



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

**SCWI-8715-0008**  
**Rev. F**  
**March 2015**

**John C. Stennis Space Center**  
**Construction Safety and Health Program**

Stennis Common Work Instruction	SCWI-8715-0008	Rev F
	<i>Number</i>	<i>Rev. I</i>
	Effective Date: March 17, 2015	
	Expiration Date: March 17, 2020	
Responsible Office: QA00/Safety and Mission Assurance Directorate		
<b>SUBJECT: Construction Safety and Health Program</b>		

## Approved By:

*Signature on File*

*03/12/15*

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 Freddie Douglas III  
 Director, Safety and Mission Directorate

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 Date

## 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 (MUTCD) 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.

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Status/Change/ Revision	Change Date	Originator/ Phone	Description
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 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

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			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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## 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.

## 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. American National Standard Institute ANSI B 15.1-1958, Safety Code for Mechanical Power Transmission Apparatus
2. 14 CFR, Aeronautics and Space
3. 29 CFR 1904, Occupational Injury and Illness Recording and Reporting Requirements
4. 29 CFR 1910, Occupational Safety and Health Standards
5. 29 CFR 1926, Safety and Health Regulations for Construction
6. 40 CFR 7, Nondiscrimination in Programs or Activities Receiving Federal Assistance from the Environmental Protection Agency
7. 40 CFR 82, Protection of Stratospheric Ozone
8. 40 CFR 112, Oil Pollution Prevention
9. 40 CFR 122, The National Pollutant Discharge Elimination System
10. 40 CFR 257, Criteria for Classification of Solid Waste Disposal Facilities and Practices
11. 40 CFR 258, Criteria for Municipal Solid Waste Landfills
12. 40 CFR 261, Identification and Listing of Hazardous Waste
13. 40 CFR 273, Standards for Universal Waste Management

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14. 40 CFR 761, Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
15. 40 CFR 763, Asbestos
16. 43 CFR 7, Protection of Archaeological Resources
17. Manual on Uniform Traffic Control Devices (MUTCD)
18. NFPA 70E National Electrical Code
19. NPR 8621.1, NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping
20. NPR 8715.3, NASA General Safety Program Requirements
21. SPR 8715.1, Safety and Health Program Requirements
22. SPR 1400.1, Document Preparation, Numbering, and Management
23. SPR 1440.1, Records Management Program Requirements
24. SSP-8715-0001, Safety and Health Handbook
25. SSP-1740-0057, Flammable Liquid Storage Cabinets
26. ANSI B15.1-1958, Safety Standard for Mechanical Power Transmission Apparatus
27. E.O. 13423, Strengthening Federal Environmental, Energy, and Transportation Management
28. NFPA 70E, Standard for Electrical Safety in the Workplace
29. SSTD-8070-0119-MISC, Standard for Dig Permit
30. SCWI-8500-0004, Hazardous Materials, Hazardous Waste and Solid Waste Plan
31. SCWI-1800-0005, Hazard Communication
32. SCWI-8500-0019-ENV, Asbestos Hazard Control Plan
33. SCWI-8500-0020-ENV, Integrated Contingency Plan
34. SCWI-8715-0003, Fall Protection Program
35. SCWI-8715-0004, Confined Space Entry Program
36. SCWI-8715-0005, Safety, Health, Housekeeping and Essential Item Inspections
37. SCWI-8715-0006, Electrical Safety Program
38. SCWI-8715-0010, Process Safety Management Program
39. SCWI-8715-0012, Work in Hazard Classification Areas
40. SCWI-8715-0013, Control of Hazardous Energy Lockout/Tagout and Non-Service/Maintenance Hazardous Energy Isolation
41. SCWI-8715-0014 Heat Stress Program
42. SWI-8834-0001, Lifting Devices and Equipment Management Instructions
43. SOI-8080-0040, Test Area Access Control
44. U.S. Environmental Protection Office. 1976. *Resource Conservation and Recovery Act*. 42 U.S.C. §6901 et seq.

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#### 4.0 ROLES AND RESPONSIBILITIES

##### 4.1 NASA SSC Construction Contractors

Construction contractors at SSC 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 <http://constructionsafety.ssc.nasa.gov/>) per contract. This course shall be taken within five (5) working days 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. In cases of conflicting statements between the OSHA and NASA Standards, the contractor shall follow the more stringent of the conflicting statements.
  - c. Mishaps are minimized to the greatest extent possible with the ultimate goal of zero.

##### 4.2 NASA SSC Onsite Prime Contractors

NASA SSC Onsite 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.

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3. Ensure that contractor employees have the appropriate background and orientation training specified in this SCWI.
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 at least one (1) supervisory employee per contractor is trained in the course “Intro to Mishap Investigations” per contract. This course shall be taken within five (5) working days after being named to perform or support an accident 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 and with this SCWI.

#### 4.3 Safety and Mission Assurance 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. Evaluate and make recommendations on applying construction safety and health programs to be used during the contractor selection process.
4. Provide the Contracting Officer (CO) with useful evaluation data and facts that can be used to assist in the selection of contractors.
5. Provide feedback to selected contractors on their performance concerning safety and health requirements.
6. Identify actions necessary to improve the safety and health programs or plans prior to starting work onsite.
7. Assure the appropriate mishap and close call reporting investigating and evaluation criteria are incorporated into contracts.
8. Meet requirements of NPR 8621.1, section 1.4.23, regarding Mishap Investigations.
9. 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.)
10. Measure and evaluate contractor performance and compliance.
11. Maintain an action tracking system for follow-up and recordkeeping purposes.
12. Develop annual contractor safety and health goals to promote continuous improvement.
13. Maintain the SSC Construction Safety Web Site at <http://constructionsafety.ssc.nasa.gov/>

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#### 4.4 Office of Center Operations

The NASA SSC Center Operations Directorate Environmental Lead 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 followup and recordkeeping purposes.

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

The NASA SSC Contracting Officer's Representative shall:

1. Obtain all necessary safety and health evaluation information and facts for inclusion in the contractor selection process.
2. Ensure safety and health evaluation results are given emphasis in the selection of a contractor.
3. Meet requirements of NPR 8621.1, section 1.4.29, regarding Mishap Investigations.
4. Provide appropriate follow-up actions acceptable to NASA SMA Directorate and Center Operations Directorate Environmental Management Staff 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. Participate in the Configuration Control Board (CCB) for construction.

#### 4.7 All Employees

All employees shall:

1. Use the "Close Call" process to report safety and health violations and risks involving observed actions of contractors.
2. Stay away from construction areas and be cognizant of tags, signs, barricades, and other postings, unless granted proper authority and Personal Protective Equipment (PPE).

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3. Follow all safety and health requirements necessary to complete a job safely.
4. Report injuries and illnesses immediately to their respective supervisor.
5. Follow manufacturer's requirements and/or instructions on the proper storage, inspection and use of equipment, fall protection (active and passive), products, tools, and personal protective equipment.

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## 5.0 SELECTION AND ANALYSIS

NASA SSC is dedicated to the OSHA VPP. This dedication will manifest itself in compliance with OSHA regulations and safety and health management systems that will result in discovery of deficiencies and an expectation of safety success. Activities or conditions that may be acceptable in other organizations may not be acceptable at NASA SSC. It is imperative, and in the best interest of the contractor, to read and understand this SCWI and the associated requirements prior to the start of any projects.

1. NASA SSC shall maintain a comprehensive review process that all contractors are required to undergo regardless of the type of contract. The extent of each analysis is dependent upon the scope of work, type of activities, and risks involved. To facilitate the process, NASA SMA shall utilize form SSC-882 to record the review of each construction contractor's solicitation submittals and present those findings to the NASA Office of Procurement.
2. At NASA SSC, construction contractors that hire subcontractors shall maintain an equally effective selection and analysis process. This includes, but is not limited to, the use of Safety and Health specifications, review of injury/illness statistics, and training.
3. Prior to completing a solicitation bid, the contractor shall obtain:
  - a. A copy of this SCWI.
  - b. Specific NASA SSC SCWIs as applicable through the NASA SSC Construction Safety Web page at <http://constructionsafety.ssc.nasa.gov>.
4. The process used to select and analyze contractors by Onsite Prime Contractors shall be as effective as the NASA SSC process.

### 5.1 Solicitation Bid

At the time of solicitation, the following information shall be submitted to the Procurement Office for review by NASA SSC SMA:

1. All requested documents identified within the Safety and Health Specifications.
2. All related documents listed in the NASA SSC Safety and Health Specifications under SD-01 (Preapproval Submittals), SD-03 (Product Data), SD-07 (Certificates), and SD-11 (Closeout Submittals).

### 5.2 Analysis Process

NASA SSC uses an evaluation process to determine the status and condition of a contractor's safety and health program. The results of the evaluation help NASA SSC ascertain if the contractor has an acceptable understanding of managing an effective safety and health program.

1. The SSC SMA Directorate shall review all the specification submittals by the contractor to determine if the correct information was submitted and what, if any, deficiencies exist. A

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rating system will be utilized to rank the contractor's safety and health program along with other performance metrics. This information is forwarded to the Contracting Officer on form SSC-882 (Contractor Safety and Health Evaluation).

2. All contractors shall be required to submit safety and health information listed in the specifications.
3. After a contractor has been awarded a contract, revision of their safety and health program may still be necessary to ensure a state of readiness for the project. This requirement is also applicable to all contractors. See Section [5.3](#).
4. The contractor shall make all reasonable changes to meet NASA and OSHA requirements. It is expected that the revised actions strengthen the overall injury and illness prevention effort for the current project and any future work.

### 5.3 Revision and Safety Plan (Post Award)

1. When necessary, NASA SSC SMA will request additional work by the contractor to address program deficiencies, OSHA noncompliance, or critical improvements deemed necessary for the project. During this period, the contractor can schedule a meeting with SMA to clarify expectations. When the contractor believes they have addressed the critical deficiencies, they can request a second analysis by NASA SSC SMA.
2. Safety and health "revision" requirements shall be achieved to the satisfaction of SMA before a contractor is allowed to work in the field or mobilize onsite.

### 5.4 Disclaimer

NASA SSC SMA is not responsible for regulatory compliance and other safety and health deficiencies that are not disclosed or discovered, or that are misunderstood, during the evaluation process. It is the responsibility of the contractor to read and understand all of the safety and health policies and procedures provided, and to fully understand and comply with applicable governmental regulations related to their business and the project. NASA will not be liable to reimburse or increase funding to cover expenses incurred by discoveries of noncompliance or unforeseen and/or misunderstood compliance responsibilities of the contractor.



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## 6.0 MANAGEMENT AND OVERSIGHT

SPR 8715.1 provides the management and oversight structure for contracts issued to contractors performing work at NASA SSC. This structure defines the role of the Contracting Officer (CO), COR, SMA, and the contractor.

### 6.1 Management

1. NASA SSC, onsite prime contractors, and construction contractors shall manage their contractors so that safety and health accountability is maintained and contractor employees are provided the same level of protection as NASA civil service employees.
2. 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 be asked to reference other NASA SSC safety and health work instructions that are applicable to their type of work.
3. 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.
4. Where NASA SSC takes a more stringent position on compliance or safety and health practice, the contractor is expected to achieve equivalent compliance to remain in good standing.
5. 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.
6. 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 exceeded.
7. At all times during performance of a construction contract and until the work is completed and accepted, the Contractor shall assign and have on the worksite a competent superintendent who is satisfactory to the Contracting Officer and has authority to act for the Contractor.

### 6.2 Expectations

1. The contractor shall take all necessary safety and health measures in performing 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 in effect on the date of the contract.
  - 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

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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 CO or designee of any special safety restrictions established so that government personnel can be notified of these restrictions.
5. The CO or designee will notify the contractor formally in writing of any noncompliance with the provisions of this work instruction and will specify corrective action to be taken. Further, the contractor shall take other such safety and health measures as directed by the CO.
6. The contractor shall immediately take corrective action after receipt of notice from the CO or designee concerning any noncompliance.
7. If the contractor fails or refuses to institute prompt corrective action in accordance with the above, the CO may invoke the provisions of the clause in the contract entitled "Stop Work," or may invoke whatever other rights are available to the Government under the terms and conditions of this contract or at common law to remedy such failure or refusal to institute prompt corrective action.
8. 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.
9. 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.
10. 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.
  - c. Each subcontractor's safety and health plans, permits, Safety Data Sheets (SDS), OSHA regulations (29 CFR 1910 and 1926), and other safety and health program documents.
11. The contractor shall ensure:
  - a. Each new employee receives safety and health orientation specific to the construction site 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.
12. The contractor's personnel shall attend all OSHA required safety and health training applicable to the project/task/work.

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13. 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 (IDLH).

### 6.3 Minimum Construction Training Requirements

#### 6.3.1 Employee SSC Orientation

1. All construction project managers, superintendents, supervisors (i.e., foremen, crew chiefs), and construction employees shall complete the Basic Orientation Plus program presented by the Gulf Coast Safety Council (GCSC). This program can be attended at any of the twenty-six (26) Safety Councils throughout the United States that are associated with the GCSC. Contact with the council can be made at <http://gulfcoastsafetycouncil.com>.
2. If it is not possible to attend the GCSC Basic Orientation program, an equivalent program shall be required (i.e., OSHA ten (10) hour for contractor employees and thirty (30) hour training for Managers, Supervisors, and Safety and Health professionals). In addition to the above Basic Orientation Plus, all contractor employees, regardless of position, are required to participate in the NASA SSC Safety and Health Orientation. This orientation can be provided by the GCSC or through the NASA SSC project coordinator. Exception: NASA onsite prime contractor employees are excluded from this requirement.
3. All contractor and subcontractor employees shall receive this orientation training prior to starting work. Documentation of the orientation must be available at the job site for auditing.
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, personnel must also complete a safety orientation for that facility. Each facility safety orientation is approximately one hour in duration and is provided at no expense to the contractor employees. These orientations will be coordinated through the construction project COR or designee. Upon completion of the orientation, a test complex badge shall be issued by NASA Security or designees and must be worn at all times, unless prevented by safety concerns. For more information on test complex access and training, refer to SOI-8080-0400 (SSC Test Access Control).

#### 6.3.2 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 must be presented upon request. Acceptable evidence of training includes any or all of the following:
  - a. Current (within two (2) years) OSHA card showing course topic signed by an OSHA authorized trainer.
  - b. Current (within two (2) years) attendance records for training performed by a qualified representative of the contractor.
  - c. Current (within two (2) years) attendance records for training performed by a qualified third-party organization/person.

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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.
4. Where unspecified by OSHA, the contractor shall establish training frequency and maintain necessary documentation.

### 6.3.3 Regulatory (Asbestos, Lead, PSM, Radiation)

1. Portions of several buildings located at SSC contain asbestos spray-applied insulation on the underside of the roof structure, in intermediate floors, in mechanical equipment rooms, and in many piping/duct systems. Work performed in these areas that involves the removal of ceiling tiles and/or work in these ceiling spaces must be performed in accordance with asbestos work requirements established in SCWI-8500-0019-ENV and 40 CFR 763. Any disturbance of these insulating systems must be performed in accordance with SCWI-8500-0019-ENV and applicable regulatory requirements. If work in, adjacent to, or involving any of these insulating systems/areas should become necessary as part of the performance of this contract, notify the CO for prior clearance and to verify whether asbestos is involved.
2. The contractor shall submit documents showing that employees performing any OSHA Class I, Class II, or Class III asbestos work at NASA SSC have a current medical examination and a current respirator fit test.
3. The contractor shall submit documents showing that employees who perform asbestos abatement activities, such as management planners, project designers, inspectors, contractors, supervisors, workers, and air monitors, are trained to the requirements of the OSHA Asbestos Standard, 29 CFR 1926.1101, and certified by the Mississippi Department of Environmental Quality (MDEQ).
4. Safe work practices must be utilized when conducting work on lead-based materials. Contractors are required to comply with 29 CFR 1910.1025 and 29 CFR 1926.62. The contractor shall submit documents showing that employees performing work involving lead-containing materials are trained to the requirements of the OSHA Lead Standards, have a current respirator fit test, and hold a valid certificate from the Commission on Environmental Quality.
5. Training documentation shall be submitted to the CO for review prior to start of any lead or asbestos abatement work.
6. Documentation of asbestos training, lead abatement training, and all other required safety and health training shall be maintained onsite by the contractor and be made available for review by the CO.
7. Contractor employees who will be working in Process Safety Management (PSM) covered processes shall comply with the applicable sections of SCWI-8715-0010, Process Safety Management and undergo PSM overview training, which is available by the responsible NASA SSC onsite prime contractor.
8. Contractors who work in PSM covered areas are also subject to the requirements of SCWI-8715-0012, Work in Hazard Classification Areas.

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9. Individuals performing source radiography must have a radiography license issued or recognized by the State of Mississippi to perform such work at the SSC. The contractor's work plan and Radiation Safety Program will be reviewed and approved by the Facility Operating Services Contractor (FOSC) Non Destructive Evaluations Assistant Radiation Safety Officer. Construction engineering companies may also use portable density gauges containing radiation sources, usually Cesium-137, Americium-241, or Radium-226. The latter two (2) radioisotopes may be combined with beryllium metal, resulting in a neutron-emitting source that could be used for measuring moisture density in a material such as soil. Gauge users are required to have a radioactive materials license issued or recognized by the Nuclear Regulatory Commission of the State of Mississippi. The construction contractor is responsible for the safe use and storage of the density gauge. When not in use, the device should be secured in an area away from heavy equipment to minimize the chance of a construction vehicle accidentally crushing or damaging the shielding such that the source becomes exposed or dislodged.
10. Contractors using Type III and IV construction lasers shall have established written procedures that address:
  - a. Restriction of laser use to "qualified" persons.
  - b. The methods undertaken to minimize direct eye potential (e.g., verifying beam path prior to firing, consideration of beam termination, not positioning at eye level, prohibiting intentional direct viewing).
  - c. Prohibited times of use (i.e., dusk or night).
11. The contractor's laser-use procedure shall be included in the safety plan written for the involved construction task. The contractor should also provide the OSHA-required proof of qualification for their construction laser operator(s) with the proposed safety plan.

## 6.4 Construction Project Hazard Analysis

### 6.4.1 Basic Requirements

1. A Construction Project Hazard Analysis (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 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.

### 6.4.2 Format

1. The CPHA shall conform to Form SSC-853, SSC Construction Project Hazard Analysis.
2. If another form of CPHA is used, it shall contain the following information:

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- 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.
  - a. Location of construction activity (e.g., Stennis Space Center (Project) Area).
  - b. Estimated start date of construction activities at SSC.
  - c. Numerical identification for each phase of work.
  - d. 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).
  - e. 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).
  - f. 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 600 mm from the edge of the excavation and at a distance to prevent excessive loading on the face of the excavation.
- g. Contractor/subcontractor signature.

## 6.5 Activity Hazard Analysis

### 6.5.1 Basic Requirements

1. An Activity Hazard Analysis (AHA) 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.

### 6.5.2 Format

1. The AHA shall conform to Form SSC-814.
2. If another form of Activity Hazard Analysis is used, it shall contain the following information:

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- a. Name of contractor or subcontractor conducting construction activities
- b. Date of Activity Hazard Analysis
- 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., Stennis Space Center (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

## 6.6 Required Meetings

### 6.6.1 Preconstruction Meetings

Preconstruction meetings will be held by the Office of Procurement to review all necessary information related to the project, including safety and health plans.

### 6.6.2 Preparatory Meetings

1. The contractor shall meet with their subcontractors prior to the project start date to discuss safety and health plans/procedures and implementation. Discussions will include hazard assessments, AHA, procedures, training, permits, emergencies, and other requirements.
2. Occasionally either party may call subsequent conferences/meetings to confirm mutual understandings, to discuss changes to the contractor's safety and health plans, and/or to address deficiencies in the safety and health program or procedures, any of which require corrective action. Minutes of these meetings and action plans shall be recorded. All Safety and Health Program changes need to be submitted in writing using the NASA SSC transmittal process for acceptance by the SSC SMA Construction Safety Manager.

### 6.6.3 Monthly Meetings

1. The project superintendent or equivalent, and a designated safety representative is required to attend a mandatory safety meeting 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.

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3. Location of these monthly meetings will be communicated during the preconstruction meeting process.



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#### 6.6.4 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.

#### 6.6.5 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. This is a perfect forum to discuss and review the daily Activity Hazard Analyses 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.

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## 6.7 Mishap Reporting

### 6.7.1. Basic Mishap Reporting Requirements

1. The contractor shall immediately report by telephone, to the NASA SSC point of contact, the CO, and SMA Construction Safety all mishaps (accidents or incidents) including any spill or release of oil or hazardous substance that fall into the following categories:
  - 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 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 million.
  - 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. Mission Failure - Any event that prevents the accomplishment of a majority of the primary mission objectives.
2. Immediately after any incident, the contractor shall notify the NASA SSC SMA Construction Safety Manager, the Contracting Officer and Security.
3. Within twenty-four (24) hours, the contractor will complete NASA SSC Form 1627 (*NASA Mishap Report*). This report is required to be submitted via email or fax to the appropriate configuration coordinator, the Contracting Officer and the SMA Directorate.
4. Written documentation of corrective action is required to be submitted within ten (10) days of the mishap, and the CO and SSC SMA shall be given a copy of the report.
5. Instructions for completion of the NASA Form 1627 are printed on the reverse of the form. Blocks 1–22, 27–28, and 33 shall be filed with the CO within twenty-four (24) hours of the mishap.

### 6.7.2 Investigation Process

All mishaps 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 or fault. The following section defines the basic expectations.

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1. 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.
2. The contractor shall take immediate action to secure potentially dangerous conditions (i.e., disconnect electrical power, secure machinery) to protect personnel.
3. As directed by NASA SSC SMA or the CO, 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 equivalent technique and ultimately drive the corrective action process.
4. Ensure at least one (1) employee on the close call investigation team is trained in the Mishap Investigation Board Orientation (posted to the Construction Safety Site at <http://constructionsafety.ssc.nasa.gov/>) per contract.
5. After the contractor completes an investigation of the mishap and has developed a plan of corrective action, the contractor shall complete the remaining portions of the NASA Form 1627 and submit it to the CO or his/her representative and to SMA Construction Safety. Additionally, the contractor shall complete a written final investigation on company letterhead and sign the report.
6. If an investigation board is convened or will be convened, the supervisor or safety representative of the contractor shall complete the form and forward it to the CO, to his/her representative, and to the SSC SMA Directorate.

### 6.7.3 Close Call Investigations

1. A “close call” is defined as 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. A close call may result from hazards or unsafe acts. Close call forms are available through the NASA SSC project contact, SMA Directorate, and in any of the NASA SSC cafeterias.
2. The process for reporting close calls shall be explained to all contractors prior to the start of work and also to employees during the Safety and Health orientation.
3. The contractor shall communicate and reinforce the close call process to their employees and subcontractor employees.
4. The contractor shall investigate all such close calls to persons and property to the extent necessary to conclude what cause(s) resulted in said close call.
5. Ensure at least one (1) employee on the close call investigation team is trained in the Mishap Investigation Board Orientation (posted to the Construction Safety Site at <http://constructionsafety.ssc.nasa.gov/>) per contract.
6. The contractor shall document his/her investigation and develop a plan of corrective action.
7. Proposed corrective actions shall be determined through the contractor and NASA SSC SMA.
8. The corrective action plan shall be entered into the contractor’s Hazard Tracking System and the corrective action shall be tracked until completed.

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9. When complete, the contractor shall notify the SMA close call coordinator so that the close call corrective actions can be verified and closed.

#### **6.7.4 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 SSC SMA, 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 (<http://constructionsafety.ssc.nasa.gov>).

#### **6.8 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.

##### **6.8.1 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.

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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.

### 6.8.2 Construction Contractor Site Manager Weekly Inspection

The contractors shall inspect the site at least weekly for hazards and failures in following safety, health, and environmental requirements and shall document any identified hazards. As applicable, the weekly inspection will include:

1. Storm water pollution prevention controls
2. Hazardous waste accumulation areas
3. Solid waste and recycling
4. A review of proactive safety measures taken to protect workers, the job site and the environment. Positive findings/lessons learned will be shared with management and the CORs/construction management teams

### 6.8.3 Equipment Pre-Use Inspections

The contractor is responsible to ensure that all required inspections (daily or pre-use) of equipment are completed. These include but are not limited to lift truck, crane, scaffold, aerial lifts, PPE, earth-drilling equipment, and fire extinguishers. Inspections may be multi-shift in a 24 hour period.

### 6.8.4 Action Tracking Systems

The contractor shall have a system for initiating and tracking hazard elimination or control and for documenting the completion of corrective actions in a timely manner. The system must track all hazards identified through inspections, investigations, employee reports, surveys, and close calls to completion and shall include interim measures to protect employees and the environment from hazards while permanent action is in work. NASA SSC will not define the type of system used. It is the contractor's responsibility to demonstrate there is a process whether it is simple or complex.

### 6.9 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

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- f. Fall protection
- g. Excavation/trenching
- h. Steel erection
- i. Other construction activities as required by 29 CFR 1926

2. Documentation shall be provided of each person's competency.

**6.10 Medical Treatment**

The contractor shall post emergency first aid and ambulance information at the project site in a readily visible location.

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 work days 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

Non-emergency:

Medical services from onsite telephone (normal working hours).....8-3810

From an offsite/cell telephone (normal working hours).....228-688-3810

From an offsite/cell telephone (after normal working hours).....228-688-3639

**Note:** Because of certain security measures in effect in various areas at SSC, it is recommended that only the above emergency numbers be used in case of an emergency. Any other notification method may result in a delayed response by emergency personnel.

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## 7.0 MEASUREMENT AND EVALUATION

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

### 7.1 Inspections

NASA SSC SMA or the 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, activity hazard analysis, and safe behavior to determine whether safety and health responsibilities are being well managed. See Form SSC-879.

### 7.2 Audits

NASA SSC SMA or the 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, activity hazard analysis, and safe behavior to determine whether safety and health responsibilities are being well managed. See Form SSC-852.

### 7.3 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. The CO will maintain contractor performance through audits and other effective means for use in future evaluation processes.
4. 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. SMA reserves the right to prioritize findings so that penalties against the contract safety incentive program are applied when program deficiencies are the deemed root cause of audit findings.
  - c. The Office of Procurement 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.

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## 8.0 SAFETY AND HEALTH PROVISIONS

### 8.1 Contractor's General Safety and Health Plan

1. The contractor shall submit a current, comprehensive, written general Safety and Health Plan describing the contractor's overall Safety and Health Program as well as other documents requested in the Contractor Safety and Health Specifications. 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.

If the Plan does not describe how the contractor performs work at a client location, a more descriptive plan will be requested.

### 8.2 Plan Contents

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

1. A policy statement signed by the top manager of the company depicting their commitment to safety.
2. Individual work instructions or procedures shall include the following:
  - a. New employee and regulatory training (see section 6.3)
  - b. Visitor Protection and Construction Site Control
  - c. Incident/Accident Investigation Program and associated forms (see section 6.7)
  - d. Procedures for performing an AHA, which includes responsibilities of safety and health personnel, the workers, the supervisors and their roles in the analysis. (Include forms used in this process)
  - e. Worksite inspections (daily and weekly)
  - f. PPE (see section 9.3)
  - g. Control of Hazardous Energy - Lockout/Tagout
  - h. Hazard communication, including where SDSs are kept on the job site
  - i. Fall protection
  - j. Confined space entry and rescue
  - k. Electrical safety and PPE for voltages (NFPA 70E) (see 8.2.k)
  - l. Respiratory protection
  - m. Powered industrial equipment (forklifts)
  - n. Powered industrial equipment (mobile aerial lifts and other lifting equipment)
  - o. Excavation, trenching, and shoring
  - p. Emergency procedures in the event of a fire, personal injury, and/or property damage (including persons to be contacted in case of an emergency) (see section 6.10)
  - q. Ladders and scaffolding (safe assembly and fall protection)
  - r. Asbestos and lead removal (see section 6.3.3)



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- s. Hand and portable power tools including power cords, Ground Fault Circuit Interrupters (GFCIs), and inspection frequency
  - t. Stairways and portable ladders
  - u. Machine and equipment guarding
  - v. Lifting equipment (cranes and hoists, rigging)
  - w. Hot work
  - x. Welding and cutting operations
  - y. Pile-driving
  - z. Concrete and masonry practices
  - aa. Flammable materials storage, use, and handling
  - bb. Sanitation
  - cc. Lightning protection
  - dd. Motor vehicle safety
  - ee. Signs, tags, barricades, and signal lights
  - ff. Hearing conservation (see section 9.10)
  - gg. Abrasive blasting/hydro-blasting
  - hh. Hazardous waste operations and emergency response including hazardous material spill/release (see 8.2.j.6)
  - ii. Compressed gases (see section 9.15)
  - jj. Radiation protection (see 8.2.p)
  - kk. Demolition
  - ll. Blasting
  - mm. Fire protection/prevention
  - nn. Ergonomics
  - oo. Machinery and mechanized equipment use
  - pp. Tree maintenance and removal
  - qq. Diving operations
  - rr. Any other applicable processes, systems, or programs necessary to address risks on the job and regulatory compliance
  - ss. Drug and alcohol program and policy
  - tt. Waste management
  - uu. Storm Water Pollution Prevention Plan (SWPPP)
  - vv. Workplace Violence prevention
  - ww. Heat Stress prevention plan
3. 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.
  4. A resume depicting the experience of the individual assigned the responsibility of safety management/oversight. Organizations shall also indicate the means for Certified Safety

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Professional services if safety and health personnel either are not certified or have less than four (4) years working experience in the area of safety and health.

5. A list of key personnel to be contacted in time of emergency.
6. The appropriate “competent person” for specific activities. A “competent person” must be named for confined space entry, asbestos work, lead abatement, scaffolding, assured grounding, ionizing radiation, rigging equipment, fall protection, excavations, steel erection, and other construction activities as required by OSHA. Provide documentation of each person’s competency. These names may be provided at the beginning of each construction feature of work.
7. Frequency and types of safety meetings, tool box talks, and examples or forms used to document attendance.
8. A statement A requirement for all necessary provisions to be posted for off limit areas so they will not be entered; nor, will the integrity of any installed safety system (e.g., guard rails, signs, warning lights) be invalidated or tampered with. A statement verifying that the contractor will not invalidate the integrity of safety systems without proper authorization will be corporeal to the plan.
9. VPP status or plans.
10. The methods by which the employer intends to meet the objectives of the safety program, including:
  - a. Layout of temporary construction buildings and facilities
  - b. Maintaining continued job cleanup, safe access, and egress
  - c. Disaster and emergency preparedness to include emergency actions to be taken to secure dangerous conditions and to protect personnel in the event of an accident
  - d. Processes for medical treatment and first aid
11. Provisions for proper PPE will include hard hats, safety shoes, eye protection, safety harnesses, and other equipment. The contractor will provide their own PPE. At minimum, hard hats, safety shoes, safety glasses and high-visibility safety apparel are required for all persons working or entering a Designated Construction Zone at SSC.
12. Immediate reporting of accidents and close calls to the CO, as well as the procedures for securing an accident scene to preserve evidence in the event of an accident or an act of nature.
13. Procedures for safe pneumatic testing of pressure systems (wherever pneumatic pressure testing is to be conducted).
14. Procedure for defining smoking risk for the various phases of work, including company procedure for establishing, maintaining, and enforcing smoking only in designated areas.
15. The plan for preventing alcohol/drug abuse on the job and company policy and actions on substance abuse and repeat safety/health infractions by their employees.
16. Plan for monitoring employee exposures to heavy metals, lead, asbestos, dust, chemical, and noise exposures.
17. 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.

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18. Necessary provisions for submission of a Traffic Control Plan (TCP) to NASA SSC SMA or the responsible safety office for review and approval prior to any road work conducted on or within fifteen (15) feet of a traveled roadway. The TCP will be in accordance with the Manual of Uniform Traffic Control Devices for Streets and Highways, Federal Highway Administration. Traffic control and marking of hazards to cover haul loads, intersections, railroads, utilities and bridges shall be referenced in the TCP.
19. Standardized company procedures that incorporate recognized controls for the protection of personnel and property.

### 8.2.1 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.

### 8.2.2 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 and shall provide the prime contractor the following:
  - a. A senior executive of the subcontractor's firm must sign a document stating that they will participate in the prime contractor's program. A copy of this document must be submitted with the prime contractor's contract-specific Safety and Health Plan.
  - b. 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

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- (e). Other safety and health issues affecting the subcontractor's employees on this contract
- c. The subcontractor will provide to the prime contractor:
  - (f). Independently documented Safety EMR used to calculate Workmen's Compensation Insurance
  - (g). The current EMR and the previous two (2) years' EMRs
  - (h). Certified evidence of the OSHA TRIR with the North American Injury Classification System (NAICS) Code for the current Recordable Incident Rate (RIR) and the previous three (3) full years' RIRs
  - (i). Certified evidence of the OSHA DART rate with NAICS code for the current DART rate and the previous three (3) full years' DART rates
  - (j). Information on all OSHA citations issued to the firm over the past three (3) years and how each citation was resolved or mitigated
  - (k). Information on all previous OSHA-reportable mishaps (OHS Forms 300) that have occurred in the past three (3) years to include:
    - (1). Any fatalities that have occurred
    - (2). Whether the investigation has been completed and, if so, the results
    - (3). The cause of the safety and health mishaps. Describe the corrective action taken and when it was implemented. If the corrective action has not yet been implemented, provide the planned implementation date. (The following Web site shall be used to verify data: <http://www.osha.gov/oshstats/index.html>).
- 4. Subcontractors performing asbestos-related work at SSC must provide their firm's Safety and Health Plan in accordance with the requirements above. This plan must discuss work procedures, provide a written Hazard Communication Program, and provide a written Respiratory Protection Program. This plan must demonstrate compliance with 29 CFR 1926.1101, 29 CFR 1910.134, and SSP-8715-0001. The CO will approve this written document before the subcontractor is allowed to perform asbestos work at SSC.
- 5. Subcontractors who require the use of respiratory protection or voluntarily allow it to be worn must provide a written respiratory protection program demonstrating compliance with 29 CFR 1910.134. This includes exposure monitoring data that documents the level of protection provided by the respirator. The CO will approve this written document before the subcontractor is allowed to perform work at SSC.
- 6. Subcontractors performing work with lead-containing materials at SSC must provide a written lead compliance plan demonstrating their compliance with OSHA standards.
- 7. Subcontractors must provide a written fall protection plan demonstrating compliance with 29 CFR 1926 Subparts L, M, R, and X as applicable for performing leading edge work; for working on scaffolds, roofs, and steel structures; or for working at unprotected heights above six (6) feet.
- 8. Subcontractors performing work on energized systems (e.g., electrical, hydraulic, kinetic, mechanical, pressurized) must provide a written plan demonstrating compliance with isolation and lockout/tagout (LO/TO) requirements of 29 CFR 1910.147 and SSP-8715-0001.

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### 8.2.3 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.

## 9.0 SPECIFIC REQUIREMENTS OVERVIEW

### 9.1 Lockout/Tagout

1. When SSC work requires the use of LO/TO procedures for worker protection, special responsibilities shall be assumed by both the requesting organization and the offsite contractor(s) in accordance with OSHA 29 CFR 1910.147 and requirements listed in this section.
2. LO/TO 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.
  - 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.
3. The contractor shall furnish proof of compliance with 29 CFR 1910.147, including verification that each employee has been trained in the procedures set forth by the contractor for locking and/or tagging the various equipment, components, or systems.
4. The requesting SSC organization shall provide the offsite contractor with a current copy of SCWI-8715-0013, Control of Hazardous Energy Lockout/Tagout and Non-Service/Maintenance Hazardous Energy Isolation.
5. The requesting SSC organization shall ensure the offsite contractor provides a copy of their safety and health procedure to the monitoring safety office prior to starting any work to ensure all potential LO/TO conflicts are resolved before the commencement of work.
6. The requesting SSC organization shall ensure the offsite contractor provides a request for SSC LO/TO training to the FOSC prior to starting any work if such training is required.
7. The offsite contractor and the requesting SSC organization shall fully understand that no work can begin until the offsite contractor's hazardous energy control procedures are approved.

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8. LO/TO program locks shall be red in color and used exclusively for locking out equipment in conjunction with this program.
9. Each lock must be accompanied by a Form SSC-808 identifying:
  - a. Company/organization name
  - b. Name and department of authorized employee who installed lock
  - c. Supervisor's name and contact information
  - d. Realistic estimated removal date
10. Tags must be legibly completed using fine or extra-fine permanent marker.

**Figure 1. SSC LO/TO Tag (Form SSC-808).**

11. The contractor shall ensure a written LO/TO procedure is completed prior to the lockout being performed. The procedure will outline the process to be followed by the contractor's employees for the specific job/task.
12. The contractor's LO/TO procedure shall be posted at the job site during the entire work task.
13. To document the LO/TO procedure, the contractor shall use NASA SSC Form 848 for a detailed written procedure that complies with OSHA requirements.
14. At the end of the job, the procedure will be maintained by the contractor for a period of one (1) year.
15. The requesting SSC organization and offsite contractor shall fully understand and comply with all the SSC LO/TO program requirements. Contact the responsible organization's safety office if additional information is needed.
16. The offsite contractor shall fully understand that a supervisor/foreman who is familiar with the SSC LO/TO program shall be onsite at all times while any LO/TO activities are being performed.

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17. The contractor shall be responsible for ensuring the system is safe and each employee relying on a lockout is protected by his/her own personal lock and tag.
18. Locks shall be individually keyed so no employee can remove another person's lock. The locks used must be plainly marked and identifiable as to who placed a lock.
19. The requesting SSC organization shall ensure that all affected employees and other employees working in the area where the offsite contractor is performing LO/TO activities are informed of this work.
20. The requesting SSC organization and offsite contractor shall ensure that any LO/TO activities performed by more than one (1) crew or contractor are coordinated, and that a group LO/TO procedure is initiated.
21. If the requesting SSC organization does not have an authorized employee to lockout the equipment/system during service by the offsite contractor, the organization shall coordinate this support service through the FOSC.
22. The requesting SSC organization shall monitor the offsite contractor to ensure compliance with all SSC LO/TO program requirements and that the contractor identifies and reports any potential problems to the NASA SSC SMA Directorate.
23. The requesting SSC organization shall ensure that all offsite contractors' LO/TO devices are removed upon job completion and before the contractor leaves SSC.

## 9.2 Confined Space Entry

The requirements for permit-required confined space entry are specified in SCWI-8715-0004.

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.

NASA SSC requires strict adherence to the Confined Space Entry Work Instruction and use of the SSC Confined Space Permit Form SSC-576.

## 9.3 Personal Protective Equipment

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 activity hazard analysis for the construction activity.

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

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requirements pertain to all personnel entering the Designated Construction Zone. Additional PPE above the minimum shall be based upon the activity hazard analysis.

#### 9.4 Fire Prevention and Protection

1. 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.
2. Burning trash, brush, or wood on the project site shall not be permitted.
3. 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 FOOSC SMA department or the SSC Fire Department.
4. In Process Safety Management (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.
5. A copy of the Hot Work permit shall be made available at the job site with the Activity Hazard Analysis.
6. Convenience appliances at construction sites/office trailers – Devices 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. This form may be obtained through the NASA SSC Construction Safety Web site (<http://constructionsafety.ssc.nasa.gov>).

#### 9.5 Welding, Cutting and Melting

1. The contractor shall clear welding and cutting operations with the CO’s representative before operations begin and obtain a Form SSC-68 for any activity that produces a source of ignition.
2. Prior to performing work in a hazardous or potentially hazardous atmosphere, the contractor shall contact the FOOSC Safety Office to conduct a safe atmospheric check of the area.
3. 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.
4. Tarpaulins used for covers or shields shall be fire resistant.
5. Shields shall be used when required to protect personnel from flash burns.
6. The contractor shall provide appropriate PPE for welding operations based on the nature of the hazards and exposure assessments.
7. 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



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- 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.
8. 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.
  9. The contractor shall discontinue burning, welding, or cutting operations thirty (30) minutes prior to the end of the normal work day.
  10. A contractor representative shall remain at the site for thirty (30) minutes after discontinuing burning, welding, or cutting operations to perform a thorough inspection of the area for possible sources of latent combustion.
  11. 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.
  12. Any unsafe conditions shall be reported to the SSC Fire Department. (From an onsite phone, dial 911 or 8-3639; from an offsite phone, dial 228-688-3639.)
  13. If operations involve a possible fire hazard, the contractor shall notify the CO and shall not proceed until clearance is obtained in writing. The CO 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.

## 9.6 Use of Explosives

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

## 9.7 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.
2. The contractor shall be subject to the requirements of SCWI-8715-0006, Electrical Safety Program. This SCWI is available from the Construction Safety and Health Web site (<http://constructionsafety.ssc.nasa.gov>).

## 9.8 Outside Areas

1. Streets, walkways, and facilities occupied and used by the Government shall not be closed or obstructed without written permission from the CO. If the contractor must obstruct any part of a street, walkway, or access to a facility, the contractor shall submit a written Traffic Control Plan (TCP) for approval by the COR (or designee) prior to commencing any such obstruction. The TCP shall be in compliance with the Manual of Uniform Traffic Control Devices (MUTCD).
2. Barricades, signs, and/or caution tape shall be placed where necessary to warn and protect employees against hazardous conditions and activities, such as overhead work, floor and wall openings, and trenches.

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## 9.9 Fall Protection

1. Compliance with 29 CFR 1910.23 and 29 CFR 1926.500 is required.
2. Per OSHA requirements, employees shall be protected from falling any time they work on a surface exposing them to a vertical drop of six (6) feet (1.8 meters) or more.
3. The contractor shall provide their own personal fall protection equipment/PPE.
4. The project safety plan provided by the contractor shall incorporate the required employee fall protection procedures as outlined in the OSHA 29 CFR 1926, Subpart M.
5. The plan shall be approved by the CO prior to any work commencing.
6. Per SCWI-8715-0003, Fall Protection Program, the contractor shall also comply with the following in addition to the OSHA standard:
  - a. For roofing work on low-slope roofs, fall protection (such as guardrail systems or warning line systems), a safety net system, or personal fall arrest systems are required. Although OSHA allows the use of a safety monitoring system as the only means of fall protection, this practice is not allowed at SSC.
  - b. Lanyards shall be equipped with double locking snap hooks. Non-locking snap hooks are not allowed at SSC.
  - c. For fall protection, full body harnesses (ANSI Class III) are required. Body belts will not be used at SSC as a means of fall protection.
  - d. Self-retracting lifelines and shock-absorbing lanyards shall be used so that the free fall distance does not result in the employee striking the ground and/or a free fall greater than two (2) feet.
  - e. Employees shall not be tied off to any roof structure that is not specifically designed as an anchorage point or has not been approved for use by a qualified person.

## 9.10 High Noise Level Protection

1. Hearing protection shall be made available for use in areas with sound levels at or above eighty-two (82) dBA.
2. Hearing protection shall be worn by employees when they are exposed to noise levels 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) dB.
3. Hearing protection shall attenuate employee noise exposure to an eight (8) hour Time Weighted Average (TWA) of eighty-five (85) dBA or less.
4. Hazardous noise construction areas shall be posted with warnings that hearing protection is required for all workers and visitors.
5. The contractor shall provide hearing protection to any authorized visitor to a hazardous noise construction site.
6. Hearing protection will be selected based on operations performed by the contractor near occupied areas involving the use of equipment with output of high noise levels (greater than ninety-four (94) dBA; e.g., jackhammers, air compressors, and explosive device activated tools). High noise work shall be scheduled for weekends or after duty working hours.

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7. Use of any such equipment shall be approved in writing by the CO's representative prior to commencement of work.

### 9.11 Hazard Communication

1. The contractor shall have a written Hazard Communication Program meeting the requirements of OSHA Standard 29 CFR 1910.1200.
2. The contractor shall ensure that each subcontractor is covered by a Hazard Communication Program.
3. All containers regardless of size and quantity shall be labeled with the chemical name and hazard warning information.

### 9.12 Safety Data Sheets (SDS)

1. Hazardous materials must be approved before being brought onsite. SDSs for all hazardous materials proposed for use at SSC must be provided to the CO for submission to the FOSC Environmental Services Office for approval prior to the delivery of the hazardous materials at SSC. Additionally, the contractor must ensure compliance with the OSHA Hazard Communication Standard (29 CFR 1910.1200).
2. At the contract job site, the contractor shall maintain a list of all hazardous materials on the job site as well as an SDS for each hazardous material used during the life of the contract.
3. The contractor shall ensure that each subcontractor is covered by a Hazard Communication Program.
4. The contractor shall ensure that all SDS requirements and recommendations are understood and followed by personnel using hazardous materials.
5. The contractor shall provide adequate controls to ensure SSC personnel are not adversely exposed to hazardous materials and to ensure the protection of the SSC environment.

### 9.13 Severe Storm Plan

In the event of a severe storm warning, the contractor shall:

1. Secure outside equipment and materials, and place materials subject to damage in protected locations
2. Check the surrounding area, including the roof, for loose material, equipment, debris, and other objects that could be blown away or against existing facilities
3. Ensure that temporary erosion controls are adequate
4. Construction office trailers are not considered safe locations during severe storms and or tornadoes. The contractor shall coordinate with the CO/COR a safe location to take cover prior to a severe storm or tornado and/or the warning of a severe storm or tornado.

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#### 9.14 Exposure Monitoring

1. The contractor shall conduct personnel exposure monitoring required for work involving hazardous chemicals, physical hazards (e.g., noise, radiation), and biological hazards (e.g., mold).
2. The contractor shall submit a report of exposure monitoring results to the CO. At a minimum, the report will include a description of:
  - a. Who was sampled (name and employee number where available) or notation that it was an area sample
  - b. Where the sample was taken
  - c. What chemical, physical, or biological parameter was sampled
  - d. The equipment used to take the sample, including calibration information
  - e. When the sample was taken
  - f. The sample duration
  - g. Activities performed during the sampling and identification of chemicals with which the employee worked, if applicable
  - h. Observed work practices
  - i. Type of engineering controls associated with the process
  - j. PPE used by the affected employee(s)
  - k. The results of the sampling, including an analysis of the results against the OSHA permissible exposure limit, American Conference of Governmental Industrial Hygienist Threshold Limit Value, or other applicable TWA, Short Term Exposure Limit, or Ceiling Limit.
  - l. An analysis of the adequacy of engineering controls, work practices, heat stress, and PPE

#### 9.15 Spill Prevention and Response

1. Adequate containment shall be provided for all liquid material and waste as required in 40 CFR 112 and SCWI-8500-0020-ENV. The containment area must be of adequate size to contain the volume of the largest drum, tank, or other container in the containment. All liquid waste must be stored on Spill Containment Pallets (SCPs), whether stored inside or outside. All individual containers of new/usable products greater than thirty (30) gallons (one hundred ten (110) liters) in capacity must be stored on SCPs inside or outside of the building. SCPs are not required inside only if engineering controls are used to make sure spilled materials cannot enter the floor drains or otherwise be released to the outside of the building.
2. SCPs shall also be used both inside and outside for the storage of any liquid in a container that is flimsy, damaged, or otherwise likely to release its contents. SCPs, drain pans, and spill/absorbent pads must also be used inside and outside as appropriate to minimize spillage during dispensing/transfer operations.
3. All SCPs in outside locations shall be covered as necessary to prevent/minimize the potential for water to accumulate in the pallet.

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4. Waterborne operations require special precautions to prevent spills directly into waters at SSC. Spill prevention measures must be planned ahead of time and may require the placement of booms or the stationing of absorbent pads prior to the commencement of work.
5. Spill prevention measures shall be taken when conducting fuel transfer operations.
6. At a minimum, absorbent material shall be available to prevent spillage to the ground.
7. If a spill of any size occurs, the contractor shall immediately contact the Fire Department at 911 (from an onsite telephone) or 228-688-3636 (from an offsite telephone).

### 9.16 Waste Management, Recycling, and Sustainable Acquisition

The contractor shall identify and dispose of all wastes produced in the following approved manners.

#### 9.16.1 Hazardous Waste Disposal

1. Identify all wastes (including chemicals; paints; petroleum, oil, and lubricant products; and solvents) and waste-producing processes and their containers. All aerosol cans shall be considered hazardous waste and disposed of accordingly.
2. Obtain a determination of whether the waste is hazardous from the CO or from the COR as required by 40 CFR 261.
3. Notify the COR prior to taking disposal action for any hazardous waste.
4. For disposal, provide either laboratory analysis data documenting the chemical content of the waste or certification by appropriate organization authority of the chemical constituents of the waste. The CO will provide technical assistance on disposal analysis requirements as requested.
5. Document the waste type, quantity, location, and personnel/contractor/agency responsible so that the material can be tracked from generation through ultimate disposal as required by the Environmental Protection Agency under the Resource Conservation and Recovery Act.
6. The COR shall provide guidance on the establishment, requirements, and management of Satellite Accumulation Areas for the management of hazardous waste and subsequent disposal, as appropriate.
7. General requirements include:
  - a. All containers holding thirty (30) gallons (one hundred ten (110) liters) or greater are required to be on spill pallets and protected from the elements.
  - b. Oily rags and aerosol cans must be collected in a designated location and containers must be clearly marked and kept closed unless adding or removing waste.
  - c. Empty drums shall not be stored among those used for waste storage.
  - d. All drums must be labeled, unless completely empty.
  - e. "No Smoking" signs shall be posted in each area where flammable materials are stored.
  - f. All work areas shall be kept clean and orderly.
  - g. Storage of hazardous materials shall be minimized.

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- h. Entering into a rolloff waste container poses an element of human risk, which shall be evaluated in advance of work operations associated with these containers.

### 9.16.2 Solid Waste Disposal

1. Solid waste includes all discarded or inherently waste-like materials. This definition may include solids, liquids, semi-solids, and materials collected for recycling as defined in 40 CFR 257 and 40 CFR 258.
2. Small quantities of solid waste can be disposed of in dumpsters located throughout the site. Containers with free liquids shall not be disposed in dumpsters. No containers containing, or having contained, hazardous or contaminated materials (e.g., paints, thinners, chemicals) will be disposed of in the dumpsters.
3. Larger loads shall be transported to offsite permitted landfills unless otherwise instructed by the CO to use the SSC landfill. All disposals at the SSC landfill must be personally approved of by the landfill operator.

### 9.16.3 Universal Waste

Contact the SSC CO for proper disposal if the project involves removal of lamps, including fluorescent lamps, high intensity discharge lamps, batteries, and thermostats. These items will be handled by appropriately trained FOSC personnel who will follow all requirements of 40 CFR 273.

### 9.16.4 Painting Operations Waste

1. All liquid, oil-based paint must be thoroughly drained from the paint cans and buckets by inverting the containers on the drum funnel (or by using the can crusher). Empty cans will be crushed and placed in a designated container. Containers with liquid waste cannot be placed in either the empty metal can bin or the landfill bin.
2. Used aerosol spray cans will not be crushed. They will be bagged and stored in a container. Used brushes, plastic containers, and paint cans that have more than 1/2 inch (13 millimeters) thickness of paint in the bottom must be bagged and placed in a separate container for landfill disposal. Latex paint waste shall be clearly labeled as "Waste Latex Paint." Empty metal latex paint cans will also be crushed and placed in a container.
3. All rules governing the disposal of hazardous waste shall be followed if using enamel paints, other oil-based paints, thinners, or other flammable substances.
4. A report detailing the type(s) and amount(s) of paint used shall be submitted to the CO upon completion of the painting portion of any project. The report shall be accompanied by copies of any and all related SDSs.

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### 9.16.5 Recycling

All onsite contractor personnel, including subcontractors, must place appropriate unused or discarded materials into the NASA Center recycling programs. Such materials include but are not limited to scrap metal, concrete, batteries (lead, nickel/cadmium, silver, and mercury), fluorescent lamps, paper, cardboard, natural/untreated wood, pallets, aluminum cans, and any other material where onsite recycling is available. A specific staging area has been designated for the collection of natural/untreated wood pallets, and concrete. All recycling arrangements shall be coordinated with the CO.

### 9.16.6 Sustainable Acquisition

1. E.O. 13423 requires certain EPA-designated items purchased for use at SSC to contain recycled materials. For a list of these items and requirements, contact the CO. These items and details on the required recycled content may also be found at <http://www.epa.gov/cpg/products.htm>. The contractor shall comply with sustainable acquisition requirements for all products procured for the performance of all contract requirements. If the contractor proposes to use products that do not meet the minimum recycled content requirements, a request for waiver must be submitted and approved before procurement of nonconforming items.
2. The contractor shall be deemed responsible for ensuring all subcontractors adhere to the aforementioned requirements while performing contractual requirements.
3. SSC shall consider the extent to which the contractor proposes to use recycled products and materials.
4. On completion of the project or each January 1, a Sustainable Acquisition Materials List Report, regarding the purchase of all products on the Environmental Protection Agency's Comprehensive Procurement Guideline List, shall be submitted to the CO.
5. The Sustainable Acquisition Materials List Report shall include the total amount of designated items purchased, the total cost of designated items purchased, the total amount of designated items purchased meeting recycled materials minimum content requirements, the total cost of designated items purchased meeting recycled materials minimum content requirements, the number of waivers requested, and the total cost of each waived item purchased. Items include concrete, insulation, carpet, latex paint, floor tiles, and roofing material.

### 9.17 Storm Water Pollution Prevention and Permitting (SWPPP)

1. The contractor shall develop and implement an SWPPP and obtain permit coverage as necessary.
2. All SWPPPs and permit applications shall be submitted to the CO for concurrence and approval before submittal to MDEQ.

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- Copies of completed applications, plans, permits, inspection forms, closure package, and any other correspondence to and from MDEQ regarding the status of storm water permits/issues shall be forwarded to the CO.

### 9.18 Wastewater Disposal

- Wastewater generated during the course of any project shall not be disposed of or allowed to be discharged into storm drains, ditches, or other onsite grounds.
- Chemical waste and chemical-contaminated wastewater shall not be poured down drains or disposed of in sinks. Discharges of these substances are prohibited by 40 CFR 122 and SCWI-8500-0004-ENV.
- Technical guidance on specific wastewater issues shall be provided by the CO, as requested.

### 9.19 PCB Management

- All maintenance activities or removal operations concerning materials contaminated by Polychlorinated Biphenyls (PCBs) shall comply with the requirements of 40 CFR 761 and be coordinated with the COR. PCB-contaminated materials include but are not limited to ballast, transformer equipment, and transformer oil.
- The contractor shall provide adequate spill protection and material management to prevent the release of PCBs into the environment.
- Requests for technical guidance concerning the disposition, management, and disposal of all PCB-contaminated materials shall be coordinated with the CO.

### 9.20 Removal of Equipment or Systems Containing Chlorofluorocarbons (CFC)

- All maintenance activities or removal operations on equipment or systems containing chlorofluorocarbons (CFCs; e.g., Freon and Halon) must comply with the requirements of 40 CFR 82 and shall be coordinated with the CO. All CFCs must be removed from the containing system prior to equipment removal and, if required, prior to various maintenance activities.
- Permission to remove CFC containing systems shall be gained from the CO prior to removal.

### 9.21 Cranes

- The use of any crane shall comply with 29 CFR 1926.1501, Subpart DD and SWI-8834-0001, Lifting Devices and Equipment Management Instructions.
- Prior to the use of any mobile crane brought to SSC, the Contractor shall submit the following documentation to the COR for review:
  - A copy of the crane's annual inspection/certification.
  - The crane operator's current training certification.
  - A current physician's certification, dated within the past two years.



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3. Any crane requires a pre-use inspection. Advance notification is required and must be made to the CO 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 CO or designee.
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.

### 1. Inspection Classification

(A) *Initial Inspection.* Prior to initial use, all new and altered cranes shall be inspected by a qualified person to verify compliance with the provisions of this volume.

(B) *Regular Inspection.* Inspection procedure for cranes in regular service is divided into two general classifications based on the intervals at which inspection should be performed. The intervals depend on the nature of the critical components of the crane and the degree of their exposure to wear, deterioration, or malfunction. The two general classifications are herein designated as *frequent* and *periodic*, with respective intervals between inspections as defined.

(1) *Frequent Inspection.* Daily to monthly intervals by a designated person.

(2) *Periodic Inspection.* One- (1) to 12- (12) month intervals, or as specifically recommended by the manufacturer or a qualified person.

### 2. Frequent Inspection

Items such as the following shall be inspected by a designated person for defects at intervals as defined in paragraph. 9.2(1) (d) (1) (B) (1) or as specifically indicated by the manufacturer, including observation during operation for any deficiencies that might appear between regular inspections. Any deficiencies shall be carefully examined and a determination made as to whether they constitute a hazard.

(A) All control mechanisms for maladjustment interfering with proper operation: daily, when used

(B) All control mechanisms for excessive wear of components and contamination by lubricants or other foreign matter

(C) Operational aids for malfunction: daily, when used

(D) All hydraulic hoses, particularly those that flex in normal operation of crane functions, should be visually inspected once every working day, when used

(E) Hooks and latches for deformation, chemical damage, cracks, and wear

(F) Rope reeving for compliance with crane manufacturer's specifications

(G) Electrical apparatus for malfunctioning, signs of excessive deterioration, dirt, and moisture accumulation

(H) Hydraulic system for proper oil level: daily, when used

(I) Tires for recommended inflation pressure

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### 3. Periodic Inspection

Complete inspections of the crane shall be performed by a qualified person at intervals as generally defined in paragraph. 9.2(1) (d) (1) (B) (2), depending on the crane's activity, severity of service, and environment, or as specifically indicated below. Any deficiencies shall be examined and determination made as to whether they constitute a hazard.

- (A) Deformed, cracked, or corroded members in the crane structure and entire boom
- (B) Loose bolts or rivets
- (C) Cracked or worn sheaves and drums
- (D) Worn, cracked, or distorted parts such as pins, bearings, shafts, gears, rollers, and locking devices
- (E) Excessive wear on brake and clutch system parts, linings, pawls, and ratchets
- (F) Any significant inaccuracies of operational aids
- (G) Lack of performance and compliance with safety requirements of gasoline, diesel, electric, or other power plants
- (H) Excessive wear of chain drive sprockets and excessive chain stretch
- (I) Cracked crane hooks
- (J) Malfunctioning travel steering, braking, and locking devices
- (K) Excessively worn or damaged tires
- (L) Hydraulic and pneumatic hose, fittings, and tubing
  - (1) Evidence of leakage at the surface of the flexible hose or its junction with the metal and couplings.
  - (2) Blistering or abnormal deformation of the outer covering of the hydraulic or pneumatic hose.
  - (3) Leakage at threaded or clamped joints that cannot be eliminated by normal tightening or recommended procedures.
  - (4) Evidence of excessive abrasion or scrubbing on the outer surface of a hose, rigid tube, or fitting. Means shall be taken to eliminate the interference of elements in contact or otherwise protect the components.
- (M) Hydraulic and pneumatic pumps and motors
  - (1) Loose bolts or fasteners
  - (2) Leaks at joints between sections
  - (3) Shaft seal leaks
  - (4) Unusual noises or vibration
  - (5) Loss of operating speed
  - (6) Excessive heating of the fluid
  - (7) Loss of pressure
- (N) Hydraulic and pneumatic valves
  - (1) Cracks in valve housing
  - (2) Improper return of spool to neutral position
  - (3) Leaks at spools or joints

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- (4) Sticking spools
- (5) Failure of relief valves to attain correct pressure setting
- (6) Relief valve pressures as specified by the manufacturer
- (O) Hydraulic and pneumatic cylinders
  - (1) Drifting caused by fluid leaking across the piston
  - (2) Rod seals leakage
  - (3) Leaks at welded joints
  - (4) Scored, nicked, or dented cylinder rods
  - (5) Dented case (barrel)
  - (6) Loose or deformed rod eyes or connecting joints
- (P) Hydraulic filters
  - (1) Evidence of rubber particles on the filter element, which may indicate hose, "O" ring, or other rubber component deterioration. Metal chips or pieces on the filter may denote failure in pumps, motors, or cylinders. Further checking will be necessary to determine the origin of the problem before corrective action can be taken.
- 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 certification/inspection document shall be kept onsite for inspection/audit.

## 9.22 Building Modifications within Occupied Facilities

The instructions in the following subsections outline the requirements for conducting building modifications within facilities occupied by employees/visitors.

### 9.22.1 General Requirements

Construction activities related to building modifications will conform to OSHA requirements and SSC safety requirements outlined in the various procedures of this SCWI and of OSHA regulations.

### 9.22.1 Specific Requirements

1. The following rules apply to storage of materials and to life safety:
  - a. Materials shall not be stored in a manner that obstructs any way of exit travel from any point in a building or structure to a public exit.
  - b. No exit door shall be locked.
  - c. No exit enclosure (e.g., enclosed stairway) shall be used for any purpose that would interfere with its use as an exit (such as for storage purposes).

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- d. No fire-rated doors (e.g., stairway enclosure doors) shall be left open and unattended where smoke or fire could pass through unchecked.
  - e. A sufficient width will be maintained for all corridors and other means of egress that will accommodate the occupant load of the currently occupied portions of the building/facility. (Under no circumstances will obstructions create a means of egress width of less than forty-four (44) inches.)
  - f. All saved or stored material shall be stored on only one (1) side of the corridor and without protrusions from the stored materials.
  - g. Gypsum board, piping, and other bulk materials that may shift or slide during storage shall be stored in a rack (preferably in the vertical position for wood sheets).
  - h. All stacked materials and equipment in storage shall be stable.
  - i. In the event that office or building contents are too bulky or present hazardous protrusions for temporary storage in corridors, then a suitable storage location shall be used for the materials.
  - j. A suitable alternate storage location shall be provided for all long-term renovations.
2. The following rules apply to housekeeping:
- a. Protruding nails from scrap lumber shall be immediately removed from the lumber or bent over to reduce puncture hazards.
  - b. All debris shall be kept clear of work areas, passageways, and stairs.
  - c. Combustible scrap and debris shall be removed at regular intervals during the course of construction (generally daily).
  - d. Containers shall be provided for the collection and separation of waste, trash, oily and used rags, and other refuse.
  - e. Covered metal containers shall be provided for garbage and other oily, flammable, or hazardous wastes.
  - f. Containers shall be emptied daily.
  - g. 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.
  - h. 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).
  - i. 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.
3. The following rules apply to signs and barricades:
- a. Appropriate warning signs and barricades shall be posted to prevent unauthorized entry to the modification/construction area.
  - b. If the modification/construction area may be required to be traversed in cases of emergency, appropriate signs shall be posted denoting the exit access as "use only for emergency exit."

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4. The following rules apply to flammable and combustible liquids:
  - a. No flammable or combustible liquids shall be stored in the facility overnight unless an approved flammable storage cabinet is provided.
  - b. Flammable liquids stored outside shall be stored in approved containers in a secure location.
  - c. Flammable storage cabinets require an approved Permit for Use of Flammable Storage Cabinet (SSC-793), in accordance with SSC Flammable Liquid Storage Cabinets, SSP-1740-0057.
5. The following rules apply to ventilation:
  - a. The SDS for adhesives, paints, and other fume-producing liquids or pastes shall be submitted to the FOSE Environmental Health Office to ensure safety of personnel in occupied parts of the building to be modified.
  - b. Adhesives, paints, and other fume-producing liquids or pastes shall be vented outside of the building by forced-air ventilation.
  - c. Ventilation ducts shall be isolated from the occupied section of the building to preclude dusts and fumes from entering occupied spaces.
6. The following rules apply to electrical systems:
  - a. Loose electrical switches and wiring shall be tied or fixed in such a way to prevent contact with personnel.
  - b. Electrical circuits shall be locked and/or tagged in accordance with SSP-8715.0001 and this SCWI.
  - c. Extension cords shall not be laid across hallway/corridor as to pose a tripping hazard to employees occupying the facility.
  - d. Temporary construction wiring shall conform to Subpart K of OSHA 29 CFR 1926 and to NFPA 70E, *National Electrical Code*.
  - e. Electrical extension cords shall not be run from inside of buildings to the outside of workplaces without a GFCI breaker installed at the receptacle location. Extension cords run outside will be protected from damage.

## 9.23 Safety in Concrete and Masonry Construction

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

### 9.23.1 General Requirements

1. 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.
2. 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.

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### 3. 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 properly spaced slings. Tag lines 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.

### 9.23.2 Specific Requirements – Concrete Finishing Equipment

#### 1. 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.

#### 2. 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.

### 9.23.3 Specific Requirements for Cast-in-Place Concrete

Where the potential exists for a form to fall, make provisions to:

1. Suspend the form and support it prior to stripping
2. Provide a safe area below, free of hazards and barricaded to prevent entry
3. Employ enough manual labor to help ensure that the form cannot fall

### 9.24 Diving/Underwater Work

The instructions in the following subsections outline the general requirements for performing diving operations related to construction, maintenance and inspection activities at SSC.

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### 9.24.1 General Requirements

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 the NASA SSC SMA Directorate.

### 9.24.2 Specific Requirements

Diving safety requirements based on water depth and type of work to be performed are provided in Table 1 and Table 2.

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

<b>Type and Depth</b>	<b>No. Divers</b>	<b>Diving Stand-by Supervisor</b>	<b>Tender</b>	<b>Total</b>
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
<b>NOTES:</b>				
a. 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.				
b. The standby diver may alternate with the working diver(s) in any twenty-four (24) hour period.				
c. Divers may dive without a tending line.				
d. 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.				
e. In an emergency situation, the Diving Supervisor will act as a tender when the standby diver has to dive.				



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**Table 2 - Diving/Underwater Work Over 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.

## 9.25 Excavation and Trenching

- The instructions in the following subsections outline the general safety requirements for excavating at SSC. Several historically sensitive areas as defined in 43 CFR 7 and in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) are located onsite. The CO shall verify whether the proposed excavation is located within the boundary of these areas.
- The NASA Environmental Office, through the CO, shall be contacted prior to any excavation within these areas.

### 9.25.1 General Requirements

- Interference Tolerances: Known or questionable interferences shall be hand-dug or vacuum excavated within six (6) feet (1.8 meters) of the interferences.
- Deep Excavation: Prior to any excavating or trenching operation deeper than twelve (12) inches (300 mm), a Dig Permit must be obtained and posted at the work site. (See paragraph "d" below for Dig Permit procedure.)

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3. **Shoring:** Unless proven otherwise by two methods - A visual and manual inspection by a competent person, soils at SSC will be considered type C (requiring a 1.5:1 slope\*). If this slope cannot be attained, shoring is required. (\***Note:** For excavations twenty (20) feet (6.1 meters) or less in depth.)
4. **Dig Permit:** All excavations, trenches, drilling, and other ground penetrations that will extend 12 inches (300 mm) or more below the ground surface will require compliance with SSTD-8070-0119-MISC and Dig Permit (Form SSC-618).

### 9.25.2 Excavation

1. 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.
2. Prior to performing any excavation work or any surface penetrations twelve (12) inches (thirty (30) centimeters) or deeper (such as driving stakes more than twelve (12) inches (thirty (30) centimeters) in the ground) on any ground surface, the contractor shall obtain a Dig Permit.
3. The contractor shall stake out subsurface high voltage cables, communication cables, and pipelines indicated within the scope of the work contemplated.
4. After exposure, the contractor shall obtain agreement from the CO on how much closer to the cable or pipe the excavations can be permitted.
5. 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.
6. All excavations and trenches five (5) feet (1.5 meters) or more in depth in which employees may be required to enter shall either be shored or sloped to the proper angle.
7. Sloping and shoring shall comply with 29 CFR 1926, Subpart P, *Excavations*.
8. Soils at SSC shall be considered type C soil unless assessed and documented otherwise by a competent person.
9. Type C soil shall require a one and one-half-to-one slope (run to rise).
10. If this slope cannot be attained, shoring shall be required.
11. The structural integrity of all shoring shall be certified by a competent person per 29 CFR 1926.650.
12. A stairway, ladder, ramp, or other safe means of egress shall be located in trench excavations four (4) feet (1.22 meters) or more in depth that require no more than twenty-five (25) feet (7.6 meters) of lateral travel for employees.
13. If ladders are used, they shall extend from the floor of the trench excavation to at least three (3) feet (0.91 meters) above the top of the excavation.
14. Ramps shall be constructed in accordance with 29 CFR 1926.651(c) (1) (i).
15. 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.
16. 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.

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17. Inspections shall be conducted throughout the shift and following rainstorms or other incidents that may change the integrity of the excavation.
18. For test area operations, no excavation work will be permitted on test days.

## 9.26 Pile Driving Operations

The following instructions provide the general safety requirements for pile-driving operations occurring within the confines of SSC.

### 9.26.1 Responsibilities

1. Construction Contractors: The construction contractor performing the pile-driving operation is responsible for ensuring:
  - a. That equipment is maintained for safe usage and that OSHA requirements are met.
  - b. That cranes used for pile-driving operations are inspected and certified by an independent crane inspection service.
  - c. That personnel are trained to safely operate pile-driving equipment.
2. Offsite Contractors: SSC's civil servant and FOOSC field engineers are responsible for assuring that offsite contractors are made aware of these requirements and that they comply with these requirements.
3. Equipment Inspection: SSC's civil servant and FOOSC field engineers are responsible for conducting an equipment inspection prior to the setup and use of any crane or pile-driving equipment within the confines of SSC.
4. Auditing: SSC's civil servant and/or FOOSC safety engineers are responsible for periodically auditing pile-driving work sites to assure safe working conditions.

### 9.26.2 General Requirements

1. Boom Stops: In all pile-driving/extraction operations, use a continuous boom stop with gradually increasing resisting force between the boom and structure of the crane.
2. Operating Wind Conditions: Do not conduct sheet-piling operations during winds in excess of twenty (20) miles per hour.
3. Personnel Safety: Personnel shall not remain on top of piles during driving activities. Hearing protection must be worn during pile-driving activities.
4. Use of Prototype Equipment: Do not use prototypical pile-driving equipment at SSC unless permission is obtained from the SSC Construction Manager and NASA SMA.
5. Leads: 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.

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6. Minimum Safety Equipment: Personnel in the immediate vicinity of pile-driving operations shall wear, at a minimum, hard hats, eye protection, hearing protection, and safety shoes.
7. Matting: Use matting as necessary where pile-driving and crane equipment will not be properly supported and stabilized by the soil.
8. Dogs on Pile Driver Hoist Drums: Do not use dogs on pile-driver hoist drums that automatically disengage by either relieving the load or rotating the drum.
9. Storage Prohibited: Landings or leads shall not be used for storage of any kind.
10. Pile Hammers: Lower pile hammers to bottom of leads while pile driver is being moved.
11. Pile Extractor: If piling cannot be pulled without exceeding the load rating of equipment, use a pile extractor.
12. Load Indicator: Use a load indicator on the hoisting equipment when extracting piling with lattice boom type setups.
13. Fall Protection:
  - 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. A full body harness with safety lanyard and shock absorber shall be used in lieu of safety belts on all elevated work associated with pile-driving.
14. Lightening Alerts: Weather conditions shall be monitored and operations shall cease during electrical storms or when lightening alerts are communicated through the Center Warning System.
15. Tag Lines: Use tag lines during sheet piling hoisting operations to control piling movement.
16. Number of Stabbed Sheet Piles: Limit the number of stabbed sheet piles within any run to an amount that will remain stable until driving.
17. Heavy Clothing: In addition to head protection, eye protection, and foot protection, personnel engaged in stabbing piles shall wear heavy shoes, heavy long-sleeved shirts, and heavy jeans or pants.
18. Equipment Requirements: 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.
19. Cutting Off of Piles: Do not perform work involving the cutting off of piles or other work within a radius of twice the length of the pile being driven.
20. Moving Parts Guarding: Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating, or moving parts or equipment will be guarded if such parts are exposed to contact by employees or may otherwise create a hazard. Guarding shall meet the requirements of American National Standards Institute (ANSI) B 15.1-1958, *Safety Code for Mechanical Power Transmission Apparatus*.
21. Hooking Up Piles: An employee engaged in hooking up piles should be the only individual allowed in the immediate area of the pile-driving operation.
22. Securing the Piling from Movement: Secure all piling from rolling by chocking the stack. No employee shall climb on a stack of piles where movement within the stack is possible.

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23. Checking for Defects: Examine piles for defects and cracks that could cause the pile to fail at any time during lifting or driving. These should be marked and removed safely from stock.
24. Manhandling Piles: Employees shall refrain from manhandling piles.
25. Rigging Selection: Rigging selection should be appropriate for the type and known weight of the piles.
26. Employee Positioning: Employees shall not place themselves between the leads and the pile or the leads and the crane.

### 9.27 Safety Requirements Related to Roofing Jobs at SSC

1. At the beginning of each workday, the contractor shall check with the CO's representative to ensure safe work conditions, including weather conditions, before proceeding to work on the roof.
2. Although OSHA allows personnel to watch over others (referred to as a "Safety Monitoring System") for certain roofing activities, history has shown this is not an effective fall protection methodology for roofing activities at SSC. A means of fall protection as outlined in OSHA and Section 9.9 of this document shall be used to provide worker protection when working off either high or low-pitched roofs with a roof edge height greater than six (6) feet from the ground level.
3. Asphalt and Kettle Selection:
  - a. Use fume-suppressing asphalt instead of conventional asphalt, or kettles with afterburner and loader systems when feasible. Follow the manufacturers' recommendations for work practices when using fume-suppressing asphalt. Because of safety concerns potentially associated with the use of kettle afterburner and/or loader systems, the manufacturer's use, maintenance, and work practice recommendations should be strictly followed.
  - b. Use kettles of appropriate size for the job. If kettles are too small, they will have to be opened more frequently to add asphalt, which increases worker exposure.
  - c. Make sure the lid fits tightly. Close the lids during normal operations when asphalt is not being added.
  - d. When opening the kettle lid to refill the kettle, fill to the maximum fluid level and complete other tasks, such as skimming and taking temperature readings. This will reduce the number of times the lid must be opened.
  - e. Chop the asphalt kegs into easy-to-handle pieces before opening the kettle lid to reduce the time the lid must be kept open when refilling.
  - f. In addition to required PPE, kettle operator shall wear safety glasses, face shield, and gauntlet-type gloves with sleeves rolled down.
4. Placing the Kettle at the Worksite:
  - a. Set the kettle on a level area to avoid spilling or tipping the kettle.
  - b. Place the kettle where the kettle operator and other on-roof workers will be least exposed to the fumes (e.g., downwind from the workers).
  - c. Always place the kettle with the inside of the lid facing away from the building (allowing fumes to be released away from the building when the lid is open).

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- d. Place the kettle away from air intake vents, doors, and windows to minimize the risk of exposing building occupants to asphalt fumes.
- e. Restrict access to the area immediately around the kettle. Mark the area with warning tape, traffic cones, and/or signs. The restricted area should be large enough for the kettle operator to work as well as for reducing the exposure of other on-roof workers by keeping them away from the kettle.
5. Maintaining Asphalt Temperature in the Kettle:
  - a. Maintain the lowest possible asphalt temperature in the kettle within the manufacturer's recommended temperature range. Always keep the temperature of the asphalt in the kettle at least twenty-five degrees (25) F below the maximum heating temperature specified by the manufacturer. Recommended application temperatures and maximum heating temperatures can be found on keg labels or bills of lading for asphalt delivered by tanker.
  - b. Before starting the job, make sure that all temperature-related equipment, such as thermometers and automatic shutoff mechanisms, are in good working order.
  - c. Calibrate the kettle thermometers and thermostats at least monthly or as recommended by the manufacturer.
  - d. Take manual temperature readings using a stem thermometer inserted just below the surface of the asphalt.
6. Requirements for operation of hot tar kettles associated with roofing activities are as follows:
  - a. All tar kettles or heating devices employing pressurized fuel burners shall be located at least twenty-five (25) feet from any combustible structure, building, material, or equipment.
  - b. No material of any nature shall be stored within ten (10) feet of the heating kettle except for kegs of bituminous asphalt that will be loaded into the kettle.
  - c. The immediate work area shall be free of all tripping hazards.
  - d. When drawing off and transporting buckets of hot liquid, when loading kettles, and when inside the kettle barricade, safety glasses, face shields, and gauntlet-type gloves with sleeves rolled down will be required.
  - e. Two (2) twenty (20) pound dry chemical extinguishers shall be located in the immediate vicinity of the kettle operator.
  - f. All gauges, valves, hoses, fittings, and clamps on and from the pressure fuel chamber to the burner will be examined on a daily basis.
  - g. Careful control of temperature of molten tar inside kettle shall be maintained to prevent accidental ignition.
  - h. The kettle operator shall be aware of recommended temperatures of the material being melted.
  - i. The kettle operator shall know how to properly extinguish an ignited kettle.
  - j. All equipment, including buckets or carrying containers, shall be free of all moisture to prevent "splattering" of hot liquid.
  - k. The area shall be barricaded and signs shall be posted around the work area.
  - l. Pipes shall be insulated and used to convey hot materials to upper elevations if there is any possibility of personnel contact.

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- m. When hoisting buckets of hot tar onto roofs, ensure that the area beneath the hoisting device is barricaded and that all personnel remain outside the barricade while buckets are being hoisted.
- n. The kettle operator shall be present at the kettle at all times when the kettle is in operation.
- o. Verification is required with the CO or designee of proper placement of the tar kettle when placing tar kettles for use near inhabited buildings.
- p. Kettle placement near air intakes shall be avoided.
- q. The kettle shall be monitored for no less than thirty (30) minutes after operations have stopped and the flame is extinguished.

### 9.28 Scaffolding

1. All scaffolds need to comply with 29 CFR 1926 Subpart L, Scaffolds, and with NASA SSP SCWI-8715.0001. In cases of conflicting statements between the OSHA and NASA Standards, the scaffold erector/user shall follow the more stringent of the conflicting statements.
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.*

### 9.29 Steel Erection

The purpose of this section is to provide the general safety requirements for the erection of steel structures at SSC.

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: Do not place open web steel joists on any structural steel framework unless the framework is safely bolted or welded.
3. Hauling Tools and Other Hand-Held Equipment: Do not carry bolts, connectors, welding rods, tools, and other hand-held equipment up ladders or walkways. Haul all material 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. Posting Sign When Working Overhead: Wherever men are working overhead, post a sign to alert employees of their presence stating, **“WARNING: MEN WORKING OVERHEAD.”** Install barricading or warning devices to keep employees away from areas where accidentally dropped tools and material may strike them.

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5. Good Housekeeping: Maintain good housekeeping on and around the work site when steel erection is taking place.

### 9.30 Earth Drilling Operations

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

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 Activity Hazard Analysis 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. Activity Hazard Analysis 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.



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

### 9.31 Ladder Safety

These 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 its maximum intended load.
  - b. A non-self-supporting portable ladder, commonly referred to as a "leaning ladder" must support at least four (4) times its maximum intended load.
  - c. Extra-heavy-duty metal or plastic ladders must be able to **support 3.3 times** their maximum intended load.
2. Ladder Angles
  - 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.
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- a. All ladders must be free of contact from:
  - a) oil
  - b) grease
  - c) wet paint
  - d) 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 face of a side rail.
5. OSHA 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 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.

### 9.32 Sanitation

1. Contractors shall adhere to the requirements of 29 CFR 1926.51 "Sanitation."
2. Fresh drinking water (plumbed, bottled or water cooler) shall be provided daily at construction sites. If coolers are used, they shall be changed daily, taped/sealed and dated. Water coolers shall be cleaned/ sanitized as needed but no less than once per month. Wash, wipe and/or rinse the cooler with a detergent and water (wipe/wash away visible algae/grime/dirt). Sanitize the water cooler with chlorine to water mixture of 1:250 (1 tablespoon per gallon of water). Sanitize all surfaces in contact with the drinking water. Let it stand for two (2) minutes and then empty the cooler through the spigot to sanitize it. The cooler can be air dried or rinsed with potable water.

### 9.33 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 accomplish if approved in writing by the manufacturer or with the use of an LDE Manager approved bottom lift fork attachment which centers the load 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.

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### 9.34 Barricades

Barricades shall be used to warn or to control/block access to an area with potential and/or existing hazards. 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.

1. 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.
2. Barricade tape shall be used to 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.
  - 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. The tape must encompass, completely around, on all sides, of the area it is protecting.
  - 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. You do not need permission to enter a yellow barricaded area, but you must look before you enter.
  - 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.

### 9.35 Heat Stress Prevention

NASA contractors and construction contractors shall:

- a. Follow the requirements outlined within the SCWI-8715-0014 “Heat Stress Program” or develop, implement, and maintain a Heat Stress Program for their employees conforming to this instruction.
- b. Respond to heat stress alerts by implementing the Heat Stress Program for employees exposed above the Heat Stress TLV.

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## 10.0 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 SSC Master Records Index.

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-808, NASA Lockout/Tagout Tag
8. Form SSC-814, SSC Safety & Health Activity Hazard Analysis
9. Form SSC-848, Hazardous Energy Control Procedure (HECP)
10. Form SSC-1627, Mishap Report
11. Form SSC-852, SSC Construction Safety Job Site Audit
12. Form SSC-853, Construction Project Hazard Analysis
13. Form SSC-879, Construction Weekly Safety Inspection
14. Form SSC-882, Contractor Safety and Health Evaluation
15. Form SSC-850, Mishap Exposure Report
16. Form SSC-793, Permit for Use of Flammable Storage Cabinet (For Fire Department Use Only)

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## Appendix A – Definitions

**Activity Hazard Analysis (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** – An event or condition that may have resulted in an accident, injury, or illness, but because of other factors did not. Examples include but are not limited to a broken circular saw that is not locked and tagged out; someone turns on the saw but notices the defect before trying to use it; a forklift operator takes a turn too quickly, dropping his\her cargo and nearly hitting a nearby worker.

**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.

**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)

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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.

**Onsite Prime Contractor** – A contractor hired by NASA SSC to carry out a function or responsibilities that are necessary for the operation of the Center.

**Safety Experience Modifier Rate (EMR)** – A computation for establishing Worker's Compensation insurance premiums. The formula compares actual reported loss information for a particular employer with average loss data for all employers in the state who are in the same classification codes. The data is one (1) of many safety performance related factors that are weighed by organizations when choosing a Contractor.

**Safety Plan** – Used to explain the process by which an organization manages safety and health. For NASA SSC purposes, a 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
ARSO	Assistant Radiation Safety Officer
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFC	Chlorofluorocarbons
CFR	Code of Federal Regulations
CO	Contracting Officer
COR	Contracting Officer's Representative
CPHA	Construction Project Hazard Analysis
DART	Days Away, Restricted, and/or Transferred
EMI	Engineering Modification Instruction
EMR	Experience Modifier Rate
EPA	Environmental Protection Agency
FOSC	Facility Operating Services Contractor
GCSC	Gulf Coast Safety Council
GFCI	Ground Fault Circuit Interrupter
IDLH	Immediately Dangerous to Life and Health
JHA	Job Hazard Analysis
LO/TO	Lockout/Tagout
MDEQ	Mississippi Department of Environmental Quality
mm	millimeter
mph	miles per hour
SDS	Safety Data Sheet
MUTCD	Manual of Uniform Traffic Control Devices
NAICS	North American Injury Classification System
NASA	National Aeronautics and Space Administration
NDE	Non Destructive Evaluations
NFPA	National Fire Protection Agency
NPR	NASA Procedural Requirement
PCB	Polychlorinated Biphenyls
PPE	Personal Protective Equipment
PSM	Process Safety Management
OSHA	Occupational Safety and Health Administration
RIR	Recordable Incident Rate
SCP	Spill Containment Pallet
SCWI	John C. Stennis Space Center Common Work Instruction
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

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SSP	John C. Stennis Space Center Plan
SSTD	John C. Stennis Space Center Technical Standard
SWPPP	Storm Water Pollution Prevention Plan
SWR	Stennis Work Request
TCP	Traffic Control Plan
TRIR	Total Recordable Incident Rate
TWA	Time Weighted Average
VPP	Voluntary Protection Program