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National Aeronautics and Space Administration

Employee

Safety and Health Guide

2006/2007

National Aeronautics and Space Administration

John F. Kennedy Space Center
Kennedy Space Center, FL 32899

www.nasa.gov

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Emergency Response – 911
(867-7911 from a cell phone)

Safety and Health Points of Contact

National Aeronautics and Space Administration

NASA Safety Hotline	867-SAFE
Ombuds, Human Resource Specialist	867-7484
Chief Medical Officer	867-6658
NASA Safety & Mission Assurance	867-2118
NASA Branch Institutional Safety	867-6351
Shuttle Safety	861-7901
Launch Services Program	476-3699
ISS/Payload Safety	867-5868
NASA Industrial Hygiene	867-6342
NASA Radiation Safety	867-6958
Hazardous Waste/Pollution Prevention	867-1599
NASA Fire (non emergency)	867-3795
NASA Emergency Preparedness	867-8723
NASA Security	867-7575
NASA Test Director	861-6831

EMERGENCY PREPAREDNESS

CCAFS Emergency Operations Center	853-9155/6
KSC Emergency Operations Center	861-9200
Emergency Operations Center (Storm Info/Update Hotline)	861-7900

Joint Base Operations Support Contractor

Occupational Health Clinic	867-3346
Employee Assistance Program	867-7398
Environmental Health	867-2400
J-BOSC Duty Officer/Trouble Call	853-5211
J-BOSC Security	867-2121

United Space Alliance

USA Trouble Call	861-6342
USA Duty Officer	867-4910
Contractor Test Conductor	861-3901 or 3903

The Boeing Company, Space Coast Operations

Boeing Trouble Call	867-5100

KSC Locator	867-4369

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Please direct any questions, suggestions or comments to:

Marguerite Davis, SA-E2, 867-8520, e-mail
marguerite.a.davis@NASA.gov**.**

Introduction

At KSC we are committed, individually and as a team, to protecting the safety and health of the public, our partners, our people, and those assets that the Nation entrusts to us. Safety is the cornerstone upon which we build mission success. This commitment begins with senior management and permeates to all levels of the organization. All supervisors and leaders at all levels are responsible for providing their employees a safe and healthy work environment, and all personnel working at KSC are charged with responsibility for working in a safe manner and watching out for the safety of their coworkers.

The purpose of the KSC Employee Safety & Health Guide is to provide employees a quick reference to NASA and KSC safety and health requirements. KSC abides by the safety and health policies and requirements outlined in this Guide. KSC's commitment to continuous improvement of safety and health is essential toward our expectations of zero mishaps in the workplace and in our daily lives. Remember, safety and health is about safe and healthy behaviors at work and at home.

James W. Kennedy
KSC Center Director

Section 1 Emergency Information

Refer to **References** for POC's, additional information & requirements.

Reporting Injury, Illness and Emergencies

- To report all emergencies and any injury or illness that requires prompt medical attention, **call 911 on a Center phone or 867-7911 on a cell phone**.
- To receive medical attention for minor illness or injury or suspected chemical exposure, notify your supervisor and report to the Occupational Health Facility (OHF).
- Off-shift medical care requirements are handled though the Emergency Medical Services, which are to be dispatched through the Center-wide 911 system. If non-urgent medical attention is required, the patient may elect to go to a local hospital or other facility to receive medical attention, or may elect to report to the KSC medical facilities the next day.

Emergency Notification and Response

- **Facility fire alarms** consist of loud, continuous bells ringing. When you hear the facility fire alarm, evacuate to the closest exit and report to your marshalling area, or 200 feet upwind from the facility.
- **Area warnings** consist of a warbler sound and indicate there is danger in the area. When you hear an area warning, evacuate the area and report to the marshalling area.
- **Tornado warnings** are a 3 to 5 minute steady siren to warn those outside to seek shelter immediately in a substantial building. Corridors in the interior hallways offer the best protection. Stay clear of exterior windows.
- **The Emergency Alert System (EAS)** is a buzzer-type noise on television or radio. All personnel shall listen and follow emergency instructions.
- **The Public Address (PA) System** is used to announce weather advisories, toxic releases and other emergencies.

- **Flashing lights** in facilities indicate hazardous operations.
- A flashing **amber** light indicates that hazardous operations are underway. Only personnel essential to the operation should be present. Do not enter.
- A **red** flashing light indicates an emergency situation and all personnel should evacuate the facility.
- A **blue** flashing light indicates that radio frequency (RF) waves are being transmitted and non-essential personnel should not approach.
- During emergencies, only emergency response personnel shall be allowed access inside the perimeter established by the incident commander.
- When evacuating for potential toxic releases, move upwind and/or crosswind from the potential source. Use windsocks to determine wind directions.

Imminent Danger

When unsafe and/or unhealthful conditions or acts pose “imminent danger” to personnel or property, all employees are vested with the right and are obligated to exercise the stop work authority.

Imminent Danger is defined as any conditions or practices in any place of employment which are such that a danger exists of which could reasonably be expected to cause death or serious physical harm immediately, or before the imminence of such danger can be eliminated. The following conditions must be met before a hazard becomes an imminent danger:

- There must be a threat of death or serious physical harm.
- For a health hazard there must be reasonable expectation that toxic or other health hazards are present exposure to them will shorten life or cause substantial reduction in physical or mental efficiency.
- The threat must be immediate or imminent.

In order to stop work, contact the supervisor in charge of the work site or onsite safety representative, identify yourself and inform them of the hazard that you have identified and that you are calling a you are exercising your stop work authority for the particular jobs affected by the hazard until the hazards has been abated. If you need assistance or the personnel performing the work are uncooperative, contact the NASA Institutional Safety Branch at 867-SAFE.

Emergency Safety Equipment

- An Emergency Life Support Apparatus (ELSA) is a temporary life support breathing apparatus intended for emergency evacuation.
- If you work in an area where toxic chemicals are present, ELSA units will be located throughout the area in green & white striped boxes for your use during emergencies.
- Specific training is required for the use of ELSA(s).

Other required emergency equipment in areas where chemical or particulate hazards are present may include safety showers and eyewash stations. In the event of skin or eye contact with a corrosive or hazardous chemical, the affected body part should be flushed using the safety showers and eyewash stations for a minimum of 15 minutes. Plumbed safety showers and eyewash stations operation must be checked weekly.

Fires & Explosions

- Report fires or abnormal smoke in facilities by using the manual fire alarm pull stations and by calling 911 (or 867-7911 if using a cell phone).
- Verbally warn personnel in the immediate area and promptly begin evacuation to the closest exit. Use the stairs (DO NOT USE ELEVATORS).
- Assist any physically impaired co-workers ("Buddy System") in exiting the building or reaching a safe area remote from the fire and near an exit stairway.
- Close doors to work area upon leaving. Feel all closed doors before opening to determine if it is safe to open.
- Proceed at least 200 feet away from the building to the designated marshalling area and remain until the "all clear" or other instructions are issued.
- Once you are in a safe area, call 911 (867-7911 on a cell phone) and report any details you may know of to assist emergency personnel response.
- Supervisors shall notify emergency response personnel of employees that are believed to be still inside the building.

Chemical Spills/Releases

All chemical spills must be reported via 911 (867-7911) for cell phones) to the Joint Communications Control Center (JCCC) for environmental reporting purposes and/or emergency response operations. If caller is unsure if the spill is non-emergency, the call will be treated as an emergency. The spill team will NOT respond until 911 has been notified.

Emergency Spill – Any unplanned release or condition resulting from an accidental; intentional spill; accumulation of hazardous waste or material; concentrations or quantities sufficient to pose a substantial, actual or potential hazard to human health; mission impact; property; or the environment. Cleanup/recovery is beyond the capability of the reporting agency.

A call to 911 (867-7911) is required. State the following:

- This is an Emergency Spill
- Your name and phone number
- Extent of injuries, fire, or explosion
- Specific location of spill
- Name of the substance released
- Quantity released in volume (gallon), or surface area covered
- Is spill contained?
- Worst case credible quantity of material that could be released
- Potential risk to human health or the environment, if known

Non-Emergency Spill – Any spill that does not pose risk to health and safety of occupants or pose an environmental emergency that can be contained and cleaned up within the capability of the reporting agency.

Non-emergency 911 (867-7911 for cell phones) call is required.

911 Center (JCCC) will contact fire and Fire Chief will respond at his discretion. State the following:

- This is a Non-Emergency Spill
- Your name and phone number
- Specific location of spill
- Name of the substance released
- Quantity released in volume (gallon), or surface area covered
- Is spill contained?
- Clean up actions taken
- Spill team IS/IS NOT required

Bomb Threats

- If you receive a bomb threat by telephone, record as much information as possible. Go to: http://phonedirectory.ksc.nasa.gov, Other points of Reference, and click on “Reporting a Bomb Threat”. It is recommended you photocopy the form and have it readily available at your desk.
- Immediately report any bomb threats or suspicious, unidentified packages by calling 911 (867-7911 on a cell phone). Do not operate cell phones within 25 feet of any suspicious package or suspected threat.
- If instructed by emergency dispatcher to evacuate the facility to the established marshalling area, proceed in an orderly manner avoiding proximity to the threat, and pull the fire alarm to evacuate others.

Shelters

The exhaust plume during a Shuttle launch consists mainly of water vapor, aluminum oxide, and hydrogen chloride, an irritant gas. In the event of a catastrophic failure of a launch vehicle early in flight, rocket fuel and oxidizer residues may also be present. Under certain meteorological conditions, these combustion products may drift over KSC at levels greater than health standards permit. Under those conditions, all employees are required to take immediate shelter.

During such an emergency, **ALL** buildings at KSC (except trailers and modular buildings), are designated as shelters. If you are directed to take shelter, remain in the building until an “All Clear” is given by a competent authority. The air conditioning/ventilation systems in facilities that are inside a potential plume corridor will be shut down via console or by contingency support teams, as required.

Workplace Violence

- At KSC, physical acts of violence, threats, harassment, intimidation or other disruptive behavior is prohibited.
- Persons engaging in such activity may be removed from the premises and may be subject to disciplinary action and criminal penalties.
- Report all incidences of this type of behavior by calling 911 (867-7911 on a cell phone) for emergency scenarios or 867-2121 for non-emergency scenarios.
- If you witness this type of behavior, do not attempt to handle it yourself. Avoid confrontation and call for help.

Section 2 Safety & Health Information

Refer to **References** for POC's, additional information & requirements.

General

KSC Safety & Health Policy

It is KSC policy to provide a safe and healthful work environment for the workforce. The workplace shall be free of unsafe and unhealthful conditions that could cause loss of life or injury or damage to facilities or equipment. The Center Director has ultimate responsibility for the KSC Safety & Health Program, and implements the program through delegation of specific responsibilities at all levels.

- All jobs can be performed in a safe and healthful manner, and unsafe and/or unhealthful behavior will not be tolerated. In addition, employees have the right to refuse to perform work that they feel is inherently unsafe and/or unhealthful, but they are obligated to work with management to determine how the work can be performed in a safe and healthful manner.
- All employees and the labor unions shall participate in KSC safety and health activities to the maximum amount that is practicable. Supervisors shall encourage and support employee participation in these activities.

Violations of KSC safety and health policies and procedures by visitors shall also be taken very seriously and may result in the visitor being barred from the Center.

Safety and Health Responsibilities

All employees at KSC shall:

- Complete their required safety and health training.
- Work safely and comply with safety policies and procedures.
- Assess work and environment for unsafe or unhealthful conditions.
- Ensure that required safety devices and equipment are available, clean and functional.
- Eliminate hazards within the employee's control.
- Report close calls and unsafe/unhealthful conditions or acts to your supervisor.
- Assist supervisor in determining corrective action for hazards.
- Participate in safety and health activities.
- Employees assume responsibility for the safety of their visitor(s) including ensuring they are aware of exit routes, evacuation procedures, special or unusual conditions, and any hazardous operations that are underway.

All supervisors and managers shall fulfill all of the above, plus:

- Complete supervisor/manager required safety and health training.
- Ensure that all of their employees have a safe and healthful workplace.
- Encourage all of their employees to report close calls and unsafe and/or unhealthful conditions or acts.
- Investigate and initiate corrective actions for reported hazards.
- Perform and document quarterly safety and health inspection walk-downs in the Goal Performance Evaluation System (GPES).
- Supervisors are charged with the responsibility of documenting and conducting organizational safety and health meetings annually for employees in administrative areas and quarterly for employees in shops and laboratories.
- Ensure that pre-test or pre-task briefings are conducted for all hazardous operations under their responsibility.
- Perform and document job hazard analyses (JHA's) for each type of job that their employees perform.
- Document training needs assessment for each employee, defining any gaps.
- Determine and provide all Personal Protective Equipment (PPE) that is required for each employee.

Senior Management shall fulfill all of the responsibilities described above under supervisors and managers and ensure that there are adequate resources available to achieve Safety and Health Program goals.

Safety and Health Councils, Boards, Committees and Panels

Detailed information on these Councils, Boards, Committees and Panels is located at**:**

From KSC Business World (http://businessworld.ksc.nasa.gov/), click on the “KSC Business System Documentation” planet; click on “Search TDKSC TechDoc” (http://tdsearch.ksc.nasa.gov/tdksc/search/general.html); go to “Search field:” select the dropdown: “Document Type*”, and at “Search text:”, type in “team” to display the list.

Minutes of the meetings are maintained by each group.

- Quarterly Safety, Health and Environmental Council
- Safety & Mission Assurance (SMA) Panel
- Human Research Institutional Review Board (IRB)
- Explosives Safety Committee
- Lifting Devices and Equipment (LDE) Committee
- Radiation Protection Committee

- Lightning Safety Assessment Committee
- Pressure Vessels/Systems Safety (PV/SS) Committee
- Safety and Health Labor Management (SHLM) Committee
- Respiratory Protection Panel
- Emergency Preparedness Planning Committee (EPPC)
- Disability Awareness and Action Working Group (DAAWG)
- Process and Human Factors Engineering Working Group (PHFEWG)
- KSC VPP Leadership Committee

- Occupational Safety and Health Cooperative Committee

Maximum Work Time (MWT)

The KSC Maximum Work Time requirements are intended to ensure that employees do not work excessive hours and compromise personnel safety; operational safety, and mission success. MWT limits apply to civil service and contractor employees in critical and non-critical positions.

MWT requirements are:

- Persons shall not work in excess of 12 consecutive hours (or 16-hours in an emergency situation).
- Persons shall not work in excess of 60 hours during a work-week (7-day period).
- Persons shall not work in excess of 7 consecutive days without at least 1 full day off.
- 0ff Persons shall not work in excess of 240 hours during a 4 consecutive work-week.
- Persons shall not work in excess of 2500 hours during a rolling 12-month period.

Safety & Health Information

- Safety & Health information is available by clicking on the KSC Safety & Health Planet at KSC BusinessWorld. Go to: http://businessworld.ksc.nasa.gov/. Features include:
- “Safety Talks”
- “Safety-on-the-Line”
- Safety and Health Metrics
- “KSC Material Safety Data Sheets”
- “KSC’s Occupational Health Program”
- An extensive document library for Kennedy Policy Directives/KNPDs are located in the KSC’s Business Management System. Included are the Kennedy NASA Procedural Requirements (KNPRs), Kennedy Documented Procedures (KDPS), and other documentation sources.
- The KSC Daily News is emailed to all employees on a daily basis.
- The Occupational Safety & Health Administration website provides up-to-date safety and health news, regulations, interpretations, and compliance directives. Go to \t “_parent” http://www.osha.gov/.
- KSC TV channels 59 and 60 are used for showing safety information videos. The KSC Channel 60 schedule is available on the SGS website.
- The Government-Industry Data Exchange Program (GIDEP) collects and distributes important safety information. For additional information, go to: http://kscsafety/isqpage.htm.

Safety & Health Training

All new NASA employees are required to take the following Safety & Health Core Courses:

- XG160KSC – Chemical Hazard Communication
- QG109KSC – General Processing Safety
- QG181KSC – KSC Employee Safety and Health Training
- QG182KSC – Ergonomics
- QG184KSC – Office Safety
- Additionally, Supervisors and managers are required to complete:
- QG180KSC – KSC Supervisor Safety and Health Training
- DuPont Safety Training (QG183KSC for supervisors or QG185KSC for executives).
- QG1866KSC – Supervisor GPES and Safety & Health Training
- Other training such as area access training, specialized classes on physical and chemical hazards or specialized equipment may be required to perform a specific job, e.g., a NASA employee assigned to work in contractor-operated facilities would be required to attend the contractors Hazard Communication training. All NASA employees are required to fill out a Training Needs Assessment to determine if they have any gaps in their required training. Access the Safety & Health Training Needs Assessment Questionnaire (which includes the Safety & Health Core Courses) at: http://kscsafety.ksc.nasa.gov/svipage.htm or directly at: http://kscsafety.ksc.nasa.gov/documents/JHA/TrainingAssessment.doc .

- All employees shall seek and complete training for any job that they feel they need to perform the job safely.
- Safety & health training is available from a number of sources including:
- The Institutional Safety Branch (SA-E2). Video & safety training materials. See http://kscsafety/ or call 867-SAFE.
- SGS provides & tracks technical training (classes & video tapes). For course schedules, go to: http://sgs.ksc.nasa.gov/safety/training or Contact Tim Pirlo, 867-2300.
- The Safety & Mission Assurance Directorate (SA) schedules NASA Safety Training Center (NSTC) Classes. Contact Suzanne Dininny, 867-7721.
- DuPont Safety Training is periodically available through the Workforce & Diversity Management Office (BA) Directorate. Contact Loretta Dreier at 867-3013.
- NASA Headquarters Code Q offers web-based safety and health training. Go to: http://solar.msfc.nasa.gov.
- OSHA and other Federal Agencies. http://www.osha.gov/
- Specialized training is required for forklift and crane operators; SCAPE suit users and employees with potential exposure to Ionizing or nonionizing radiation; hazardous materials; pyrotechnic devices; working on elevated structures (>25 ft. and unenclosed); lockout/tagout of electrical or mechanical energy sources; and entry into confined spaces.
- For course schedules, go to: http://sgs.ksc.nasa.gov/safety/training or Contact Tim Pirlo, 867-2300.

Occupational Safety and Health Administration (OSHA) Voluntary Protection Program (VPP)

Under VPP, OSHA partners with management and labor to work for a safer and healthier worksite. Management agrees to operate an effective program that meets an established set of guidelines and employees agree to participate in the program and work with management to continuously improve the safety and health program. Detailed information regarding VPP can be found at these websites: http://kscsafety/vppwhat.htm,

http://kscsafety/vppnkapg.htm.

OSHA recognizes outstanding safety and health programs by awarding the Voluntary Protection Program (VPP) Star designation level of achievement.

Sites designated by OSHA at the Star level shall:

- Comply with and enforce all applicable OSHA regulations.
- Provide a safe and healthful workplace by implementing exemplary safety and health programs.
- Perform quarterly self-inspections and identify and correct potential safety and health hazards.

- Prepare for emergency scenarios and perform accident investigations.
- Communicate safety and health information to employees to help them work safely and stay healthy, and communicate safety and health information to visitors to protect them.

While employees are encouraged to be proactive in finding solutions to safety or health issues or concerns, all employees have the right to file a complaint with OSHA if they feel that an unsafe or unhealthful condition exists and no proactive solution is undertaken.

KSC was designated a STAR VPP site on February 2, 2004.

Life Safety Code

National Fire Protection Association (NFPA)

The Life Safety Code addresses those construction, protection, and occupancy features necessary to minimize danger to life from fire, including smoke, fumes, or panic. The Code establishes minimum criteria for the design of egress facilities so as to permit prompt escape of occupants from buildings, or, where desirable, into safe areas within buildings.

- Means of egress shall be continuously maintained free of all obstructions or impediments to full instant use in the case of fire or other emergency (7.1.10.1).
- No furnishings, decorations, or other objects shall obstruct exits, access thereto, egress therefrom, or visibility thereof (7.1.10.2.1).
- Doors shall be arranged to be opened readily from the egress side whenever the building is occupied…. (7.2.1.5.1).
- Any door, passage, or stairway that is neither an exit nor a way of exit access and that is located or arranged so that is likely to be mistaken for an exit shall be identified by a sign that reads as follows (7.10.8.1):

NO

EXIT

Safety Permits

The following safety permits may be obtained by calling the Duty Officer at 853-5211 (24 hours a day; 24 hours advanced notice is requested):

- Confined space work permit (KSC Form 16-287)
- Burn permit (KSC Form 2-13) for using propane/acetylene torches, heat guns, grinders, and arc welders. Burn permits for welding and grinding are only required for operations outside of approved shops.
- Excavation permit (KSC Form 26-312)

Ionizing Radiation (which includes radioactive sources and radiation producing devices) and Nonionizing Radiation (such as hazardous levels of Radio Frequency (RF) radiation, lasers, and optical devices) require usage permits which are obtained through the specific program. Contact the KSC Radiation Protection Officer (RPO), Randall Scott, TA-C2, at 867-6958.

Traffic Safety and Crosswalks

Employees driving motor vehicles on Center must:

- have their vehicle registered
- observe posted speed limits
- observe Florida DMV laws
- wear a seat belt at all times

Park only in authorized or designated areas. Never leave vehicle unattended while motor is running.

Bicycle riders shall observe the same rules as motor vehicles. Riding on sidewalks is prohibited.

All pedestrians at KSC shall walk on the sidewalks when they are available, and use the crosswalks to cross roadways. Before stepping into crosswalk and proceeding into the road, ensure that approaching traffic is aware of your intension to cross and that they are stopped. Florida Statute Title XXIII Chapter 316.130(8) states that – "No pedestrian shall suddenly leave the curb or other place of safety and walk or run in the path of a vehicle which is so close that it is impossible for the driver to yield."

Never assume that a vehicle will stop.

BE AWARE, BE COURTEOUS, and

BE RESPECTFUL

Use of Cell Phones While Driving

- Cell phone use by NASA employees is prohibited (unless it is a hands-free type phone) at KSC while driving a government owned, leased or rented car. Emergency responders on the way to an emergency are exempt.
- Cell phone use is prohibited in areas where explosives are present or areas with explosive atmospheres.
- Cell phone use while driving your POV is strongly discouraged.

Contractor Safety

All contractors performing work at KSC must comply with applicable safety and health regulations, i.e., OSHA, state, Agency and Center. Contractors are responsible for providing their employees and any subcontractor employees with a safe and healthful working environment.

The major onsite performance based contracts and selection processes have numerous embedded safety and health provisions such as:

- Evaluation of past and present safety and health performance.
- Safety and health clauses in the contracts.
- NASA approval of the contractors Safety and Health Plan prior to contract start.
- Participation in KSC senior safety and health management forums.
- Safety and health surveillance programs tailored to key programs and key hazardous operations.

The onsite Construction Contractors have numerous embedded safety and health provisions such as:

- Evaluation of past and present safety and health performance prior to selection.

- Safety and health clauses in the contracts.
- NASA approval of the contractors Safety and Health Plan prior to contract start.
- Contractors are responsible for safety in their respective work areas or facilities.
- Pre-construction meetings are conducted to discuss safety and health issues associated with the work.
- The contractor is required to conduct daily site inspections and submit weekly and monthly project safety and health evaluations.
- Additional on-site requirements include posting all emergency telephone numbers and a list of responsible personnel and safety points of contact, and maintaining a copy of 29CFR1910 and the "Contractor's Safety Information and Requirements" (a KSC document).

Anyone who witnesses a safety violation by any contractor shall call the NASA Engineering Development and Institutional Division (SA-E) at 867-SAFE (7233).

Inclement Weather

Lightning Safety Rules

Launch/Spacecraft Facilities

Actions to be taken depend on the facility and stage of operation and is controlled by the Program/Project Lightning Safety Plan. If you have questions, contact the complex/facility safety supervisor.

Notices

Phase I Lightning Advisory: This notification advises that atmospheric conditions are expected to produce, or is producing, lightning which will arrive at specified areas within 30 minutes. Advisories are intended to provide personnel in outside areas and personnel conducting hazardous operations sufficient lead time to secure the operation before the forecasted weather system arrives.

Phase II Lightning Warning: This notification is issued when lightning is imminent or occurring within the five (5) nautical mile boundary of a specified lightning alert area. Personnel should seek shelter and the lightning policy controlling operations for each complex/facility should be implemented.

Lightning Safety Rules

- Seek shelter in a lightning protected facility or enclosed building. Large, enclosed buildings tend to be safer than small or open structures.
- Stay indoors and do not venture outside, unless absolutely necessary.
- Stay away from doors, windows and conducting surfaces (metal) with exposure to the outside environment. Clear all roof structures.
- Do not work on fences, telephone or power lines or any electrical equipment connected to outside power sources
- In general, avoid use of corded phones except in an emergency. However, in large office buildings with Lightning Protection Systems and underground utilities, use of phones and computer work stations is considered safe. For trailers and small out buildings with above ground utilities, use of phones or computers is unsafe.
- Do not handle combustible or flammable materials stored in P.O.L. lockers outside a lightning protected facility.

- Tractors and general heavy equipment machinery should be stopped and dismounted. Refuge should be sought in a fully enclosed metal vehicle or protected building.
- Fully enclosed metal vehicles such as cars, trucks and buses are generally safe. Vehicles with fiberglass or fabric roofs are not acceptable for lightning protection.
- If caught in the open, without protective shelter, personnel should avoid being the highest point. Standing erect makes a person extremely vulnerable. Assume a crouched position with both feet close together, knees under chin, arms around knees and head down. Avoid lying flat on the ground as lightning ground currents many cause a voltage potential across the body sufficient to cause death.

For lightning safety assessments contact
Terry Willingham, 861-4110.

Thunderstorm Safety Rules

- A severe thunderstorm WATCH does not require immediate action and is issued to heighten public awareness.
- A severe thunderstorm WARNING indicates that imminent danger to life and/or property is possible in the path of the storm. The following actions should be taken at once:
- Postpone all outdoor activity, if at all possible.
- Pass information on the severe weather warning to other personnel who may not be in a position to hear the original announcement.
- Take shelter in a sturdy building or a hardtop automobile. DO NOT take shelter in trailers or modular/temporary facilities.
- Dock boats and stay away from the water.
- Get to higher ground if flooding is imminent.
- Wait for the “all clear” announcement by the Public Address (PA) System.

Tornado Safety Rules

- If you spot a funnel cloud and time permits call 911 (867-7911 on cellular phones) to report it.
- A tornado WATCH means conditions are favorable for tornado development. Listen for updates or possible warnings.
- A tornado WARNING means a tornado has been sighted or is imminent. When a tornado warning (3-5 minute steady siren) is sounded:
- Seek shelter in a substantial steel-framed or reinforced concrete building.
- Evacuate structures with wide, free span roofs, such as high bays, aircraft hangars and atriums.
- If you are unable to reach a steel-frame or reinforced concrete building, lie flat in a ditch or ravine.
- If outdoors, or inside a minimum shelter, such as a shed, be alert to the possibility of flying debris.
- If you are in a trailer, evacuate to a suitable building.
- If you are in a boxcar or modular building, move away from doors and take cover under a desk.
- Move away from windows and doors (move to interior of the building); close hallway doors and take cover under a desk.
- If you are on upper floors of a multi-story building, go to the lower floors to prevent injury if the roof comes off.
- Occupants of vehicles should seek shelter inside a building.
- Employ the buddy system and assist those in need.
- Report any injuries, downed power lines or gas leaks to 911 (867-7911 for Cell Phones).
- Return to work when “All Clear” is announced.

Hurricane/Tropical Storm Safety Rules

HURCON IV: Issued 72 hrs. in advance of the earliest possible arrival of 50-knot (58 mph) winds.

- Check hurricane kits and emergency supplies and issue as required.
- Secure loose objects outside.
- Fill gas tanks of government vehicles. (Parking may be directed at HURCON III).
- Secure small buildings and trailers.
- Move portable equipment inside.
- Identify essential personnel and recall or place on standby as necessary.
- Secure hazardous and non-hazardous waste sites at your facilities.
- Designate essential personnel to be recalled for the recovery of your facilities Damage Assessment Recovery Team (DART).
- Report major problems to your building custodian or hurricane coordinator.

REVIEW HURCON III actions.

HURCON III: Issued 48 hrs. before the earliest possible arrival of 50-knot (58 mph) winds.

- Ensure that HURCON IV actions are complete.
- Notify building custodians to begin hurricane preparations, i.e., secure windows, doors, etc.
- Download computer hard drives to disks and take the disks with you upon evacuation.
- Cover electrical equipment with plastic and elevate when possible.
- Secure loose articles from desks and work areas as practical.
- Park government vehicles where and when directed.
- Release non-essential personnel when directed.
- REVIEW HURCON II actions.

HURCON II: Issued 24 hrs. in advance of the earliest predicted arrival of 50-knot (58 mph) winds.

- Ensure that all HURCON III and HURCON IV actions are complete.
- Maintain accountability of personnel.
- Complete hurricane preparations until directed otherwise.
- EVACUATE when directed (except Hurricane Ride out Teams).
- Monitor local radio and TV for “return to work” calls. This could take several days to weeks.

HURCON I: Issued 12 hrs. in advance of the earliest predicted arrival of 50-knot (58 mph) winds.

Hurricane Ride-out Teams’ activities.

Hurricane Categories:

- Category 1– 75 to 95 mph expected winds, 4 to 5 ft. expected tidal surge, and minimal damage expected.
- Category 2– 96 to 110 mph expected winds, 6 to 8 ft. expected tidal surge, and moderate damage expected.
- Category 3 – 111 – 130 mph expected winds, 9 to 12 ft. expected tidal surge, and extensive damage expected.
- Category 4 – 131 to 155 mph expected winds, 13 to 18 ft. expected tidal surge, and extreme damage expected.
- Category 5 – greater than 155 mph expected winds, greater than 18 ft. expected tidal surge, and catastrophic damage expected.

For hurricane status call 861-7900.

Refer to **References** for POC's, additional information & requirements.

Injury & Illness Prevention

Audits and Inspections

- The Institutional Safety Branch (SA-E2), performs annual safety inspections of all KSC buildings inhabited by civil service employees. Corrective actions are documented and tracked using the Facility Inspection Database (http://kscsafety.ksc.nasa.gov/insppage.htm).
- The Joint Base Operations Support Contractor (J-BOSC) performs health inspections of all KSC buildings inhabited by civil service employees in accordance with 29CFR1960. Corrective actions are documented and tracked on the Facility Inspection Database.
- The KSC Fire Department conducts annual fire safety inspections of all buildings.
- KSC supervisors perform quarterly safety inspection walk-downs. Employees may accompany supervisors during these inspections. Any discrepancies are documented and tracked to closure in the Goal Performance Evaluation System (GPES).

Unsafe and/or Unhealthful Conditions or Acts

- Report all unsafe and/or unhealthful conditions or acts (hazards) to your immediate supervisor.
- If you see a situation that poses an imminent danger of death or serious physical harm use the “stop work authority” and notify your immediate supervisor.
- If you see someone performing a hazardous act, question the person on the spot (if you can do so without further endangering that person or yourself by interrupting the task).

Methods of hazard reporting include:

- Report through line management (Branch, Division, or Directorate).
- Report through the safety organization (organizational S&MA office, if one exists).
- Call the Engineering Development and Institutional Division (SA-E) HOTLINE at 867-SAFE (7233).
- You can fill out the “Close Calls and Unsafe and/or Unhealthful Conditions or Acts” form, on-line at ”http://businessworld.ksc.nasa.gov/ and forward to the NASA Engineering Development and Institutional Division, SA-E, for action.

- The KSC Ombuds is available to assist in resolving safety concerns. Anonymity will be maintained if requested. Contact the KSC Ombuds, Mr. James Thompson, Human Resources Specialist, BA-A, at 867-7484 or Alternate, Ms. Hortense Burt, XA-D2, at 867-8768.
- You can report safety problems or concerns through the NASA Safety Reporting System (NSRS) whenever no action has been taken locally. NSRS is independent, confidential, voluntary, and responsive.

Pre-addressed, postage-paid NSRS forms are located throughout the Center or on-line at: http://www.hq/nasa.gov/office/codeq/nsrsindx.htm

If the safety issue remains unresolved, employees have a right to report it to Occupational Safety and Health Administration (OSHA).

Contact the OSHA Area Office in Tampa at (813) 626-1177, or, toll-free 800-321-OSHA (6742). The OSHA website is located at: http://www.osha.gov/ .

Mishaps and Close Calls

Definitions:

A mishap is an unplanned event that results in at least one of the following:

- Injury to non-NASA personnel, caused by NASA operations.
- Damage to public or private property (including foreign property), caused by NASA operations or NASA funded development or research projects.
- Occupational injury or occupational illness to NASA personnel.
- Destruction of, or damage to, NASA property except for a malfunction or failure of component parts that are normally subject to fair wear and tear.

A close call is an event in which there is no injury or only minor injury requiring first aid and/or no equipment/property damage or minor equipment/property damage (less than $1000), but which possesses a potential to cause a mishap.

Mishap and Close Call Reporting

- Immediately report all mishaps and close calls to your supervisor.
- If emergency response is required due to injury, fire, release of hazardous materials or serious damage, call 911 (867-7911 from a cell phone).
- If not transported to an off-site medical facility, all injured personnel must report to the NASA Occupational Health Facility and complete a KSC Form 6-2.
- NASA personnel involved in mishaps or their supervisors must call the NASA Engineering Development and Institutional Division at 867-SAFE (867-7233) as soon as possible.
- Contractor personnel involved in mishaps must call their respective contractor safety organizations.

- Close calls may also be reported by contacting your respective safety organization or by using the KSC Close Call and Unsafe and/or Unhealthful Conditions or Acts Reporting Form, KDP-KSC-F-2111, which are available in bins located throughout the Center and online in Businessworld.
- Traffic accidents involving government vehicles must be reported to the appropriate safety organization and the driver of the vehicle must complete and submit a Motor Vehicle Accident Report, SF 91, to the GSA Fleet Management Center, 4FF-6.

Mishap and Close Call Investigation

The responsible safety organization will determine the appropriate level of investigation in accordance with the requirements of NPR 8621.1, NASA Procedural Requirements for Mishap Reporting, Investigating, and Recordkeeping, and KNPR 8715.3, KSC Safety Practices Procedural Requirements.

For injuries to NASA civil servants, the employee's supervisor is responsible for conducting a preliminary investigation and documenting the results on the last page of the KSC Form 6-2 that was provided to the employee at the Occupational Health Facility. This form shall be sent to the NASA Institutional Safety Branch (SA-E2), within 72 hours of the incident. NASA Engineering Development and Institutional Division personnel will investigate all reported civil service mishaps and close calls.

Job Hazard Analysis (JHA)

Performing a Job Hazard Analysis (JHA) is a technique that focuses on job tasks and workplace hazards as a way to identify hazards before they occur. After uncontrolled hazards are identified initiate steps to eliminate or reduce hazards to an acceptable risk level. JHAs should be reviewed periodically to ensure it remains current; after an illness/injury or close call occurs; and when job procedures change. Train all employees affected by changes in procedures or protective measures adopted.

General Work Place Safety

- All civil service employees (also contractors and visitors) shall comply with all warnings, signs, barriers and alarms. Do not enter areas with warnings, barriers or flashing lights.
- To help prevent slips, trips and falls, wear slip resistant shoes. Use spill-proof cups/lids on beverage containers. Clean up beverage spills. Do not walk on wet floors. Report any loose flooring to your supervisor or facility manager. Pick up items dropped on the floor.
- Use proper lifting techniques such as keep your back straight, lift using your leg muscles, and keep the load close to your body. Do not twist your body while lifting. Request assistance with any large or heavy items.
- Use stepladders to access out-of-reach items. Do not over-reach or stand on furniture, boxes, or chairs.
- Observe good housekeeping practices. Keep work areas neat and clean. Keep aisles and hallways clear.
- Appliances should be plugged directly into an outlet (no extension cords).
- To prevent fire hazard, never install extension cords in a permanent fashion, or inside ceilings, floors, or walls. Use extension cords only for **temporary** purposes, and disconnect them when not in use.

- When extension cords are used as temporary power they shall be grounded medium or heavy-duty construction, UL Listed and of sufficient length to avoid piggy backing (Plugged into another extension cord or power strip).
- Damaged cords present both fire and electric shock hazard. Immediately discard any cord or that shows signs of damage or feels hot to the touch during use. Never repair a damaged cord.
- Cords used outdoors or in damp areas must be designated for outdoor use, and should be connected to an outlet that is protected by a Ground Fault Circuit Interrupter (GFCI).

Lockout/Tagout

- When performing repair or maintenance, energized systems (electrical, mechanical, gaseous or liquid systems) shall be locked out and tagged out in order to protect employees from accidental machine start-up or unexpected energy release.
- Only authorized employees shall lock and tag equipment, or remove locks and tags and return equipment to service.
- Do not tamper with locks and tags or try to operate locked or tagged equipment.
- Tags shall be legible and contain a point of contact.
- Locked and tagged equipment shall be listed on the lockout/tagout control log.
  If you are not familiar with the lockout/tagout requirements contact your safety office prior to conducting the work.

Asbestos Safety

- Do not cut, sand, polish or remove materials potentially containing asbestos. At some locations at KSC, you will see signage indicating that materials “does not contain asbestos” or “may contain asbestos”. Materials that “may contain asbestos” that are in good condition (undamaged) are considered safe.
- Only personnel with special training may remove asbestos.
- Environmental Health maintains a database of descriptions and locations of asbestos containing building materials in facilities at KSC so that precautions can be taken to work safety. HCS maintains a database which may be accessed at http://amis.ksc.nasa.gov/

Ladder Safety

- Do not stand on the top two steps of the ladder.
- Ascend and descend facing the ladder.
- Inspect the ladder and verify it is in good shape.
- Use wood or fiberglass ladders around electrical hazards.
- Do not over-reach on ladders. Adjust the ladder, or get a higher one.

Hazardous Materials

Hazard Communications (HAZCOM)

Everyone has the right to know about the hazards of their work and how to protect themselves from those hazards. The KSC HAZCOM program provides information on the hazards of chemicals in the work place, and how to use them safely.

All civil service employees at KSC are required to take QG160KSC Hazcom Training (awareness) as part of their core safety and health training. Employees that work with/around hazardous materials/ chemicals must take additional, specialized training.

All hazardous chemicals or materials must be properly identified and legibly labeled.

Material Safety Data Sheets (MSDS's) for all chemicals in the work area must be readily available. Read and understand all MSDS's for the chemicals you are working with. This includes being knowledgeable about emergency procedures and emergency medical treatment. MSDS's are available on-line at: http://MSDS.

Hypergols

Hypergols are fuels and oxidizers that ignite spontaneously upon contact with each other. No ignition source is required.

- Hypergols are extremely toxic and corrosive.
- Hypergols are used to propel/maneuver spacecraft.
- MMH is a clear liquid and has a “fishy” ammonia smell.
- N_2O_4 is a reddish-brown fluid and has a pungent “bleach” smell.
- PPE requirements may vary depending on the job being performed, but may include full Self Contained Atmosphere Protective Ensemble (SCAPE).
- Hypergols are present at multiple facilities and areas at KSC, such as the Orbiter Processing Facility (OPF), Pads 39A & B, the Hypergol Maintenance Facility (HMF), the Spacecraft & Assembly Encapsulation Facility (SAEF), and the Vertical Processing Facility (VPF).
- In emergency response to hypergol releases, be sure to check the wind socks and evacuate upwind and crosswind.

Anhydrous Ammonia

Anhydrous ammonia (NH_3) is used as a refrigerant for spacecraft cooling. Anhydrous ammonia is flammable and explosive.

Ammonia is normally a gas, but pressurizing it will make a liquid. Liquid ammonia is colorless and has a pungent odor. Contact with liquid ammonia causes burns.

Gaseous ammonia is colorless, lighter than air and has a penetrating odor. It has an affinity for water, and is extremely irritating to the skin, eyes, nose, and throat.

Anhydrous ammonia operations are fairly common at the KSC Space Station Processing Facility (SSPF). During these operations there may be planned ammonia venting as well as the possibility of ammonia leaks. Personnel in this area should be aware of the following facts:

The anhydrous ammonia being processed is much more potent than dilute solutions of household ammonia. However, the ammonia vapors that you could smell outside the SSPF are no different in composition than those from common household ammonia. Because of the pungent odor, you can detect ammonia vapors at levels well below those that are hazardous.

If you smell ammonia vapors near the SSPF during ammonia operations, leave the area immediately and notify Boeing Operations at 867-5800.

Explosives and Propellants

Cardinal Principle of Explosive Safety: “Expose the minimum number of people, to the minimum amount of explosive, for the minimum length of time.”

Explosive Safety includes:

- Protecting explosives and propellants from inadvertent initiation
- Protecting personnel, equipment and facilities from exposure to detonations
- Establish operating procedures and ensure they are followed
- Ensuring proper equipment, i.e. cranes, forklifts and test equipment, are within current specs (calibration, weight load tested, daily checkouts) when used around explosives
- Ensure facilities are maintained and configured for the operations being performed

Fire Symbols

Fire Symbols must be posted whenever explosives enter a facility:

- Mass Detonating – 1 (Destruct Charges LSC)
- Non-Mass Detonating, Fragment producing hazard – 2 (Fragmentation Grenades)
- Mass Fire Hazard – 3 (Solid Propellant SRM)
- Moderate Fire, No Blast Hazard – 4 (Ammunition, 9MM)

(Red Background)

Chemical Symbols shall be posted when commodities are present, in addition to fire symbols. Fire and chemical symbols shall be removed whenever the explosive or chemical is taken out of the facility. The red figure on blue background is for Oxidizers – nitrogen tetroxide. The yellow figure on blue background is for fuel – Hydrazine.

Vehicles loaded with explosives shall:

- Not be left unattended unless they are parked in a designated area
- Be equipped with two class 4A:60BC rated portable fire extinguishers
- Be placarded with DOT explosive symbols

(Yellow Background)

Within the explosives or flammable liquid operational hazard areas, the following items or conditions are restricted or not allowed:

- Cell phones, 2-way radios, or talk back pagers (within 25 feet)
- Ignition sources including vehicles powered by internal combustion engines
- Smoking or smoking materials such as matches and lighters (within 50 feet of building, vehicle, or handling equipment).
- Oxygen rich environments

All personnel who handle, store, or transport explosive, hypergol, or pyrotechnics must be **trained and certified**.

Refer to **References** for POC's, additional information & requirements.

Health Services

The Occupational Health Facility (OHF) provides health services for all NASA civil service and contractor employees, such as:

- Emergency medical or first aid treatment for any work-related injury/illness.
- Annual or work–related physical examinations and physician consultations.
- The Employee Assistance Program (EAP) provides counseling and referral services by a certified professional to employees experiencing emotional stress, family or relationship problems, substance abuse problems, or financial concerns. Appointments are confidential and may be made by calling 867-7398. EAP also provides support groups for diabetes, smoking cessation, grief, cancer, and elder care.
- Located at the O&C and the OSB Facility the KSC Fitness Centers offer several free health and fitness programs to KSC civil service employees (http://fitness.ksc.nasa.gov/).
- Rehab Works is a musculoskeletal injury rehabilitation program available free to KSC civil service (http://rehabworks.ksc.nasa.gov/)
- Health Education/Screening Programs for diabetes, cardiovascular disease, hypertension, vision, colorectal cancer, and a number of wellness initiatives are available to KSC civil service employees at the OHF clinics.

For additional information call 867-3346, or visit the website at:
http://sgs.ksc.nasa.gov/sgs/sites/other/chs/omehs/occmed/home.

Automated External Defibrillators (AED)

The development of AEDs has significantly improved the chances of survival of a cardiac arrest. NASA has implemented a program to provide AEDs and trained personnel at strategic locations throughout the Spaceport such as the Fitness Centers. Ideally, individuals trained in the use of the AEDs will be located nearby where the AEDs are located. Trained individuals will be notified to respond as soon as the emergency call is received.

In an actual emergency first call 911.

If an AED is used for an actual emergency at KSC, it will be reported as soon as possible to the AED Program Director or the AED Program Coordinator. When electrodes are applied to a patient and the AED is turned on, these together will constitute “use” of the AED. The individual who used the AED will then provide written documentation of the use of the AED according to current KSC AED Policy protocol.

After an event, the AED Program Coordinator will contact the AED Responder for an AED review. At this time, the AED Program Coordinator will determine, in concert with the Employee Assistance Program (EAP) counselor, whether Critical Incident Stress Debriefing (CISD) is warranted for the provider and any other personnel involved in the incident.

Personal Protective Equipment (PPE)

PPE is the last line of protection for employees when exposure to workplace hazards cannot be prevented by more effective measures.

Employees required to use PPE shall:

- Receive training on proper use of PPE.
- Inspect PPE prior to use for damage and cleanliness.
- May require fit tests for proper sealing of respirators.

Questions about the selection of appropriate PPE should be directed to the NASA Safety office (physical hazards) at 867-7233.

Requirements for PPE selection and use are described in numerous KSC documents, refer to References for POC's, additional information and requirements.

NASA's CORE VALUES:

SAFETY

TEAMWORK

INTEGRITY

MISSION SUCCESS

Personal Protective Equipment Listing

EYE, HAND and FACE PROTECTION	
Hazards	**Required PPE**
Splash/splatter/spray of chemicals or biological materials; cryogenic liquids	Chemical goggles or safety glasses with side shields covered by a full-face shield.
High pressure cleaning or spraying	Safety glasses with side shields or safety glasses covered by a full-face shield.
Grinding/drilling - any flying particles or projectiles	Goggles or safety glasses with side shields
Power tools (air or electrical)	Safety glasses with side shields.
Typical laboratory - chemical splash	Chemical goggles or safety glasses with side shields covered by a full-face shield.
Acetylene welding, cutting, burning, molten metals	Cutting goggles with appropriate filter lens numbers.
Arc Welding and cutting	Safety glasses with side shields and welding hood with appropriate filter lens numbers
Chipping, grinding or machining - flying particles	Goggles, safety glasses with side shields or face shield (face shield required for heavy grinding)
HAND and ARM PROTECTION	
Skin exposure to chemicals	Appropriate chemical resistant gloves.
Handle tools or materials likely to cause scrapes, cuts or bruises	Metal mesh, leather, canvas, Kevlar material or cloth gloves.
Skin contact with hot surfaces	Oven mitts, Leather or aluminized gloves, arm protection
Cryogenic liquids, skin contact with cold surfaces	Cryogen mitts, leather gloves
Exposure to exposed high voltage electrical wiring, etc	Electrical insulating gloves

Personal Protective Equipment Listing Continued

FOOT, LEG and BODY PROTECTION	
Hazards	**Required PPE**
Hazards to feet related to sharp or heavy objects/equipment	Metatarsal guards, toe guards, combination foot-toe guards, safety shoes
Splash/splatter/spray of chemicals or biological materials	Appropriate nomex coveralls, Tyvek garment, rubberized apron, chemical splash garment, chemical resistant boots.
Cryogenic materials, flammable liquids/gases	Nomex coveralls
High voltage	Insulated gloves, shoes
HEAD PROTECTION	
Work under elevated work platforms, suspended loads or low overhead clearance	Hard hats
HEARING PROTECTION	
Exposed to loud noise from machines, tools, etc.	Ear muffs and/or ear plugs with sufficient noise reduction rating to lower exposure below 85 dBA.
RESPIRATORY PROTECTION	
Exposure to dusts, fumes, mists, gases, vapors, smoke.	Appropriate half- or full-face air-purifying, or air supplied respirator
FALL PROTECTION	
Full body harness.	Provides protection for workers at elevated heights over 6 ft. The approved harness is the full body style with shock absorbing lanyard.

Confined Space

A Confined Space is a workspace not intended for continuous human occupancy, has limited means of entry and exit, and is subject to accumulation of a hazardous atmosphere, lack of oxygen or contains other potential hazards to personnel.

The OSHA Permit-Entry Confined Space regulation (29 CFR 1910.146) establishes stringent requirements regarding entry and work in confined spaces.

Because confined space work may vary with location and hazards, it is necessary to prepare a hazard assessment prior to confined space entry.

A Confined Space Work Permit (KSC Form 16-287) is required for any work in a permit-required confined space, unless covered by a written hazardous operating procedure that specifies the requirements normally contained in the permit.

Ionizing Radiation Safety

Ionizing radiation consists of radioactive sources or radiation-producing devices. Use of radioactive materials or radiation-producing machines requires compliance with rules and regulations set forth by KSC, NASA and federal codes of the Nuclear Regulatory Commission (NRC) and OSHA.

- All ionizing radiation areas are identified, posted and restricted.
- To avoid unnecessary exposure, all unauthorized and non-essential personnel shall stay out of controlled radiation areas.
- The procurement, possession, and use of ionizing radiation sources or ionizing radiation-producing devices require approval by the KSC Radiation Protection Program.

Report any mishap or close call involving hazardous ionizing radiation exposure or potential for exposure to the Radiation Protection Officer, Randall Scott, TA-C2, at 867-6958.

Nonionizing Radiation Safety

Nonionizing Radiation consists of Radio Frequency (RF) and microwave, lasers, and ultraviolet, infrared, and visible light. Use of hazardous non-ionizing radiation requires compliance with requirements established by KSC, NASA, the State and consensus and federal standards.

- Procurement, possession, and use of hazardous non-ionizing radiation (such as lasers and optical radiation devices) and specific user authorization require approval through the KSC Radiation Protection Program.
- Registration of lasar pointers can be accomplished by contacting the SGS Health Physics Office at 853-5689.

Report any mishap or close call involving hazardous nonionizing radiation exposure or potential for exposure to the Radiation Protection Officer, Randall Scott, TA-C2, at 867-6958.

Bloodborne Pathogens

- Many illnesses & diseases such as HIV and Hepatitis B are transmitted by contact with blood or other body fluids.
- Do not clean areas that are contaminated with blood or other body fluids. Center emergency response personnel and special Center janitorial personnel are trained in proper clean up and disposal. Call the J-BOSC Duty Office at 853-5211.

NASA has an exposure control plan that applies to individuals whose assigned duties bring them into frequent contact with blood and other infectious materials.

Laboratories

Lab workers shall be provided information and training to ensure that they are knowledgeable of the hazards and the safe use of chemicals they work with.

All laboratories with hazardous chemicals are required to have a Chemical Hygiene Plan. This plan shall:

- Be accessible to all employees
- Contain standard operating procedures for work with hazardous chemicals
- Contain criteria for using control measures such as engineering controls, personal protective equipment (PPE) and hygiene practices
- Provide measures to ensure proper functioning and cleanliness of protective equipment (such as respirator or fume hoods)
- Contain provisions for medical consultation and medical examinations when appropriate
- Contain provisions for training.

All employees in a lab with hazardous chemicals shall have access to and receive training on information contained on the manufacturer supplied Materials Safety Data Sheet (MSDS).

Ergonomics

Musculoskeletal disorders (MSDs) are common illness in the office workplace and are caused by inflammation and irritation of muscles, joints, nerves, and tendons. Symptoms exist over time and often include muscle aches & pains, sensations of burning, tingling and numbness.

You are more likely to develop a MSD if you:

- Perform regularly assigned fatiguing tasks.
- Use excessive force to perform repetitive actions.
- Repeat the same motion throughout the workday.
- Work in awkward postures or in positions that restrict circulation.
- Routinely handle vibrating tools or handling cold objects.
- Have a preexisting injury or illness that can be aggravated by assigned work tasks.

Report MSD signs and symptoms to the OHF.

At KSC, the J-BOSC Industrial Hygiene Office (867-2400) provides consultation to civil service and contractor employees on workspace modification to eliminate ergonomic problems and investigates MSD concerns reported through the OHF.

Indoor Air Quality

Aggravation of allergy symptoms are the most common complaint associated with poor indoor air quality. Any civil service or contractor employee who suspects their allergy symptoms are related to poor IAQ where they work should report it to the OHF for evaluation.

The J-BOSC Industrial Hygiene Office (867-2400) will investigate any IAQ concerns of civil service or contractor employees reporting to the OHF or through the work area supervisors and building managers.

Respiratory Protection

Adequate respiratory protection will be provided to employees whenever:

- Personnel are required to work in hazardous atmospheres where the action level of the hazardous air contaminant is exceeded or oxygen deficient atmospheres are present.
- Personnel are involved in the handling, transfer, or use of hazardous chemicals where the toxicity of the chemical is of such a nature as to place those personnel at significant risk of serious illness or injury in the event of a leak, spill, or other release of the chemical.
- Personnel are required to enter atmospheres which have unknown concentrations of oxygen and/or air contaminants.
- An Industrial Hygienist or Safety Professional determines that personnel exposure(s) could exceed the action level.
- The KSC Respiratory Protection Program establishes requirements for the selection and use of air-purifying respirators, air-supplied respirators and emergency escape respirators, as well as policy for written operating procedures, hazard assessments for respirator use, breathing air quality, medical screening for users, and employee training.

The JBOSC Environmental Health contractor provides KSC Civil Service and contractor safety organizations hazard assessments of operations and procedures that may require use of respiratory protection.

Medical certification and annual training (with fit test) is required for use of air-purifying or air-supplied respirator protective equipment.

Hearing Loss Prevention

Hazardous noise may be continuous (such as the noise of a lawn mower) or impulsive/impact (such as the noise of a pistol shot or pile driver).

All personnel are required to wear hearing protection in posted hazardous noise areas when noise is present or where the allowable noise exposure limits may be exceeded.

Heat-Induced Illness

People not acclimated to working in heat; whose work requires use of special protective clothing; or who may have certain medical conditions, may be at greater risk than others of experiencing a serious heat-induced illness, e.g., heat exhaustion and heat stroke. Prevention of heat-induced illness includes building up tolerance to heat, performing the heaviest work during cooler parts of the day, drinking plenty of fluids, wearing light and loose clothing, taking frequent breaks in the shade, and avoiding heavy meals and caffeine just before working.

OSHA QUICK CARD™

Protect Yourself

Heat Stress

When the body is unable to cool itself by sweating, several heat-induced illnesses such as heat stress or heat exhaustion and the more severe heat stroke can occur, and can result in death.

Factors Leading to Heat Stress

High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; some medicines; and inadequate tolerance for hot workplaces.

Symptoms of Heat Exhaustion

- Headaches, dizziness, lightheadedness or fainting.
- Weakness and moist skin.
- Mood changes such as irritability or confusion.
- Upset stomach or vomiting.

Symptoms of Heat Stroke

- Dry, hot skin with no sweating.
- Mental confusion or losing consciousness.
- Seizures or fits.

Preventing Heat Stress

- Know signs/symptoms of heat-related illnesses; monitor yourself and coworkers.
- Block out direct sun or other heat sources.
- Use cooling fans/air-conditioning; rest regularly.
- Drink lots of water; about 1 cup every 15 minutes.
- Wear lightweight, light colored, loose-fitting clothes.
- Avoid alcohol, caffeinated drinks, or heavy meals.

What to Do for Heat-Related Illness

- Call 911 (or local emergency number) at once.

While waiting for help to arrive:

- Move the worker to a cool, shaded area.
- Loosen or remove heavy clothing.
- Provide cool drinking water.
- Fan and mist the person with water.

For more complete information:

OSHA Occupational Safety and Health Administration
U.S. Department of Labor
www.osha.gov (800) 321 -OSHA

OSHA 3154-07R-05

The OSHA Quick Card, Protect Yourself Heat Stress, can be accessed at

http://www.osha.gov/as/opa/heatstress/index.html .

Employees should be aware of the symptoms and what to do for cases of heat-induced illness. For additional information about heat-induced illness (heat rash/prickly heat, heat cramps, heat syncopy, dehydration); risk factors, controls and preventative measures call J-BOSC Environmental Health at 867-2400, or go to http://sgs.ksc.nasa.gov/sgs/sites/other/chs/omehs/ehs/home/ihheat.cfm

Solar Safety

Overexposure to the sun can cause sunburn, premature aging of the skin, cataracts, and damage to the immune system. Over exposure also leads to the development of flat, scaly, reddish patches called Solar Keratoses that may be precancerous. The most serious consequence of over exposure to the sun is skin cancer.

Overexposure prevention recommendations consist of avoiding the sun between 10 a.m. and 3 p.m; using a sunscreen with SPF 15 or greater (waterproof product if swimming or exercising); wear a broad-brimmed hat/ sunglasses/protective clothing. Be aware that clouds provide little protection from UV rays; and be informed about any medications you are taking and their side effects. Some antibiotics such as Tetracycline and Sulfa produce an allergic-type rash on body parts exposed to sun.

Smoking

- At KSC, all buildings and facilities are smoke-free, including KSC leased GSA vehicles.
- Smoking in front of building air intakes is prohibited.
- Discard smoking material only in designated receptacles. Exercise caution when dry weather conditions exist.
- Facility Managers are responsible for determining designated smoking areas outside of the building exits. Some building and facility exits are designated as non-smoking.

Major Chemical Hazards

	ACGIH 8hr.-TWA TLV	IDLH	HAZARD	DESCRIPTION
Monomethyl hydrazine (MMH) (CH_4N_2)	.01 PPM	20 PPM	Corrosive, Toxic, Flammable, Carcinogen (animal)	Propellant Clear, colorless liquid Ammonia smell
Hydrazine (N_2H_4)	.01 PPM	50 PPM	Corrosive, Toxic, Flammable, Carcinogen (animal)	Fuel component Clear, colorless liquid Ammonia, fishy smell
Aerozine-50 (Hydrazine/ Unsymmetrical dimethyl hydrazine mixture)	.01 PPM	15 PPM	Corrosive, Toxic, Flammable, Carcinogen (animal)	Clear, colorless liquid Ammonia like odor
Nitrogen Tetroxide (N_2O_4) as Nitrogen Dioxide (NO_2)	1 PPM 15 MIN Average (NIOSH)	20 PPM	Corrosive, Oxidizer	Yellow-brown liquid or reddish-brown gas (>70F); Pungent bleach odor
SRB Propellant	None	No data	Combustible Solid	Solid rubber material Odorless
Anhydrous Ammonia (NH_3)	25 PPM	300 PPM	Corrosive, Toxic, Flammable	Clear, colorless gas Pungent odor
Liquid Hydrogen (LH_2)	None	Non-toxic Non-corrosive	Cryogenic, Explosive, Flammable, Asphyxiant	Clear, colorless Odorless

TLV - Threshold Limit Value (NIOSH)
ACGIH - American Conference of Governmental Industrial Hygienists
NIOSH - National Institute of Occupational Safety and Health
PPM - Parts Per Million
IDLH - Immediately Dangerous to Life and Health

Major Chemical Hazards Continued

	ACGIH 8hr.-TWA TLV	IDLH	HAZARD	DESCRIP-TION
Liquid Nitrogen	None	Non-toxic	Cryogenic Asphyxiant	Colorless gas or Clear liquid Odorless
Liquid Oxygen (LOX or LO2)	None	Non-toxic	Cryogenic, Oxidizer	Colorless gas or pale blue liquid Odorless
Liquid Helium	None	Non-toxic	Cryogenic Asphyxiant	Colorless gas or clear liquid Odorless

TLV - Threshold Limit Value (NIOSH)
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PPM - Parts Per Million
IDLH - Immediately Dangerous to Life and Health

REFERENCES

Section 1 - Emergency Information:

TOPIC	REQUIREMENTS	TITLE	INFO - POC
Reporting Injury, Illness and Emergencies	**29 CFR 1960**		
	KNPR 8715.3	KSC Safety Practices Procedural Requirements	867-SAFE (7233)
Emergency Notification and Response	**KNPR 8715.3**	KSC Safety Practices Procedural Requirements	867-SAFE (7233)
	JDP-KSC-P-3001	Warning, Alerting, and Evacuation	Wayne Kee, 7-8723
Imminent Danger	**KNPR 8715.3**	KSC Safety Practices Procedural Requirements	867-SAFE (7233)
Emergency Safety Equipment	**KNPR 8715.3**	KSC Safety Practices Procedural Requirements	867-SAFE (7233)
Fires & Explosions	**NPR 8715.3**	NASA Safety Manual	867-SAFE (7233)
	NSTD-8719.11	NASA Safety Standard for Fire Protection	Michael Stevens, 7-8723
	KNPR 8715.3	KSC Safety Practices Procedural Requirements	867-SAFE (7233)
	JDP-KSC-P-3003	Fire Response	Michael Stevens, 7-8723
Chemical Spills/Releases	**KNPR 8715.3**	KSC Safety Practices Procedural Requirements	867-SAFE (7233)
	KNPR 8500.1	KSC Environmental Requirements	Diane Callier, 7-4280
	JDP-KSC-P-3008	Hazardous Materials Response	Diane Callier, 7-4280

REFERENCES

Section 1 - Emergency Information Continued:

TOPIC	REQUIREMENTS	TITLE	INFO - POC
Bomb Threats	**KNPR 1600.1**	KSC Security Procedural Requirements	Patrick Klotz, 7-2450
Shelters	**29 CFR 1910.1200**		
	JDP-KSC-P-3004	Launch Accidents	Wayne Kee, 7-8723
Workplace Violence	**KNPD 1620.9**	KSC Workplace Violence Mitigation Program (MVMP)	Linda Maust, 7-2455

The NASA Vision
To Improve Life Here,
To Extend Life There,
To Find Life Beyond.

The NASA Mission
To Understand and Protect Our Home Planet
To Explore the Universe and Search for Life
To Inspire the Next Generation of Explorers
... As Only NASA Can.

REFERENCES

Section 2 - Safety and Health Information

TOPIC	REQUIREMENTS	TITLE	INFO - POC
KSC Safety & Health Policy	**29 CFR 1960**		
	KNPD 8700.1	Safety and Mission Assurance Policy Directive	867-SAFE (7233)
	KNPR 8715.3	KSC Safety Practices Procedural Requirements	867-SAFE (7233)
Safety and Health Responsibilities	**29 CFR 1960**		
	KNPD 8700.1	Safety and Mission Assurance Policy Directive	867-SAFE (7233)
	KNPR 8715.3	KSC Safety Practices Procedural Requirements	867-SAFE (7233)
Safety & Health Councils, Boards, Committees & Panels	**KNPD 1150.24**	KSC Councils, Boards, and Committees	Donna Lozaw, 7-3311
Maximum Work Time (MWT)	**KNPR 8715.3**	KSC Safety Practices Procedural Requirements	Florence Smith, 867-2532
Safety and Health Training	**KDP-KSC-F-3240**	KSC Civil Service Safety & Health Training Needs Assessment	867-SAFE (7233)

REFERENCES

Section 2 - Safety and Health Information Continued:

TOPIC	REQUIREMENTS	TITLE	INFO - POC
Occupational Safety and Health Administration (OSHA) Voluntary Protection Program/VPP	29 CFR 1960		
	OSHA: CSP 03-01-001 - TED 8-0.3		Dave Facemire, 867- 7232
	KNPD 8700.1	Safety and Mission Assurance Policy Directive	867-SAFE (7233)
Exit and Egress Information	29 CFR 1910.35		
	NFPA 101	Life Safety Code	Michael Stevens, 7-8723
Safety Permits	KSC-TA-6167	Health and Safety Reference Manual	Duty Officer, 853-5211
	KSC-UG-2805	KSC Work Center Safety and Health Guide	867-SAFE (7233)
Traffic Safety & Crosswalks	Florida Statute Title XXIII Chapter 316.130(8)		Dann Oakland, 867-3008
	KNPR 1600.1	KSC Security Procedural Requirements	Dann Oakland, 867-3008

REFERENCES

Section 2 - Safety and Health Information Continued:

TOPIC	REQUIREMENTS	TITLE	INFO - POC
Use of Cell Phones While Driving	**KNPR 1600.1**	KSC Security Procedural Requirements	Dann Oakland, 867-3008
Contractor Safety	**29 CFR 1910, 29 CFR 1926**		
Inclement Weather (Safety Rules: Lightning, Thunder Storm, Tornado, Hurricane/Tropical Storm)	**NPR 8715.2**	NASA Emergency Preparedness Plan Procedural Requirements	Wayne Kee, 7-8723
	JDP-KSC-P-3005	Adverse Weather	Lightning POC: Terry Willingham, 861-4110,
	JDP-KSC-P-3006	Hurricane Preparation and Recovery	Hurricane Status 861-7900, Wayne Kee, 7-8723

NASA's CORE VALUES:
**Safety *Teamwork *Integrity *Mission Success*

REFERENCES

Section 3 - Safety

TOPIC	REQUIREMENTS	TITLE	INFO - POC
Injury & Illness Prevention	**29 CFR 1904**		
Audits and Inspections	**29 CFR 1960**		
	KNPR 8715.3	KSC Safety Practices Procedural Requirements	867-SAFE (7233)
Unsafe and/or Unhealthful Conditions or Acts	**KDP-KSC-F-2111**	KSC Close Call and Unsafe and/or Unhealthful Conditions or Acts Reporting Form	867-SAFE (7233), KSC Omsbud: James (Jim) Thompson, 867-7484
	KNPR 8715.3	KSC Safety Practices Procedural Requirements	867-SAFE (7233)
Mishaps and Close Calls	**29 CFR 1904**		
	NPR 8621.1	NASA Procedural Requirements for Mishap Reporting, Investigating, and Recordkeeping	867-SAFE (7233)
	KNPD 8700.1	Safety and Mission Assurance Policy Directive	867-SAFE (7233)
	KDP-KSC-P-1450	KSC Mishap and Close Call Processes	867-SAFE (7233)
	KDP-KSC-F-1473	Safety and Mission Assurance Notification Process	867-SAFE (7233)
	KNPR 8715.3	KSC Safety Practices Procedural Requirements	867-SAFE (7233)

REFERENCES

Section 3 - Safety Continued

TOPIC	REQUIREMENTS	TITLE	INFO - POC
Mishap and Close Call Reporting	**NPR 8621.1**	NASA Procedural Requirements for Mishap Reporting, Investigating, and Recordkeeping	867-SAFE (7233)
	KDP-KSC-P-2111	Reporting Close Calls	867-SAFE (7233)
	KNPR 8715.3	KSC Safety Practices Procedural Requirements	867-SAFE (7233)
Mishap and Close Call Investigation	**KDP-KSC-P-1473**	KSC Mishap Reporting and Investigating	867-SAFE (7233)
	KDP-KSC-P-1474	Mishap Investigation Board (MIB)	867-SAFE (7233)
	KNPR 8715.3	KSC Safety Practices Procedural Requirements	867-SAFE (7233)
Job Hazard Analysis (JHA)	**KDP-KSC-P-3221**	Job Hazard Analysis (JHA) Selection	867-SAFE (7233)
	KDP-KSC-F-3222	General Administrative Work Area	867-SAFE (7233)
	KDP-KSC-F-3227	JHA Template	867-SAFE (7233)
General Workplace Safety	**KNPR 8715.3**	KSC Safety Practices Procedural Requirements	867-SAFE (7233)
	KSC-UG-2805	KSC Work Center Safety and Health Guide	867-SAFE (7233)
Lockout/Tagout	**29 CFR 1910.147**		
	NPR 8715.3	NASA Safety Manual	867-SAFE (7233)
	KNPR 8715.4	KSC Lockout/Tagout Procedural Requirements	Rick Sweet, 7-8524
Abestos Safety	**29 CFR 1910.1001**		
	KNPR 1840.19	Asbestos Management Program	Mike Cardinale, 867-6342

REFERENCES

Section 3 - Safety Continued:

TOPIC	REQUIREMENTS	TITLE	INFO - POC
Ladder Safety	**29CFR 1910.27**		
	KSC-UG-2805	KSC Work Center Safety and Health Guide	867-SAFE (7233)
	KSC-TA-6167	Health and Safety Reference Manual	Harold Williams, 7-8411
Hazardous Materials	**KNPD 1800.2**	KSC Hazard Communication Program	Mike Cardinale, 867-6342
	KSC-UG-2805	KSC Work Center Safety and Health Guide	867-SAFE (7233)
Hazard Communications (HAZCOM)	**29 CFR 1910.1200**		
	KNPD 1800.2	KSC Hazard Communication Program	Mike Cardinale, 867-6342
Hypergols	**JDP-KSC-P-3008**	Hazardous Materials Response	Diane Callier, 7-4280
Anhydrous Ammonia	**JDP-KSC-P-3008**	Hazardous Materials Response	Diane Callier, 7-4280
	KSC-TA-6167	Health and Safety Reference Manual	Harold Williams, 7-8411
Explosives & Propellants	**NSS 1740.12**	NASA Safety Standard for Explosives, Propellants,	Bo Brown, 867-6959
	KNPR 8715.3	KSC Safety Practices Procedural Requirements	867-SAFE (7233)

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REFERENCES

Section 4 - Health

TOPIC	REQUIREMENTS	TITLE	INFO - POC
Health Services			867-3346, OHF
Automated External Defibrillators (AED)	**TA-POLICY-012**	Kennedy Space Center (KSC) Automated External Defibrillator (AED) Policy	David A. Tipton, MD, 867-6385
Personnel Protective Equipment/PPE:	**29 CFR 1910.132**		
	KNPR 8715.3	KSC Safety Practices Procedural Requirements	867-SAFE (7233)
	KNPR 8715.5	KSC Personal Protective Equipment (PPE) Program Procedural Requirements	867-SAFE (7233)
Confined Space	**29 CFR 1910.146**		
	KNPR 1840.19	KSC Industrial Hygiene Program	Mike Cardinale, 867-6342
	KNPR 8715.3	KSC Safety Practices Procedural Requirements	867-SAFE (7233)
	KSC-UG-2805	KSC Work Center Safety and Health Guide	867-SAFE (7233)
Ionizing Radiation Safety	**KNPR 1860.1**	KSC Ionizing Radiation Protection Program	Randall Scott, 867-6958
Nonionizing Radiation Safety	**KNPR 1860.2**	KSC Nonionizing Radiation Protection Program	Randall Scott, 867-6958
Bloodborne Pathogens	**29 CFR 1910.1030**		853-5211 (J-BOSC)
	KSC-UG-1904	NASA Employee Exposure Control Plan for Bloodborne Pathogens	Mike Cardinale, 867-6342
	KSC-UG-2805	KSC Work Center Safety and Health Guide	867-SAFE (7233)

REFERENCES

Section 4 - Health Continued:

TOPIC	REQUIREMENTS	TITLE	INFO - POC
Laboratories	**29 CFR 1910.1450**		
	KDP-KSC-F-3223	Job Hazard Analysis-Laboratories	867-SAFE (7233)
	KSC-UG-2805	KSC Work Center Safety and Health Guide	867-SAFE (7233)
	KTI-5123	Chemical Hygiene Plan	Steve McDanels, 861-8969
	KTI-5117	Laboratory Safety Plan	Orlando Melendez, 7-9407
Ergonomics	**29 CFR 1910**		867-2400 (J-BOSC)
	KDP-KSC-F-3242	Job Hazard Analysis-Computer Workstation	Mike Cardinale, 867-6342
	KNPR 1840.19	KSC Industrial Hygiene Program	Mike Cardinale, 867-6343
	KNPR 8715.3	KSC Safety Practices Procedural Requirements	867-SAFE (7233)
Indoor Air Quality	**29 CFR 1910**		867-2400 (J-BOSC)
Respiratory Protection	**29 CFR 1910.134**		
	KNPR 1820.4	KSC Respiratory Protection Program	Mike Cardinale, 867-6342
	KNPR 1840.19	KSC Industrial Hygiene Program	Mike Cardinale, 867-6342
	KNPR 8715.5	KSC Personal Protective Equipment Program	867-SAFE (7233)
Hearing Loss Prevention	**29 CFR 1910.95**		
	KNPR 1820.3	KSC Hearing Loss Prevention Program	Mike Cardinale, 867-6342

REFERENCES

Section 4 - Health Contuined:

TOPIC	REQUIREMENTS	TITLE	INFO - POC
Heat Induced Illness	**29 CFR 1910.95**		
	KNPR 1600.1	KSC Industrial Hygiene Program	Mike Cardinale, 867-6342 or 867-2400 (J-BOSC)
Solar Safety	**KNPD 1810.1**	KSC Occupational Medicine Program	David A. Tipton, MD, 867-6385
Smoking	**KNPD 1216.1**	Smoke-Free Workplace	David A. Tipton, MD, 867-6385

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Notes

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