for the coming week, audit findings, and any other pertinent safety and health topics and issues.
2. Attendance of these meetings will be taken and records maintained for NASA SSC review. Attendance forms should at least contain the names, date, meeting topic, and leader's name.

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#### 5.6.4 Daily Stair Step Meeting

1. Communication from management to the employees performing the work is critical to safety and health. Therefore, NASA SSC will require the use of a “Stair Step” method of communication. This communication starts with the contractor management and ends with the contractor’s employees and subcontractor employees.
2. Construction and subcontractor management shall hold daily meetings to discuss the safety and health issues related to the day’s activities. This discussion is encouraged as the starting point of business/project meetings. It is also encouraged to discuss and review the daily AHAs for that day.
3. The results of the daily meeting and critical communication shall be stepped forward to supervision and construction employees during the Daily Safety and Health Review (“toolbox”) meetings. These toolbox talks should focus on topics that relate to work activities or safety observations and concerns.
4. Each work crew shall conduct Daily Safety and Health Review meetings. These toolbox type meetings shall be held before the start of each crew’s work shift activities or before the start of a new task/activity during a work shift.
5. Toolbox meetings shall be led by the work activity/craft supervisor, foreman, or crew chief and include:
  - a. Communication from daily management meetings that is pertinent to safety and health
  - b. Basic job steps for the task/activity
  - c. Potential hazards and corrective actions for each job step
  - d. AHA reminders
  - e. Coordination between multiple activities and organizations.
  - f. Precautions, permits, PPE, barricades, energy isolation, work platforms, and abatements necessary for the activity
  - g. Other pertinent topics and issues
6. An attendance form shall be used to document attendees and action items from these meetings. Attendance forms should contain the names, date, meeting topic and leaders name at a minimum.

### 5.7 Mishap Reporting

#### 5.7.1 Basic Mishap Reporting Requirements

1. The Contractor shall immediately report by telephone all incidents in the following order:
  - a. Dispatch at 228-688-3636 (by cell phone) or 911 (by landline),
  - b. CO or COR,
  - c. SMA Construction Safety Representative
2. The reporting of all incidents shall include any spills or release of oil or hazardous substance that fall into the following categories:

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- a. Type A - Mishaps causing an occupational injury or illness that resulted in a fatality or permanent total disability and/or damage to equipment or property equal to or greater than \$2 million.
  - b. Type B - Mishaps causing permanent partial disability or resulting in hospitalization for inpatient care of three (3) or more people within thirty (30) workdays of the mishap, or damage to equipment or property equal to or greater than \$500,000 but less than \$2,000,000.
  - c. Type C - Mishaps causing a nonfatal occupational injury or illness that result in days away from work, restricted work, or transfer to another job not including the day or shift in which it occurred, or hospitalization for inpatient care of one (1) or two (2) people within thirty (30) workdays of the mishap, or damage to equipment or property equal to or greater than \$50,000 but less than \$500,000.
  - d. Type D - Mishaps causing any nonfatal OSHA recordable occupational injury or illness that does not meet the definition of a Type C, or damage to equipment or property greater than \$20,000 but less than \$50,000.
  - e. NASA Mishap Information System (NMIS) Close call – An unplanned occurrence in which there is no injury, and equipment or property damage is less than \$20,000, but which possesses the potential to cause a mishap.
3. Within twenty-four (24) hours, the contractor will complete the initial NASA SSC Form 1627 (*NASA Mishap Report*). This report is required to be submitted to the COR and the SMA Construction Safety Representative.

#### 5.7.2 Investigation Process

All mishaps and NMIS close calls associated with NASA SSC contracts are required to be investigated in accordance with the procedures outlined in NPR 8621.1. The purpose is to assess the causes and develop measures to prevent the incident from occurring again on that construction project as well as across the SSC site. Accident investigation is not for the purpose of assessing blame and is completely separate from any proceedings the Agency may undertake to determine civil, criminal, or administrative culpability or liability. Immediately following the incident, the area shall be protected from being tampered with or disturbed after the injured person is cared for and transported to a medical facility (if necessary).

1. The contractor shall take immediate action to secure potentially dangerous conditions (i.e., disconnect electrical power, secure machinery) to protect personnel.
2. The contractor shall investigate all such work-related incidents or accidents to persons and property to the extent necessary to conclude what cause(s) resulted in said accident or incident. A root cause analysis will be performed using the “Five Whys”, or an equivalent technique and ultimately drive the corrective action process.
3. Ensure at least one (1) employee on the mishap/close call investigation team is trained in the Mishap Investigation Board Orientation (posted to the Construction Safety Site at <https://constructionsafety.ssc.nasa.gov/>) per contract.
4. After the contractor completes an investigation of the mishap/close call (NMIS) and has developed a plan of corrective action, the contractor shall complete the remaining portions of

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the final NASA Form 1627 and submit it to the COR and to NASA SMA Construction Safety Representative. Additionally, the contractor shall complete a written final investigation on company letterhead and sign the report.

5. If an investigation board is convened or will be convened, the supervisor or safety representative of the contractor shall complete the required form and forward it to the COR, and to the SMA Construction Safety Representative.

#### 5.7.3 Close Call Reporting System Close Calls

1. A CCRS close call is defined as a hazardous condition and/or situation which, if uncorrected, has the potential to result in an injury to personnel or damage to equipment/property.
2. Close calls, as reported in CCRS, should not be confused with NMIS close calls.
3. The process for reporting close calls is documented in SCWI-8715-0016 and shall be explained to all contractors prior to the start of work and also to employees during the Safety and Health orientation.
4. The contractor shall communicate and reinforce the close call process to their employees and subcontractor employees.
5. Close calls will be investigated by NASA SMA.

#### 5.7.4 Statistical Information and Reporting (Monthly Requirement)

1. To provide accurate mishap statistics, the contractor shall complete a Mishap Exposure Report (MER - NASA SSC Form 850) for the project each month, and submit the report via the submittal process to the SMA Construction Safety Representative, the CO and COR.
2. The submitted copy shall arrive no later than two (2) working days after the close of each calendar month in which the contractor/subcontractor is working on site at SSC.
3. The report shall include the contractor/subcontractor name, number of employees onsite, total man hours onsite, and any incidents (by type) onsite that have occurred. It is the contractor's responsibility to obtain this same information from all their lower tier subcontractors and to submit their reports along with the subcontractor's submittals each month. When there are no mishaps to report, the contractor is still required to submit a report. The types of mishaps to report will be discussed during the preconstruction meeting held before work begins.
4. The MER will contain the "since contract inception rolling report" of work hours, mishaps, close calls.
5. The mishap exposure report may be obtained through the NASA SSC Construction Safety Web site (<https://constructionsafety.ssc.nasa.gov>).

### 5.8 Inspections

The contractor shall implement, at a minimum, a two-phase inspection system for all definable features of work as described in the following subsections.

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#### 5.8.1 Daily Inspection

1. Daily inspections shall be performed prior to beginning any definable feature of work.
2. These inspections shall include a review of contract requirements (with all personnel responsible for supervision of the work).
3. The daily inspection will include chemical and fuel storage areas to ensure materials are properly stored and to identify any spills or releases.
4. Review of contract requirements shall include:
  - a. A check to ensure compliance for all specific requirements for the feature of work.
  - b. Review of the appropriate AHA and hazard abatement plans.
  - c. Discussion of procedures for controlling the safety of the work, including repetitive deficiencies.
  - d. Examination of the work area to ascertain that all preliminary work has been completed in a timely and safe fashion.
5. These inspections shall be made a matter of record in the contractor's safety documentation. Daily inspections will be reconvened when and if changes in the work or crew occur.

#### 5.8.2 Construction Contractor Site Manager Weekly Inspection

The contractors shall inspect the site at least weekly for safety and health hazards. Inspections shall be documented, and records of inspection be made available upon request. Form SSC-879 shall be used to record the weekly inspection.

#### 5.8.3 Equipment Pre-Use Inspections

The contractor is responsible to ensure that all required inspections (daily or pre-use) of equipment are completed and documented using a form that represents the equipment inspected. These include, but are not limited to, lift truck, crane, scaffold, aerial lifts, PPE, earth-drilling equipment, and fire extinguishers. If multiple shifts are used in a twenty-four (24) hour period, a required "daily" inspection shall take place at the beginning of each shift.

### 5.9 Activities Requiring a "Competent Person"

1. For the following type of activities, the Safety and Health Plan must name the appropriate "competent person":
  - a. Confined space entry
  - b. Asbestos/lead work/abatement
  - c. Scaffolding
  - d. Ionizing radiation
  - e. Rigging equipment/heavy equipment operation
  - f. Fall protection
  - g. Excavation/trenching
  - h. Steel erection

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- i. Other construction activities as required by 29 CFR 1926
2. Documentation shall be provided of each person's competency.

## 5.10 Medical Treatment

1. The contractor shall post emergency first aid and ambulance information at the project site in a readily visible location.
2. SSC maintains a medical clinic for minor injury and emergency medical treatment that may be used by the contractor. This service is available during normal workdays and work hours. SSC maintains emergency ambulance service on a continuous twenty-four (24) hours a day, seven (7) days a week basis. Telephone numbers for these services are as follows:

Emergency Medical/Ambulance Service:

Onsite telephones (landline) only.....911

If you do not have access to an onsite telephone.....228-688-3636

3. In the event of exposure to blood or other potentially infectious materials, the requirements of SCWI-1800-0003 shall be followed.

## 6.0 MEASUREMENT AND EVALUATION

NASA SSC reserves the right to check all work sites at any time. NASA SSC SMA Directorate or designee shall inspect and audit all contractors to evaluate safety and health performance and compliance.

### 6.1 Inspections

NASA SSC SMA or the NASA Prime responsible safety office shall perform weekly construction job site inspections. These inspections include, but are not limited to, a review and verification of OSHA compliance, permits, AHA, and safe behavior to determine whether safety and health responsibilities are being well managed. Form SSC-879 will be used to record the weekly inspection. Monthly audits, prescribed in Section 6.2, can serve as one (1) weekly audit per month.

### 6.2 Audits

NASA SSC SMA or the NASA Prime responsible safety office shall perform monthly construction job site audits. These audits include, but are not limited to, a review and verification of OSHA compliance, permits, AHA, and safe behavior to determine whether safety and health responsibilities are being well managed. Form SSC-852 will be used to record the monthly audit.



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### 6.3 Post-Audit Actions

1. Audit findings shall result in actions by NASA SSC SMA through the CO to reinforce or enforce compliance and performance.
2. Audit findings shall be entered in a NASA action tracking system and monitored until the actions are mitigated.
3. NASA SSC Office of Procurement maintains an incentive program for construction contractors that are designed to reward contractors for excellent compliance and for an injury-free environment.
  - a. The Office of Procurement, with input from SMA, contractually enforces the incentive program. SMA shall report findings to the Office of Procurement as soon as possible upon discovery.
  - b. The Office of Procurement, in conjunction with NASA SMA, shall assess which violations are applicable and will notify the construction contractor of the finding and the deduction to the available incentive. This program is covered in detail in Section H of the solicitation/contract.

## 7.0 SAFETY AND HEALTH PROVISIONS

### 7.1 Contractor's Safety and Health Plan

1. The contractor shall submit a current, comprehensive, written project-specific Safety and Health Plan that interfaces with the contractor's overall Safety and Health Program. The Contractor shall address each of the elements/sub-elements in the outline contained in Section 7.2 in the order that they are provided in that Section. If an item is not applicable because of the nature of the work to be performed, the Contractor shall state this exception and provide a justification (e.g. Diving Operations: NA, there are no diving operations anticipated on this job.). The plan shall show compliance with Federal OSHA Safety and Health Standards 29 CFR 1904, 29 CFR 1910, and 29 CFR 1926. In addition, the contractor's safety and health plan shall show how the contractor will meet the NASA safety requirements.
2. Understanding that the Safety and Health Plan is submitted prior to work starting and that some project-specific information is not yet known (e.g., subcontractors to be used, type of fall protection to be used at a certain point in time, specific cranes or other load handling equipment to be brought on site, etc.), the known information shall be provided and additional information added at each preparatory phase/meeting along with the appropriate AHAs.
3. A copy of the contractor's project-specific, accepted Safety and Health Plan shall be made available upon request.

### 7.2 Plan Contents

At a minimum, the Safety and Health Plan shall include:

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1. A statement of safety and health policy statement signed by the top manager of the company depicting their commitment to safety.
2. Background information. List the following:
  - a. Contractor
  - b. Contract number
  - c. Project name
  - d. Brief project description, description of work to be performed, location, equipment to be used, anticipated high risk activities, and major phases of work anticipated
3. Responsibilities and Lines of Authority: Identification and accountability of personnel responsible for safety at both corporate and project level.
  - a. Well-written responsibilities for senior management, managers, supervisors, professional and technical personnel, safety and health personnel, employees, and subcontractor employees within the established construction safety and health program. Responsibilities should be clearly written so that safety and health responsibilities are maintained through line management and driven by senior management.
  - b. The appropriate “competent person” for specific activities. A “competent person” must be named for activities requiring a competent person as listed in Section 5.9. Documentation of each person’s competency must be provided. These names may be provided at the beginning of each construction feature of work.
4. Subcontractors, Suppliers, and Non-Construction Contractor Employees: Provide procedures for coordinating activities safely with other employers on the job site.
  - a. Safety responsibilities of subcontractors and suppliers.
  - b. Safety responsibilities and coordination with non-construction contractor employees that may be present on or near the jobsite (NASA, Synergy-Achieving Consolidated Operations and Maintenance (SACOM), Tenants, etc.).
5. Training:
  - a. Employee safety and health training requirements to include new employee orientation, initial/refresher training, and site-specific job hazard training and awareness. The contractor shall make certifications/proof of training readily available for review.
  - b. Requirements for mandatory training and certifications that are applicable to the project.
6. Mishap/close call investigation and reporting procedures and associated forms.
7. A list of key personnel to be contacted in time of emergency.
8. Frequency and types of safety meetings, toolbox talks, and examples or forms used to document attendance.
9. The methods by which the employer intends to meet the objectives of the safety program, including:
  - a. Visitor protection and construction site control
  - b. Layout of temporary construction buildings and facilities
  - c. Maintaining continued job cleanup, safe access, and egress
  - d. Disaster, pandemic, and other emergency preparedness to include emergency actions to be taken to mitigate hazardous conditions and to protect personnel
  - e. Processes for medical treatment and first aid

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10. Procedures for safe pneumatic testing of pressure systems (wherever pneumatic pressure testing is to be conducted).
11. Procedure for monitoring employee exposures to regulated hazardous substances such as exposures to heavy metals, lead, asbestos, dust, chemical, noise, etc.
12. Individual policies, plans, programs, and procedures shall include the following:
  - a. Abrasive Blasting (Section 8.1)
  - b. Asbestos and Lead Abatement (Section 8.2)
  - c. Barricades and Signage (Section 8.3)
  - d. Compressed Gases (Section 8.4)
  - e. Concrete and Masonry (Section 8.5)
  - f. Confined Space Entry (Section 8.6)
  - g. Cranes (Section 8.7)
  - h. Demolition (Section 8.8)
  - i. Diving Operations (Section 8.9)
  - j. Drug and Alcohol Program and Policy
  - k. Earth Drilling Operations (Section 8.10)
  - l. Electrical Safety (Section 8.11)
  - m. Excavation and Trenching (Section 8.12)
  - n. Explosives (Section 8.13)
  - o. Fall Protection and Prevention (Section 8.14)
  - p. Fire Prevention and Protection (Section 8.15)
  - q. Flammable Materials (Section 8.16)
  - r. Hand and Power tools (Section 8.17)
  - s. Hazard Communication (Section 8.18)
  - t. Hearing Conservation (Section 8.19)
  - u. Heat Stress Prevention (Section 8.20)
  - v. Housekeeping (Section 8.21)
  - w. Ladders (Section 8.22)
  - x. Lockout/Tagout (Section 8.23)
  - y. Machine and Equipment Guarding (Section 8.24)
  - z. Machinery and Mechanized Equipment (Section 8.25)
  - aa. Motor Vehicle Safety (Section 8.26)
  - bb. Pile-driving (Section 8.27)
  - cc. Powered Industrial Trucks (Section 8.28)
  - dd. PPE (Section 8.29)
  - ee. Radiation protection (Section 8.30)
  - ff. Respiratory protection (Section 8.31)
  - gg. Sanitation (Section 8.32)
  - hh. Scaffolds (Section 8.33)
  - ii. Severe Weather (Section 8.34)
  - jj. Smoking (Section 8.35)
  - kk. Stairways (Section 8.36)
  - ll. Steel Erection (Section 8.37)

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- mm. Traffic Control Plan (Section 8.38)
- nn. Tree Maintenance and Removal (Section 8.39)
- oo. Welding, Cutting, and Melting (Section 8.40)
- pp. Workplace Violence Prevention

### 7.3 Compliance, Enforcement and Disciplinary Action

Safety and health procedures shall include:

1. Methods and procedures to ensure compliance with the Safety and Health Plan by employees and subcontractors.
2. Methods and procedures to enforce safety and health requirements with the employees and the subcontractor's employees.
3. Methods and procedures for the discipline of employees (from within the organization and subcontractors' organizations) for violations of the safety and health plans.
4. Methods and procedures for award and reward of employees (from within the organization and subcontractors' organizations) for outstanding implementation and compliance of the safety and health plans.

### 7.4 Subcontractor Safety and Health Plans

1. Prime contractors shall be responsible to review the Safety and Health Plans of their subcontractors to determine alignment with this SCWI and compliance with governmental regulations.
2. The subcontractor shall have a Safety and Health Plan that is equal to or better than that of the prime contractor.
3. Subcontractors shall participate in and be covered by the prime contractor's Safety and Health Program. The prime contractor will then be responsible for:
  - a. The safety and health of the subcontractor's employees
  - b. Providing and documenting all safety and health training for the subcontractor's employees
  - c. Ensuring compliance with all work practices and hazard assessments/analyses
  - d. Obtaining permits for all hazardous work performed by the subcontractor
  - e. Other safety and health issues affecting the subcontractor's employees on this contract

### 7.5 Changes to Safety and Health Plans

After acceptance of the Safety and Health Plans, the contractor shall notify the CO in writing a minimum of seven (7) calendar days prior to any proposed change. Proposed changes must be submitted to the SMA Directorate for approval prior to any work being performed within the scope of the proposed changes.

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## 8.0 SPECIFIC REQUIREMENTS OVERVIEW

### 8.1 Abrasive Blasting

The requirements for abrasive blasting are specified in SCWI-8500-0018-ENV. All abrasive blasting shall require an industrial hygiene assessment of the surface to be abated and the potential hazards of blast media constituents.

### 8.2 Asbestos and Lead Abatement

1. The requirements for asbestos abatement activities are specified in SCWI-8500-0019-ENV.
2. The requirements for lead abatement activities are specified in SCWI-8500-0018-ENV.

### 8.3 Barricades and Signage

1. Appropriate warning signs and barricades shall be posted to prevent unauthorized entry into a construction area.
2. Barricades shall be used to warn or to control/block access to an area with potential and/or existing hazards. When multiple contractors are working in the same area of a construction site, the barricade or tape shall be physically labelled/identified by the contractor who installed it. When the work is completed, or the barricade is no longer needed, the tape shall immediately be taken down. It is the responsibility of the person/group that set the barricade up to take it down.
  - a. Physical barriers/barricades (ropes, chains, cables, boards, steel piping, etc.) shall be used to prevent access to an area with existing hazards. As the hazards warrant, the physical barrier may need to be of sufficient strength to prevent a person from falling or breaking through, such as to prevent a person from falling to a lower level or to block an opening. Physical barriers may also be used to force the flow of traffic in the desired direction.
  - b. Barricade tape shall be used as a minor impediment to warn personnel or to prevent "accidental" entrance to an area or situation. Tape is not considered a physical barrier/barricade and shall not be used in lieu of a physical barrier/barricade when required.
    - a) Red tape with black "DANGER" or "DANGER DO NOT ENTER" lettering designates immediate danger and the area it guards shall not be entered until and unless permission is obtained from the owner of the area. Only authorized personnel shall enter a designated "DANGER" area. All others shall go around or get permission to enter from the responsible person. A sign shall be attached on or near the red barricade tape, in a conspicuous location, detailing the reason for the barricade, approximate length of time the area will be barricaded, and identifying the party who put it up and the number where they can be contacted. For the purposes of excavation safety, danger tape must be placed on all sides at a minimum of six (6) feet around the excavation.

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- b) Yellow tape with black "CAUTION" lettering shall designate an area of caution to warn personnel against potential hazards or caution against unsafe conditions or practices. Permission to enter a yellow barricaded area is required in the test facilities and test support areas. Personnel must maintain situational awareness prior to and during entrance to the area.
  - c) Magenta (Purple)/Yellow tape denotes DANGER and POSSIBLE RADIATION EXPOSURE and shall be used to designate a radiation area along with the required signage. Employees shall not be allowed to enter unless authorized by the radiographic personnel in charge.
3. If the construction area may be required to be traversed in cases of emergency, appropriate signage shall be posted denoting the exit access as "used only for emergency exit".

#### 8.4 Compressed Gases

1. The use of compressed gases will be in accordance with Department of Transportation regulations and recommendations published by the Compressed Gas Association that have been incorporated by reference in the Occupational Safety and Health Act.
2. Transporting Compressed Gases in portable cylinders:
  - a. Gas cylinders must have the valve protection cover cylinder cap in place while being transported.
  - b. Motor vehicles used to haul compressed gas cylinders shall be equipped with racks or other means of securing the cylinders in an upright position.
  - c. Cylinders (or Dewar) containing liquefied or toxic gases shall be transported in vehicles that are not enclosed.
3. Support Required for Compressed Gases in portable cylinders - Compressed gas cylinders must be supported at all times, whether full or empty. Acceptable methods of support include:
  - a. Wall-mounted or bench-mounted gas cylinder brackets
  - b. Chains or belts anchored to walls or benches
  - c. Free-standing dollies or carts designed for gas cylinders and equipped with safety chains or belts
4. Valve Protective Covers for Compressed Gases in portable cylinders - Gas cylinders must have protection covers in place except when:
  - a. A cylinder connected to a piece of equipment and properly supported is considered to be in use.
  - b. The pressure regulators must be removed and valve protection covers replaced before moving cylinders, even though the cylinders are secured to a dolly of hand truck (e.g., acetylene and oxygen cylinders used for cutting, brazing, etc., may not be transported with the regulators attached to the cylinders).
5. Cylinders used in gas welding and cutting operations shall follow requirements in 29 CFR 1926.350.

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## 8.5 Concrete and Masonry

The following information provides general safety requirements for the building of concrete and masonry structures/facilities at SSC.

### 1. General Requirements:

- a. Design/Analysis/Authorization: Introduction of loads onto “new” or partially cured concrete structures is prohibited without specific design analysis and authorization from the NASA CO or the COR.
- b. Application of Fall Protection: No employee shall be permitted to place or tie reinforcing steel more than six (6) feet above any adjacent working surface unless the employee is protected by the use of a safety harness or equivalent fall protection.
- c. Reinforcing Steel:
  - a) Securely tie together bundles of reinforcing steel moved by crane to prevent slipping. Handle steel bundles more than twenty (20) feet in length with two (2) properly spaced slings. Taglines must be used.
  - b) All vertical assemblies of rebar, such as columns and piers, must be guyed to prevent collapse.
  - c) Do not use reinforcing steel for scaffolding hooks or stirrups, or for any load-bearing hook or device in any application.
  - d) All exposed vertical ends of reinforcing steel will be protected with an approved end cap.
  - e) All exposed horizontal ends of reinforcing steel will be protected with scratch guard caps.

### 2. Concrete Finishing Equipment:

- a. Power Concrete Trowels:
  - a) Do not modify the “dead man” switch in any way and test the switch before each use.
  - b) Do not refuel gasoline-powered trowels while the engine is running.
- b. Concrete Saws, Abrasive Saws, and Other Powered Equipment:
  - a) Equip all tools and all guards as provided by the manufacturer.
  - b) Use only appropriate blades, discs, and other consumable parts designed and “rated” for the tool, saw, or equipment.
  - c) Do not use saws, drills, abrasive saws, and other tools for purposes other than for which they were designed; use only within the manufacturer’s limitations.
  - d) Do not cut, drill, sand, grind or shot blast concrete or concrete block dry. Wet methods must be utilized in all situations unless the methods pose a safety or environmental risk. If the work results in the generation of visible dust, employees will be monitored for exposure to silica.

### 3. Cast-in-Place Concrete

- a. Where the potential exists for a form to fall, make provisions to:
  - a) Suspend the form and support it prior to stripping
  - b) Provide a safe area below, free of hazards and barricaded to prevent entry
  - c) Employ enough manual labor to help ensure that the form cannot fall

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## 8.6 Confined Space Entry

1. The requirements for permit-required confined space entry are specified in SCWI-8715-0004.
2. NASA SSC does not classify all trenching and excavations as confined spaces. However, some conditions do warrant the application of a Confined Space Permit. These include but are not limited to potential hazardous atmosphere, electrical hazards, hot materials, steam, engulfment, and contents under pressure.
3. NASA SSC requires the use of the SSC Confined Space Permit, Form SSC-576 for entry and Form SSC-821 for permit-required confined space reclassification.

## 8.7 Cranes

1. The use of any crane shall comply with 29 CFR 1926.1501, Subpart DD and SWI-8834-0001.
2. Prior to the use of any mobile crane brought to SSC, the Contractor shall submit the following documentation to the CO, and COR for review:
  - a. A copy of the crane's annual inspection/certification.
  - b. A copy of the crane's load test.
  - c. The crane operator's current training certification.
  - d. A current physician's certification dated within the past two (2) years.
3. Any crane requires a pre-use inspection. Advance notification is required and must be made to the CO, and COR at least forty-eight (48) hours prior to such crane's intended use so the inspection can be coordinated. This inspection must be completed by the NASA Lifting Device Equipment Manager (LDEM), the SACOM LDEM, and/or their representative.
4. In addition to the OSHA-required inspections of cranes, SSC requires a documented daily inspection of each crane prior to its use. These documents shall be maintained on the construction site for audit purposes.
5. Cranes of any height must be lowered during the hours of darkness to less than one hundred (100) feet above ground level. If this is not possible, the crane shall be lit in accordance with Federal Aviation Administration regulations and comply with provisions of 14 CFR Part 77.9, (Subpart B).
6. A current crane certification/inspection document shall be kept onsite for inspection/audit.

## 8.8 Demolition

1. All demolition activities shall be performed in accordance with ANSI Standard A10.6, Safety Requirements for Demolition.
2. An engineering survey by a Registered Professional Engineer (RPE) shall be performed of the structure to determine the structure layout, the condition of the framing, floors, walls, the possibility of unplanned collapse of any portion of the structure (any adjacent structure where employees or property may be exposed shall be similarly checked), and the existence of other potential or real demolition hazards.



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3. A demolition plan developed by an RPE shall be submitted to the COR for approval. Plan shall be based on the engineering, lead and asbestos surveys and shall intend for the safe dismantling and removal of all building components and debris. Anticipated hazards shall be identified in the plan and addressed with AHAs.
4. All employees engaged in demolition/renovation activities shall be instructed in the plan so that they may conduct their work activities in a safe manner.
5. Electric, gas, water, steam, sewer, and other service lines affected as a result of project work shall be shut off, capped, or otherwise controlled inside and outside the building line before demolition is started. The Contractor must confirm that the disconnection or de-energizing has been performed prior to the start of the demolition process. This confirmation shall be documented with signatures from all utility owners.
6. All hazards shall be controlled or eliminated before demolition is started.

## 8.9 Diving Operations

1. The contractor performing diving operations shall form a Diving Control Safety Board with the majority of the members being active, certified divers and that contains at least one (1) member from NASA SMA.
2. Diving safety requirements based on water depth and type of work to be performed are provided in Table 1 and Table 2.

**Table 1 - Diving/Underwater Work Less Than Thirty-Three (33) Feet in Depth**

Type and Depth	No. Divers	Diving Stand-by Supervisor	Tender	Total
Scuba - under twelve (12) feet, clear water allows observation of diver at work at all times from surface	1(c)	1(b)	(a)	2
Scuba - under twelve (12) feet, limited visibility	1	1(b)	(a)	2
Scuba - over twelve (12) feet and less than thirty-three (33) feet	1	1(b)	1	3
Scuba - "Buddy" diver safety system under twelve (12) feet	2(c)	1(b)	(a)	3
Scuba - "Buddy" diver safety system between twelve (12) and thirty-three (33) feet	2	1(b)	1	4
Surface supplied divers	1	1(b)(d) 1(e)	1	4

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**NOTES:**

- One (1) of the qualified divers on the crew shall also be qualified as Diving Supervisor and shall assume the duties and responsibilities of that position.
- The standby diver may alternate with the working diver(s) in any twenty-four (24) hour period.
- Divers may dive without a tending line.
- The standby diver will not be required if two (2) or more submerged divers are receiving air, are tended from the same surface platform or barge, are in direct communication with each other or the same central station, and each diver has sufficient length of air supply hose to reach the other in the event of an emergency. Each member of this group of divers will be considered an effective standby diver for the other members.
- In an emergency situation, the Diving Supervisor will act as a tender when the standby diver has to dive.

**Table 2 - Diving/Underwater Work Greater Than Thirty-Three (33) Feet in Depth**

Type	Repetitive Dives or Decompression Involved	No. Divers	Standby	Diving Supervisor	Tender	Time- Keeper	Total
Surface	No	1	1(a)	1(c)	1		4
Supplied Air	Yes	1	1(a)	1(c)	1	1	5
Buddy - pair	No	2	1(a)(b)	1	1		5
Scuba	Yes	2	1(a)	1	1	1	6

**NOTES:**

- The designated standby diver shall not dive during any twenty-four (24) hour period except in emergencies.
- The standby diver may perform timekeeping duties as necessary.
- In an emergency situation, the Diving Supervisor will act as a tender when the standby diver has to dive.

## 8.10 Earth Drilling Operations

These requirements shall apply to rock, soil, and concrete drilling operations.

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1. The use of drilling equipment shall be operated, inspected, and maintained as specified in the manufacturer's operating manual. A copy of this manual must be available at the job site.
2. Prior to bringing earth drilling equipment on the job site, a survey shall be conducted to identify overhead electric hazards and potential ground hazards, such as contact with hazardous agents in the soil or underground utilities.
3. An AHA shall be conducted initially and whenever the job scope or new hazards are likely. The AHA must include the SDS for the drilling fluids, and all other applicable sections must be completed.
4. All members of the drilling crews shall be trained in:
  - a. The operation, inspection, and maintenance of the equipment
  - b. The safety features and procedures to be used during operation, inspection, and maintenance of the equipment
  - c. Overhead electrical line and underground hazards
  - d. Information contained in equipment manuals
  - e. AHA specifics
5. Drilling equipment shall be equipped with two (2) easily accessible emergency shutdown devices, one (1) for the operator and one (1) for the helper.
6. Clearance from electrical sources shall be maintained at all times, including movement of the drill.
7. Earth drilling equipment shall not be transported with the mast in an upward position.
8. The path of travel for earth drilling equipment shall be over smooth, level terrain that is stable and absent of holes or other forms of hazards, and the travel distance limited to short distances.
9. Earth drilling equipment shall be set up on stable ground and maintained level.
10. Cribbing shall be used when necessary.
11. Outriggers shall be extended according to the manufacturing specifications.
12. Permit-required confined space requirements shall be followed in the event a confined space is created and personnel will be entering the space for any reason.
13. Auger guides should be used on hard surfaces.
14. The operator shall verbally alert employees and visually ensure that employees are clear of any equipment before engagement or activation.
15. Drill rods shall be neither run nor rotated through rod slipping devices.
16. Augers shall be cleaned only when the rotating mechanisms are in a neutral position and stopped.
17. Long-handled shovels shall be used to move cuttings from the auger.
18. Open boreholes shall be capped and flagged.
19. Open excavations shall be barricaded.
20. The auger shall include a guide to protect the employee from inadvertent contact with the auger. This guide can include, but is not limited to, a barricade around the perimeter or a presence-sensing device.
21. The use of side-feed swivel collars on drill rods are restricted to those collars that are retained by either a manufacturer-designed stabilizer or stabilizer approved by a professional engineer.

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22. Drill rigs with open Cat Head winches are prohibited.

### 8.11 Electrical Safety

1. The contractor shall appoint an individual responsible for the electrical safety of each work team and to restrict access to dangerous locations. Whenever work involves exposure to electrical hazards, a qualified person in charge shall complete a job safety plan and conduct a job safety briefing with the personnel involved with the work as outlined in SCWI-8715-0006.
2. No energized electrical work shall be allowed at SSC unless approved by Prime Contractor Safety, SMA Support Contractor Safety, NASA Operations and Maintenance Technical Authority and NASA SMA Subject Matter Expert.
3. The contractor shall be subject to the electrical safety program requirements in SCWI-8715-0006 and lockout/tagout requirements in SCWI-8715-0013 (also see Section 8.23).

### 8.12 Excavation and Trenching

1. Known or questionable interferences shall be hand-dug or vacuum excavated within six (6) feet of the interferences.
2. Prior to any excavating or trenching operation deeper than twelve (12) inches, a Dig Permit must be obtained and posted at the work site. (See paragraph "d" below for Dig Permit procedure.)
3. All excavations, trenches, drilling, and other ground penetrations that will extend twelve (12) inches or more below the ground surface will require compliance with SSTD-8070-0119-MISC and Dig Permit (Form SSC-618).
4. Prior to performing excavation work, it shall be determined whether the excavation to be performed will result in a confined space meeting the definition in 29 CFR 1910.146. NASA SSC requirements for confined space entry are defined in SCWI-8715-0004.
5. Prior to performing any excavation work or any surface penetrations twelve (12) inches or deeper (such as driving stakes more than twelve (12) inches in the ground) on any ground surface, the contractor shall obtain a Dig Permit.
6. The contractor shall stake out subsurface high voltage cables, communication cables, and pipelines indicated within the scope of the work contemplated.
7. After exposure, the contractor shall obtain agreement from the CO on how much closer to the cable or pipe the excavations can be permitted.
8. Excavations that expose buried slip joint PVC or transite pipes require the contractor to shore the buried pipe for the protection of the pipe from undermining and lateral movement.
9. All excavations and trenches five (5) feet or more in depth in which employees may be required to enter shall either be shored or sloped to the proper angle.
10. Sloping and shoring shall comply with 29 CFR 1926, Subpart P, *Excavations*.
11. Soils at SSC shall be considered type C soil unless assessed and documented otherwise by a competent person.
12. Type C soil shall require a one and one-half-to-one slope (run to rise).

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13. If the required slope cannot be attained, support systems, shield systems, or other protective systems shall be required per 29 CFR 1926.652.
14. The structural integrity of all shoring shall be certified by a competent person per 29 CFR 1926.650.
15. A stairway, ladder, ramp, or other safe means of egress shall be located in trench excavations four (4) feet or more in depth that require no more than twenty-five (25) feet of lateral travel for employees.
16. If ladders are used, they shall extend from the floor of the trench excavation to at least three (3) feet above the top of the excavation.
17. Ramps shall be constructed in accordance with 29 CFR 1926.651(c)(1)(i).
18. Daily inspections of excavations and trenches shall be made by the contractor, their safety representative, and/or a competent person prior to the commencement of work activities.
19. If evidence of possible cave-ins or slides is apparent, all work in the excavation or trench shall cease until the necessary precautions have been taken to safeguard all personnel.
20. Inspections shall be conducted throughout the shift and following rainstorms or other incidents that may change the integrity of the excavation.
21. For test area operations, no excavation work will be permitted on test days.
22. Protection shall be provided to prevent personnel, vehicles, and equipment from falling into excavations. Protection shall be provided according to the following hierarchy.
  - a. Class I is used if the excavation is exposed to members of the public or vehicles or equipment.
    - a) Perimeter protection guarding against personnel falling into an excavation it shall meet the following: have the strength, height, and maximum deflection requirements for guardrails; provide fall protection equivalent to that provided by a toprail, midrail, and toeboard; and have post spacing equivalent to a standard guardrail.
    - b) Perimeter protection guarding against traffic (vehicles and/or equipment) falling into an excavation shall be designed, by a qualified person, to withstand the potential forces and bending moments due to impact by traffic.
  - b. Class II is used if the excavation does not meet the requirements for Class I perimeter protection but is routinely exposed to employees and is deeper than six (6) feet or contains hazards (e.g., impalement hazards, hazardous substances). Warning barricades or flagging shall be placed at a distance not closer than six (6) feet from the edge of the excavation.
  - c. Class III is used if the excavation does not meet the requirements for either Class I or Class II perimeter protection. Warning barricades or flagging shall be placed a distance not closer than six (6) inches nor more than six (6) feet from the edge of the excavation.

### 8.13 Explosives

Explosives shall not be used or brought to the project site without proper authorization.

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#### 8.14 Fall Protection and Prevention

The requirements for fall protection and prevention are specified in SCWI-8715-0003.

#### 8.15 Fire Prevention and Protection

1. The requirements for fire prevention and protection are specified in SPLN-8838-0001.
2. Hot work:
  - a. The requirements for obtaining a hot work permit are specified in SCWI-8838-0002.
  - b. Open-flame heating devices will not be permitted except when authorized by a Form SSC-68, Flame "Hot Work" Permit. Approval for the use of open fires and open-flame heating devices will not relieve the contractor from the responsibility for any damage incurred because of fires.
  - c. Form SSC-68, Flame "Hot Work" Permit, shall be issued to perform operations that require flame-producing equipment. Obtaining these forms shall be coordinated through the SACOM SMA department or the SSC Fire Department.
  - d. In PSM covered areas or where flammable materials are stored or used, the hot work requirements expand from flame producing to include spark producing. This can include electric tools, grinders, and chisels.
  - e. A copy of the Hot Work permit shall be made available at the job site with the AHA.
3. Burning trash, brush, or wood on the project site shall not be permitted.
4. Heat generating appliances at construction sites/office trailers (such as coffee pots, hot plates, water heaters, microwave ovens) that will be used for the employee's convenience during normal working hours shall be permitted (form SSC-222) for use by the SSC Fire Department prior to use. An application (from SSC-221) for the permit shall be completed and forwarded to the SSC Fire Department for review.
5. Heating Devices and Melting Kettles:
  - a. A hot work permit shall be required for all heating devices and melting kettles.
  - b. All gauges, valves, hoses, fittings, and clamps on and from the pressure fuel chamber to the burner shall be inspected on a daily basis.
  - c. Heating devices and melting kettles shall be placed on firm, level, and noncombustible foundations. Placement shall be downwind from employees or occupied buildings and away from air intake vents, doors, and windows and at least twenty-five (25) feet from any combustible structure, building, material, or equipment.
  - d. Verification of proper placement with the CO or designee shall be required when placing tar kettles for use near inhabited buildings.
  - e. Protection of heating devices and melting kettles shall be provided against traffic, accidental tipping, or similar hazards. Surrounding areas shall be marked with warning tape, traffic cones, and/or signs.
  - f. No material of any kind shall be stored within ten (10) feet of the kettle, with the exception of the bituminous material that will be loaded into the kettle.

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- g. A method to contain uncontrolled spills of the heated material, which might be on fire, shall be developed. The placement of a fire-retardant tarp under the kettle (or other effective means) shall be used.
- h. A minimum of two (2) twenty (20) pound fire extinguishers, shall be available within twenty-five (25) feet of the working kettles. The kettle operator shall know how to properly extinguish an ignited kettle.
- i. The kettle operator shall be present at the kettle at all times when the kettle is in operation.
- j. The kettle operator must be trained in the proper operation of the kettle and have knowledge of the material being heated so as to not allow the material to be heated beyond the allowable temperature. A working thermometer shall be provided and used.
- k. All melting kettles shall be appropriately sized for the job.
- l. Kettles shall be provided with an effective tight-fitting lid and calibrated thermometer in operating condition. The lid should open away from the building.
- m. The temperature of the asphalt in the kettle must be at least twenty-five (25) degrees F below the maximum heating temperature specified by the manufacturer.
- n. In addition to minimum construction site PPE, employees shall wear safety glasses, face shields, and gauntlet type gloves with sleeves rolled down.
- o. Pipes shall be insulated and used to convey hot materials to upper elevations if there is possibility of personnel contact.
- p. When hoisting buckets of hot tar onto roofs, the area beneath the hoisting device shall be barricaded to prevent employees from entering the area underneath.
- q. The kettle shall be monitored for no less than thirty (30) minutes after operations have stopped and the flame is extinguished.

#### **8.16 Flammable Materials**

1. All storage, handling, and use of flammable liquids shall be in accordance with SSP-1740-0057, SPLN-8838-0001, NFPA 30, or other applicable standards under the supervision of a qualified person.
2. All sources of ignition shall be prohibited in areas where flammable liquids are stored, handled, and processed. Suitable "NO SMOKING, MATCHES, or OPEN FLAME" signs shall be posted in all such areas.
3. Flammable cabinets may not be used without approval from the SSC Fire Department. Application shall be made by completing form SSC-792 to include a drawing of the floor plan with the location of the cabinet and submitting the application to the SSC Fire Department for review and approval.

#### **8.17 Hand and Power Tools**

1. Power tools shall be of a manufacturer listed by a nationally recognized testing laboratory for the specific application for which they are to be used.
2. Use, inspection, and maintenance.

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- a. Hand and power tools shall be used, inspected, and maintained in accordance with the manufacturer's instructions and recommendations and shall be used only for the purpose for which designed. A copy of the manufacturer's instructions and recommendations shall be maintained with the tools.
- b. Hand and power tools shall be inspected, tested, and determined to be in safe operating condition before use. Continued daily inspections shall be made to assure safe operating condition and proper maintenance.
- c. Hand and power tools shall be in good repair and with all required safety devices installed and properly adjusted. Tools having defects that will impair their strength or render them unsafe shall be removed from service.
3. Throwing tools or materials from one location to another or from one person to another, or dropping them to lower levels, shall not be permitted.
4. Only non-sparking tools shall be used in locations where sources of ignition may cause a fire or explosion. Refer to SCWI-8715-0012 for additional requirements on usage of tools, cell phones and portable electronic products in hazardous classified areas.
5. Loose and frayed clothing, loose long hair, dangling jewelry (including dangling earrings, chains, and wrist watches) shall not be worn while working with any power tool.
6. Ground-Fault Circuit-Interrupter protection shall be provided on all circuits serving portable electric hand tools or semi-portable electric power tools (such as block/brick saws, table saws, air compressors, welding machines, and drill presses).
7. Refer to SCWI-8715-0006 for additional requirements on construction site usage of portable electric tools and electrical apparatus.

#### **8.18 Hazard Communication**

1. The contractor shall have a written Hazard Communication Program meeting the requirements of SCWI-1800-0005.

#### **8.19 Hearing Conservation**

1. Hearing conservation shall be in accordance with SCWI-8500-0002.
2. Hearing protection shall be made available for use in areas with sound levels at or above eighty-two (82) Decibels – A-weighted (dBA). Hearing protection shall be used with any equipment producing noise at 85 dBA or higher.
3. Hearing protection shall be worn by employees when they are exposed to hazardous noise levels, those in excess of 85 dBA independent of duration of exposure or in any area with equipment producing impact/impulse noise greater than one hundred (100) dBA.
4. Hearing protection shall attenuate employee noise exposure to an eight (8) hour Time Weighted Average of eighty-five (85) dBA or less.
5. Hazardous noise construction areas shall be posted with warnings that hearing protection is required for all workers and visitors.
6. The contractor shall provide hearing protection to any authorized visitor exposed to a hazardous noise construction site.



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7. Hearing protection will be selected based on operations performed by the contractor and the noise reduction ratio of the protection.
8. Use of any jackhammers, explosive device activated tool, and other such equipment shall be approved in writing by the COR prior to commencement of work.

## 8.20 Heat Stress Prevention

The requirements for heat stress prevention are specified in SCWI-8715-0014.

## 8.21 Housekeeping

1. Protruding nails from scrap lumber shall be immediately removed from the lumber or bent over to reduce puncture hazards.
2. All debris shall be kept clear of work areas, passageways, and stairs.
3. Combustible scrap and debris shall be removed at regular intervals during the course of construction (generally daily).
4. Containers shall be provided for the collection and separation of waste, trash, oily and used rags, and other refuse.
5. Covered metal containers shall be provided for garbage and other oily, flammable, or hazardous wastes.
6. Waste containers shall be emptied daily.
7. Areas adjacent to the modification/construction area will be properly protected from hazardous activities or processes. At a minimum, this includes the erection of plastic sheets (from the floor to the bottom of the ceiling or floor above) where dust or debris must be minimally contained.
8. If considerable dust and/or debris may be encountered or if high noise levels will cause disturbances to the adjoining area, then a solid wall shall be erected (from the floor to the bottom of the ceiling or floor above).
9. Where dust or debris is tracked into hallways outside of the barrier, the area will be vacuumed daily to prevent the spread of a potentially combustible dust hazard into occupied areas.

## 8.22 Ladders

The following requirements shall be in place when using ladders on the construction site:

1. Loads
  - a. A self-supporting portable ladder, commonly referred to as a "foldout ladder" must support at least four (4) times the maximum intended load.
  - b. A non-self-supporting portable ladder, commonly referred to as a "leaning ladder" must support at least four (4) times the maximum intended load.
  - c. Extra-heavy-duty metal or plastic ladders must be able to support 3.3 times the maximum intended load.
2. Ladder Angles

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- a. Leaning ladders, which are designed to lean against a wall or other fixture, shall be positioned at such an angle that the horizontal distance from the top support to the base of the ladder is approximately 1/4 (one-quarter) the working length of the ladder.
- b. The angle of a wooden ladder (job-made) shall equal approximately 1/8 (one-eighth) the working length of the ladder. Because job-made ladders are custom made, and not made by a professional manufacturer, it's important that the ladder joints are not placed under pressure that would compromise the ladder's stability.
3. Ladder Rungs
  - a. Ladder rungs, ladder cleats, or ladder steps must be level, parallel, and evenly spaced anytime the ladder is in use. It's also required that ladder rungs be spaced between ten (10) and fourteen (14) inches apart. Exception - Extension trestle ladders: eight (8) – eighteen (18) inches for the base, and six (6) – twelve (12) inches on the extension section.
  - b. The shape of a rung must be designed in a manner that does not allow a construction worker's foot to slide off of it. Equally important, the rung must also be skid-resistant.
4. Slipping Hazards
  - a. All ladders must be free of contact from oil, grease, wet paint and any hazard that may cause the surface to become slippery.
  - b. A wood ladder cannot be coated with any type of opaque covering.
  - c. Ladders are allowed to have an identification or warning label, but they must exist only on one (1) face of a side rail.
5. Other Requirements
  - a. Foldout or stepladders must have a metal spreader or locking device to hold the front and back sections in an open position when in use.
  - b. When two (2) or more ladders are used to reach a work area, they must be offset with a landing or platform between the ladders.
  - c. The area around the top and bottom of a ladder must be kept clear.
  - d. Ladders must not be tied or fastened together to provide longer sections, unless they are specifically designed for such use.
  - e. Never use a ladder for any purpose other than which it was designated.
  - f. Service and safety stickers must be attached and legible per manufactures requirements.
  - g. Ladders will be inspected before use, and a color code identification system used on a monthly basis to denote the inspection.

### 8.23 Lockout/Tagout (LO/TO)

The requirements for LO/TO are specified in SCWI-8715-0013. These requirements shall apply to all persons performing work at the site who install, repair, maintain, or inspect electrical apparatus, mechanical apparatus, and hydraulic and/or pressure systems. This includes, but is not limited to:

- a. Service facilities such as electrical substations, electrical distribution systems, underground utilities (to include water and sewer), and heat and refrigeration systems.

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- b. Cryogenic, combustible gas, vacuum, compressed air, or other compressed gas systems (such systems include compressors, storage facilities, transfer or distribution facilities, and other components thereof).
- c. All other systems and equipment that would be hazardous if these procedures are not followed.

## 8.24 Machine and Equipment Guarding

Power tools designed to accommodate guards shall be equipped with such guards. All guards must be functional. Reciprocating, rotating, and moving parts of equipment shall be guarded if exposed to contact by employees or otherwise create a hazard.

## 8.25 Machinery and Mechanized Equipment

1. Before any machinery or mechanized equipment is placed in use, it shall be inspected and tested in accordance with the manufacturer's recommendations.
2. All safety deficiencies noted during the inspection shall be corrected prior to the equipment being placed in service at the project.
3. Any time the machinery or mechanized equipment is removed and subsequently returned to the project (other than equipment removed for routine off-site operations as part of the project), it shall be re-inspected and recertified prior to use.
4. No modifications or additions that affect the capacity or safe operation of machinery or equipment shall be made without the manufacturer's written approval.
5. Whenever any machinery or equipment is found to be unsafe, or whenever a deficiency that affects the safe operation is observed, the equipment shall be immediately taken out of service and its use prohibited until unsafe conditions have been corrected.
6. Machinery and mechanized equipment shall be operated only by designated, qualified personnel.
  - a. Machinery or equipment shall not be operated in a manner that will endanger persons or property nor shall the safe operating speeds or loads be exceeded.
  - b. Getting off or on any equipment while it is in motion is prohibited.
  - c. Machinery and equipment shall be operated in accordance with the manufacturer's instructions and recommendations.
  - d. The use of headphones for entertainment purposes (e.g., radio, CD, music, books, etc.,) while operating equipment is prohibited except for communication directly related to operating the machinery or equipment.
  - e. The use of cell phones or any other electronic device that may cause distraction is prohibited while operating equipment.
7. Mechanized equipment shall be shut down before and during fueling operations.
8. Bulldozer and scraper blades, end-loader buckets, dump bodies, and similar equipment shall be either fully lowered or blocked when being repaired or when not in use. All controls shall be in a neutral position, with the engines stopped and brakes set, unless work being performed on the machine requires otherwise.

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9. All vehicles that will be parked or are moving slower than normal traffic on haul roads shall have a yellow flashing light or four-way flashers visible from all directions.

## 8.26 Motor Vehicle Safety

1. SSC driving rules shall be followed at all times.
2. The use of cell phones or any other electronic device that may cause distraction is prohibited while operating a motor vehicle.
3. All motor vehicle occupants must wear a seat belt while moving.
4. Personnel shall not be permitted to ride in the back of trucks.

## 8.27 Pile Driving

1. NASA and SACOM Field Engineers shall:
  - a. Ensure construction contractors are aware of and comply with the pile-driving requirements.
  - b. Conduct an equipment inspection prior to the setup and use of any crane or pile-driving.
  - c. Periodically audit pile-driving work sites to assure safe working conditions.
2. The construction contractor performing the pile-driving operation is responsible for ensuring:
  - a. Equipment is maintained for safe usage and OSHA requirements are met.
  - b. Cranes used for pile-driving operations are inspected and certified by an independent crane inspection service.
  - c. Personnel are trained to safely operate pile-driving equipment.
3. Use of a continuous boom stop with gradually increasing resisting force between the boom and structure of the crane shall be mandatory.
4. Sheet-piling operations shall not be conducted during winds in excess of twenty (20) miles per hour.
5. Personnel shall not remain on top of piles during driving activities.
6. Prototypical pile-driving equipment at SSC is prohibited unless permission is obtained from the CO (or designee) and NASA SMA.
7. Fixed and swinging leads shall be provided with ladders and safety climbing devices, or similar attachment points, so that elevated workers constantly have their safety harness lanyards attached. If the leads are provided with loft platform(s), such platform(s) must be protected by standard guardrails. Employees shall not remain on leads, ladders or platforms while pile is being driven.
8. Personnel in the immediate vicinity of pile-driving operations shall wear, at a minimum, hard hats, eye protection, hearing protection, and safety shoes. Personnel engaged in stabbing piles shall heavy long-sleeved shirts, and heavy jeans or pants.
9. Matting shall be used as necessary where pile-driving and crane equipment will not be properly supported and stabilized by the soil.
10. Dogs on pile-driver hoist drums that automatically disengage by either relieving the load or rotating the drum shall not be used.
11. Landings or leads shall not be used for storage of any kind.

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12. Pile hammers shall be lowered to the bottom of leads while pile driver is being moved.
13. If piling cannot be pulled without exceeding the load rating of equipment, a pile extractor shall be used.
14. The use of a load indicator on the hoisting equipment when extracting piling with lattice boom type setups is required.
15. Fall Protection/Restraint:
  - a. Personnel engaging in stabbing activities shall use fall protection (safety harness with attached lanyard).
  - b. The use of fall protection safety belts is prohibited at SSC.
  - c. A full body harness with a fall protection or restraint lanyard shall be used on all elevated work associated with pile-driving.
16. Weather conditions shall be monitored and operations shall cease during electrical storms or when lightning alerts are communicated through the Center Warning System.
17. Tag lines shall be used during sheet piling hoisting operations to control piling movement.
18. The number of stabbed sheet piles within any run shall be limited to an amount that will remain stable until driving.
19. Pile-driving equipment and cranes used for handling of piles shall also comply with the requirements of 29 CFR 1926.603 and 29 CFR 1926 Subpart CC, respectively.
20. Work involving the cutting off of piles or other work within a radius of twice the length of the pile being driven shall be prohibited.
21. Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating, or moving parts or equipment shall be guarded if such parts are exposed to contact by employees or may otherwise create a hazard.
22. An employee engaged in hooking up piles should be the only individual allowed in the immediate area of the pile-driving operation.
23. All piling shall be secured from rolling by chocking the stack. No employee shall climb on a stack of piles where movement within the stack is possible.
24. Piles shall be examined for defects and cracks that could cause the pile to fail at any time during lifting or driving. Damaged or defective piles shall be marked and removed safely from stock.
25. Employees shall refrain from manhandling piles.
26. Rigging shall be selected by a qualified rigger and shall be appropriate for the type and known weight of the piles.
27. Employees shall not place themselves between the leads and the pile or the leads and the crane.

## 8.28 Powered Industrial Trucks

Powered industrial truck operations shall adhere to the requirements of 29 CFR 1910.178 and SWI-8838-0001, Lifting Devices and Equipment Management Instructions. Bottom fork lifting (below-the-tines lift) shall only be accomplished if approved in writing by the manufacturer or with the use of an LDE Manager approved bottom lift fork attachment which centers the load

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between the tines and is rated for the lift. Free rigging (the direct attachment of rigging equipment such as slings, shackles, rings etc., to one or both tines) shall not be allowed.

### 8.29 Personal Protective Equipment (PPE)

1. All personnel performing construction activities and visitors to construction sites shall wear appropriate PPE. Contractors will provide appropriate PPE to employees and ensure that all visitors to construction sites are allowed access only when wearing appropriate PPE. The appropriate PPE ensemble shall be decided by the AHA for the construction activity.
2. For all Designated Construction Zones, the minimum PPE shall be hard hats, safety glasses with side shields, protective-toed shoes, and high-visibility safety apparel. The minimum PPE requirements pertain to all personnel entering the Designated Construction Zone. Additional PPE above the minimum shall be based upon the AHA.

### 8.30 Radiation Protection

Radiation activities are covered under the SSC Health Physics Programs. Specific program requirements are specified in SCWI-8700-0002. Ionizing radiation requirements are specified in SCWI 8700-0004 and non-ionizing requirements are specified in SCWI 8700-0005.

### 8.31 Respiratory Protection

The requirements for respiratory protection are specified in SCWI-1840-0001.

### 8.32 Sanitation

1. Site sanitation requirements are specified in 29 CFR 1926.51, *Sanitation*.
2. An adequate supply of potable water shall be provided in all places of employment, for both drinking and personal cleansing.
3. Fresh drinking water (plumbed, bottled or water cooler) shall be provided daily at construction sites. Drinking water requirements, to include cooler usage and cleaning, shall conform to the requirements of SCWI-8715-0014.
4. Use of a common cup (a cup shared by more than one worker) and other common utensils is prohibited. Unused disposable cups shall be kept in sanitary containers and a waste receptacle shall be provided for used cups.
5. Potable drinking water dispensers shall only contain drinking water and shall not be used to store or cool drinks or food or other items.
6. Toilet facilities shall be provided at each construction site with the exception of mobile crews that have transportation immediately available to travel to nearby toilet facilities.
7. Where it is not practical to provide running water for hand washing, hand sanitizers may be used as a substitute for running water.

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### 8.33 Scaffolds

1. All scaffolds shall comply with 29 CFR 1926 Subpart L, *Scaffolds*. In cases of conflicting statements between the OSHA and NASA Standards, the scaffold erector/user shall follow the more stringent requirement.
2. Under no circumstance shall a scaffold be reconfigured or altered by unqualified personnel. Qualified scaffold erectors under the supervision of a competent person are the only personnel who can reconfigure or alter a scaffold at SSC. A competent person, as defined by OSHA, is one (1) who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
3. In addition to inspection requirements noted in 29 CFR 1926 Subpart L, scaffolds on or in the vicinity of a test stand, shall be inspected by the competent person after an engine test prior to use.

### 8.34 Severe Weather

1. In the event of a severe storm warning, the contractor shall:
  - a. Secure outside equipment and materials, and place materials subject to damage in protected locations
  - b. Check the surrounding area, including the roof, for loose material, equipment, debris, and other objects that could be blown away or against existing facilities
  - c. Ensure that temporary erosion controls are adequate
  - d. Construction office trailers are not considered safe locations during severe storms and or tornadoes. The contractor shall coordinate with the COR a safe location to take cover prior to a severe storm or tornado and/or the warning of a severe storm or tornado.
2. In the event of actual or potential hazardous lightning conditions, requirements outlined in SCWI-8715-0001 shall be followed.

### 8.35 Smoking

Smoking shall only be allowed in designated areas that are in accordance with SPD 1800.1.

### 8.36 Stairways

1. On all structures twenty (20) feet or more in height, stairways shall be provided during construction.
  - a. Where permanent stairways are not installed concurrently with the construction of each floor, a temporary stairway shall be provided to the work level.
  - b. Alternatives to the use of stairways shall be addressed in the AHA and accepted by the COR.
2. Stairway design shall be in accordance with 29 CFR 1926.1052.

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3. Metal pan landings and metal pan treads, when used, shall be secured in place and filled with concrete, wood, or other material at least to the top of each pan.
4. Wooden treads shall be nailed in place.

### 8.37 Steel Erection

1. All steel erections shall be performed in accordance with 29 CFR 1926, Subpart R, *Steel Erection*, except in the case of fall protection where the NASA SSC requirement is six (6) feet.
2. Open web steel joists shall not be placed on any structural steel framework unless the framework is safely bolted or welded.
3. Bolts, connectors, welding rods, tools, and other hand-held equipment shall not be carried up ladders or walkways. Materials shall be hauled in secure containers. The use of five (5) gallon buckets is permissible, but the wire bail must be removed and a substantial support installed.
4. Wherever workers are working overhead, a sign shall be posted to alert employees of their presence stating, “**WARNING: Construction OVERHEAD**”. Barricading or warning devices shall be installed to keep employees away from areas where dropped tools and material may strike them.
5. Good housekeeping shall be maintained on and around the work site at all times, but especially when steel erection activities are taking place.

### 8.38 Traffic Control Plan (TCP)

1. Streets, walkways, and facilities occupied and used by the Government shall not be closed or obstructed without written permission from the COR.
2. If the contractor must obstruct any part or conduct work within fifteen (15) feet of a street, walkway, or access to a facility, the contractor shall submit a written TCP for approval by the COR (or designee) prior to commencing any such obstruction. The TCP shall be in compliance with the MUTCD.
3. Traffic control and marking of hazards to cover haul loads, intersections, railroads, utilities and bridges shall be referenced in the TCP.

### 8.39 Tree Maintenance and Removal

1. Tree maintenance and removal activities shall be performed in accordance with ANSI Z133, American Standard for Arboricultural Operations – Safety Requirements and ANSI A300, American National Standard for Tree Care Operations – Tree, Shrub, and Other Woody Plant Management.
2. A Tree Maintenance and Removal Program shall be developed by/under the direction of a qualified tree worker in accordance with the ANSI references above. This Program shall be submitted to the COR for approval prior to the work being performed.



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3. Contractors performing line-clearance tree trimming for the purpose of clearing space around electric power generation, transmission, or distribution lines or equipment shall be trained in, and familiar with, the safety-related work practices, safety procedures, and other safety requirements that pertain to his or her job assignments per OSHA 1910.269(a)(2) requirements.

#### **8.40 Welding, Cutting, and Melting**

1. The contractor shall clear welding and cutting operations with the COR before operations begin and obtain a Hot Work Permit (Form SSC-68) per SCWI-8838-0002 for any activity that produces a source of ignition.
2. All welding and cutting operations shall require a hazardous coatings assessments prior to initiating work per SCWI-8500-0018-ENV.
3. Prior to performing work in a hazardous or potentially hazardous atmosphere, the contractor shall contact the SACOM construction manager to coordinate an industrial hygiene atmospheric check of the area.
4. The operation of all welding, burning, and torch cutting equipment will be checked and approved by a competent person. Any defective equipment shall immediately be put in safe operating condition or removed from the site.
5. Oxyfuel gas, and other oxygen-fuel gas welding and cutting systems using cylinder-regulator-hose-torch shall be equipped with both a reverse-flow check valve and a flash arrestor, in each hose, at the torch unless otherwise indicated by the manufacturer instructions.
6. Tarpaulins used for covers or shields shall be fire resistant.
7. Shields shall be used when required to protect personnel from flash burns.
8. The contractor shall provide appropriate PPE for welding operations based on the nature of the hazards and exposure assessments.
9. All surfaces covered with toxic preservatives (e.g., lead, cadmium, or chromium bearing paint or surface coatings) shall be stripped of all toxic coatings at a distance of at least four (4) inches from the area of heat application. If the concentration of a substance in the breathing zone of the employee exceeds the occupational exposure limit or threshold limit value, local exhaust ventilation must be provided in addition to the stripping back procedure.
10. The contractor shall provide the authorized Government safety and health representative with baseline exposure data to air contaminants upon request; i.e., Lead, Chromium VI.
11. The contractor shall discontinue burning, welding, or cutting operations thirty (30) minutes prior to the end of the normal workday.
12. A contractor representative shall remain at the site for thirty (30) minutes to serve as a fire watch after discontinuing burning, welding, or cutting operations to perform a thorough inspection of the area for possible sources of latent combustion.
13. The contractor shall be equipped with one (1) or more full ten (10) pound (6.8-kilogram) fire extinguishers suitable for the type of hot work and area combustibles.
14. Any unsafe conditions shall be reported to the SSC Fire Department. (From an onsite phone, dial 911 or 8-3636 or from an offsite phone, dial 228-688-3636.)

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15. If operations involve a possible fire hazard, the contractor shall notify the COR and shall not proceed until clearance is obtained in writing. The COR may request a standby from the Fire Department. This requirement does not relieve the contractor of their responsibility for welding and cutting safety. The designated fire watch shall give the job of fire surveillance their undivided attention.
16. Carts specifically designed for O<sub>2</sub> and Acetylene with a manufactured separation barrier between the cylinders may be used for ready storage.

## 9.0 Records and Forms

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

The following records shall be retained in accordance with this procedure.

1. Form SSC-68, Flame "Hot Work" Permit
2. Form SSC-221, Application for Small Appliance Permit
3. Form SSC-222, Permit for Use of Small Appliances
4. Form SSC-576, Confined Space Entry Permit
5. Form SSC-618, Dig Permit
6. Form SSC-724C, SSC Training and Certification Record System Attendance Roster
7. Form SSC-793, Permit for Use of Flammable Storage Cabinet (For Fire Department Use Only)
8. Form SSC-808, NASA Lockout/Tagout Tag
9. Form SSC-814, SSC Safety & Health Activity Hazard Analysis
10. Form SSC-821, Permit Required Confined Space Reclassification
11. Form SSC-848A, Hazardous Energy Control Procedure
12. Form SSC-850, Mishap Exposure Report
13. Form SSC-852, SSC Construction Safety Job Site Audit
14. Form SSC-853, Construction Project Hazard Analysis
15. Form SSC-879, Construction Weekly Safety Inspection
16. Form SSC-882, Contractor Safety and Health Evaluation
17. Form SSC-1627, Mishap Report

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## Appendix A– Definitions

**AHA** – The AHA is specific to an activity (i.e., pile-driving, concrete pour), as opposed to the Job Hazard Analysis, which is specific to the steps within a task or job. AHA is sometimes called a Safe Work Permit or Safe Plan of Action. The AHA is a tool to review the activities being performed for the purpose of identifying all hazards of the activity and taking measures to protect employees and/or reduce risk.

### Close Call -

- **NMIS Close Call** – An unplanned event in which there is no injury, and equipment or property damage is less than \$20,000, but which possesses the potential to cause a mishap.
- **CCRS Close Call** – A hazard condition and/or situation which, if uncorrected, has the potential to result in an injury to personnel or damage to equipment/property.

**Competent Person** – A "competent person" is defined by OSHA as "one (1) who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them." A "competent person" has training and/or experience, is knowledgeable of applicable standards, is capable of identifying workplace hazards relating to the specific operation, and has the authority to correct them. Some standards add specific requirements that must be met by the competent person and will be enforced as applicable.

**Construction Contractor** – A group or individual that is contracting with NASA SSC for the construction or renovation of a building, road, or other structure.

**Construction**—Activities including: construction, excavation, alteration, renovation, repair, painting, decorating, surveying, and demolition.

**Corrective Action** – The action(s) resulting from a finding, incident investigation, inspection, meeting, or audit that need to be addressed to ensure a safe and healthy worksite/workplace.

**Consultant** - Experienced professional or firm who provides expert knowledge for a fee. He or she works in an advisory capacity only. If the scope of the consultation should lead to construction like activities, the Consultant shall be considered a construction contractor and applicability to this SCWI and all associated procedures shall apply, as stated in section 2.0.

**Designated Construction Zone** – an area where construction occurs which is designated by Construction Safety Officials as having heightened risk commensurate with the need to establish a baseline minimum safety protocol to assure safe work practice.

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**Mishap** – A NASA term used to describe an unplanned event that results in at least one (1) of the following: 1) an injury to non-NASA personnel, 2) damage to public or private property, 3) an occupational injury or occupational illness to NASA personnel, 4) a NASA mission failure before the scheduled completion of the planned primary mission, or 5) destruction of, or damage to, NASA property.

**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.

**NASA Direct Construction Contractors** - NASA prime construction contractors, their employees and their subcontractors performing construction activities at SSC for NASA. This includes the Multiple Award Construction Contract and other NASA directly funded construction contracts.

**NASA Prime Contractors** - The contractor and their employees who work for the SSC direct support contracts. These include:

1. SACOM, Laboratory Services Contract, Information Technology Services Contract, Protective Services Contract, and the Safety & Mission Assurance Services (NASA SMAS) Contract.
2. Subcontractors (and their employees) to the NASA Prime Contractors.

**Safety Plan** – Used to explain the process by which an organization manages safety and health. For NASA SSC purposes, Safety Plan will include procedures or work instructions that are used to achieve compliance with safety and health regulations.

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## Appendix B - Acronyms and Abbreviations

AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
CCRS	Close Call Reporting System
CFR	Code of Federal Regulations
CO	Contracting Officer
COR	Contracting Officer's Representative
CPHA	Construction Project Hazard Analysis
dBA	Decibels – A-weighted
LDEM	Lifting Device Equipment Manager
LO/TO	Lockout/Tagout
MER	Mishap Exposure Report
MUTCD	Manual of Uniform Traffic Control Devices
NASA	National Aeronautics and Space Administration
NFPA	National Fire Protection Agency
NMIS	NASA Mishap Information System
NPR	NASA Procedural Requirement
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
PSM	Process Safety Management
RPE	Registered Professional Engineer
SACOM	Synergy-Achieving Consolidated Operations and Maintenance
SCWI	John C. Stennis Space Center Common Work Instruction
SDS	Safety Data Sheet
SMA	Safety and Mission Assurance Directorate
SPD	John C. Stennis Space Center Policy Directive
SPR	John C. Stennis Space Center Procedural Requirement
SSC	John C. Stennis Space Center
SSP	John C. Stennis Space Center Plan
SSTD	John C. Stennis Space Center Technical Standard
STAR	System for Tracking Audits/Assessments and Reviews
TCP	Traffic Control Plan
VPP	Voluntary Protection Program