

Kennedy NASA Procedural Requirements

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KSC Construction Contractor Safety and Health Practices Procedural Requirements

**National Aeronautics and
Space Administration**

John F. Kennedy Space Center

Revision History

The primary purpose of this document is to make available to NASA/KSC construction contractors requirements regarding Safety, Health, and Fire Prevention including project Safety and Health Plans, workplace safety compliance to 29 CFR 1926 (Safety and Health Regulations for the Construction Industry) and 29 CFR 1910 (Safety and Health Regulations for General Industry), National Consensus Standards, and NASA/KSC Safety Program and Policies.

Some of the requirements presented herein are repeated in this KNPR for convenience and appear in other requirements documents. Revisions of this KNPR will reflect changes to these requirements in other documents.

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PREFACE

P.1 Purpose

- a. The safety and health of all persons involved in any type of work at the National Aeronautics and Space Administration's (NASA) John F. Kennedy Space Center (KSC) is paramount. Safety is the freedom from conditions that can cause death, injury, occupational illness, damage to or loss of equipment or property, or harm to the environment. NASA's safety priority is to protect the public, international partners, astronauts and pilots, the NASA workforce (including contractor employees working on NASA contracts), and high-value equipment and property.
- b. This Construction Contractor Safety and Health Requirements Kennedy NASA Procedural Requirements (KNPR) was compiled for use by NASA/KSC Construction Contractors to assist them in developing Site Specific Safety and Health plans for their work at KSC and to assure contractors and their employees (to include subcontractors) perform all work in a safe manner compliant with 29 Code of Federal Regulation (CFR) 1926, Safety and Health Regulations for the Construction Industry, 29 CFR 1910, Safety and Health Regulations for General Industry, national consensus standards, and NASA and KSC Safety Program and Policies.
- c. This document is a summary of safety information, requirements, and regulations that NASA construction contractors shall follow when conducting work on KSC. Information provided is for reference only and is not intended to cover all safety requirements of the Occupational Safety and Health Administration (OSHA) and this contract. This KNPR is not intended to relieve contractors of their obligations under OSHA regulations or any other applicable local, State, or Federal laws and regulations.

P.2 Applicability

The provisions of this document are applicable to all prime NASA/KSC construction contractors and associated subcontractors performing work under construction contracts to the NASA/KSC procurement office.

P.3 Authority

[KNPD 8700.1, Safety and Mission Assurance Policy Directive](#)

P.4 Applicable Documents

- a. 29 CFR Part 1926, Occupational Safety and Health Standards for Construction Industry
- b. 29 CFR Part 1910, Occupational Safety and Health Standards for General Industry
- c. NFPA 70E, Standard for Electrical Safety in the Workplace
- d. OSHA Publication 3071, Job Hazard Analysis (JHA)
- e. [NPR 8715.3, NASA General Safety Practices Procedural Requirements](#)
- f. [KNPD 1800.2, KSC Hazard Communications Program](#)
- g. [KNPR 1820.3, KSC Hearing Loss Prevention Program](#)
- h. [KNPR 1820.4, KSC Respiratory Protection Program](#)
- i. [KNPR 1840.19, KSC Industrial Hygiene Program](#)

- j. [KNPR 1860.1, KSC Ionizing Radiation Protection Program](#)
- k. [KNPR 1860.2, KSC Non-Ionizing Radiation Protection Program](#)
- l. [KNPR 8715.3, Kennedy Safety Practices Procedural Requirements](#)
- m. [NASA-STD-8719.9, Standard for Lifting Devices and Equipment](#)
- n. ANSI A10-14, Requirements for Safety Belts, Harnesses, Lanyards and Lifelines for Construction and Demolition Use
- o. ANSI A92.2-2001, Vehicle Mounted Elevating and Rotating Work Platforms
- p. 45TH Space Wing Instruction 15-101, Weather Support
- q. [KSC-PLN-1904, Trailer/Equipment Tiedown Plan for the Kennedy Space Center](#)
- r. [KSC-PLN-2807, Mishap Preparedness and Contingency Plan](#)
- s. [KSC-STD-Z0008, Standard for Design of Ground Life Support Systems and Equipment](#)

P.5 Cancellation / Supersession

None

Original signed by

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CHAPTER 1: GENERAL INFORMATION

1.1 Goal

To assure NASA/KSC Construction Contractors provide for a safe work environment for their employees and their subcontractors while also protecting NASA employees (to include contractors) from injury and equipment and property from damage or loss.

1.2 Objective

This document is a requirements document containing Safety and Health issues and requirements to be performed by construction contractors for KSC and does not directly identify or consider environmental issues or regulatory requirements.

1.3 Responsibilities

It is the responsibility of the prime contractor to ensure that the safety and health requirements identified in this document and the Site-Specific Safety and Health Plan (SSSP) are observed by all contractor and subcontractor employees on the job site.

1.4 Terminology

- a. The terms “plan,” “safety plan,” and “Site-Specific Safety and Health Plan” are used interchangeably in this document.
- b. Throughout this document, the terms “contractor” and “construction contractor” are used synonymously and denote the responsible organization for identifying and performing safety and health requirements. These terms include all prime and subcontractor employees.

CHAPTER 2: SITE-SPECIFIC SAFETY AND HEALTH PLAN (GENERAL REQUIREMENTS)**2.1 General Requirements**

a. The Site-Specific Safety and Health Plan (SSSP) shall address the policies, procedures, and techniques that will be used to assure the safety and occupational health of the contractor's and their subcontractor's workforce on the awarded contract. Additionally, the contractor shall address how they will protect the NASA workforce (including contractor employees working on NASA contracts), the public, and NASA equipment and property.

NOTE: Corporate safety and health plans (program) should be used in the development of the SSSP, but as a standalone document it does not fulfill the requirements of a site-specific plan.

b. At a minimum, all areas of this chapter shall be applicable to all construction contractors.

NOTE: Contractors and subcontractors are expected to be knowledgeable of and comply with the NASA and KSC policies contained in the contract, all applicable sections of OSHA regulations, and other applicable local, state, and federal laws.

c. The SSSP shall apply to all employees working on the site, including all subcontractor employees.

d. The prime contractor's site supervisor shall be responsible for ensuring employees abide by all applicable regulatory and NASA/KSC (identified in the accepted SSSP) safety and health requirements and best practices as defined by national consensus standards.

NOTE: It is the responsibility of the contractor's site supervisor to inform the Contracting Officer (CO), Contracting Officer Technical Representative (COTR), and safety specialist of updates or changes to the SSSP.

e. Review and acceptance of the SSSP by the NASA/KSC CO in consult with NASA/KSC Institutional Safety Branch shall occur prior to commencement of any site work.

f. Any specific hazard SSSP requirements (e.g., Confined Space, Maintenance of Traffic, Fire Protection, etc) shall be included as an appendix to the SSSP.

NOTE: The areas contained in Chapter 3, Site-Specific Safety and Health Plan (Project-Specific Requirements), are additional areas that will be addressed as required based on the specifics and applicability to the work to be performed by the contract.

g. A safety specialist representative from the Center Safety Office (Institutional Safety Branch) will be assigned to each contract to advise the project CO and COTR and to monitor and evaluate the safety of the contractor's construction operations.

h. Any evaluation given by the safety specialist is to be deemed advisory only and shall not relieve the contractor from any responsibility for safety matters.

i. The job site shall be subject to inspection by the Center Safety Office for safety and health requirements compliance.

j. Noncompliances uncovered by the Center Safety Office for safety and health requirements are identified to the contractor's site supervisor, documented and processed in a report provided to the project CO and COTR weekly.

k. Safety specialist, contract project manager, and safety manager names and telephone numbers shall be exchanged no later than at the pre-work meeting.

l. Contractors shall verify (not merely assume) that all drawings/documents depicting existing configurations are correct for areas posing hazards to personnel or property.

m. Contractors that fail to follow safety procedures, create, or allow imminent danger situations to occur, or accumulate multiple safety noncompliances shall be issued a stop work order by the CO until the safety issues are corrected.

NOTE: A “stop work order” differs from “stop work authority,” which can be invoked by any employee on KSC when any activity poses an imminent danger to personnel. See definitions in [Appendix A](#) for additional clarification.

2.2 Contractor Employee Training

a. All contractor personnel engaged in job site activities shall receive the required training prior to initiation of work activities.

NOTE: Personnel may not perform any work activity on the job site until they have received the required training for the respective job activities.

b. The contractor shall identify in their SSSP employees that will serve in a special role, such as site supervisor, competent person, qualified person, heavy equipment operator, etc.

c. The contractor shall certify that all employee training (including subcontractor employee training) required by NASA and OSHA standards has been completed and is current.

d. New employees shall have their training verified by the prime contractor’s site supervisor prior to any site work involvement.

e. Contractors using temporary employees shall train or verify and certify (document) that these employees are trained on OSHA and the SSSP requirements for the tasks they will be performing.

f. Contractors shall ensure that the safety and health trainer is knowledgeable through relevant education and experience to conduct training in the area(s) being taught.

g. The training certification shall include the employee name, date of training, expiration dates of training, type of training received, instructor name, and credentials.

h. These training certification records shall be maintained at the job site and shall be available for review by the assigned project safety specialist.

i. The training certification summary shall be signed by a company official (manager) and provided as part of the contractor’s SSSP.

j. The training certification summary shall be updated monthly to reflect additions and deletions from the employee lists and to maintain current employee training expiration dates.

k. Updated training certification summaries shall be maintained at the job site and shall be available for review by the assigned project safety specialist.

2.3 Accident / Incident (Mishap / Close Call) Reporting

a. In the event of a mishap, the contractor shall take immediate action to prevent further injury to personnel and/or damage to any property.

NOTE 1: In the event of a serious accident / incident, immediately call 911, (321) 867-7911 (cell phone on KSC), or (321) 853-0911 [cell phone on Cape Canaveral Air Force Station (CCAFS)]. Ambulances are on call 24 hours/day; 7 days/week on KSC and CCAFS).

NOTE 2: A 911 call should be made for any mishap, even when there is no apparent injury (i.e., a piece of heavy equipment is damaged but the operator appears uninjured) because this begins the notification process and minimizes the potential risk of further incidents or injury.

b. The contractor site supervisor shall take action or give support to NASA response personnel to secure the site, limit unnecessary access, and preserve evidence until the site is released by KSC Security, KSC Safety, or the mishap board chairperson.

c. The contractor shall ensure all potential incident witnesses remain at the worksite until interviewed and released by the NASA Safety Investigator.

d. Type A or B Mishap / Close Call incidents (property damage greater than \$250,000 or personnel injury/illness equivalent to or exceeding inpatient hospital care within 30 days of mishap or permanent or partial disability) shall be reported within 1 hour to the Center Institutional Safety Office [(321)867-SAFE], the project CO, and COTR by telephone or in person.

e. Type C or D Mishap / Close Call incidents (property damage greater than \$1,000 or personnel injury/illness equivalent to or exceeds a nonfatal OSHA-recordable occupational injury and does not meet the criteria of an A or B Mishap / Close Call) shall be reported to the Center Institutional Safety Office, CO, and COTR within 4 hours of the event (or by 7:30 AM the next workday for incidents occurring during shifts other than first shift) by telephone [(321) 867-SAFE] or in person.

f. Initial notification / report for mishaps and close calls shall include the time, the location, a description of the event, the organization(s) involved in the event, and a preliminary worst case estimate of the injuries/illness and/or the direct cost estimate of the damage resulting from the event.

g. The contractor shall submit a KSC Incident Report by e-mail or fax (867-1120) within 4 hours of a Mishap / Close Call.

h. The contractor shall notify their company president/top-level management or program manager of all incidents that are deemed immediately dangerous to the life and/or health of their employees.

i. The contractor shall investigate all Type C or D Mishap / Close Call incidents (unless directed otherwise by the NASA Safety Office) in order to determine the root cause and furnish the CO with a written report within 30 days of the mishap or close call by completing page 2 of the KSC Incident Report form, which shall include the investigation findings and proposed or completed corrective actions.

j. The contractor shall perform trend analysis of their mishaps / close calls to identify potential reoccurring safety issues and share the analysis results with all contract employees.

2.4 Weather Policy

2.4.1 General

Contractors performing work outdoors shall have a means of receiving the KSC weather advisories and warning alerts at all times during work performance. The contractor can receive

these alerts from a weather warning pager (issued through the CO) or text message received on a cell phone.

NOTE: Wind, lightning warnings, and other adverse weather warnings are announced over the KSC Center-wide public address system. For tornado sightings, KSC will activate the Center-wide tornado warning siren system and make announcements over the public address system.

2.4.2 Wind Policy

The contractor shall adhere to outdoor work restrictions as follows:

- (1) During steady state winds of 18 knots [20.7 miles per hour (mph)] or greater or gusts of wind 22 knots (25 mph) or greater, no erection of or work on floats, spiders, and /or scaffolding, nor lifting of personnel in buckets, crane baskets, etc. shall occur.
- (2) During steady state winds of 20 knots (23 mph) or greater or gusts of wind 25 knots (28.7 mph) or greater, no mobile/portal crane hoisting or crane operations shall occur. When lifting operations are underway and winds at this level or above occur, safe the load and discontinue lifting operations.
- (3) During steady state winds of 30 knots (34.5 mph) or greater or gusts of wind 35 knots (40.3 mph) or greater, no work on facility roofs, structure tops, unprotected areas or outside hand rails shall occur and all materials on roofs shall be secured or removed.
- (4) During steady state winds of 35 knots (40.3 mph) or greater or gusts of wind 40 knots (46 mph) or greater, contractor supervisors shall immediately conduct a walk down of their area for unsecured items.
- (5) During steady state winds of 40 knots (46 mph) or greater or gusts of wind 45 knots (51.7 mph) or greater, immediate actions shall be taken to secure at ground level all loose or unanchored items, equipment, supplies and/or materials.

NOTE: The CCAFS Weather Office issues advisories for winds less than 35 knots and warnings for winds greater than 35 knots

2.4.3 Lightning Restrictions

a. During Phase 1 Lightning Advisory, it shall be permissible for outdoor and all electrical system work to continue provided that the operations can be terminated immediately upon notification of Phase 2 Lightning Advisory.

NOTE: Phase 1 Lightning Advisories are issued via the Center-wide public address system with a desired lead-time of 30 minutes when the potential for lightning is expected to move into, or develop within 5 nautical miles (nm) (9.26 kilometers) of specified work areas.

b. During Phase 2 Lightning Warning:

- (1) Employees at risk of lightning strikes shall take immediate cover.
- (2) Personnel access to roofs or open top levels of structures shall be prohibited.
- (3) Electrical systems work and maintenance (indoors and outdoors) and any other operation requiring personnel to put themselves at risk of lightning exposure shall be prohibited.

NOTE: Phase 2 Lightning Warning are issued via the Center-wide public address system when lightning is considered imminent or actually occurring within the aforementioned (Phase 1) 5 nm (9.26 kilometers) work area.

2.4.4 Tornado Notification

a. During a Tornado Watch, the contractor's site supervisor shall take the necessary measures to ensure all construction site workers can take immediate cover in an approved structure when a Tornado Warning is issued.

NOTE: Tornado Watches are issued via the Center-wide public address system as an alert that conditions are favorable for the development of tornadoes in and close to the watch area. These watches are issued with information concerning the watch area and the length of time they are in effect.

b. During a Tornado Warning, personnel shall take cover immediately in approved structures.

NOTE: Tornado Warnings are issued via the Center-wide public address system to warn that a tornado has been sighted by storm spotters or has been indicated by radar. These warnings are issued with information concerning where the tornado is presently located and what communities are in the anticipated path of the tornado.

2.4.5 Hurricane Condition (HURCON) Policy

During the Atlantic Hurricane Season (June 1 through November 30), Florida is subject to extreme destruction associated with hurricanes. Contractors will be notified of hurricane conditions when they are present and are required to perform the following actions:

a. Hurricane Condition IV (Arrival of sustained winds of 50 knots / 58 mph or greater within 72 hours): Contractors shall prepare their site by securing structures and loose objects, perform the necessary housekeeping, and prepare for evacuation.

b. Hurricane Condition III (Arrival of sustained winds of 50 knots / 58 mph or greater within 48 hours): Contractors shall evacuate the worksite when directed by the CO and leave KSC.

c. Contractors shall tie down trailers and equipment with anchorage that complies with [KSC-PLN-1904, Trailer/Equipment Tiedown Plan for the Kennedy Space Center](#).

2.5 Clothing

a. Contractor employees conducting work on NASA construction contracts are required to wear appropriate clothing. Appropriate clothing for construction workers shall be (at a minimum) long pants, sleeved shirt (with sleeves at least four inches in length and no tank tops), and a style of shoe appropriate for the type of work to be performed.

NOTE: Overly loose fitting, torn, or ragged clothing is not acceptable.

b. Contractor employees shall report to work daily with the proper clothing suitable for the task and hazard level of work.

c. Safety shoes or boots that comply with American National Standard Institute (ANSI) Z41 [American Society for Testing and Materials (ASTM) F2413-0] shall be required when there is a potential for injury to the feet.

NOTE: It is a recommendation on all construction sites that all employees wear safety toe shoes or boots. See also [section 3.17, Personal Protective Equipment \(PPE\)](#).

d. Fire retardant clothing shall be worn for tasks that present a potential for arc flash, flash fire, or explosion to minimize the effects of arc flash, flash fires and burns from contacting hot equipment and material (see also [section 3.5](#) concerning electrical work PPE).

2.6 Construction Site Safety

a. The contractor shall ensure the safety of all personnel, regardless of organization, while within the boundaries of the worksite, including control of personnel on site, ensuring the use of required PPE, ensuring the observation of any special conditions and restrictions while on site, and establishing when and to whom the site is off limits.

b. The contractor shall, at a minimum, designate one site supervisor and ensure that a site supervisor is on site at all times during construction.

c. If a site supervisor cannot remain on site, they shall designate in their absence an authorized individual with the responsibilities, accountability, and authority of the absent supervisor; if such an individual is not designated all construction work shall be halted until the site supervisor returns.

d. The site supervisor or authorized representative while performing supervisory tasks shall not perform other labor type duties (i.e., he should be supervising and not working as a laborer or operator).

e. The contractor shall permit only designated employees who are qualified by training and/or experience to operate equipment and machinery.

NOTE: A qualified operator is one knowledgeable of the equipment's/machine's operations, operations manual, limitations, restrictions, and safety requirements.

f. The site supervisor shall develop means of communication to disseminate information throughout the worksite (handheld radios, bulletin boards, etc.).

g. The site supervisor shall at all times have a means of communication to contact emergency services.

h. Emergency numbers shall be posted at the worksite in a location where all employees have access.

i. Personnel shall not use cell phones/texting devices while performing work, inspections, testing, system walk downs, or surveying on construction sites.

j. Since the effort necessary for roofing demands full and undivided attention, cell phones shall not be used by any personnel on roof surfaces except for emergency calls.

NOTE: Necessary business calls or replying to pages or telephone calls may be accomplished only from a safe zone at the site.

k. Contractor shall implement policies to encourage employees to submit suggestions or report issues regarding site and facility safety and health to the project assigned safety specialist or by calling the Center Safety Office at (321) 867-SAFE (7233).

l. All contractors shall instruct employees that safety suggestions, violations, or issues can be reported anonymously to their employer or the Center Safety Office without fear of retaliation or retribution.

m. Contractor employees that are performing work in or transitioning through a construction site controlled by another contractor shall comply with the safety and health requirements of that worksite and apply common sense to avoid injuries.

n. Contractor employees working in the vicinity of or transitioning through an area where KSC operations are in progress shall comply with the safety and health requirements and direction of the NASA controlling authority of the area.

NOTE: Workers should be alert to the conditions of the walking surface and immediately inform the appropriate personnel when a hazard is observed.

2.7 Controlled Areas

Posted or controlled areas shall not be entered, nor will the integrity of any installed protective system (e.g., guardrails, safety signs, warning lights, etc.) be rendered inoperable, without proper written approval from the CO and agreement by the facility manager and the Center Safety Office.

2.8 Drinking Water

a. Contractors shall ensure access to potable drinking water sufficient for the number of employees at the job site.

b. Drinking water shall be dispensed into individual paper drinking cups either from a stationary bubbler with guarded orifice or from a fully enclosed sanitary water container.

c. Common drinking cups, dipping water by individual drinking cups, dippers, canteens, etc. shall be prohibited.

d. Where single service cups (disposable/to be used only once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.

2.9 Evacuation (Facility or Area)

a. The contractor shall assign a point-of-contact (POC) for work conducted inside a facility, prior to starting work.

b. The contractor shall obtain a copy of the facility emergency evacuation procedures from the facility manager, COTR, or NASA Safety representative.

c. The POC shall ensure all contractor employees (including subcontractors) are briefed on evacuation and marshalling areas the first day of work.

d. Should evacuation of any area be necessary for reasons other than tornadoes, contractor employees shall follow the facility evacuation procedures and meet the POC at the marshalling area or at least 200 feet from the hazard.

e. The POC shall account for all employees and report the head count to the on-scene commander as soon as possible.

f. POCs shall notify the on-scene commander immediately if any employee is not accounted for.

g. Contractor Employees shall not return to work inside or within 200 feet of the facility until the on-scene commander gives the "ALL CLEAR".

2.10 First Aid and Medical

a. The contractor shall make provisions for prompt medical attention in case of employee injury prior to starting work.

NOTE 1: Personnel should report an emergency by dialing 911, (321) 867-7911 (cell phone on KSC) or (321) 853-0911 (cell phone on CCAFS) from a cellular phone.

NOTE 2: For non-emergency, walk-in medical care, personnel should report to the KSC Occupational Health Facility (OHF) located at the corner of 2nd St. SE and C Ave. SE during normal office hours (0700 – 1600 hrs). After hours or on weekends, call (321) 867-7911 (the KSC 911 Number). Emergency Medical Services (EMS) personnel will evaluate for first aid or transport to nearest medical facility.

b. All emergency contact telephone numbers shall be posted at the job site in an area accessible and conspicuous to all personnel.

c. Contractor Site supervisors shall:

(1) Ensure employees are aware of their responsibility to report any injury to their supervisor immediately.

(2) Follow the requirements for Accident/Incident (Mishap / Close Call) Reporting.

(3) Ensure any employee that is transported off Center after hours reports to the OHF the next duty day the OHF is open. Compliance with all follow-up visits is required.

(4) Ensure employees are compliant with the restrictions ordered by the physician.

d. First Aid Program

(1) The contractor's first aid program shall be designed to reflect the known and anticipated risks of the specific work environment.

(2) The contractor shall have a person(s) adequately trained to render first aid.

(3) The person trained in first aid shall be present at the worksite any time work is being performed.

(4) First aid training courses shall include specific knowledge and skills instruction for general and workplace hazards.

(5) First aid supplies shall be readily available and in sufficient quantities at the job site.

2.11 Hazard Communications

a. The contractor shall have at each worksite a written hazard communication plan specific to the worksite that is compliant with CFR 1910.1200 describing how labels and other forms of warning, material safety data sheets, and employee information and training will be met.

b. This written Hazard Communication Plan shall be submitted as part of the SSSP.

c. The plan shall describe the contractors approach to providing training to workers (including subcontractors) on the details of the hazard communication program, an explanation of the labeling system used at the worksite, and information on location and access to Material Safety Data Sheets (MSDS).

NOTE: OSHA requires that if employees receive job instructions in a language other than English, then the training and information to be conveyed under the Hazard Communications standard will also need to be conducted in the applicable foreign language.

d. The contractor shall ensure that each container of hazardous chemicals and any secondary container (bottle, tank, vessel, etc.) in the workplace is properly labeled [i.e., Hazardous Materials Identification Sheet (HMIS)], tagged, or marked with the appropriate hazard warnings.

NOTE: Labeling and MSDSs provide employees with the specific information regarding the physical and health hazards of the hazardous chemical.

e. The contractor shall ensure the labels or other forms of warning are legible, in English, and prominently displayed on the container or readily available in the work area throughout each work shift.

f. The contractor shall not remove or deface existing labels on incoming hazardous chemical containers unless the container is immediately relabeled with the required information.

g. The contractor shall submit in hard copy to the CO a copy of every MSDS for any potentially hazardous material brought onsite for use on this contract.

h. The contractor shall provide a complete and accurate list accompanied by the applicable MSDS of all materials and chemicals listed on the Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-To-Know Act (EPCRA) and Section 112(r) of the Clean Air Act that will be stored onsite and/or used in the execution of this contract, regardless of the quantity.

i. This information shall be provided to the CO prior to the time of delivery of the materials and chemicals to the site.

j. This inventory shall be updated and resubmitted to the CO on a monthly basis.

k. All inventory reporting shall be completed on the Chemical Inventory for Construction Projects at Kennedy Space Center, Form (8-313NS).

l. Appropriate labels and MSDS shall be provided for all chemical shipments.

2.12 Heat Stress

a. The contractor's SSSP shall address how to protect employees from heat stress, heat exhaustion, and/or heat stroke.

NOTE: Heat advisory warnings are issued through the KSC Duty Office in the same manner as other weather watches and warnings.

b. The contractor shall ensure employees are trained on the signs and symptoms of heat stress injuries and appropriate actions to take in the case of a heat stress injury.

c. The site supervisor shall ensure all contractor employees on site take breaks as necessary to prevent heat related illnesses.

2.13 Housekeeping

a. Good housekeeping practices shall be observed at all times.

- b. Only approved, marked containers shall be used for disposal of wastes in accordance with applicable regulations.
- c. During the course of construction, form and scrap lumber with protruding nails and all other debris shall be kept cleared from work areas, passageways, and stairs in and around buildings or other structures.
- d. During the course of construction all protruding reinforcing steel, onto and into which employees could fall, shall be guarded to eliminate the hazard of impalement.
- e. Combustible scrap and debris shall be removed from work areas at least daily during the course of construction.
- f. At the completion of construction, the contractor shall clean up the construction area of all excess construction debris and return to grade level all above surface protrusions which are not permanent fixtures.

2.14 Inspections (Contractor Worksite)

- a. The contractor shall perform a daily inspection of the job site, materials, and equipment to identify existing or potential hazards.
- b. The inspection shall be accomplished by a Competent Person (General) [see definition in [Appendix A](#), Competent Person (General)] designated by the contractor.
- c. The contractor shall document the completion of this inspection at least weekly.

2.15 Inspections (KSC Safety Representatives)

The job site shall be subject to inspection by KSC Safety and Health personnel at any time. KSC construction safety specialists perform site visits of all KSC Construction of Facilities (CoF) project sites.

NOTE: KSC construction safety specialists document site inspections and/or minor safety and health violations/noncompliances on KSC Form 50-17, NASA/KSC Safety – Site Observations Daily Log Construction Contractors. The contractor's site supervisor works with the KSC construction safety specialists, the COTR, and/or CO (depending on severity) to implement corrective action(s). For serious, willful, or repeat findings, a Notice of Safety Violation (NOSV) may be issued. The NOSV requires a formal response from the contractor.

2.16 Job Hazard Analysis (JHA)

The JHA is a technique that focuses on job tasks as a way to identify hazards before they occur. It focuses on the relationship between the worker, the task, the tools, and the work environment. The goal is to identify all uncontrolled hazards then take the steps/actions to eliminate or reduce the hazards to an acceptable risk level. The terms Job Hazard Analysis (JHA), Job Safety Analysis (JSA), and Activity Hazard Analysis (AHA) are synonymous.

- a. Prior to the start of work, the contractor shall perform a job hazard analysis of all tasks. The completed JHAs shall be provided to Center Safety Office through the CO as an appendix to the SSSP prior to the start of any onsite work.
- b. The JHA shall include the following elements:
 - (1) Task (Activity) Description: Specify the work to be performed such as operating machinery, equipment, and powered hand tools.

(2) Hazard Description: Using the listed tasks, identify the hazards from the work to be performed (e.g., flying debris, dust, wood chips, or metal shavings getting into the eyes).

(3) Hazard Controls: The preventive measures taken to eliminate or mitigate the hazard to an acceptable risk level [e.g., know and utilize the manufacturer's operating, maintenance, and safety procedures and use personal protective equipment (PPE) as required.]

(4) Reference [section 3.5, Electrical Safety](#), for additional requirements regarding JHAs for energized electrical work.

2.17 Maximum Work Hour Policy

Requirements for the Maximum Work Hour Policy are in [KNPR 8715.3, Kennedy Safety Practices Procedural Requirements](#).

2.18 Pre-task Meetings

a. Prior to the start of each work day, when a task changes during operations, prior to any hazardous task, or prior to any confined space entry, the contractor shall conduct a Pre-Task Meeting and communicate all job related safety issues with all employees involved. Where a task involves a confined space entry, completion of the required Pre-Task Meeting shall be noted on the confined space entry permit.

b. At a minimum, the following topics shall be covered in the Pre-Task Meeting:

(1) Work tasks planned for the day to include sequence and hazard management.

(2) Weather issues that could affect work.

(3) PPE required for the work tasks.

(4) Safety hazard awareness (from JHA).

2.19 Safety Meetings

a. The contractor shall conduct and document weekly safety meetings for all employees at the job site inclusive of subcontractor employees.

b. The weekly safety meeting shall discuss safety and health related issues as well as any incidents (and subsequent corrective actions taken) that have occurred at the site.

c. The first weekly safety meeting shall occur the first work day prior to the start of any tasks.

d. If during performance of the contract, a break of more than five work days occurs, the site supervisor shall conduct a safety meeting the first day back to work.

e. Documentation of safety meetings shall include a short summary of the items covered, the date and location of the meeting, the name and signature of the person conducting the meeting, and a roster of attendees. Documentation of these safety meetings shall be kept at the construction site for review by the assigned safety specialist for the duration of the contract.

2.20 Safety Systems – (Permanently Installed)

a. The contractor shall protect and not invalidate the integrity of any installed safety systems or personnel safety devices (such as firefighting equipment and sensing devices, fire alarm centers, fire water supply, guardrails, safety chains, warning lights, and safety signs) without prior approval from the CO.

- b. Prior CO approval shall be obtained when access to device-guarded systems is required.
- c. In the event the contractor determines (and CO approves) that it is necessary to temporarily remove or invalidate any personnel safety devices in order to accomplish a task, an alternate means of protection shall be approved and in place prior to removing or invalidating any permanently installed safety devices or equipment.

2.21 Sanitary Conditions and Facilities

- a. The contractor shall be responsible for providing temporary restroom facilities at the job site when sanitary facilities are unavailable.
- b. One chemical toilet, adequately serviced, for every 15 employees or less shall be required.
- c. A hand washing facility shall be provided adjacent to chemical toilet placement locations.
- d. A shower facility shall be provided for each ten employees of each gender when showers are required in the performance of work (such as lead abatement).
- e. The contractor shall provide change rooms equipped with storage facilities for street clothes and separate storage facilities and/or disposal containers for the protective clothing when employees are required to wear protective clothing.

2.22 Temporary Structures, Trailers, and Work Areas

- a. All temporary structures and trailers shall be clearly marked with the contractor's name and an emergency phone number.
- b. Trailers shall be pre-approved by the COTR and the facility manager for parking locations.
- c. Trailers shall be tied down when stationary for a period in excess of two weeks.
- d. A digging permit shall be requested through the project COTR and approved prior to tying down any trailer or temporary structure.
- e. All NASA Construction sites with or without temporary structures shall be clearly marked by clear and visible signage with the following information:
 - (1) Company name of the prime contractor (XXXXXX Construction, Inc).
 - (2) Prime Contractor Site Supervisor's name and contact phone number.
 - (3) Prime Contractor Safety Supervisor's name and contact phone number.
 - (4) NASA KSC Project CO name and contact phone number.
 - (5) NASA KSC COTR name and phone number.
 - (6) NASA KSC Safety (321) 867-SAFE.

2.23 Vehicle Operations

The contractor shall adhere to permit requirements, restrictions and conditions for overweight, oversized or slow moving vehicles as identified in contract clause JC-6, Traffic Restrictions and in [KNPR 1600.1, KSC Security Procedural Requirements](#).

NOTE: Movement of oversized or slow moving vehicles is prohibited on KSC roadways between the hours of 0600-0900 and 1500-1800.

CHAPTER 3: SITE SPECIFIC SAFETY AND HEALTH PLAN (PROJECT-SPECIFIC REQUIREMENTS)

NOTE: The SSSP should only contain the parts of Chapter 3 that pertain to the work to be performed as part of the awarded construction project.

3.1 Confined Space Entry

- a. Each contractor whose scope of work requires entry into and work in confined spaces shall write and include as an appendix to the project SSSP a Confined Space Entry Program (Plan) that implements the requirements of 29 CFR 1910.146.
- b. When the contract requires work in telecommunications manholes, the contractor shall include the process they will use to meet the provisions of CFR 1910.268(o) in their SSSP.
- c. The Contractor shall coordinate with the COTR to complete a confined space hazard evaluation request (KSC Form 28-750NS) that identifies hazardous conditions (present or introduced) and entry requirements for all confined spaces, regardless of type or designation.
- d. The contractor shall notify and obtain approval from the Power Coordinator (321-867-7300) and from Communications Control (321-867-4141) prior to performing any work in electrical and/or communications manholes.
- e. The contractor shall coordinate all confined space entry work with KSC Environmental Health, KSC Fire Services, and any resident government or contractor organization whose employees have access to the worksite, as identified by the CO and/or COTR.
- f. Where the contractor will act as a controlling employer with operational control over the permit space during multiple employer entry, the plan shall incorporate procedures to coordinate entry operations (for example, hazardous operations, required PPE, employee training, rescue, emergency services, and all other aspects of the entry) with each entrant's employer.

NOTE: The contractor may perform atmospheric testing or use the government-provided services including environmental health monitoring and consultation support for the testing of atmospheres in confined spaces. To request government-provided atmospheric testing for confined space entry, a minimum 24 hour advance scheduling is required through the Environmental Health work control desk at 867-2400.

- g. Standing water shall be pumped out of the confined space prior to any entry check.
- h. The confined space permit must be maintained on site and available to contractor and government personnel. A pre-task meeting in accordance with [section 2.18, Pre-task Meetings](#), shall be completed and noted on the approved confined space entry permit.

3.2 Cranes and Lifting Operations

- a. All crane and lifting equipment operations and maintenance shall be conducted in accordance with manufacturer's recommendations and appropriate ASME B30 series standard.
- b. Only certified (licensed) and trained personnel shall be permitted to operate a mobile crane or other lifting equipment.
- c. Operators of mobile cranes or other lifting equipment shall be trained and certified by a recognized certification organization that is authorized to perform this function.

- d. Riggers shall be trained and certified.
- e. Flagmen shall be trained in applicable crane or lifting equipment operation procedures.
- f. Cranes and lifting equipment shall be certified for operational use by the appropriate authorizing agency.
- g. Lifting device controls shall be manned by the operator while a load is suspended and/or when the equipment is operational.
- h. Personnel shall not perform work or be located under a suspended load at any time.
- i. Daily and periodic formal (monthly and annually) equipment inspection shall be conducted, the results documented, and be made available on the job site.
- j. Crane inspections shall be performed by a qualified person.

NOTE: A crane qualified person is one who is capable of identifying existing and predictable lifting equipment related hazards in the surroundings or working conditions which are hazardous or dangerous to employees or property and who has authorization to take prompt corrective measures to eliminate them. A crane qualified person has the requisite technical knowledge to competently conduct all required inspections to the applicable standard(s).

- k. Each type of inspection shall follow manufacturer's suggestions and include, at a minimum, the areas listed in the appropriate ASME B30 series standard.
- l. The contractor shall have a system for documenting crane problems and discrepancies.
- m. The crane operator shall review previously identified problems and discrepancies to determine possible impact on the planned activity prior to any operation.
- n. The following documentation shall be available at the job site when lifting equipment is operational:
 - (1) Operator certification.
 - (2) Equipment certification.
 - (3) Inspection and load test documentation.
- o. Crane load charts shall be located in the crane cab.
- p. Cranes shall not be operated without load charts.
- q. A hand signal illustration shall be posted at the job site detailing hand signals to be given to crane operators as prescribed by the applicable ASME standard for the type of crane in use.
- r. A Pre-Task Briefing shall be performed and documented prior to commencing crane operations that shall include, at a minimum:
 - (1) What task is to be performed.
 - (2) How (the methods) the task will be performed.
 - (3) Where each crew member will be positioned.

- (4) What task each crew member will perform.
- (5) Who is in charge of the operation.
- s. The working area around any lifting operation shall be controlled to limit personnel to include only those persons considered essential to the lifting operation.
- t. If the controlled area cannot be maintained, the lifting operation shall be stopped immediately.
- u. The site supervisor shall be in overall charge of lifting operation on the job site and shall ensure:
- (1) All personnel involved are instructed in the proper positioning, rigging, and moving to be done.
 - (2) The crane has met all its maintenance, test, and inspection requirements and is to be operated within its rated capacity and the operator is properly certified.
 - (3) The vicinity of the lift is controlled and the operator remains at the controls the entire time the load is suspended.
 - (4) The crane operator and signalmen have communications with each other. If communications are lost, the lifting operation shall be immediately stopped.
 - (5) All personnel within the controlled lifting area are wearing the appropriate personal protective equipment (e.g., hardhat, safety shoes, and gloves) as described in the Safety and Health Plan.
 - (6) A Pre-Task Briefing was performed and all personnel are knowledgeable of the operation to be performed, tasks to be done, route to be traveled, and safety considerations.
 - (7) At no time will any part of the crane or load pass within the designated minimum safe approach distance of an electrical power line unless the line is de-energized and visibly grounded on both sides of the area of possible contact.
- v. All crane operations shall comply with the NASA/KSC Adverse Weather requirements and this document.

NOTE: When moving cranes, adhere to the crane manufacturers wind limits for both operations and positioning.

- w. Crane operations involving critical lifts (as defined in [Appendix A](#) of this document) shall have a lift plan submitted for review and acceptance to the CO in consultation with the KSC Lifting Devices and Equipment Manager (LDEM) and Center Safety Office.
- x. Cranes shall not be used to hoist employees on a personnel platform unless approved in advance by the CO in consultation with the KSC LDEM and Center Safety Office.
- y. Cranes left outdoors shall be secured by the operator when operations are complete. Crane booms of any height shall be lowered during the hours of darkness. If this is not feasible, the crane shall be lit in accordance with Federal Aviation Administration (FAA) regulations.

3.3 Demolition

3.3.1 Engineering Survey

- a. The contractor shall have an engineering survey completed by a competent person (general) prior to permitting employees to start demolition operations.
- b. The structure shall be examined to determine the condition of the framing, floors, and walls, and possibility of unplanned collapse of any portion of the structure.
- c. Any adjacent structure where employees may be exposed shall also be similarly checked.
- d. The contractor shall submit this survey to the CO for review.

3.3.2 Demolitions Involving Hazardous Materials

- a. When demolition activities involve hazardous materials, such as silica, mold, or toxic substances regulated under 29 CFR 1926.1101 – 1152, an approved plan for the safe handling and containment of those hazardous materials shall be in place prior to the start of demolition (see [section 3.11, Hazardous Substances](#), for additional plan requirements).
- b. The plan for handling/containment of all hazardous materials shall be fully compliant with applicable Federal, State of Florida, NASA, and/or other authorized regulatory agencies' current standards.

3.3.3 Continuing Site Inspections

- a. Inspections by a competent person (general) shall be made as the work progresses to detect hazards resulting from weakened or deteriorated floors, or walls, or loosened material.
- b. No employee shall be permitted to work where such hazards exist until they are corrected by shoring, bracing, or other effective means.

3.3.4 Removing Debris from Elevated Sites

- a. Whenever materials are dropped more than 20 feet to any point lying outside the exterior walls of the building, an enclosed chute of wood, or equivalent material, shall be constructed, installed, and used in accordance with 29 CFR 1926.852.
- b. The area surrounding the discharge end of a chute shall be securely closed off when operations are not in progress.
- c. Any floor opening into which debris is dumped shall be protected by a guardrail approximately 42 inches above the floor or other surface on which personnel stand to dump the material.
- d. When debris is dropped through holes in the floor without the use of chutes, the area onto which the material is dropped shall be completely enclosed with barricades not less than 42 inches high and not less than 6 feet back from the projected edge of the opening above. Signs warning of the falling materials hazard shall be posted at each level.
- e. Debris removal shall not be permitted in this lower area until debris handling ceases above.
- f. Where wall openings present a hazard of employees falling through, the opening shall be protected to a height of approximately 42 inches.

g. All floor openings not used as debris drops shall be enclosed with guardrails and toe boards or covered over with material that is properly secured to prevent its movement and sufficient to support the weight of any load which may be imposed.

3.3.5 Personnel Access Points to Demolition Site

- a. Employee entrances into multistory structures being demolished shall be completely protected by sidewalk sheds or canopies, or both, providing protection from the face of the building for a minimum of 8 feet. All such canopies shall be at least 2 feet wider than the building entrances or openings 1 foot wider on each side thereof, and shall be capable of sustaining a load of 150 pounds per square foot.
- b. Only those stairways, passageways, and ladders designated as means of access to the structure of a building shall be used. Other access ways shall be entirely closed at all times.
- c. Walkways or ladders shall be provided to enable employees to safely reach or leave any scaffold or wall.

3.3.6 Additional Demolition Requirements

- a. Any structural member being dismembered shall not be overstressed.
- b. No workers shall be permitted in any area which can be adversely affected by demolition operations when balling or clamming is being performed. Only those workers required for the performance of the operation shall be permitted in this area.

3.4 Dive Operations (Commercial)

This section applies to diving and related support operations conducted in connection with all types of work and employment.

- a. All dive operations shall be accomplished in accordance with 29 CFR 1910.401 through 440.
- b. The contractor shall develop, maintain, and make available to each dive team member at the dive location a safe practices manual containing a copy of CFR 1910.420-440 Commercial Dive Operations (OSHA) standard and the employer's policy for implementing the OSHA standard requirements.
- c. Each dive team member shall have the experience or training necessary to perform assigned tasks in a safe and healthy manner, including sufficient expertise with applicable tools, knowledge of equipment and systems relevant to assigned tasks and techniques pertaining to the assigned diving mode, diving operations, and emergency procedures.
- d. All dive team members shall be trained in cardiopulmonary resuscitation and first aid (American Red Cross standard course or equivalent).
- e. Dive team members who are exposed to or control the exposure of others to hyperbaric conditions shall be trained in diving-related physics and physiology.
- f. The site superintendent or designated person-in-charge shall be at the dive location in charge of all aspects of the diving operation affecting the safety and health of dive team members. The designated person-in-charge shall have experience and training in the conduct of the assigned diving operation.
- g. The contractor shall comply with the following requirements prior to each diving operation (pre-dive):

(1) A list shall be kept at the dive location of the telephone or call numbers of the following: An operational decompression chamber (if not at the dive location); hospitals; available physicians; available means of transportation; and the nearest U.S. Coast Guard Rescue Coordination Center.

(2) First aid kit and supplies appropriate for the diving operation and approved by a physician shall be available at the dive location. An American Red Cross standard first aid handbook or equivalent, and a bag-type manual resuscitator with transparent mask and tubing shall also be available at the dive location.

h. The planning of dive operations shall include an operations hazard analysis that takes into account:

(1) Surface and underwater conditions and hazards.

(2) Breathing gas supply (including reserves).

(3) Thermal protection.

(4) Diving equipment and systems.

(5) Dive team assignments and physical fitness of dive team members (including any impairment known to the employer).

(6) Repetitive dive designation or residual inert gas status of dive team members.

(7) Decompression and treatment procedures (including altitude corrections).

(8) Emergency procedures.

(9) Hazardous activities.

(10) Other activities in the vicinity which are likely to interfere with the diving operation.

i. Prior to commencing dive operations, team members shall be briefed on:

(1) The tasks to be undertaken.

(2) Safety procedures for the diving mode.

(3) Any unusual hazards or environmental conditions likely to affect the safety of the diving operation.

(4) Any modifications to operating procedures necessitated by the specific diving operation.

j. Prior to making individual dive team member assignments, the contractor shall:

(1) Inquire into the dive team member's current state of physical fitness.

(2) Indicate to the dive team member the procedure for reporting physical problems or adverse physiological effects during and after the dive.

k. A standby diver shall be available while a diver is in the water.

l. The breathing gas supply system including reserve breathing gas supplies, masks, helmets, thermal protection, and bell handling mechanism (when appropriate) shall be inspected prior to each dive.

m. When diving from surfaces other than vessels in areas capable of supporting marine traffic, a rigid replica of the international code flag "A" at least one meter in height shall be displayed at the dive location in a manner which allows all-round visibility, and shall be illuminated during night diving operations.

n. During-dive procedures:

(1) A means capable of supporting the diver shall be provided for entering and exiting the water. The means for exiting the water shall extend below the water surface, and a means shall be provided to assist injured divers from the water or into a bell.

(2) An operational two-way voice communication system shall be used during dive operations and to obtain emergency assistance.

o. Decompression, no-decompression, and repetitive tables (as appropriate) shall be at the dive location. A depth-time profile, including when appropriate any breathing gas changes, shall be maintained for each diver during the dive including decompression.

p. Use of electrical tools, equipment or explosives shall be done in accordance with all applicable federal, state, and local regulations.

q. Dive termination and post-dive procedures shall be done in accordance with 29 CFR 1910.422 and 423, respectively.

3.5 Electrical Safety

a. All electrical work shall be performed in accordance with the current edition of the National Electric Code (NEC), National Fire Protection Association (NFPA), OSHA, and contract referenced documents.

b. Contractors performing work on or near any electrical system shall provide a written program for such work as part of its SSSP. The written program shall be consistent with the requirements of 29 CFR 1910.331 through 29 CFR 1910.335; 29 CFR 1910.147 (lockout/tagout); 29 CFR 1926, Subpart K, Electrical; and NFPA 70E, Standard for Electrical Safety in the Workplace.

c. The electrical safety program shall specifically address the NFPA 70E, Article 130 requirements for any energized electrical work to be performed by written work permit only. This shall include applicable hazard analyses and associated approach boundary and PPE determinations.

d. Contractors performing work on or near Electric Power Generation, Transmission, and Distribution (such as Orsino Substation, C-5 Substation, the Emergency Power Plant, and overhead and underground 15 kilovolt (kV) power distribution systems) shall provide a written program for such work as part of their SSSP that is compliant with the requirements of 29 CFR 1910.269; 29 CFR 1910.332 through 29 CFR 1910.334; and ANSI C2 (National Electrical Safety Code).

e. Circuits shall be placed in an electrically safe condition by de-energizing, applying lockout/tagout, and verifying lack of voltage using suitable test equipment prior to grounding or performing any work on electrical conductors or electrical circuits.

NOTE: Exceptions to this requirement are covered in [section 3.5.2 Exposure to Energized Parts](#).

3.5.1 Electrical System Outage Work Permits

- a. All necessary outages that affect utility systems, such as electrical, water, fire detection and protection systems, and air handling systems, require an electrical system outage work permit. Work shall be scheduled so as to minimize outages.
- b. Request for utility outage permits shall be made in writing to the CO at least 14 working days in advance of the time required.
- c. The request shall state the system involved, area involved, approximate time of outage, and the nature of the work.
- d. When high and medium voltage circuits and/or equipment are de-energized by KSC's Institutional Services Contractor (ISC), the Contractor shall obtain a work permit (KSC Form 26-4000NS) from the ISC. The Contractor shall lockout / tag-out and verify lack of voltage using suitable test equipment prior to grounding or performing any work on such circuit(s) and/or equipment.

NOTE: Submittal of a contractor's outage request does not constitute automatic approval. Due to the nature of the operations at KSC, the contractor may not know until the day before the requested date if the outage will take place as scheduled. All outages will take place outside normal work hours.

3.5.2 Exposure to Energized Parts

- a. Energized parts to which an employee might be exposed shall be placed in an electrically safe work condition before any employee works on or approaches them unless the contractor can demonstrate that de-energizing introduces additional or increased hazards or is infeasible due to equipment design or operational limitations.
- b. If energized parts are not placed in an electrically safe work condition (i.e., due to increased or additional hazards or infeasibility), the work to be performed shall be considered energized electrical work and shall be performed under a written Energized Electrical Work Analysis & Authorization Permit (exception, items c and d below).
- c. If there is no increased exposure to electrical burns or explosion due to electrical arcs, it shall be permissible for personnel to work with energized parts that operate at less than 50 volts to ground without de-energizing the parts.
- d. Work performed on or near live parts by qualified electrical persons related to tasks (such as testing, troubleshooting, voltage measuring, replacing incandescent/fluorescent light bulbs, etc.) is permitted without an energized electrical work permit, provided appropriate safe work practices and personal protective equipment are used. Employees exposed to energized electrical circuits for these activities shall wear Electrical Hazard (EH) rated shoes or stand on non-conductive matting in addition to wearing the appropriate PPE.
- e. A two-person buddy system shall be used when performing work on or near exposed energized parts.
- f. The site supervisor shall conduct an energized work pre-work briefing and document it using the Energized Electrical Work Analysis/Authorization Worksheet (KSC Form 28-1102) prior to starting work.

3.5.3 Energized Electrical Work Analysis & Authorization Permit Contents

An Energized Electrical Work Analysis & Authorization Permit shall include, at a minimum the following information:

- a. A description of the circuit and equipment to be worked on and their location.
- b. Justification for why the work must be performed in an energized condition.
- c. A description of the safe work practices to be employed.
- d. Results of the shock hazard analysis and determination of shock protection boundaries.
- e. Results of the flash hazard analysis and determination of flash protection boundaries.

NOTE: The Government will provide available information on applied system voltage, upstream circuit protective device settings, cabling distances and sizes, and available fault current as required to support the shock hazard and flash hazard analyses.

- f. The personal protective equipment to safely perform the assigned task.
- g. Means employed to restrict the access of unqualified persons from the work area.
- h. Evidence of completion of a job briefing, including a discussion of job-specific hazards.
- i. Energized work approval, with signatures of authorizing or responsible Contractor management personnel (superintendent, safety officer, owner, etc.), and concurrence by the COTR.
- i. The written electrical safety program shall include JHAs covering all anticipated or known work to be performed in hazardous locations or on or near energized parts including "routine" tasks not requiring an energized work permit by NFPA 70E. Additional JHAs shall be submitted during the course of the work as required by the COTR. Each JHA shall be specific to a particular task and its associated hazards (taking into account voltage, short circuit, and clearing time levels) and shall at a minimum address the following areas and contain the following elements:

3.5.3.1 Areas

- a. Power switching or operating electrical equipment.
- b. Voltage checks to determine equipment is de-energized (usually associated with an outage). Where systems are de-energized by personnel other than those employed by the Contractor, the Contractor shall be responsible for application of individual lockout / tag-out and verifying lack of voltage while wearing the proper PPE and utilizing proper instruments.
- c. Voltage/current checks or troubleshooting.
- d. Energized equipment access.
- e. Hot work such as breaker racking, fuse replacement, etc.
- f. Manhole, vault, or equipment entry with energized cables present. Approximately 10-weeks prior to planned manhole entries, the Contractor's qualified safety professional shall coordinate with the COTR to complete a confined space hazard assessment (KSC Form 28-750NS) in accordance with KNPR 1840.19 for each task requiring a confined space entry permit.

- g. Means employed to restrict the access of unqualified persons from the work area.
- h. Evidence of completion of a job briefing, including a discussion of any job-specific hazards.
- i. Energized work approval, with signatures of authorizing or responsible Contractor management personnel (superintendent, safety officer, owner, etc.), and concurrence by the COTR.

3.5.3.2 Elements

- a. Power switching or operating electrical equipment.
- b. Date of the analysis.
- c. Description of the activity.
- d. General work steps.
- e. Potential hazards for each step.
- f. Controls required for each hazard (PPE, lockout / tag-out, administrative, etc.)
- g. Detailed list of all PPE, special tools, and safety equipment required including required calibrations, certifications, and inspections.
- h. List of all training provided for qualified personnel. A separate list of all qualified personnel shall also be provided.
- i. Lighting survey to ensure adequate lighting is available for the task, particularly for spaces not normally illuminated such as vaults and manholes.

3.5.4 Working in Close Proximity to Energized Parts

- a. If the exposed parts are not de-energized, additional safety-related work practices shall be implemented to protect employees who may be exposed to the electrical hazards.
- b. Such work practices shall protect employees against direct contact with energized circuit part with any portion of the body or indirectly through some other conductive object.
- c. Work practices shall be suitable for the conditions under which the work is to be performed and for the voltage level of the exposed electric conductors or circuit parts.

3.5.5 Shock Hazard Analyses

- a. A shock hazard analysis shall be performed by a qualified electrical person to determine voltage exposure, boundary requirements, and the personal protective equipment necessary in order to minimize the possibility of electric shock.
- b. Results of the shock hazard analysis shall be provided to the COTR and the Center Safety Office for review.

3.5.6 Flash Hazard Analyses and Arc Flash PPE

- a. A flash hazard analysis shall be completed by a qualified electrical person to protect personnel from arc flash injury. Results of the arc flash analysis shall be provided to the COTR and the Center Safety Office for review.

- b. The analysis shall determine the flash protection boundary and the personal protective equipment that personnel within the flash protection boundary shall use.
- c. Personnel working with, on, or around energized circuits shall wear appropriate arc flash personal protective equipment as required by NFPA Code 70E.

3.5.7 Testing of Electrical Parts and Equipment Prior to Employee Exposure

- a. A qualified electrical person shall use test equipment to determine the circuit elements and electrical parts of equipment to which employees will be exposed.
- b. The qualified person shall also verify that the circuit elements and equipment parts are de-energized after the circuit(s) is locked and tagged out.
- c. The test shall determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage back feed even though specific parts of the circuit have been de-energized and presumed to be safe.
- d. The test equipment shall be checked for proper operation immediately before and after the absence of voltage check on an energized circuit.
- e. Prior to reenergizing equipment, a qualified electrical person shall conduct tests and visual inspections, as necessary, to verify that all tools, electrical jumpers, shorts, grounds, and other such devices were removed so that the circuits and equipment can be safely re-energized.

3.5.8 Temporary Power/Wiring

- a. Ground fault circuit interrupters (GFCIs) shall be utilized on all temporary power. All extension cords shall be rated for heavy duty and used in conjunction with GFCIs.
- b. Temporary electrical wiring required during construction and major repairs shall be installed by a qualified electrician and protected with circuit breaker or fuses.
- c. Temporary wiring and extension cords shall be protected against mechanical damage and, when damaged or spliced, removed from service.

3.6 Equipment

- a. The contractor shall submit a list of all specialty or heavy equipment (contractor owned, leased, rented, etc.) proposed for use on the contract, including but not limited to forklifts, lulls, cranes, earth moving equipment, and other power industrial trucks.
- b. Operators of equipment shall be trained to use the equipment.
- c. Documentation of training shall be submitted in accordance with the training and applicable equipment section of this document.
- d. The contractor shall perform daily equipment inspections and as recommended by the manufacturer.
- e. The use of any tool, material, or equipment which is not in compliance with applicable regulatory requirements shall not be used.
- f. Defective equipment shall be removed from service and/or tagged out using KSC Form 20-165 or a contractor equivalent tag to render them inoperable.

3.7 Excavation

a. All excavation work shall conform to the requirements set forth in 29 CFR 1926 Subpart P.

b. Dig Permits

(1) Anytime digging is performed, for any reason and to any depth, an approved Excavation Notification Worksheet, Dig Permit, (KSC Form 28-812NS) is required.

(2) Permits are obtained through the project COTR and shall remain on site for review for the duration of the permit.

(3) Any deviations from the approved excavation shall be approved in advance.

(4) Adherence to excavation permit category and conditions shall be mandatory.

c. Special Requirements to Hand-Dig Excavations in Specific Situations

(1) The contractor shall hand dig all excavations within 24 inches in all directions of a marked located utility line.

(2) The contractor shall also hand dig a pilot trench when called for on the Dig Permit for all underground utility work along the centerline of new trenches and down to the bottom elevation of the new utility.

(3) The pilot trench shall be carefully opened to determine the existence and location, if any, of active underground utilities which shall be protected and kept in service.

NOTE: Machine excavation may proceed only after it is determined that all existing utilities have been identified and protected.

d. Protection of Personnel During Excavations

(1) Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavated face.

(2) Material and equipment shall be kept at least two feet from the edge of excavations.

(3) Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person (excavation) for evidence of a situation that could result in possible cave ins, indications of protective systems failure , hazardous atmosphere, or other hazardous conditions.

NOTE 1: A Competent Person in Excavation is one 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. The competent person is specifically trained in, and is knowledgeable about, soil analysis, the use of protective systems, and the requirements of the excavation standard.

NOTE 2: A qualified person in excavation is a person or engineer must have more technical expertise, but would not necessarily have expertise in hazard recognition or the authority to correct identified hazards.

(4) A record of this inspection shall be maintained at the job site.

NOTE: The contractor may use the Excavation Checklist (KSC Form 28-814) for this purpose.

(5) A stairway, ladder, ramp, or other safe means of egress shall be located in trench excavations that are 4 feet or more in depth, and shall require no more than 25 feet of lateral travel.

(6) All excavations 5 feet or greater in depth shall have adequate shoring or be sloped at an angle not steeper than 1.5 to 1 vertical.

NOTE: Soil on KSC is classified as type C.

e. If any obstructions, interferences, or unforeseen conditions are encountered (i.e., concrete thrust blocks, direct buried cable below grade, unidentified utilities, etc.) all digging shall cease immediately, and the Project Construction Inspector and/or COTR shall be notified.

f. A thrust block is a configured piece of concrete located underground at water and sewer utility piping to prevent movement from line pressure fluctuations. The contractor shall not remove any buried concrete without prior approval from the CO when excavating soil .

3.8 Fall Protection

a. Contractors shall submit a Site-Specific Fall Protection Plan that addresses project-specific fall hazards.

b. This plan shall address the contractor's approach to implementing the requirements of [KNPR 8715.3, Kennedy Safety Practices Procedural Requirements](#), and applicable OSHA regulations.

c. This plan shall become a part of the contractor's overall project SSSP.

3.9 Fire Protection and Prevention

Contractors are responsible for on-site fire prevention and protection while in the process of executing contracts on Kennedy Space Center and satellite installations. Fire prevention and protection policies contained within have been established in accordance with NASA directives, OSHA Code of Federal Regulations, and NFPA Fire Codes.

The contractor shall brief their employees and subcontractors on fire prevention and protection responsibilities.

NOTE: Construction sites will be inspected periodically by KSC fire inspectors to assure compliance with fire prevention measures. The CO will be notified of any areas found to be substandard.

3.9.1 Handling and Storage of Flammable Liquids

a. Elevated fuel storage tanks shall be:

- (1) Grounded/Bonded.
- (2) Free of leaks (hose, nozzles, and valves).
- (3) Equipped with "No Smoking within 50 feet" signs.
- (4) Located at least 50 feet from buildings and combustibles.
- (5) Posted with proper placards/labels.

- b. Small containers of fuel shall be STORED in Underwriters Laboratories or Factory Mutual and NFPA 30 approved (listed) Flammable Storage Cabinets labeled "Flammable - Keep Fire Away."
- c. Flammables and any other volatile material shall not be stored or left overnight in any building, facility, or structure. They must be removed from worksites at the end of each day and stored in an area previously approved by the CO and the KSC Fire Prevention Office, or they must be removed from the installation.
- d. All hazardous material spills shall be reported immediately by calling 911, (321) 867-7911 (cell phone on KSC) or (321) 853-0911 (cell phone on CCAFS).
- e. Stored containers shall be sealed or covered. Leaking containers will be removed from the storage area.
- f. Wiping rags, drop cloths, paint brushes, and rollers shall be stored in covered metal containers at the end of each working day.
- g. All sources of ignition shall be eliminated and the area well ventilated when floor finishes containing combustible or flammable liquids are used.

3.9.2 Smoking

- a. The contractor shall not allow smoking in any facilities or on roofs of facilities on KSC.
- b. The contractor shall allow smoking only in designated areas that are approved by the KSC Fire Prevention Section.
- c. Designated smoking areas shall have conspicuous and legible signs posted designating area, and an adequate number of metal containers with self-closing cover devices shall be readily available for disposal of smoking material.
- d. Each metal container shall have stenciled on it "SMOKING MATERIAL ONLY."
- e. All cigarette lighting items (i.e. lighters, matches, etc.) shall be surrendered to the Gate Security Guard or at entry control points in areas where smoking or flame producing devices are forbidden.
- f. At the end of every shift of duty day, all collected smoking material shall be completely extinguished, saturated with water, and removed for disposal in dumpsters.

3.9.3 Fuel Powered Equipment

- a. Fuel powered equipment (such as air compressors, hoists, pumps, etc.) shall be located so that exhaust stacks are well away from combustible material and facility air intakes.
- b. Refueling shall not be conducted while engine is running or hot.
- c. Equipment shall be free of fuel and oil leaks.
- d. Fuel powered equipment shall not be used inside buildings or facilities or under facility overhangs.

3.9.4 Fire Hydrants Adjacent to Construction Sites

- a. Fire hydrants shall only be used with the approval of the KSC Assistant Chief of Fire Protection at 321-861-4684.

- b. Fire hydrants shall not be blocked. A minimum clearance of 25 feet shall be maintained at all times.
- c. The contractor shall place a three-way valve on hydrants used to support construction activities (after approval has been given).
- d. At the end of the workday, hoses shall be disconnected from the fire hydrant and the caps replaced.
- e. Fire hydrants shall only be opened with a hydrant wrench.

3.9.5 Fire Extinguishers

- a. Fire Extinguishers (compliant with NFPA 10) shall be provided and maintained by the contractor for use on the job site.
- b. A fire extinguisher belonging to a facility shall not be considered adequate fire protection in lieu of a contractor provided fire extinguisher for all hot work operations.
- c. Fire extinguishers and other firefighting equipment shall be visible and accessible at all times.
- d. Contractor personnel shall be trained on classification of fires, fire extinguishers, and their uses.

3.9.6 General

- a. The contractor shall not tamper with, disturb, or modify the fire alarm detection and suppression systems unless official contract work is to be performed on these systems.
- b. Any road or access to facilities that will be blocked due to construction or digging shall be reported to the ISC Consolidated Control Center (867-7627) at least 24 hours before actual work begins.
- c. The use of temporary heaters for personnel warmth shall be coordinated with the Fire Inspector prior to use and shall comply with the National Fire Codes.
- d. Portable fire extinguishers and fire detection/suppression devices shall be kept clear and unobstructed at all times.

NOTE: The KSC Fire Prevention Office is available for assistance in any matters pertaining to good fire safety practices. They can be reached at 861-4684 Monday through Friday from 0700 to 1530 hours. After 1500 hours, and on weekends, for questions about fire safety call 861-8718 or 867-4103.

3.10 Hand and Power Tools

- a. All portable power tools, whether company-furnished or employee-owned, shall be maintained in a safe condition and shall meet all applicable ANSI and/or OSHA Standards (29CFR1926 Subpart I) for design and use.
- b. Tool guards shall be in place and functional at all times when in use.
- c. All electric tools shall be double insulated or grounded.
- d. Extension cords used for portable power tools shall be ground fault (GFCI) protected unless the cord is plugged into a ground fault protected outlet.

- e. Power tools shall be disconnected at the end of each workday.
- f. Powder actuated tools shall only be operated by employees who have been trained in its operation and verified by the Site supervisor(s) as trained.
- g. There shall be a standard means of identifying the powder levels of loads used.
- h. Requirements for Tools Using Loads (Ammunition)
 - (1) Loads (ammunition) shall be stored in locked metal containers (limited to 1000 rounds unless stored in an approved explosive storage area).
 - (2) Only the quantity necessary for the specific job shall be taken to the job site.
 - (3) Loads (as with all explosive materials) shall be kept away from heat sources.
 - (4) Loads shall remain in the personal control of the authorized operator.
 - (5) Loads shall never be left unattended at the job site.
 - (6) Each authorized operator shall keep positive control on all loads until unused portions are returned to the locked containers in the storage area.

3.11 Hazardous Substances

3.11.1 Asbestos Containing Material (ACM):

- a. The contractor shall provide a written Asbestos Management and Abatement Implementation plan, approved by the CO, prior to the commencement of work, as an attachment to the SSSP.
- b. The plan shall be in compliance with the requirements of 29CFR1926.1101, the Code of Federal Regulations (CFR) National Emission Standards for Hazardous Air Pollutants (NESHAP) 40 CFR 61 Subpart M, the Florida Administrative Code (FAC) requirements FAC 62-257, and the Florida Statute (F.S.) 469 Asbestos Abatement, and F.S. 376.60 Asbestos Removal Program Inspection and Notification Fee.
- c. NASA/KSC will provide information regarding the location and quantity of known ACM in the facilities in which work will be performed. The contractor shall notify the CO if any undocumented ACM or suspected ACM is encountered.
- d. The contractor shall coordinate any asbestos management and abatement with designated KSC Environmental Health and Fire Services personnel and any resident government or contractor organization whose employees may have access to the work location.

3.11.1.1 Placards, Signs, and Other Notices

- a. Placards, signs, or other notices shall be posted at the perimeter of regulated areas.
- b. Posting shall be in a location visible to other employees who work in the vicinity of the abatement operation.
- c. In addition to posting requirements identified in 29 CFR 1926.1101, the notice shall identify the type of work in progress, Project Identification Number, and provide the name and phone number of the COTR for project information and for notification in the event of an emergency.

3.11.1.2 Asbestos Abatement Requirements

a. Asbestos materials must be handled, packaged, labeled, and disposed of per EPA 40 CFR 61 and OSHA Construction Standards 29 CFR 1926.1101.

b. Asbestos abatement contractors shall be licensed by the State of Florida in accordance with Florida Statute Chapter 469; Asbestos Abatement. This Florida Statute Chapter requires that:

(1) No person shall conduct an asbestos survey, develop an operation and maintenance plan, or monitor and evaluate asbestos abatement unless trained and licensed as an asbestos consultant in accordance with this chapter.

NOTE: Any person engaged in the business of asbestos surveys prior to October 1, 1987, who has been certified by the Department of Labor and Employment Security as a certified asbestos surveyor, and who has complied with the training requirements of s. 469.013(1)(b), may provide survey services as described in s. 255.553(1), (2), and (3).

(2) No person shall be permitted to prepare asbestos abatement specifications unless trained and licensed as an asbestos consultant in accordance with this chapter.

c. If more than 260 linear feet, 160 square feet, or 35 cubic feet of ACM is to be removed, or any load-bearing structure is to be demolished regardless of whether or not asbestos is present, the contractor shall submit to the Florida Department of Environmental Protection (FDEP) a "Notice of Asbestos Renovation and Demolition Form" [DEP Form 62-257.900(1)].

3.11.1.3 Project Monitoring

a. Each asbestos abatement contractor is responsible for ensuring project monitoring in accordance with the applicable requirements of 29 CFR 1926.1101.

b. Monitoring records shall be maintained at the worksite and shall be available for government inspection.

3.11.1.4 Pre-Work Asbestos Abatement Inspection

a. Asbestos abatement work shall not begin until the government conducts a pre-abatement workplace inspection involving the establishment of regulated areas related to asbestos abatement.

b. Pre-work inspections shall be requested at least 24 hours in advance by contacting the Medical and Environmental Health Services duty office at 867-2400.

c. Abatement work shall be permitted to proceed upon successful completion of the inspection (KSC Form 28-1230; Pre-work Inspection).

3.11.1.5 Final Asbestos Abatement Clearance Inspection

a. A Final Asbestos Abatement Clearance Inspection prior to the opening of a regulated area for normal occupancy following an asbestos abatement activity. The contractor shall request this inspection at least 24 hours in advance by contacting the Medical and Environmental Health (EH) Services duty office at 867-2400.

b. A regulated area shall not be opened until a NASA EH Office representative successfully completes a Final Clearance Inspection (KSC Form 28-1231; Post Work Inspection).

3.11.2 Steel Structure Maintenance (Abrasive Blasting / Surface Preparation / Spray Painting)

- a. When performing work involving toxic metals regulated under 29 CFR 1926.1101 – 1152, the contractor shall provide a written Toxic Metals Safety and Health Plan as an attachment to the SSSP.
- b. The Toxic Metals Safety and Health Plan shall:
- (1) Be approved by the CO prior to the commencement of work.
 - (2) Describe the contractor's approach to implementing the requirements of the applicable OSHA standards at the job site, including proposed engineering and administrative controls and selection of PPE and respiratory protection equipment.
 - (3) Address the contractor's approach to contain and control dusts, fumes, and other airborne or waterborne emissions from the worksite.
 - (4) Address monitoring activities during the work (emission control measures).
- c. Prior to the commencement of any spray painting or abrasive blasting operations, the contractor shall take precautions to protect all personnel and government hardware from contamination or damage during sandblasting and painting operations.
- NOTE:** The CO is the approving authority for the method of protection.
- d. Power tools used for surface preparation shall be equipped with dust collection shrouds or other attachments exhausted through a high efficiency particulate air (HEPA) filtered vacuum system.
- e. At no time shall workers be allowed to leave the worksite wearing contaminated clothing or equipment (e.g., shoes, coveralls, or head gear). All contaminated clothing and equipment shall be prevented from reaching the worker's home or vehicle.
- f. When required under 29 CFR 1926.1101 – 1152, the contractor shall provide a clean change area equipped with storage facilities for street clothes and a separate area with facilities for the removal and storage of contaminated work clothing and equipment.
- g. Project Monitoring
- (1) Each contractor performing regulated work is responsible for ensuring project monitoring in accordance with the applicable requirements of 29 CFR 1926.62 and 1926.1101 – 1152.
 - (2) Monitoring records shall be maintained at the worksite and shall be available for government inspection.
- h. Pre-work Inspection
- (1) Where work requires the establishment of a regulated area, work may not begin until the government conducts a pre-work inspection of the regulated area and any associated containments related to the work.
 - (2) Pre-work inspection shall be requested at least 24 hours advance and may be scheduled by contacting the Medical and Environmental Health Services duty office at 867-2400.

3.11.3 Silica

Crystalline silica, also called free silica, is an odorless crystalline solid that is found as a dusty air contaminant in many industrial surface materials and processes. It is the cause of the lung disease silicosis. Silica dust consists of solid particles generated by work processes such as concrete saw cutting, grinding, mixing, drilling, and crushing. It may also become respirable when disturbing materials such as ceramic tile, rock, CMU, roofing, or similar materials.

- a. When work includes concrete cutting, crushing, or other operations that mechanically abrade concrete and mortar, the SSSP shall address the contractors approach use of engineering and work practice controls and/or use of respiratory protection to prevent employee exposure to silica dust.
- b. Each contractor shall ensure project monitoring to demonstrate exposure compliance with the requirements of 29 CFR 1926.55, Appendix A.
- c. Monitoring records shall be maintained at the worksite and be available for government inspection.
- d. The contractor shall establish a controlled work area whenever unprotected personnel may be exposed to airborne silica dust that can reasonably be expected to be in excess of applicable exposure limits.
- e. The controlled work area shall have warning signs that read:

WARNING
CRYSTALLINE SILICA WORK AREA
RESPIRATORY PROTECTION REQUIRED
NO SMOKING, DRINKING OR EATING

3.12 Hearing Conservation

- a. When work includes employee exposure that exceeds the limits in the tables below, the SSSP shall address the contractors approach to complying with the requirements of 29 CFR 1926.52.
- b. Employee noise exposures shall be managed through implementation of engineering, work practice, and/or PPE to the following exposure limits:

DURATION		EXPOSURE LEVEL ² dBA
(hours)	(minutes)	
16	960	82
8	480	85
4	240	88
2	120	91
1	60	94
0.5	30	97
0.25	15	100
0.125 or less	7.5 or less	103

TABLE 3-1: NOISE EXPOSURE LIMITS¹

¹ Using:

Exchange Rate = 3 dB
 Lower Threshold = 80 dB,
 $T=480/2^{(L-85)/3}$ where T=time in min. and L=exposure level
 Meter set to slow response

² The exposure noted for each sound level for the duration noted is equivalent to 100% of the allowed noise dose. The Action Level is any exposure equivalent to 50% of the exposure duration in this Table.

Sound Level Decibels (dB)*	PERMITTED NUMBER OF IMPULSES OR IMPACTS PER DAY (imp/day)
>130	none
130	100
120	1,000
110	10,000
<i>*Decibels peak sound pressure level measured with a Type I/II sound level meter with peak hold feature using Z, C-weighting, or linear scale at fast response.</i>	

TABLE 3-2: NOISE EXPOSURE LIMITS FOR IMPACT OR IMPULSIVE NOISE

c. Hearing Protection Devices

- (1) Earmuffs and/or earplugs shall be provided in accordance with 29 CFR 1910.95. Such equipment shall be issued for the exclusive use of each employee and shall not be traded or shared.
- (2) Personnel shall wear hearing protection whenever engineering and administrative controls do not reduce employee noise exposure below the Action Level.
- (3) All persons working within a posted hazardous noise area, without regard to their exposure duration, shall wear hearing protection when noise is present.
- (4) All employees operating equipment with sound levels exceeding levels exceeding 85 decibels (acoustic) (dBA) shall use hearing protection.
- (5) Hearing protectors shall attenuate the employee's noise exposure to a level below the noise exposure limit of 85 dBA 8-hr time weighted average (TWA).
- (6) A combination of both earmuffs and plugs shall be used where noise levels equal or exceed 100 dBA 8-hr TWA and any exposure equal to or greater than 105 dBA.

d. The contractor shall affix appropriate warning signs on the perimeter and control area entry point for workers and surrounding area employees who may pass near the worksite when noise levels reach the action level greater than 82 dBA .

e. Warning signs and decals shall comply with the requirements of 29 CFR 1910.145, "Specifications for accident prevention signs and tags."

3.13 Hot Work Permits

Hot work permit requirements applicable to contractors are contained in [KNPR 8715.3, Kennedy Safety Practices Procedural Requirements](#). In addition to these requirements, the following also apply.

a. A KSC Hot Work Permit(s) shall be obtained from Kennedy Fire Services prior to any:

(1) Hot work for roof construction or repair using a “torch down” method (KSC Form 2-270).

(2) Hot work for demolition, modification or new construction that includes welding, cutting, burning, open flame and heat producing operations, soldering, heat sealing, or any spark producing operation (i.e., grinding) (KSC Form 2-271).

(3) Hot work for roof construction or repair using “tar kettle” operations (KSC Form 2-272).

b. The COTR shall facilitate obtaining the hot work permit. The contractor shall comply with all requirements identified on the hot work permit.

NOTE: The Fire Inspector who issues the permit will perform an onsite inspection and briefing prior to issuing the permit and will inspect the site periodically to assure hot work requirements are being met and prior to any permit renewal.

c. The contractor shall comply with all requirements identified on the permit and have the permit posted in a visible and accessible area on the job site to employees and inspectors for the duration of operations it was issued for.

d. All combustible material shall be cleared from the hot work area. Fire resistant guards, curtains, or shields shall be used where appropriate.

e. All combustibles (trash, debris, wood, etc.) shall be removed daily.

f. All flammable liquids and propane cylinders shall be removed from roofs at the end of each work day.

g. Flammable gas containers shall be of the approved safety type with spark arresting screen in filler neck, cap, and vent cap intact and an attached HMIS label with correct information.

h. The fire watch (where applicable by permit) shall be familiar with fire watch duties and shall be trained to operate the approved fire extinguishers.

i. A fire watch shall monitor all areas where hot work has been performed for the minimum time specified in the permit after hot work is stopped. This includes breaks, lunch, and end of shift.

j. The permit will identify the type and number of fire extinguishers required for the type of work and size of the area of work being performed.

3.14 Industrial Hygiene

a. The contractor shall comply with all applicable OSHA standards and [KNPR 1840.19, KSC Industrial Hygiene Program](#).

b. The contractor shall provide employees with an environment in which occupational health hazards are identified, evaluated, and eliminated or controlled in such a manner that personnel do not suffer adverse health effects as a result of their employment.

c. Additionally, the contractor shall:

(1) Ensure workplace inspections are conducted and operations/procedures are reviewed to identify hazardous materials and physical agents.

(2) Ensure MSDS for materials used in the workplace are reviewed to identify health hazards, symptoms of exposure, and requirements for safe use of the material.

(3) Ensure written procedures are in place for operations that require use of hazardous materials and physical agents. Written procedures must identify the hazards and include instruction on use of required engineering and work practice controls and required PPE.

(4) Ensure their employees are aware of hazardous materials and physical agents in the work area, understand the requirements for safe work with these materials and agents, and know what actions to take in an emergency (e.g., chemical spill or release).

3.15 Ladders and Stairways

3.15.1 Ladders

a. The contractor shall ensure that each employee using ladders is trained on recognizing the fall hazards, proper placement, use and construction of, maximum intended load, and the standards of 29 CFR 1926.1052 and 1053, as applicable.

b. The contractor shall inspect ladders daily and prior to each use and any found to have structural defects shall be "tagged out" and remove from the job site.

c. Employees working on ladders shall:

(1) Maintain three points of contact with the ladder at all times (i.e., one hand and two feet, two hands and one foot, etc).

(2) Maintain the stability of the ladder by avoiding overreaching.

(3) Keep the belt buckle or the centerline of the body between the rails.

(4) Ensure the balance of the ladder by refraining from placing one foot on an adjacent surface while the other foot is on the ladder.

(5) Ensure material, equipment, and tools are not carried by hand up or down a ladder.

d. When selecting ladders, the job application shall always be considered, (e.g., use fiberglass ladders for electrical work, Type I ladders for heavy duty work, etc).

e. The contractor shall ensure all ladders, to include job made ladders, are compliant with 29 CFR 1926.1053.

f. Stepladders shall be used in the fully opened and locked position; personnel shall not stand, sit, or work on or above the last two steps from the top of a stepladder.

3.15.2 Stairs

a. Stairs shall be provided for access to office trailers or other transportable work locations.

b. Stairs shall be installed at angles to the horizontal of between 30 and 50 degrees.

c. Riser height and tread width shall be uniform throughout any flight of stairs including any foundation structure used as one or more treads of the stairs.

d. All treads shall be slip resistant and the nosing shall be of non slip finish.

e. All parts shall be free of hazardous projections such as protruding nails.

- f. Stairs with 4 or more risers or more than 30 inches in height shall be equipped with at least 1 handrail and 1 stair rail system along each unprotected side or edge.
- g. Handrails and top rails shall be capable of withstanding a force of 200 pounds in any downward or outward direction along the top edge.
- h. Mid-rails, screens, mesh, or equivalent structural members shall be provided between the top rail and the stairway steps.
- i. Stairway platforms shall be no less than the width of a stairway and a minimum of 30 inches in length measured in the direction of travel.
- j. Standard railings and mid-rails shall be provided on the open sides of all exposed stairways and stair platforms.
- k. Handrails and mid-rails shall be provided on at least one side of closed stairways preferably on the right side descending.

3.16 Lockout / Tagout (Control of Hazardous Energy)

Requirements for Lockout/Tagout to be addressed in the Site Specific Safety and Health Plan are in [KNPR 8715.3, Kennedy Safety Practices Procedural Requirements](#).

3.17 Personal Protective Equipment (PPE)

Personal Protective Equipment requirements applicable to contractors are contained in [KNPR 8715.3, Kennedy Safety Practices Procedural Requirements](#). In addition to these requirements, the following also apply.

- a. The contractor shall take all necessary precautions to protect employees and shall provide at contractor expense any personnel protective devices and safety equipment required.
- b. The contractor shall ensure that any PPE required (including employee-owned PPE) is provided, used, and maintained in a compliant condition.
- c. Personal Protective Equipment shall be stored in a manner to prevent PPE from damage, dust, sunlight, chemical contamination, or extreme temperatures.
- d. The contractor shall document that all employees have received and understood the PPE training provided.
- e. Contractor employees shall wear approved hard hats as required by the SSSP.
 - (1) ANSI Z89.1 Class G or E hardhats shall be used.
 - (2) ANSI Z89.1 Class C hardhats shall not be used on construction sites at KSC.
- f. Approved industrial type safety glasses with side shields meeting the requirements of ANSI Z87.1 shall be worn by contractor personnel if eye injuries may result from the task being performed.
- g. When there is a potential crush hazard to the feet, safety type shoes shall be worn.

NOTE: It is highly recommended that all employees wear safety-toed shoes or boots. Safety toe work shoes may be required depending on the type of work being performed.

h. Fire retardant clothing shall be worn for designated tasks that present a potential for arc flash, flash fire, or explosion.

3.18 Process Safety Management

a. Contractors working in areas covered by the OSHA Process Safety Management (PSM) Standard shall schedule an employee awareness briefing on PSM through the CO and ensure all employees attend prior to starting work.

b. The contractor shall ensure all employees are informed of the known potential fire, explosion, or toxic release hazards associated with a facility in which the contractor is performing work prior to starting work.

c. All contractor employees shall ensure all employees are briefed on the applicable provisions of the facility emergency action plan by conducting a facility safety briefing prior to commencement of work.

d. The contractor shall ensure that any new employees brought to the job site receive facility safety training prior to entering process areas.

e. The contractor shall ensure that all subcontractor employees follow the safety rules of the facility including all safe work practices.

f. The contractor shall inform the project CO, COTR, and assigned Safety Specialist of any unique hazards to the facility presented by the contractor's work, or of facility hazards found during the contractor's work.

3.19 Radiation Protection

a. Radiation Protection requirements shall apply if the contract involves the use of ionizing or non-ionizing radiation producing equipment, devices, materials, or operations such as radiographic projectors, lasers, radio frequency (RF)/microwave transmitters, X-ray fluorescence (XRF) detection systems, or radioactive materials.

b. The contractor shall provide physical restraining barriers to protect surrounding area personnel from the emission of any radiation (e.g., weld testing, weld x-rays, etc.), preclude access to restricted areas by unauthorized personnel, and post the appropriate radiation hazard warning signs.

c. The contractor shall comply with [KNPR 1860.1, KSC Ionizing Radiation Protection Program](#), [KNPR 1860.2, KSC Non-Ionizing Radiation Protection Program](#), and applicable Federal, state, and local regulations for these types of activities performed.

3.20 Respiratory Protection

3.20.1 Respiratory Protection Plan

a. This section shall apply to all contracts involving asbestos abatement, abrasive blasting, painting, and other work where hazardous atmospheres can be anticipated.

b. Contractors whose work requires the use of respiratory protection PPE shall provide a written program for such work as part of its Site Specific Safety Plan.

c. The plan shall describe written policies, plans, and procedures and meet the requirement of a site-specific respiratory protection plan described in 29 CFR 1910.134, Respiratory Protection, and shall list the respiratory protection PPE to be used in completion of the contracted work and the basis for the selection of the respiratory protection PPE.

d. Respiratory protection plans shall be reviewed and approved by the NASA Industrial Hygiene Office prior to the commencement of any work.

e. The respiratory protection plan shall be maintained by the contractor at the worksite for the duration of the contracted work.

3.20.2 Project Monitoring

a. Each contractor performing work requiring the use of respiratory protection shall ensure project monitoring occurs in accordance with the applicable requirements of 29 CFR 1926.1000 to demonstrate the proper selection of respiratory PPE.

b. Monitoring records shall be maintained at the worksite and shall be available for government inspection.

3.20.3 Breathing Air

a. The contractor shall take precautions to ensure that connectors used in contractor-supplied breathing air systems are incompatible with connectors present on either KSC gas systems or on contractor supplied systems that are used to supply non-respirable gases.

NOTE: [KSC-STD-Z0008, Standard for Design of Ground Life Support Systems and Equipment](#), establishes requirements for connectors to be used in KSC facility breathing air and non-respirable gas systems. Facility breathing air systems located at KSC/CCAFS are to use a Hansen 3/8 inch quick disconnect as a breathing air distribution interface. KSC facility non-respirable gas systems are to use 1/4 inch quick disconnects for gas distribution interfaces. Although most facility systems were designed in accordance with this standard, there are nonconforming locations at KSC.

b. The Contractor shall be permitted to use KSC facility breathing air systems, if available at the work location.

c. The contractor shall perform a Pre-Work Site Inspection to identify coupling types in use at the work location before mobilizing or using any breathing air equipment.

d. The contractor shall also submit a written certification to show the contractor's breathing air system has been recently inspected and meets Grade D breathing air standards.

NOTE: Alternately, the contractor may arrange for on-site testing of contractor-supplied breathing air by the Government at least five days prior to start of work.

e. The contractor shall also provide a worksite evaluation for the NASA Safety Office to review before using any breathing air system.

NOTE: The breathing air test and the safety inspection can be coordinated through the CO, and will be at no cost to the contractor.

f. The contractor shall tag or label connector ends of all lines and flexible hoses of contractor-provided breathing air or non-respirable gas distribution systems with tags or labels that clearly identify the contents of the lines or hoses.

g. The contractor shall provide a description of the steps taken to comply with these requirements in their safety plan submittal.

3.21 Rollover Protection for Mobile Equipment

a. Rollover protection devices and seatbelts shall be in place on all special purpose equipment at all times.

NOTE: Equipment includes crawler and rubber tired tractors, with or without attachments, such as front end loaders, blades, self propelled earth movers, including pan scrapers, bottom dumps, side dumps, rollers, and graders.

b. Special purpose equipment without rollover protection devices shall not be allowed on the construction site.

c. Seatbelts shall be utilized anytime the equipment is in operation.

3.22 Scaffolding

a. The contractor shall designate a competent person (scaffolding) for the erection and inspection of any scaffolding systems used on the contract.

b. Scaffolds shall be designed by a qualified person and shall be constructed and loaded in accordance with that design.

NOTE 1: A competent person in scaffolding is one who is capable of identifying existing and predictable hazards as it relates to scaffolding 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.

NOTE 2: A qualified person in scaffolding is a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project.

c. A competent person (scaffolding) shall supervise the moving, erection, modification, and dismantling of all scaffolding.

d. All scaffolds and scaffold components shall be designed to support at least four times the maximum intended load.

e. Scaffolds shall be inspected for visible defects by a competent person (scaffolding) before each work shift and after any occurrence which could affect the scaffold's structural integrity.

f. Scaffold users shall confirm that a competent person (scaffolding) has inspected the scaffolding during that work shift before they access the scaffolding.

g. The inspection shall be documented and available to employees that access the scaffold.

NOTE: A recommended documentation process includes a tag attached to the scaffold that shows the inspector's name and date/time of each inspection.

h. Guardrails and toe boards shall be installed on all open sides and ends of platforms more than four feet above the ground or floor.

i. All planking used on scaffolds shall be scaffold grade, or equivalent.

j. Scaffolds that are NOT rolling tower-type scaffolds shall not be moved while employees are on them.

k. Moving rolling tower type scaffold while employees are on them shall be permitted only when ALL of the following conditions are met:

- (1) The maximum scaffold height does not exceed twice the minimum base width/length.
- (2) The surface on which the scaffold is being moved shall be within three degrees of level and free of pits, holes, and obstructions.
- (3) Employees on scaffold shall be made aware of the move.
- (4) Forces shall be applied at points well below five feet above the base of the structure.
- (5) No portion of the employee on the scaffold may extend outward beyond the wheels, casters, or other supports.

l. Minimum clearance from power lines for any scaffold component shall be:

- (1) Insulated Lines less than 300 volts: 3 feet
- (2) Insulated or non-insulated lines less than 50 kV: 10 feet
- (3) Insulated or non-insulated lines greater than 50 kV: 10 feet + 4" for each kV > 50 kV

m. Ladders or any makeshift device such as a box or barrel shall not be used to increase the working level height of employees on the scaffold. All work shall be accomplished from the scaffold deck.

n. No employee shall climb the outside framework or cross braces of a scaffold. All scaffold access shall be by ladder, walkway, ramp, or stairs.

o. No material shall be stored on scaffold decks. Material staged on the scaffold deck for immediate installation or use that is not installed or used shall be removed from the scaffold when work is stopped for the day.

p. Contractors shall ensure employees who perform work (scaffold user) while on a scaffold are trained in accordance with the requirements identified in 29 CFR 1926.454.

q. Documentation of employee scaffold user training shall be provided as part of the contractor's safety plan submittal.

3.23 Steel Erection

a. The contractor shall have a Site Specific Steel Erection Plan that includes a complete final copy of specifications and drawings issued for construction by the design Professional Engineer (PE).

NOTE: A Preconstruction conference and site inspection should be conducted between the erector, contractor, project engineer, and any additional personnel needed to develop and review the site-specific steel erection plan.

b. The Site Specific Steel Erection Plan shall include:

- (1) A site lay out drawings detailing the access roads into and through the job site for safe delivery and movement of cranes, derricks, trucks, and other necessary equipment, the material to be erected methods for vehicular and pedestrian control. A firm, properly graded, drained

area, readily accessible to the work with adequate space for safe storage of materials and safe operation of the erectors equipment.

(2) The sequence of erection activities that includes material deliveries, staging, storage locations, and coordination with other trades and construction activities.

(3) A description of the crane and/or derrick selection and placement that includes site preparation and path for overhead loads, a pre-plan of all overhead hoisting and operations, and plans for critical lifts including rigging supplies and equipment.

(4) The erection sequence including guying, bracing, bridging, anchor rod and anchor bolt mods, columns, and beams (including joists and purlins), connections, decking, ornamental and miscellaneous iron work.

(5) A description of the fall protection procedures that will be used in compliance with [KNPR 8715.3, Kennedy Safety Practices Procedural Requirements](#) and 29 CFR 1926.760.

(6) A certification for each employee who has received training for performing steel erection operations as required by 29 CFR 1926.761.

(7) A list of the designated qualified and competent persons in steel erection.

(8) A description of procedures that will be utilized in the event of rescue or emergency response.

c. Prior to commencement of steel erection the contractor shall ensure the following written notifications have been received:

(1) Concrete footings, piers and walls, and the mortar in masonry piers and wall as attained, on the basis of an appropriate ASTM standard test method of field cured samples either 75 percent of the intended minimum compressive design strength of sufficient strength to support the loads imposed during steel erection.

(2) Any repairs, replacements, and modification of the anchor bolts were conducted in accordance with 29 CFR Subpart R Steel Erection 1926.755(b)

3.24 Vehicle Mounted Elevating and Rotating Work Platforms

3.24.1 General Requirements for Elevating Work Platforms (EWP)

a. "Field Modification" of aerial lifts for uses other than those intended shall be permitted only after the modification has been certified in writing by the manufacturer or by a nationally recognized testing laboratory in accordance with all applicable provisions of ANSI A92-2.

b. If a request to evaluate a "field modification" is submitted to the manufacturer and a response is not received within a reasonable time period, a Professional Engineer shall be assigned to evaluate the unit and calculate a process to modify the unit, adding the necessary fall protection devices necessary to safely use the lift.

c. Boom and basket load limits specified by the manufacturer shall not be exceeded.

d. Electrical tests performed on high voltage bucket trucks shall be made in conformance with the requirements of ANSI A92-2.

e. If lift equipment is modified, as outlined above, all welding shall conform to the Automotive Welding Society (AWS) Standards.

f. When operating aerial lifts under, over, by, or near energized electric power lines, the operator shall not approach closer than the restricted approach boundary as defined in NFPA 70E, Table 130.2(C).

g. A personal fall arrest system shall be required for all employees in any lift. This shall include a body harness and lanyard with deceleration device affixed to the manufacturers provided anchor point.

h. If the employee must exit the lift, the employee shall use the double lanyard system. The employee shall remain attached to the lift with one lanyard, and shall only exit the lift in accordance with the approved safety plan.

3.24.2 Operations

a. Lift controls shall be tested each day prior to use to determine that such controls are in safe working condition.

b. Fall protection equipment shall only be used by personnel that have been properly trained.

c. Fall protection equipment shall be inspected prior to each use.

d. Attaching fall arrest or positioning lanyards to an adjacent pole, structure, or equipment while working from an aerial lift shall not be permitted.

e. Employees shall always stand firmly on the floor of the basket, and shall not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position.

f. The brakes shall be set and outriggers, when required, shall be positioned on pads or a solid surface.

g. Wheel chocks shall be installed before using an aerial lift on an incline. Aerial platforms shall not be operated in any manner on grades, side slopes, or ramps exceeding those for which the aerial platform is rated by the manufacturer.

h. An aerial lift truck shall not be moved when the boom is elevated in a working position with employees in the basket.

i. Articulating Boom and Extensible Boom Platform Operation

(1) Articulating boom and extensible boom platforms, primarily designed as personnel carriers, shall have operational platform (upper) and lower controls.

(2) Upper controls shall be in or beside the platform within easy reach of the operator. Lower controls shall provide for overriding the upper controls.

(3) Controls shall be plainly marked as to their function.

(4) Lower level controls shall not be operated unless permission has been obtained from the employee in the lift, except in case of emergency.

3.24.3 Work Practices

a. Employees shall keep all parts of the body inside the platform during raising, lowering, and positioning.

NOTE: This provision does not apply to an occupant of the platform performing the duties of a signal person.

b. Employees shall always stand firmly on the floor of the basket and shall not sit or climb on the edge or railings of the basket or use planks, ladders, or other devices to gain additional elevation or for a work position.

3.24.4 Inspection and Maintenance

a. Vehicle mounted elevating and rotating work platforms shall be inspected daily (if the contractor is working more than one shift per day, inspections shall be done at the start of each shift), and shall not be placed in service if the inspection shows any condition adversely affecting the safety of the vehicle.

b. The following items shall be inspected:

(1) Operating controls and associated mechanisms for conditions interfering with proper operation.

(2) Visual and audible safety devices for malfunction.

(3) Hydraulic or pneumatic systems for observable deterioration or excessive leakage.

(4) Fiberglass and other insulating components for visible damage or contamination.

(5) Missing or illegible operational and instructional markings.

(6) Electrical systems of/or related to the aerial device for malfunction, signs of excessive deterioration, dirt and moisture accumulation.

(7) Visual inspection of bolts, pins, and other fasteners for loose, deformed, or missing fasteners and other locking devices.

c. Any suspected items shall be carefully examined or tested and a determination made by a qualified person as to whether they constitute a safety hazard. All unsafe items shall be replaced or repaired before use.

d. Where vehicle mounted elevating and rotating work platforms are used on an around the clock basis, they shall be examined after each shift, and if defects are found, they shall be immediately reported and corrected.

e. Inspections shall be documented, signed, and kept with the equipment at the worksite.

f. If operators change during the same shift, they shall review the inspection document and initial it if the status of the vehicle did not change.

3.24.5 Training Requirements

a. Employees shall receive formal training in elevated work platforms before being allowed to operate any aerial lift as defined by this procedure.

b. Training in fall protection equipment is required before operating in an aerial lift.

3.25 Welding and Cutting Operations

a. All welding and cutting operations shall be in accordance with Occupational Safety and Health Administration 29CFR1926 Subpart J, KSC Fire Prevention Procedures for Contractors, The National Fire Protection Association 51B.

b. The contractor shall ensure flammable materials are at least 50 feet and combustibles 35 feet from welding operation. Exceptions are only authorized when approved by the KSC Fire Inspector when:

- (1) The flammable and combustible materials cannot be relocated.
- (2) The work cannot be accomplished by any other means.
- (3) The flammable and combustible materials are protected by the use of welding blankets or other fire inspector approved methods.

c. Welding and cutting operations shall not be conducted in the vicinity of flammable liquids, gases, vapors, or oxygen enriched atmospheres.

d. Prior to any torch cutting/welding on any painted surface, the coating shall be removed a minimum of 4 inches in each direction from the cut/weld point or personal protective equipment requirements in OSHA standard 29 CFR 1926.62 must be complied with.

e. Only employees properly trained and certified to operate welding and torch equipment shall operate such equipment.

f. Only approved equipment (such as torches, regulators, pressure reducing valves, acetylene generators, gas hoses, electric cables, etc.) shall be acquired and used for hot work operations.

g. All work shall be properly shielded from observation of the bare arc by adjacent or passing personnel.

h. Arc welders shall conduct inspections daily before beginning operations to ensure their equipment is clear of defects and safe to use. Report any defects to supervision.

i. All portable cylinders used for storage and transportation of compressed gasses shall be constructed and maintained in accordance with the regulations of the U.S. Department of Transportation (DOT).

j. Labeling / Marking of Cylinders used in Welding

- (1) Cylinders shall be legibly marked with either the chemical or trade name of the gas contained.
- (2) Cylinder labeling/markings shall be by means which is not easily removed.
- (3) When practical the marking shall be on the shoulder of the cylinder.

k. Compressed gas cylinders shall be equipped with valves and/or connections that comply with ANSI requirements.

l. Cylinder valves shall be closed before moving cylinders, when work is finished, and when empty.

m. Acetylene is flammable and highly explosive when mixed with air. As such, it shall be handled and stored safely as follows:

- (1) Acetylene shall be stored in a vertical position.
- (2) Never use acetylene at a pressure higher than 15 psig.

(3) Where cylinders have been lying in a horizontal position, they shall stand in an upright position for at least two hours prior to use.

n. Oxygen cylinders in storage shall be separated from fuel gas cylinders or other combustible materials a minimum distance of 20 feet or by a non combustible one half hour rated fire resistant barrier at least 5 feet tall.

o. Cylinders shall be placed in storage when there is no reasonable anticipation of use within a 24 hour period.

p. Cylinders in use or transport shall be stored in an upright position and secured by chain or bracket that prevents falling. The preferred method is an approved welding cart.

q. When transporting cylinders by a crane or derrick, a cradle, boat, or suitable platform shall be used. Slings, chokers, ropes, or electric magnets shall not be used for this purpose.

r. Valve protection caps shall always be in place when not in use or inter connected.

s. Cylinders shall not be dropped, struck, handled roughly, or permitted to strike each other violently.

t. Valve caps shall be used to protect valves from damage.

u. Valve caps shall not be used as a lifting device.

v. Valve protection caps shall be installed before moving the cylinder unless the cylinder is secured on a special truck.

3.26 Working Over or Near Water

a. A serviceable United States Coast Guard (USCG)-approved life vest or buoyant work vest shall be worn by all employees required to work within six feet of an unprotected edge that is over water if NASA Safety determines there is a danger of drowning if an employee were to fall.

b. In addition to life or buoyant work vests, a throwable ring buoy with 90 feet of rope attached for emergency rescue shall be maintained within 200 feet of the worksite.

c. The life/work vests and ring buoys shall be inspected for defects that alter their strength or buoyancy prior to each use. Defective equipment shall be replaced immediately.

d. A rescue skiff shall be immediately available (able to perform rescue within four minutes of employee entering the water) in the work area to assist in emergency rescue.

3.27 Work Zone Maintenance of Traffic (MOT)

a. Where work is accomplished on or within 15 feet of the roadway, a work zone safety Maintenance of Traffic (MOT) plan shall be developed as a part of the contractor's SSSP by a certified and trained Traffic Engineer. The MOT plan shall be developed and implemented in accordance with the Florida Department of Transportation (FDOT) standards.

NOTE: In lieu of an engineered plan, pre-designed plans found in FDOT Design Standard for Traffic Control through Work Zones, Index 600, may be used.

b. All employees working within 15 feet of a roadway or street shall wear reflective vests compliant with ANSI/ISEA 107 – 2004 Class 2 High-Visibility Safety Apparel. Class 3 is required for flaggers performing work at night.

- c. The contractor site supervisor managing traffic control set up shall be trained to the intermediate or advanced MOT level.
- d. The Intermediate/Advanced trained MOT person shall verify/ensure the control zone is correctly set up prior to the start of each day's work.
- e. Only trained flagmen shall be used to control traffic through work zones.
- f. The flagman shall have no other duties assigned while the traffic control zone is established.
- g. The verification of training shall be submitted in the training section of the contractor's SSSP.

APPENDIX A: DEFINITIONS

Acetylene: At 70° F and atmospheric pressure, pure acetylene is a colorless, odorless, gas. The commercial grade of acetylene, generated from calcium carbide, has a distinctive garlic odor.

Low pressure – at or below 1 psig

High pressure – above 1 psig, but not exceeding 15 psig

Action Level: The concentration or level at which the use of control measures becomes mandatory. The Action Level is used when variations of measured air contaminant levels can exceed the regulated level. Unless otherwise mandated by a specific regulatory or consensus standard, the "action level" is set at one-half of the exposure limit of the hazardous material.

Adverse Weather: Winds in excess of 35 knots, heavy rain/hail, or the potential for lightning within 5 nautical miles that could affect the area within 30 minutes.

Anchorage (Anchor Point): A secure point of attachment for lifelines, lanyards, or deceleration devices. It shall be capable of supporting 5000 pounds per person or designed by a qualified person with a safety factor of 2.

Approved: Listed and approved by Underwriters Laboratories, Inc., Factory Mutual Engineering Corporation, The Bureau of Mines, National Institute for Occupational Safety and Health (NIOSH), AWG, ANSI, NFPA, or other nationally recognized agencies which list, approve, test, or develop specifications for equipment to meet Fire Protection, Health, or Safety requirements and/or acceptable to the authority having jurisdiction.

Asbestos Containing Material (ACM): Any material that contains greater than one percent asbestos by volume.

Authority Having Jurisdiction: The NASA organization/directorate, office, or individual responsible for approving equipment, an installation, or a procedure.

Brazing: A process where metals are soldered together by heating the metal to temperatures above 800° F and using a nonferrous filler metal having a lower melting point to join the metals together.

Close Call: An occurrence or a condition of employee concern in which there is no injury or only minor injury requiring first aid and no significant equipment/property damage/mission failure (less than \$1000), but which possesses a potential to cause a mishap or negative mission impact.

Competent Person: One 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.

Compressed Gas Cylinder: A container specifically designed for compressed gases. High pressure cylinder means those approved for service pressure of 900 psig or greater. Low pressure cylinders are those marked with a service pressure of less than 900 psig.

Confined Space: A space that is large enough and configured so that a worker can bodily enter and perform assigned work, and has limited or restricted means of entry or exit, (for example: tanks, vessels, storage bins, vaults, pits and spaces that may have limited entry), and is not designed for continuous human occupancy.

Connector: A device which is used to couple (connect) parts of the personal fall arrest system and positioning device systems together. It may be an independent component of the system, such as a carabineer, or it may be an integral component part of the system, such as a buckle or D-ring sewn into a body belt, body harness, or snap hook spliced or sewn to a lanyard or self retracting lanyard.

Contracting Officer: A person with the authority to enter into, administer, and/or terminate contracts and make related determinations and findings.

Critical Lift: Any lift where failure/loss of control could result in loss of life, loss or damage to flight hardware or a lift involving special high dollar items such as spacecraft, one of a kind articles, or major facility components, whose loss would have serious programmatic or institutional impacts. Critical lifts also include lifting of personnel with a crane, operations with special personnel and equipment safety concerns beyond normal lifting hazards, lifts of moderate to high level of risk involving hazardous materials, poisons, corrosives, or highly volatile substances, large and complex geometric shapes, lifts exceeding 75 percent of the rated capacity of the crane, lifts of submerged or partially submerged objects, and lifts involving multiple cranes or multiple hook lifts.

Crystalline Silica: Crystalline silica is a basic component of soil, sand, granite, and many other minerals. Quartz is the most common form of crystalline silica. Cristobalite and tridymite are two other forms of crystalline silica. All three forms may become respirable size particles when workers chip, cut, drill, or grind objects that contain crystalline silica.

Deceleration Device: Any mechanism, such as a rope grab, rip stitch lanyard, specially woven lanyard, tearing or deforming lanyards, automatic self retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

Excavation: Any man made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

Exposure: The process by which a chemical or physical agent enters the body through any route of entry including inhalation, ingestion, or absorption through the skin. Potential for exposure exists where air contaminants are present or where hazardous materials can come into contact with the skin.

Facility: The buildings, containers, or equipment that contain or support a process.

Failure: Load refusal, breakage, or separation of components.

Fall Arrest System: A system designed to stop one or more persons from striking a lower level or obstructions if a fall occurs. Fall arrest systems require the use of a full body harness, a connecting means, a suitable anchorage, planned rescue procedures, and proper training of all users.

Fire Watch: A person designated to monitor the area around a welder, normally outside an authorized welding shop, to watch for fires resulting from welding, cutting, or torch use operations.

Flammable Gas: Any substance that exists in the gaseous stage at normal atmospheric temperature and pressure. It is capable of being ignited and rapidly oxidized when mixed with the proper portions of air.

Flammable Liquid: Any liquid having a flashpoint below 100 deg. F. (37.8 deg. C.), except any mixture having components with flashpoints of 100 deg. F. (37.8 deg. C.) or higher, the total of which make up 99 percent or more of the total volume of the mixture. Flammable liquids are identified as Class I liquids.

Fuel Gas: Gases such as acetylene, natural gas, hydrogen, propane, methylacetylene propadiene, synthetic fuels, and hydrocarbons are usually used with oxygen to produce heating.

Hazardous Chemical or Material: Chemicals or materials which are health hazards or physical hazards.

Hazardous Task: A task where an accident could be life threatening or result in a permanent disabling injury.

Health Hazard: A health hazard is a chemical or physical agent where it is established that acute or chronic injury or illness may occur in exposed employees, based upon statistically significant evidence in at least one study conducted in accordance with scientific principles.

Hoist (Hoisting): All crane or derrick functions such as lowering, lifting, swinging, booming in and out or up and down, or suspending a personnel platform.

Hole: A gap or void 2 inches or more, (5.1 cm) in its least dimension in a floor, roof, or other walking/working surface.

Hot Work: A work activity that by its nature creates an open source of ignition that is capable of initiating fires or explosions, e.g., electrical or gas welding, cutting, brazing, grinding, or similar flame or spark producing operations.

Hot Work Permit: KSC Form 2-13, CCAFS/KSC Welding and Burn Permit for operations at and KSC

Imminent Danger: An impending or threatening situation which if left uncorrected is likely result in serious injury or property damage.

In Storage: OSHA interprets oxygen/acetylene cylinders to be in storage when it is reasonably anticipated that gas will not be drawn from the cylinder within 24 hours (overnight hours included). "Reasonably anticipated" is based on whether specific welding or cutting work is planned or scheduled within a 24 hour period from the last use.

Industrial Hygiene: The profession devoted to the prevention of occupational illness or disease associated with exposures to hazardous materials and physical agents.

Infeasible: It is impossible to perform the construction work using a conventional fall protection system (i.e. guardrail system or personal fall arrest system) or that it is technologically impossible to use any one of these systems to provide fall protection.

Live Parts (Electrical): Energized conductive components.

Lockout/Tagout: The process of configuring equipment in a temporary condition in which the release of energy is prevented from endangering personnel performing servicing and/or maintenance.

Material Safety Data Sheet (MSDS): Technical information on chemical products published by the chemical manufacturer, formulator, or importer. The MSDS contains product name,

ingredients, toxicity, physical and chemical characteristics, fire and explosion data, health hazard information, and emergency and disposal procedures.

Maximum Intended Load: The total load of all persons, equipment, tools, materials, transmitted loads, and other loads reasonably anticipated to be applied to a scaffold or scaffold component at any one time.

Mishap: An undesired and unexpected event that results in injury requiring more than first aid, occupational illness to personnel, and/or damage to property of at least \$1000. Reference KNPR 8715.3, Chapter 10 for defined levels of NASA mishaps.

Noncompliance: A violation of an OSHA Standard or a provision of this document.

Opening: A gap or void 30 inches or more high and 18 inches or more wide, in a wall or partition, through which employees can fall to a lower level. A gap 12 inches or more in its least dimension in a floor, roof or other walking/working surface. Skylights and smoke domes are classified as openings when they do not meet strength requirements (capable of supporting without failure twice the weight of employees, equipment and materials that may be imposed on the cover at any one time).

Platform: A work surface elevated above lower levels. Platforms can be constructed using individual wood planks, fabricated planks, fabricated decks, and fabricated platforms.

Qualified Person: A person who, by possession of a recognized degree, licensing (electrical), certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project.

Rescue: Fire Services rescue personnel.

Roofing Work: The hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the roof deck.

Serious Accident / Incident: Accident/incident resulting in an injury or illness requiring prompt medical treatment or in situations such as fires, facility or property damage (estimated at \$1,000 or more), hazardous material or chemical spills, threatening behavior or workplace violence, explosions, bomb threats or a wild animal sighting that poses an immediate threat to any employee.

Steel Erection: Construction, alteration or repair of steel buildings, bridges and other structures, including the installation of metal decking and all planking used during the process of erection. Steel erection activities include hoisting, laying out, placing, connecting, welding, burning, guying, bracing, bolting, plumbing and rigging structural steel, steel joists and metal buildings; installing metal decking, curtain walls, window walls, siding systems, miscellaneous metals, ornamental iron and similar materials; and moving point to point while performing these activities.

Stop Work Authority (Safety): Authority provided to all employees at KSC to stop work or work tasks that pose an imminent danger to the employee(s) performing the work or others in the area. The authority is limited to the location where the imminent danger is present.

Stop Work Order (Safety): A directive from the Contracting Officer to cease part or all jobsite work for failure to follow safety and health procedures, imminent danger situation or conditions, accumulation of safety violations, etc.

Toe Board: A low protective barrier that prevents material and equipment from falling to lower levels and provides protection from falls for personnel.

Unprotected Sides and Edges: Any side or edge (except at entrances to points of access) of walking/working surface (e.g., floor, roof, ramp, or runway) where there is no wall or guardrail system at least 39 inches high.

Walking/Working Surface: Any surface, whether horizontal or vertical on which an employee walks or works, including but not limited to floors, ramps, bridges, runways, formwork and concrete reinforcing steel. Does not include ladders, vehicles, or trailers on which employees must be located to perform their work duties.

Welder or Welding Operator: As used herein are intended to designate any certified operator of electric or oxyfuel gas welding or cutting equipment, or allied processes.

Welding, Electric: The process in which electrical energy is converted into heat for welding (i.e. arc welding and resistance welding)

Welding, Gas: A group of welding processes wherein fusion is produced by heating with a gas flame, with or without the application of pressure or filler materials.

Work Area: The portion of a walking/working surface where job duties are being performed.

Violation: An omission or commission, a condition, or a situation that is in conflict with the procedures, standards and the requirements of safety and health standards.

Violation (Repeat): Occurring more than once; usually after it being previously identified; may be classified as minor or serious

Violation (Willful): A violation committed with an intentional disregard of, or plain indifference to, the requirements of OSHA or this document.

APPENDIX B: ACRONYMS

ACM	Asbestos Containing Material
AHA	Activity Hazard Analysis
ANSI	American National Standard Institute
ASTM	American Society for Testing and Materials
AWS	Automotive Welding Society
CCAFS	Cape Canaveral Air Force Station
CFR	Code of Federal Regulation
CO	Contracting Officer
CoF	KSC Construction of Facilities
COTR	Contracting Officer Technical Representative
dB	decibels
dBA	decibels (acoustic)
DOT	United States Department of Transportation
EH	Electrical Hazard
	Environmental Health
EMS	Emergency Medical Services
EPCRA	Emergency Planning and Community Right-to-Know Act
EWP	Elevated Work Platform
FAA	Federal Aviation Administration
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
F.S.	Florida Statute
GFCI	Ground Fault Circuit Interrupter
HEPA	High Efficiency Particulate Air
HMIS	Hazardous Materials Identification Sheet
ISC	Institutional Services Contractor
JHA	Job Hazard Analysis
JSA	Job Safety Analysis
KNPR	Kennedy NASA Procedural Requirement
KSC	John F. Kennedy Space Center
kV	Kilovolt
LDEM	Lifting Devices and Equipment Manager
MOT	Maintenance of Traffic
mph	miles per hour

MSDS	Material Safety Data Sheet
NASA	National Aeronautics and Space Administration
NEC	National Electric Code
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
nm	nautical mile
NOSV	Notice of Safety Violation
OHF	Occupational Health Facility
OSHA	Occupational Safety and Health Administration
PE	Professional Engineer
POC	Point-of-Contact
PPE	Personal Protective Equipment
PSM	Process Safety Management
RF	Radio Frequency
SSSP	Site-Specific Safety and Health Plan
TWA	Time Weighted Average
USCG	United States Coast Guard
XRF	X-Ray Fluorescence