

**CENTER DIRECTIVES MANAGEMENT SYSTEM****ELECTRONIC SOURCE DOCUMENT**

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# Ames Procedural Requirements

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**COMPLIANCE IS MANDATORY**

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## Ames Health and Safety Procedural Requirements

### Chapter 27: Construction Safety Management

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## 27.1 Responsibilities

- a. All persons who manage, perform, and provide support for construction work located on all property under the jurisdiction of Ames Research Center (ARC) shall conduct operations in compliance with the requirements identified in this chapter, all applicable governing regulatory agency regulations and agency guidelines pertaining to safety in construction.
- b. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance. It is the responsibility of the Prime Contractor to coordinate work and prevent one subcontractor from interfering with or creating hazardous working conditions for another, to inspect subcontractor operations and ensure that accident prevention responsibilities are being carried out.

### 27.1.1 Safety, Health and Medical Services Division shall:

- a. Provide construction safety oversight for construction and/or maintenance projects.
- b. Provide Certified Asbestos Consultants for assessment and oversight of projects including maintenance activities that pose a potential or actual disturbance of materials that contain asbestos.
- c. Provide California Department of Public Health - Certified Lead Professional, Project Monitor and Inspector, and Lead Risk Assessor for assessment and oversight of projects including maintenance activities that pose a potential or actual disturbance of materials containing lead.
- d. Provide updates and information on construction safety regulatory changes to ARC, evaluate, and minimize their impact to the Center.
- e. Ensure a thorough review and evaluation of all building permits prior to the start of construction projects.
- f. Ensure a thorough review and evaluation of contractor safety plans and all associated documentation prior to the start of construction projects.
- g. Support construction related mishap investigations.
- h. Accompany all regulatory agency personnel, including OSHA inspectors, on all visits to construction sites.
- i. Maintain a central location for all construction safety management documentation.

### 27.1.2 Construction Safety Specialist shall:

- a. Be the primary health and safety contact for inspection and compliance pertaining to construction and maintenance related work activities.
- b. Conduct regular job site inspections for compliance to NASA policies, all applicable governing regulatory agency laws and guidelines for construction and maintenance activities.
- c. Notify responsible parties of safety hazards to initiate remediation on a job site for construction and maintenance activities.
- d. Provide professional safety technical advice related to construction activity:
  1. Review of contractor's safety submittals in accordance with the deliverables section of this document and associated safety documentation submitted to the COTR to ensure compliance with OSHA and Ames Health and Safety Procedural Requirements.
  2. Review construction permits to integrate complete and applicable safety requirements into safety plans, drawings, specifications and contractor or project documents during the design phase.
  3. Review Contractor documentation on required health and safety "Weekly Tailgate Meetings".
  4. Attend construction projects bid walks and preconstruction meetings to communicate safety expectations and provide guidance to the COTR, project managers and contractor personnel.

5. Support construction related mishap investigations per requirements outlined in Ames Health and Safety Procedural Requirements: Chapter 4 - Mishap Reporting and Investigating.
- e. Issue Unsafe Condition Noncompliance Notice (see appendix) to the COTR and Contracting Officer when a documented deficiency has not been resolved in a reasonable amount of time.
- f. Issue Stop Work Notice (see appendix) to the COTR and Contracting Officer when a deficiency poses an imminent health and/or safety hazard
- g. Maintain a copy of all construction project documentation.
- h. Conduct a job-site review of Hot Work permits that have been issued by the NASA Ames Fire Marshal's office.
- i. Document inspections.

### **27.1.3 Ames Research Center Health Unit shall:**

Upon request, provide emergency medical treatment to construction workers who have experienced an acute injury or illness while working on Ames Research Center property.

### **27.1.4 Construction Manager, Project Manager shall:**

- a. Ensure that a survey to determine the presence, location, and quantity of asbestos and/or lead-containing materials has been conducted prior to any work performance, if applicable. See Ames Health and Safety Procedural Requirements: Chapter 30 - Asbestos Management Plan; Chapter 35 - Lead Management Plan for additional information.
- b. Ensure that all construction-related work activities are conducted in accordance with NASA policies and all applicable regulations that pertain to construction safety. Include requirements in construction contracts for safety performance and written safety plans.
- c. Ensure that the "Construction Permit" is not issued until a safety specialist in the appropriate field (i.e., Fire, Safety and Asbestos) approves the design plan.
- d. Ensure legionella control features in water and ventilation systems, as stated in ASHRAE 12-2000. Examples include avoidance of dead legs in water systems, effective water temperature controls and proper placement of air intakes.

### **27.1.5 Code JA, Acquisition Division shall:**

- a. Invoke the "Suspension of Work" provision of the contract should the Contractor or subcontractors refuse or fail to ensure prompt corrective action of safety deficiencies.
- b. Review past safety performance prior to Contractor selection including incident rates, lost time accidents and Experience Modification Rate (EMR).
- c. Notify the Ames Safety, Health and Medical Services Division when the hired contractor has an EMR above 1.25.

### **27.1.6 COTR, Construction Manager shall:**

- a. Ensure that every construction project has a designated Construction Manager and/or Project Manager that is trained in NASA and OSHA standards applicable to contracts and construction and receives refresher training periodically. Initial training equivalent to thirty (30) classroom hours on construction safety that includes regulations in 29 CFR 1926 or California's Construction Safety Orders in CCR Title 8 will satisfy this requirement. The COTR should receive similar training.
- b. Submit contractor safety plans, authorized work plan and all associated documentation to the Construction Safety Specialist for review.
- c. Ensure that construction contractors implement an injury prevention policy and comply with the provisions of the approved construction safety plan and associated documentation.
- d. Ensure that all construction related work activities are conducted in accordance with NASA policies and all applicable regulations that pertain to construction safety.

- e. Cultivate a communication partnership with the ARC Construction Safety Specialist to ensure:
  - 1. Monitoring of construction related work and maintenance activities.
  - 2. Participation in bid walks, pre-construction and weekly progress meetings.
- f. Provide notification to all affected building occupants before any construction work begins in occupied buildings.
- g. Ensure that only NASA Environmental Division designated personnel sign hazardous waste manifest(s).
- h. Coordinate confined space activities as required in the Ames Health and Safety Procedural Requirements: Chapter 26 - Confined Space Entry.
- i. Ensure that existing utilities (e.g., electrical, gas, steam) requiring shutoff are identified and a lockout/tagout plan has been established.

### **27.1.7 Construction Contractors shall:**

- a. Comply with the provisions of the approved construction safety plan and associated documentation.
- b. Exercise supervisory authority over all construction activities. Comply and require all subcontractors to comply with NASA construction safety requirements and all applicable regulations that pertain to construction and safety.
- c. Conduct daily job-site safety inspections and document the inspections utilizing the Construction Safety Inspection form (see appendix) or equivalent.
- d. Ensure that all employees are competent and trained or appropriately certified for the activities they are conducting per NASA and OSHA requirements.
- e. Ensure that all employees are fully aware of the hazards associated with the project.
- f. Ensure that the contractor or subcontractor who created or controls the hazard immediately abates health and safety hazards at the worksite.
- g. Designate a Site Safety and Health Officer (SSHO) with assurance responsibility for safe work procedures and authority to correct unsafe conditions. See the Personnel and Qualifications section of this chapter for additional information.
- h. Notify the Contracting Officer Technical Representative (COTR) immediately upon discovery of any health and safety deficiency that the contractor cannot resolve.
- i. Notify the COTR immediately upon discovery of an inspection by regulatory agency personnel, including OSHA.
- j. Notify the Contracting Officer as soon as practical, but not later than one (1) hour after a hospitalization, fatality, \$1 million loss or high visibility incident. See the Accident Scene and Notification section of this chapter for additional information. File electronic Quick Report at <http://q.arc.nasa.gov/IncidentReporting.html> within twenty-four (24) hours.
- k. Notify the Contracting Officer as soon as practical, but not later than four (4) hours after other accidents meeting the definition of Recordable Injuries or Illnesses, property damage equal to or greater than \$1,000, Close Calls, or any weight handling equipment accident in accordance with NASA NPR 8621.1. See the Accident Scene and Notification section of this chapter; Ames Health and Safety Procedural Requirements: Chapter 4 - Mishap Reporting and Investigating for additional information. File electronic Quick Report at <http://q.arc.nasa.gov/IncidentReporting.html> within twenty-four (24) hours.
- l. Ensure that the Contracting Officer Technical Representative (COTR) has authorized your safety work plans and documentation before work begins. Alternatively, for very small or short duration projects, a signed copy of your Code of Safe Work Practices may satisfy this requirement. In the absence of the above, immediately contact the COTR. See the Submittals section of this chapter for additional information.
- m. Ensure that no deviation from the approved health and safety submittals occur without the approval of an authorized and competent safety person. Notify the CO, Ames Construction Safety Specialist and COTR in writing with any revised submittals.

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## 27.2 Worksite Procedures

### 27.2.1 Utility Pre-outage Coordination

- a. Construction Contractors shall:
  1. Apply for utility outages in writing through the COTR, Project Manager or Construction Manager at least ten (10) working days in advance. Include the location of the outage, duration of outage, any necessary sketches and information that clearly identifies the circuits or system requested to be turned off.
  2. Attend a pre-outage coordination meeting with the COTR, Project Manager or Construction Manager that includes the installation or utility representative after your request has been approved in writing and prior to beginning work on the utility system. The purpose of the meeting is to review the scope of work and the lock-out/tag-out procedures for worker protection.
  3. Only perform work on de-energized electrical circuits.

### 27.2.2 Hazard Control

- a. Worksite hazards shall be adequately controlled to prevent injury and illness. Provide pre task planning, job site training, inspections, hazard identification, hazard controls, management commitment to eliminate hazards, on-site authority to remedy recognized hazards and adequate records documentation. The Prime Contractor is responsible for ensuring subcontractor compliance with the safety and occupational health requirements.
- b. In the event that any severe hazard exposure or imminent danger becomes evident, stop work, secure the area, then develop a plan to safely remove the exposure and control the hazard. Take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSE/SAFE A10.34) and the environment.

### 27.2.3 Protection of the Public and Federal Employees

Work shall not be performed in any area occupied by the public or federal employees unless specifically permitted by the contract or Contracting Officer. Adequate steps must be taken for the protection of the public or federal employees at all times. See Ames Health and Safety Procedural Requirements: Chapter 30 - Asbestos Management Plan and Chapter 42 - Safety Lanes, Barricades, Hazard Labeling and Posting for additional information.

### 27.2.4 Accident Scene and Notification

- a. Call 650-604-5555 for emergency medical and fire response.
- b. Notify the Ames Safety, Health and Medical Services Division immediately at 650-604-5602.
- c. Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted.
- d. Do not allow personnel to leave the scene or discuss details before formal interviews have been completed by Government investigation team.
- e. Notify the Contracting Officer as soon as practical, but not later than one (1) hour after a hospitalization, fatality, \$1 million loss or high visibility incident.
- f. Notify the Contracting Officer as soon as practical, but not later than four (4) hours after other accidents meeting the definition of recordable injuries or illnesses per 29 CFR part 1904 (OSHA recordkeeping Regulations), damage to Government or Contractor property equal to or greater than \$1,000, Close Calls, or any weight handling equipment accident in accordance with NASA NPR 8621.1B.
- g. Within notification include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of

personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.).

- h. File electronic Quick Report at <http://q.arc.nasa.gov/IncidentReporting.html> within twenty-four (24) hours.

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## 27.3 Forms, Notices and Permits

### 27.3.1 Display of Safety Information

- a. Within one (1) calendar day after commencement of work, erect a safety bulletin board at the job site.
- b. Posted items are required to be durable in order to withstand the outdoor elements such as rain and sun or replaced frequently so they remain legible.
- c. Where size, duration, or logistics of project do not facilitate a bulletin board, an alternative method acceptable to the Contracting Officer that includes all mandatory information for employee and visitor review shall be deemed as meeting the requirement for a bulletin board.
- d. Items posted on the bulletin board shall include:
  1. Confined space entry permit.
  2. Hot work permit.
  3. Excavation permit.
  4. Federal and California OSHA posters.
  5. Emergency information such as numbers to call for emergency assistance, name and location of designated medical facility.
  6. Contact information of key NASA and Contractor personnel working on the project.
  7. Code of safe practices, AHA's or post location where they can be found, site specific plan.

### 27.3.2 Construction Safety Inspection Form

Utilize the inspection form provided in the appendix or equivalent.

### 27.3.3 Unsafe Condition Noncompliance Notice

This notice may be issued for an unsafe condition or for noncompliance. Deliver personally or electronically to the COTR, Contracting Officer, and the Construction Program Manager for the Safety, Health and Medical Services Division. See appendix for sample.

### 27.3.4 Stop Work Order Notice

This notice may be issued if imminent danger or repeated unsafe condition. Deliver personally or electronically to the COTR, Contracting Officer, and the Construction Program Manager for the Safety, Health and Medical Services Division. See appendix for sample.

### 27.3.5 Hot Work Permit

Obtain and post a written permit at job site prior to performing "Hot Work" or operating other flame/spark producing devices (welding, cutting, powder actuated tools, tar pots, etc.) from the NASA Ames Fire Prevention Office located in Building 158 Room 202 at 650-604-2024 or 650-604-3112. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. See the Hot Work section in this chapter for additional information.

### 27.3.6 Excavation Permit

Obtain and post a written permit at job site prior to performing excavation of six (6) inches or deeper from Ames Facilities Maintenance at 650-604-2960. See the Trenching and Excavation

section of this chapter for additional information.

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## 27.4 Personnel and Qualifications

### 27.4.1 Site Safety and Health Officer (SSHO)

- a. The SSHO shall:
  1. Report to a senior project (or corporate) official.
  2. Be on-site during all times when work is being performed. An SSHO (or a Designated
  3. Perform daily jobsite safety self-evaluation inspections and complete checklists.
  4. Possess authority to take corrective action measures to abate safety violations.
  5. Perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor.
  6. Have completed the thirty (30) hour OSHA 510 - Standards for Construction Industry or equivalent course.
  7. Maintain SSHO competency through twenty-four (24) hours of formal safety and health related coursework every four (4) years.
  8. Have a minimum of one (1) year safety related work experience.
- b. Failure to have a trained SSHO present on the jobsite when work is performed is considered a Non Compliant condition.
- c. For limited service contracts, the Contracting Officer and Ames Safety, Health and Medical Services Division may modify SSHO requirements in writing.
- d. The Prime Contractor is responsible for ensuring subcontractor compliance with the SSHO requirements.

### 27.4.2 Competent or Qualified Person

- a. Competent or Qualified Person shall:
  1. Be available for all hazardous work identified in the Contractor's safety plan and in accordance with OSHA.
  2. Be onsite at all times when work associated with their professional expertise is being performed.
- b. The Contracting Officer, in consultation with the Ames Construction Safety Specialist, will review and approve Competent or Qualified Person credentials.
- c. The Prime Contractor is responsible for ensuring subcontractor compliance with the Competent or Qualified Person requirements.

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## 27.5 Submittals

Submit plan(s) and reports to the COTR fifteen (15) calendar days prior to on-site work or as noted in this section.

### 27.5.1 Corporate Injury Illness Prevention Program (IIPP)

- a. Required for every contractor and sub-contractor working at NASA Ames. Work cannot proceed without an accepted IIPP. Additional information and detailed requirements for the IIPP can be obtained online from the California Division of Occupational Safety and Health

(DOSH). <http://www.dir.ca.gov/dosh> or [http://www.dir.ca.gov/dosh/dosh\\_publications/iipp.html](http://www.dir.ca.gov/dosh/dosh_publications/iipp.html)

- b. The Corporate IIPP shall include the following elements in sufficient detail:
1. Management commitment/assignment of responsibilities.
  2. Safety communications system with employees.
  3. System for assuring employee compliance with safe work practices.
  4. Scheduled inspections/evaluation system.
  5. Accident investigation.
  6. Procedures for correcting unsafe/unhealthy conditions.
  7. Safety and health training and instruction.
  8. Recordkeeping and documentation.
  9. Code of Safe Practices.
  10. Periodic safety meetings with management.
  11. Toolbox safety meetings with work crew.

### **27.5.2 Site Specific Safety Plan (supplement to IIPP)**

- a. Required for every contractor and sub-contractor working at NASA Ames. Work cannot proceed without an accepted Site Specific Supplement that interfaces with the Corporate IIPP.
- b. The Safety Plan shall include the following elements in sufficient detail:
1. Names and qualifications of all personnel designated to perform work on this project.
  2. Certification or Proof of training for each qualified and competent person.
  3. Proof of training for Site Safety and Health Officer (SSHO).
  4. Identify and list all unusual or high-hazard activities specific to the job and provide AHA's for those uncontrolled hazards where written plans such as confined space entry and fall protection are not already provided.
  5. Provide two (2) Toolbox safety meeting topics with detail for jobs planned to last more than one week that will be used during the project. Topics should relate to hazards that employees will encounter.
- c. Continuously review and amended the Safety Plan as necessary throughout the life of the contract. Provide copies of revised supplement to the COTR and Ames Construction Safety Specialist.

### **27.5.3 Activity Hazard Analysis (AHA)**

- a. Activity Hazard Analysis is a technique that focuses on job tasks as a way to identify hazards before they occur. The AHA focuses on the relationship between the worker, the task, the tools, and the work environment. After you identify uncontrolled hazards, you will take steps to eliminate or reduce them to an acceptable risk level.
- b. Activity Hazard Analysis is similar to a Job Hazard Analysis (JHA).
- c. Required for every contractor and sub-contractor working at NASA Ames. An AHA shall be completed for each unusual or high-hazard activity on the job site that is uncontrolled (where written plans such as confined space entry and fall protection are not already provided). Work cannot proceed without approved AHA's. Additional information and a sample AHA can be found in the appendix.
- d. Identification of hazards. A hazard is the potential for harm. If left uncontrolled, a hazard could result in injury or harm. A hazard can be a physical object, chemical, noise, radiation, extreme heat or cold, electrical energy or anything else that has the potential to cause harm.
- e. Must be posted on job board to be made available to employees for reference at all times during work.

### 27.5.4 Confined Space Entry Plan

- a. Use a qualified person to prepare a confined and/or enclosed space entry plan in accordance with Ames Health and Safety Procedural Requirements: Chapter 26 - Confined Space Entry, applicable OSHA standards 29 CFR 1910, 29 CFR 1926, OSHA Directive 2.100, and any other federal, state and local regulatory requirements identified in your contract. The most stringent requirements govern when inconsistencies arise.
- b. Required for every contractor and sub-contractor working in confined spaces at NASA Ames.
- c. Confined Space Entry Plan must:
  1. Identify the qualified person's name, qualifications, training and experience.
  2. Delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions.
  3. Include procedure for rescue by contractor personnel and the coordination with emergency responders.

### 27.5.5 Excavation Plan

- a. Use a qualified person to prepare and sign a written Excavation Plan that is site specific.
- b. The Excavation Plan must:
  1. Address any fall hazards during different phases of construction.
  2. Identify trench and shoring systems.
  3. Include tabulated data and specifications or registered engineer tabulated data for shoring or benching systems and be readily available on-site for review.
  4. Include registered professional engineer stamp, specifications, and tabulated data for Job-made shoring or shielding and be readily available on-site for review.
  5. Include scope of work, start and end date, exact location of the excavation, name and contact information of the competent person, excavation details (depth, soil type, adjacent structures such as roadways, etc.), cave-in protection to be provided, access, egress, air sampling, platforms, ramps, information on underground construction other than trenching, means to control water accumulation in the excavation, means to protect pedestrians and vehicular traffic from excavations.
- c. Also see the Trenching and Excavation section of this chapter.

### 27.5.6 Fall Protection Plan

- a. Use a qualified or competent person per Z359.2 to prepare and sign a written Fall Protection Plan that is site specific and meets the minimum requirements for a comprehensive managed Fall Protection program.
- b. The Fall Protection Plan must:
  1. Address any fall hazards in the work place during different phases of construction.
  2. Address how to protect and prevent workers from falling to lower levels.
  3. Include responsibilities, equipment and methods employed, assisted rescue, self-rescue and evacuation procedures, training requirements, and monitoring methods.
- c. See Ames Health and Safety Procedural Requirements: Chapter 40 - Fall Protection Program for additional information.

### 27.5.7 Radiation Safety Manual and Work-site Procedures

- a. Submit License Certificates for radiation materials and equipment to the Contracting Officer and Radiation Safety Office (RSO) 650-604-4548 or 650-604-3979 (Ames Safety, Health and

Medical Services Division, N237 room 108) for all specialized and licensed material and equipment that could cause fatal harm to construction personnel or to the construction project.

- b. Provide the RSO with written procedures for site work and a copy of the firm's radiation safety manual. The RSO will review for authorization and provide job site posting and surveillance requirements.

### **27.5.8 Crane Reports**

- a. Submit crane inspection reports to the COTR.

### **27.5.9 Crane Lift Plan**

- a. Use a qualified person to prepare and sign a written Crane Lift Plan that is site specific. See Ames Health and Safety Procedural Requirements: Chapter 17 - Lifting Devices and Equipment; NASA-STD-8719.9 - Standard for Lifting Devices and Equipment; Lifting Devices section of this chapter for information.
- b. Submit crane company safety plan and provide it at the lift site.
- c. Submit Licensed Operator (NCCCO) Certification to the COTR.
- d. Submit Rigger and Signal Person Certifications to the COTR.

### **27.5.10 Crane Critical Lift Plan**

- a. Use a qualified person to prepare and sign a weight handling critical lift plan where and of the following conditions are present:
  1. When failure/loss of control could result in loss of life, loss or damage to flight hardware.
  2. When major facility components whose loss would have serious programmatic or institutional impact.
  3. Lifting personnel with a crane, lifts where personnel are required to work under a suspended load, and operations with special personnel and equipment safety concerns beyond normal lifting hazards.
- b. For lifts of personnel, demonstrate compliance with the requirements of 29 CFR 1926.1400.
- c. See Ames Health and Safety Procedural Requirements: Chapter 17 - Lifting Devices and Equipment; Lifting Devices section of this chapter; NASA-STD-8719.9 - Standard for Lifting Devices and Equipment for information.
- d. Submit Licensed Operator NCCCO/Rigger Certifications.

### **27.5.11 Investigation Report**

- a. Use a qualified person to conduct an accident investigation for recordable injuries or illnesses, damage to Government or Contractor property equal to or greater than \$1,000, Close Calls, or any weight handling equipment accident in accordance with NPR 8621.1B.
- b. Establish then document the root cause(s) of the accident and corrective actions.
- c. File electronic accident report at <http://q.arc.nasa.gov/IncidentReporting.html> using the NASA Incident Reporting Information System (IRIS) within twenty-four (24) hours.
- d. Provide the written accident investigation report to the Contracting Officer within five (5) calendar days of the accident.
- e. The Contracting Officer will provide copies of any required or special forms.

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## **27.6 Construction Site Reference Materials**

Maintain project related reference materials and make them available to all personnel working at

the job site. Include applicable equipment manufacturer's manuals and safety related information to protect employees.

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## 27.7 Obstructions

- a. Contractors, construction activity and maintenance operations shall not:
  1. Obstruct a corridor, aisle, stairway, door, or exit in such a manner as to encroach on routes of ingress or egress utilized by the public or building occupant.
  2. Obstruct access to fire protection panels and equipment.
  3. Obstruct or close streets, walks, and other facilities occupied and used by the Government without written permission from the Contracting Officer.

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## 27.8 Temporary Traffic Disruption

- a. Construction or maintenance operations that disrupt traffic must:
  1. Use flaggers to achieve safe traffic flow.
  2. Maintain training documentation for personnel on site.
  3. Be conducted in accordance with California Manual on Uniform Traffic Control Devices (CMUTCD); Ames Health and Safety Procedural Requirements: Chapter 42 - Safety Lanes, Barricades, Hazard Labeling and Posting.
  4. Post traffic control signs and install traffic barriers per CMUTCD Part 6, Temporary Traffic Control.

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## 27.9 Fences and Barricades

- a. Provide, erect, and maintain lights, barriers, signals, passageways, detours, and other traffic-control items that may be required for protection of the public.
- b. Contractor shall ensure that the work area:
  1. Is fenced, barricaded or otherwise blocked off from the public and building occupants to prevent unauthorized entry into the work area. The minimum construction standard for interior temporary barriers consist of floor-to-ceiling and wall-to-wall metal studs 400 mm on center anchored top and bottom, covered with a minimum of one layer 15 mm gypsum wallboard.
  2. Maintains access to fire hydrants and fire department connections. Coordinate with NASA Security and the NASA Ames Fire Department prior to erecting fences and barricades.
  3. Has fences and barricades removed upon completion of the project.
- c. Caution tape or alternate methods may only be used to secure a construction site with the approval of the Ames Construction Safety Specialist.
- d. Obtain approval from COTR at least 72 hours in advance of starting any activity that will obstruct traffic.
- e. Provide qualified flag personnel for traffic control when roadways are obstructed during normal working hours, and provide lighted barricades in appropriate locations at roadways obstructed beyond normal working hours.

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## 27.10 Hot Work

- a. Personnel performing hot work or operating other flame/spark producing devices (welding, cutting, powder actuated tools, tar pots, etc.) shall:
  1. Obtain and post a written permit at job site prior to work from the Ames Fire Prevention Office at 650-604-2024 or 650-604-3112. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. See appendix for permit example.
  2. Provide forty-eight (48) hours notice to Ames Facilities Maintenance at 650-604-2960 prior to any hot work permit that would otherwise affect the fire access panel, or fire and life safety system within any building that would require facilities to respond.
  3. Provide at least two (2) twenty (20) pound "ABC rated" extinguishers for normal hot work at each source with current inspection tag, approved safety pin and tamper resistant seal.
  4. Provide a designated Fire Watch (an individual with appropriate training and experience) for any hot work in accordance with NFPA 51B and remain on-site for a minimum of 30 minutes after completion of the task or as specified on the hot work permit.
  5. Review location of the nearest fire alarm boxes and emergency services dispatch phone number 650-604-5555 with personnel when starting hot work in the facility.
  6. Follow: NFPA 51B - Fire Prevention during Welding, Cutting and Other Hot Work, 2009 ed.; Ames Health and Safety Procedural Requirements: Chapter 20 - Fire Protection. The most stringent requirements govern when inconsistencies arise.
  7. Contact the Ames Fire Prevention Office 650-604-2024 or 650-604-3112 for permit and pre inspection assistance.
- b. Questions regarding a fire, post emergency response/reporting should be directed to the Ames Fire Marshal at 650-604-4302.

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## 27.11 Trenching and Excavation

- a. Obtain and post a written permit at job site prior to performing excavation of six (6) inches or deeper from Ames Facilities Maintenance at 650-604-2960.
- b. Trenching and excavation personnel shall:
  1. Strictly comply with 29 CFR 1926 Subpart P in its entirety, Subpart S (1926.800 - Underground Construction) and Subpart V (1926.956 - Underground lines).
  2. Have a Competent Person perform soil classification and provide site control in accordance with 29 CFR 1926.
  3. Have all underground utilities in the work area positively identified by a private utility locating service in addition to any station locating service.
  4. Coordinate with NASA Ames in addition to a private locating service whenever contract work involves concrete chipping, saw cutting, or core drilling within concrete slabs, pier structures, bridges, and the like. Reinforcing steel used in the construction of these structures makes them extremely difficult to identify.
  5. Use outages to isolate utility systems in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the contractor from meeting this requirement.
  6. Hand dig using wood or fiberglass handled tools when any adjacent construction work is expected to come within three (3) feet of an underground system or known utility. If construction is parallel to an existing utility, expose the utility by hand digging every one-hundred (100) feet.
  7. De-energize underground high voltage prior to pneumatic or machine powered excavation or subsurface demolition activities in vicinity.
  8. Obtain underground ground penetrating radar, sonar, or equivalent scanning type survey

to locate and mark ground for all buried utilities and electrical conduits whenever high voltage is suspected to be near planned digging.

9. Only operate trenching machines with digging chain drives when the spotters/laborers are in plain view of the operator.
10. Be trained on the hazards of digging chain drives with emphasis on the distance that needs to be maintained when the digging chain is operating.
11. Follow requirements in the section of this chapter titled: Gas Protection.

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## 27.12 ARC Flash Labels

a. Construction Contractors shall:

1. Provide warning labels per NEC section 110.16 and 29 CFR 1910.335(b)(1), for electrical equipment installed.
2. Post label conspicuously on or near the equipment that states "WARNING -- Arc Flash and Shock Hazard -- Appropriate PPE Required."
3. Post label to provide additional information described in NFPA 70E indicating: flash hazard boundary, calories per square centimeter, personal protective equipment level, kilovolt shock hazard when cover is removed, limited approach distance, restricted approach distance and prohibited approach distance.

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## 27.13 Severe Storm Plan

a. In the event of a severe storm warning, the Construction Contractor shall:

1. Secure outside equipment and materials and place materials that could be damaged in protected areas.
2. Check surrounding area, including roof, for loose material, equipment, debris, and other objects that could be blown away or against existing facilities.
3. Ensure that temporary erosion controls are adequate.

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## 27.14 Confined Space Entry

a. Personnel entering and working with confined spaces shall:

1. Follow the requirements of OSHA 29 CFR Part 1910.146, OSHA 29 CFR Part 1926, CAL OSHA CCR Title 8, section 5156, Ames Health and Safety Procedural Requirements: Chapter 26 - Confined Space Entry, Chapter 28 - Respiratory Protection. The most stringent requirements govern when inconsistencies arise.
2. Follow requirements in the section of this chapter titled: Gas Protection.
3. Notify the NASA Ames Fire Department prior to entry to assure rescue operations are available and after entry has been completed by calling 650-603-8596.
4. Obtain an entry permit from the Ames Safety, Health and Medical Services Division, 650-604-5602. The form is at <http://server-mpo.arc.nasa.gov>; via NEF window, obtain ARC Form 230.

a. Enter data for each element on the form.

b. Upon work completion, send the completed permit to the Ames Safety, Health and Medical Services Division, ATTN: Administrative Assistant M/S 237-14, Bldg. 237.

5. Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented.
6. Review all hazards pertaining to the space with each employee prior to entry.
7. Develop and review a confined space rescue plan with the all personnel involved in the entry prior to entry.
8. Use forced air ventilation for all confined space entry operations and maintain the minimum air exchange requirements to ensure exposure to any hazardous atmosphere is kept below its action level.
9. Maintain constant communication between workers inside the space and outside the space.
10. Require continuous atmosphere monitoring with audible alarm for toxic gas detection inside the confined space while workers are present.
11. Maintain current training in CPR/AED and First Aid for the attendant position.

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## 27.15 Radiation Safety

- a. The use of radioactive material sources, ionizing radiation producing machines, particle accelerators or Class 3b or 4 lasers for industrial radiographic inspections or construction activities are not allowed on Ames Research Center property unless the NASA Ames
- b. Radiation Safety Office has reviewed and approved the procedures to be used.
- c. The NASA Ames Research Center is a Federal site, under the jurisdiction of the Nuclear Regulatory Commission (NRC). All non-NRC licensed radiographic companies must obtain and hold a current reciprocity agreement (NRC form 241) in accordance with 10 CFR 150.20 authorizing radiographic activities at the NASA Ames Research Center. Filing for the reciprocity agreement requires a three (3) day notification prior to commencement of operations and must be renewed annually at the first of each year. A copy of the radiography contractor's current license to conduct radiography and a current copy of its company radiation safety manual shall be kept on file with the NASA Ames Research Center Radiation Safety Office. The Radiation Safety Officer can be reached by calling 650-604-3979.

### 27.15.1 Radioactive Materials and Radiation Producing Equipment

- a. Personnel working with radiographic operations shall:
  1. Notify the Radiation Safety Office (RSO) 650-604-4548 or 650-604-3979 (Ames Safety, Health and Medical Services Division, N237) in writing two (2) working days prior to obtaining radiographic operations permit. Notify the NASA Ames Fire Department of any Radioactive Material use by calling 650-603-8596.
  2. Submit License Certificates for radiation materials and equipment to the Contracting Officer and RSO for all specialized and licensed material and equipment that could cause fatal harm to construction personnel or to the construction project.
  3. Provide the RSO with written procedures for site work and a copy of the firm's radiation safety manual. The RSO will review for authorization and provide job site posting and surveillance requirements. Conduct radiation operations only under the surveillance of the Contracting Officer, or the COTR.
  4. Transport Regulated Amounts of Radioactive Material to comply with 49 CFR, Subchapter C, Hazardous Material Regulations.
  5. Be protected from radiation exposure in accordance with 10 CFR 20 Standards for Protection Against Radiation.
  6. Cause all buildings to be cleared of personnel, conspicuously post the 2mR/hr boundaries, and erect requisite barriers prior to initiation of radiographic procedures, as required by 10 CFR 34.42.

7. Commence all radiographic procedures after 5:30 PM and terminate before 5:30 AM unless alternative hours have been authorized by the NASA Ames Research Center Radiation Safety Office.
  8. Post signs during hours of darkness that are conspicuously illuminated with an amber or white light.
  9. Maintain direct surveillance of the area at all times that the source is exposed. This will require a minimum of two sets of eyes observing the radiographic boundary at all times the source is exposed to protect against unauthorized entry.
  10. Comply with all radiographic equipment and paperwork requirements identified in 10 CFR 34 and maintain a properly, currently calibrated survey meter on site. Conduct periodic monitoring during all radiographic examinations. Failure to comply with these regulations will result in the Contractor being requested to terminate all work and leave the facility.
  11. Immediately report to the Radiation Safety Officer and the Contracting Officer any radiological health hazard, emergency, or loss of ionizing radiation source at the center (or its alternative sites).
  12. Perform non-destructive testing in accordance with NAVSEA Technical Publication T9074-AS-GIB-010/271 "Requirements for Non destructive Testing Methods," modified by deletion of all reference to Bureau of Ships and other Navy agencies and substitution of NASA therefore unless otherwise approved.
  13. Comply with the base policy concerning the use of transmitters such as radios, cell phones, etc., and Emissions control (EMCON) restrictions.
  14. Remove all warning signs and ropes after conducting a final radiation survey.
  15. Notify the Contracting Officer or the COTR upon completion of radiological operations.
  16. Follow the requirements of Ames Health and Safety Procedural Requirements: Chapter 7 - Ames Radiation Safety Guide; Chapter 8 - Laser and Microwave Safety. The most stringent requirements govern when inconsistencies arise.
- b. Personnel working with radiographic operations shall not:
1. Initiate actual exposure of the radiographic film or unshielding the source until after 5:30 PM on weekdays.
  2. Make assumptions concerning building occupancy in instances where radiography is scheduled near or adjacent to buildings or areas having limited access or one-way doors. Where necessary, the Contracting Officer will direct the Contractor to conduct an actual building entry, search, and alert. Where removal of personnel from such a building cannot be accomplished and it is otherwise safe to proceed with the radiography, position a fully instructed employee inside such building or area to prevent exiting while external radiographic operations are in process.

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## 27.16 Gas Protection

- a. Construction Contractors and personnel working with confined spaces shall:
1. Have one or more employees properly trained and experienced in operation and calibration of gas testing equipment and formally qualified as gas inspectors that are on duty during times workers are in confined spaces with the primary function to test for gas and operate testing equipment.
  2. Test for gas and oxygen deficiency then document at least every fifteen (15) minutes or more often when character of ground or experience indicates gas may be encountered unless equipment of constant supervisory type with automatic alarm is employed. Special requirements, coordination, and precautions will apply to areas that contain a hazardous atmosphere or, by virtue of their use or physical character may be oxygen deficient.
  3. Test for gas before workmen are permitted to enter the excavation after an idle period exceeding thirty (30) minutes.

4. Create permanent record of readings daily, indicating the concentration of gas, point of test, and time of test. Submit copies of the gas test readings to the Contracting Officer at the end of each work day.
5. Follow CFR 1910.146 if work is in a confined space. See Confined Space Entry section of this chapter for additional information.

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## 27.17 Hazardous Materials Use

- a. Construction Contractors and personnel working with hazardous materials on construction sites or facilities maintenance shall:
  1. Receive approval from the Contracting Office or their designated representative prior to bringing any hazardous material onto the job site. Allow a minimum of 10 working days for processing of the approval.
  2. Follow Ames Procedural Requirements (APR) 8800.3 - Hazardous Materials Management (chapters 3 and 4).
  3. Follow the Ames Standard Construction Specification - Environmental Compliance and Pollution Prevention sections for storage, handling or disposal of hazardous materials or hazardous waste.
  4. Obtain Material Safety Data Sheets (MSDS) for all chemicals and make them available on the job site at all times for any workers who may be exposed to the chemical.
  5. Train employees in proper and safe use of any hazardous materials used at the job site.
  6. Provide suitable facilities for quick drenching or flushing of the eyes and body when a person may be exposed to corrosives, irritants or toxic chemicals that can be reached within ten (10) seconds of the immediate work area.

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## 27.18 Electrical

- a. Construction Contractors and personnel working with electrical shall:
  1. Certify underground electrical spaces safe for entry before entering to conduct work.
  2. De-energize and ground all underground cables to be cut. Positively identify cables to be cut using an impulse cable phasing device.
  3. Comply with Worksite Procedures (Pre-outage Coordination section) of this chapter.
  4. Perform all high voltage cable cutting remotely using hydraulic/piercing cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator will be allowed in the space during the actual operation.
  5. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method. When working in energized substations, only qualified electrical workers will be permitted to enter.
  6. Require that personnel use personal protective equipment that at a minimum includes electrical hard hat, safety shoes, insulating gloves with leather protective sleeves, fire retarding shirts and coveralls, face shields and safety glasses when working near energized circuits as defined by the NFPA 70E. Insulating blankets, hearing protection and switching suits may also be required depending on the specific job and the Contractor's AHA.
  7. Size portable extension cords in accordance with manufacturer ratings for the tool to be powered and protect from damage.
  8. Immediately remove from service all damaged extension cords.
  9. Ensure that portable extension cords meet the requirements of NFPA 70E and OSHA

electrical standards.

10. Provide GFCI (ground fault circuit interrupter) for wiring used on construction site in accordance with 29 CFR 1926.404(b)(1).
11. Provide GFCI (ground fault circuit interrupter) protection for electric powered hand tools.
12. Follow Ames Health and Safety Procedural Requirements: Chapter 48 - Portable Hand and Power Tools.
13. Follow the requirements of Ames Health and Safety Procedural Requirements: Chapter 11 - Electrical Safety. The most stringent requirements govern when inconsistencies arise.

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## 27.19 Scaffolding

- a. Construction Contractors and personnel working with scaffolding shall:
  1. Comply with 29 CFR: 1926.451, 1926.452, 1926.454, 1926 Subpart L Scaffolds.
  2. Ensure that daily documented inspections are performed by a qualified employee.
  3. Provide employees with a safe means of access to the work area on the scaffold.
  4. Prohibit Climbing of any scaffold braces or supports not specifically designed for access.
  5. Access scaffold platforms greater than twenty (20) feet maximum in height by use of a scaffold stair system with an adequate gate.
  6. Ensure that employees are qualified to perform scaffold erection and dismantling.
  7. Use scaffolding with the capability of supporting at least four (4) times the maximum intended load and are not overloaded with materials.
  8. Ensure that required fall protection is used and the fall protection plan is followed.
  9. Ensure that Stationary scaffolds are attached to structural building components to safeguard against tipping forward or backward.
  10. Prohibit use of side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material.
  11. Ensure The first tie-in shall be at the height equal to 4 times the width of the smallest dimension of the scaffold base.
  12. Ensure that supported scaffolds are set on base plates, mud sills, or other adequate firm foundation.
  13. Ensure that scaffold or work platform erectors have fall protection during the erection and dismantling of scaffolding or work platforms that are more than six (6) feet. See Ames Health and Safety Procedural Requirements: Chapter 40 - Fall Protection Program.
  14. Follow the training requirements in Ames Health & Safety Procedural Requirements: Chapter 40 - Fall Protection Program.

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## 27.20 Lifting Devices and Material Handling Equipment

- a. Construction Contractors shall:
  1. Notify the Contracting Officer, COTR or Project Manager fifteen (15) business days in advance of any cranes entering the center so that notifications can be made to the Ames Lifting Device Equipment Manager (LDEM).
  2. Obtain a copy of the lift plan requirements package at the Preconstruction Conference or by contacting the LDEM, 650-604-5162, Building N213, room 253.
  3. Submit lift plan to the LDEM, 650-604-5162, Building N213, room 253, for coordination and authorization five (5) business days prior to scheduled lift.
  4. Comply with the crane manufacturer's specifications and limitations for erection and

operation of cranes and hoists used in support of the work. Perform erection under the supervision of a designated person (as defined in ASME B30.5).

5. Perform all testing in accordance with the manufacturer's recommended procedures.
6. Comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, and ASME B30.3 for construction tower cranes. Comply with Ames Health and Safety Procedural Requirements: Chapter 17 - Lifting Devices and Equipment.
7. Follow the requirements of ASME B30.5 or ASME B30.22 as applicable when operating in the vicinity of overhead transmission lines.
8. Prove that using any other access to the work location would provide a greater hazard to the workers or is impossible when crane suspend personnel work platforms (baskets) are used. Do not lift personnel with a line hoist or friction crane.
9. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10, Standard for Portable Fire Extinguishers.
10. Keep clear of loads about to be lifted and of suspended loads. Operator is to remain at the controls for all suspended loads.
11. Use cribbing when performing lifts on outriggers.
12. Position the crane hook/block directly over the load. Side loading of the crane is prohibited.
13. Position a physical barricade to prevent personnel from entering the counterweight swing (tail swing) area of the crane.
14. Provide (and always make available to personnel) the certification records which include the date of inspection, signature of the person performing the inspection, and the serial number or other identifier of the crane that was inspected. Document using a checklist.
15. Provide (and always make available to personnel) written reports listing the load test procedures used along with any repairs or alterations performed on the crane.
16. Certify that all crane operators have been trained in proper use of all safety devices. Maintain proof of operator qualifications and the approved lift plan on the project site for review.
17. Take steps to ensure that wind speed does not contribute to loss of control of the load during lifting operations. Prior to conducting lifting operations set a maximum wind speed not to exceed 23 miles per hour at which a crane can be safely operated based on the equipment being used, the load being lifted, experience of operators and riggers, and hazards on the work site. Include the maximum wind speed determination as part of the activity hazard analysis plan for that operation.
18. Perform critical lifts in accordance with Ames Health and Safety Procedural Requirements: Chapter 17 - Lifting Devices and Equipment.
19. Maintain manufacturer's specifications or owner's manual for the equipment on the project site and ensure personnel have reviewed additional safety precautions or requirements that are not identified by OSHA. Incorporate such additional safety precautions or requirements into the project AHA's.
20. Ensure that Material handling equipment such as forklifts are not be modified with work platform attachments for supporting employees unless specifically allowed in the manufacturer's printed operating instructions.
21. Ensure that the use of hooks on equipment for lifting of material are used in accordance with manufacturer's printed operating instructions.
22. Ensure that Operators of forklifts or power industrial trucks are licensed in accordance with OSHA.

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## 27.21 Pressure Systems

Follow the requirements of Ames Health and Safety Procedural Requirements: Chapter 10 - Pressure Systems Safety. The most stringent requirements govern when inconsistencies arise.

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## 27.22 Asbestos and Lead

Follow the requirements of Ames Health and Safety Procedural Requirements: Chapter 30 - Asbestos Management Plan, Chapter 35 Lead Management Plan. The most stringent requirements govern when inconsistencies arise.

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## 27.23 Fall Protection

Follow the requirements of Ames Health and Safety Procedural Requirements: Chapter 40 - Fall Protection Program. The most stringent requirements govern when inconsistencies arise.

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## 27.24 Safety Lanes, Barricaded, Hazard Labeling and Posting

Follow the requirements of Ames Health and Safety Procedural Requirements: Chapter 42 - Safety Lanes, Barricades, Hazard Labeling and Posting. The most stringent requirements govern when inconsistencies arise.

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## 27.25 Portable Ladder Safety

Follow the requirements of Ames Health and Safety Procedural Requirements: Chapter 40 - Fall Protection Program. The most stringent requirements govern when inconsistencies arise.

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## 27.26 Portable Hand and Power Tools

Follow the requirements of Ames Health and Safety Procedural Requirements: Chapter 48 - Portable Hand and Power Tools. The most stringent requirements govern when inconsistencies arise.

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## 27.27 Use of Explosives

Explosives shall not be used or brought to the project site, except as provided in this section.

### 27.27.1 Powder-Actuated Tools

- a. Construction Contractors and personnel working with powder-actuated tools shall:
  1. Be thoroughly trained in the particular tool used before entering work site and exercise extreme care at all times.
  2. Ensure that tool use complies with Federal and State OSHA regulations.
  3. Possess a certificate of training issued by Hilti or other authorized manufacturer of the tool being used and be able to produce certificate upon request.
  4. Obtain a Hot Work permit when using powder-actuated tools. See Hot Work section of this chapter for additional information.
  5. Use powder-actuated tools in accordance to the manufacturer's specifications and safety precautions.
  6. Wear appropriate PPE such as safety glasses or goggles and hearing protection.
  7. Provide notice to all occupants when used in laboratory or office areas before the tool is fired. Persons in adjacent work places may be startled or even injure themselves when

- unexpectedly exposed to the noise generated by a powder-actuated tool.
8. Perform testing of the tool each day before loading to verify safety devices are in proper working condition. Use a method of testing in accordance with the manufacturer's recommended procedure. Immediately remove from service and tag any tool found not in proper working order, or that develops a defect during use, until properly repaired.
  9. Load tool just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at an employee. Keep hands clear of the open barrel end.
  10. Secure loaded tools when left unattended.
  11. Be used with the correct shield, guard, or attachment recommended by the manufacturer.
  12. Ensure that powder-actuated tools meet all applicable requirements of American National Standards Institute (ANSI) A10.3-2006, Safety Requirements for powder-actuated fastening systems.
  13. Obtain the Material Safety Data Sheet (MSDS) for the cartridges and keep with the equipment on site.
  14. Only bring cartridges for one (1) day of work onto Ames property. Remove unused cartridges from Ames property at the end of each day.
- b. Construction Contractors and personnel working with powder-actuated tools shall not:
1. Drive fasteners into very hard or brittle materials including, but not limited to: cast iron, glazed tile, surface-hardened steel, glass block, live rock, face brick, or hollow tile.
  2. Drive fasteners into materials easily penetrated unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side.
  3. Drive a fastener into a spalled area caused by an unsatisfactory fastening.
  4. (4). Use tool or drive fasteners in an explosive or flammable atmosphere.

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## Appendix A: Definitions and Acronyms

**AHA - Activity Hazard Analysis:** Defines the activities being performed and identifies the work sequences, the specific anticipated hazards, site conditions, equipment, materials and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk. The AHA is similar to a Job Hazard Analysis however it is based on activities.

**Code of Safe Practices:** This is a document required by CAL/OSHA as part of the employer's Injury and Illness Prevention Program (IIPP). It is a set of work site rules that stipulate how to perform job duties safely and to keep the work site safe. The following are selected requirements: The employer must develop and adopt a written Code of Safe Practices specific to the employer's operations. Title 8 CCR Chapter 4, 1509(b) It must be posted at each job site office or be readily available at the job site. 1509(c) Workers, when first hired, must be directed to read the Code of Safe Practices. 1510(a) The code shall contain language pertinent to the relevant parts of the operation that would affect the employee's safety.

**Competent Person:** An individual who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them [29 CFR 1926.32(f)]. By way of training and/or experience, a competent person is knowledgeable of applicable standards, is capable of identifying workplace hazards relating to the specific operation, and has the authority to correct them. Some standards add additional specific requirements that must be met by the competent person.

**Construction Contractor:** A business entity (i.e., person, corporation, partnership, joint venture, etc.) which has satisfied the contracting officer that they qualify as one of the following: They own, operate, or maintain a place of business regularly engaged in the construction, alteration, or repair of buildings, structures, communication facilities, or other engineering projects, including

furnishing and installing of the necessary equipment; or If currently entering into a construction activity, they have made all necessary prior arrangements for personnel, construction equipment, and required licenses to perform construction work.

**Construction Permit:** The Construction Permit Program is a systematic and easily referenced method for issuing Construction Work Permits at Ames Research Center. Construction permits shall be obtained in accordance with APR 8829.1 and APD 8829.1.

**Construction Work:** Construction work, as defined by OSHA is any construction, alteration, and/or repair, including painting and decorating of a structure. (29 CFR 1910.12(b)). In order for work to be construction work, the employer need not itself be a construction company. Further, construction work is not limited to new construction; it may include the repair of existing facilities. The replacement of structures and their components is also considered construction work (See OSHA Standard Interpretation 08/11/94 - Construction vs. Maintenance).

**CO - Contracting Officer:** Any person who, by appointment in accordance with procedures prescribed by the Federal Acquisition Regulations and NASA FAR Supplement, is currently a contracting officer with the authority to enter into contracts, administer contracts, and make determinations and findings with respect thereto or with any part of such authority.

**COTR - Contracting Officer's Technical Representative:** A person exercising authority and responsibility delegated by the CO. This individual represents the CO in the daily surveillance of the contractor, and provides overall technical management of the contract.

**Demolition:** Any operation that involves the intentional burning, wrecking, or taking out of any load-supporting structural members of a facility. Demolition also refers to the separation of a structure from its foundation prior to relocation.

**Experienced Modification Rate:** Factors based on claims paid for Workers Compensation Insurance for the state.

**Imminent Danger:** The Occupational Safety and Health Act of 1970, section 13(a) defines imminent danger as ".....any conditions or practices in any place of employment which are such that a danger exists which could reasonably be expected to cause death or serious physical harm immediately or before the imminence of such danger can be eliminated through the enforcement procedures".

**Maintenance:** means keeping equipment or a structure in proper condition through routine, scheduled or anticipated measures without having to significantly alter the structure or equipment in the process as defined by OSHA. For equipment, this generally means keeping the equipment working properly by taking steps to prevent its failure or degradation.

**NASA Ames Fire Department:** The onsite fire department that provides first responder support in case of fire or related emergencies. The fire department supports fire-related emergencies at construction sites and hot work concerns.

**NCCCO:** National Commission for the Certification of Crane Operators.

**Repair:** Facility work required to restore a facility or component thereof, including collateral equipment, to a condition substantially equivalent to its originally intended and designed capacity, efficiency, or capability. It includes the substantially equivalent replacement of utility systems and collateral equipment necessitated by incipient or actual breakdown. Repair work is considered construction work.

**Unsafe or Unhealthy Condition:** A hazardous condition that poses or has the potential to pose a risk to the health and safety of personnel or the public, and/or damaging to equipment, machinery, or the environment.

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## Appendix B: Activity Hazard Analysis Worksheet

## Activity Hazard Analysis Worksheet

<b>Code:</b>	<b>Task/Equipment Location:</b>	
<b>Task/Equipment Description:</b>		
<b>Analysis By:</b>		<b>Approved By:</b>
<b>Date:</b>		<b>Date:</b>
<u>Sequence of Steps or Activities</u>	<u>Hazards or Potential for Mishaps</u>	<u>Preventive Measures</u>
Demolition	Head, feet, hearing and respiratory protection	Wear personal protective equipment: hard hat, safety shoes, ear plugs, gloves that protect hands from sharp edges & face/dust masks.
	Electric shock	Survey the work area for utilities that need to be turned off. Arrange pre-outage coordination. Verify that electrical circuit has been de-energized before workers proceed. Use lockout/tagout procedures. Plug all power tools in to GFCI protected circuit.
	Exposure to silica dust	Use wet method while drilling, breaking or crushing concrete when dust is present. Wear N95 rated dust mask. Wear safety glasses to protect eyes.
	Falling objects	Ensure barricades and signage is in place. Deny entry into falling object zone unless all work has been stopped and area is safe to enter. Notify workers in adjacent buildings of demolition activity and evacuate if building debris are likely to fall onto structure. Conduct safety tailgate meeting on falling object hazards prior to start of work.
	Falling from heights	Follow approved written Fall Protection plan for the project [or list specific equipment and Fall Protection required for the hazard].

Copy 1 – QH Safety, Building 223

Copy 2 – Post at job site

Copy 3 – File for your records

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## Appendix C: Hot Work Permit

# NASA Ames Hot Work Permit

THIS HOT WORK PERMIT IS REQUIRED FOR ANY TEMPORARY OPERATIONS OR TASKS INVOLVING OPEN FLAMES AND/OR SPARKS SUCH AS BRAZING, CUTTING, GRINDING, FLAME SOLDERING, PIPE THAWING AND TORCH-APPLIED ROOFING AND SEAM WELDING. IT ALSO APPLIES TO THE USE OF ORDINARY ELECTRICAL EQUIPMENT IN A HAZARDOUS (CLASSIFIED) LOCATION.

ALL HOT WORK OPERATIONS SHALL BE IN COMPLIANCE WITH CALIFORNIA FIRE CODE CHAPTER 26, AND NFPA 51B

**\*\*\*FIRE REPORTING: DIAL (650) 604-5555 TO REPORT ALL FIRES OR OTHER EMERGENCIES\*\*\***

Permit No. \_\_\_\_\_ Issue Date: \_\_\_/\_\_\_/\_\_\_ Expires: \_\_\_/\_\_\_/\_\_\_

**REQUESTOR INFORMATION:**

Name: \_\_\_\_\_

Company: \_\_\_\_\_

Contact #: \_\_\_\_\_

BUILDING/ROOM: \_\_\_\_\_

DESCRIPTION OF WORK/EQUIPMENT INVOLVED:  
\_\_\_\_\_  
\_\_\_\_\_

I verify the hotwork location has been examined, operator qualifications verified, and precautions listed have been followed. The operation described is hereby authorized.

PRINT NAME: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_  
(FIRE PREVENTION OFFICER)

**INSTRUCTIONS TO HOTWORK SUPERVISOR**

1. Verify precautions listed at the right (or do not proceed with work).
2. Post approved permit (Yellow copy) at job site during the hotwork operations.
3. Return completed hotwork permit (Yellow copy) to the Fire Prevention Office (Bldg 158, Rm. 202) when project is finished.
4. Call (650) 604-2024/3112 to request an extension (if needed).

WORK STARTED: \_\_\_\_\_

WORK COMPLETED: \_\_\_\_\_

FIRE WATCH ENDED: \_\_\_\_\_

Work area and all adjacent areas to which sparks and heat might have spread were inspected during the fire watch period and were found fire safe.

**FINAL CHECKUP (HOT WORK SUPERVISOR)**

Work area was monitored for specified period of time following hot work and found fire safe.

PRINT NAME: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

**PRIOR TO COMMENCING WORK ENSURE:**

- ✓ Installed automatic or manual fire suppression systems and/or hose streams are operational. **Buildings with automatic smoke/fire detection, call IAP Service Call Desk (650) 604-5212 to request alarm technician.**
- ✓ Area within 35' of hot work area is free of flammable/combustible liquids, trash, dusts, lint, or oily deposits.
- ✓ Combustible floors and/or combustible storage protected with approved materials (welding pads, blankets or curtains; fire-resistant tarps, etc.)
- ✓ All wall and floor openings protected with approved fire resistive non-combustible materials.
- ✓ Ducts and conveyor systems that might carry sparks to distant combustibles shall be shielded, shut down, or both.
- ✓ Provide adequate ventilation in areas where smoke and harmful fumes or vapors may be generated.
- ✓ The hot work equipment to be used shall be in satisfactory operating condition and in good repair.
- ✓ Personnel protected from electrical shock if working in wet areas.
- ✓ One multi-purpose dry chemical fire extinguisher rated a minimum 2-A-20:B-C shall be provided within 30' of the worksite.

**DURING AND AFTER HOTWORK OPERATIONS:**

- ✓ Fire watch will be monitored during and for 30 minutes after work, including breaks (Longer if deemed necessary by the fire prevention officer or hotwork supervisor).
- ✓ Fire watch; trained in the use of portable fire extinguishers; familiar with sounding the alarm and notifying 911 dispatch in the event of an emergency.
- ✓ Fire watch required for adjoining areas, above, and below (as applicable).

**WORK ON WALLS/CEILINGS/CONCEALED SPACES**

- ✓ Hot work done near walls, partitions, ceilings, or roofs of combustible construction shall be protected by a listed or approved welding curtain, welding blanket, welding pad, or equivalent.
- ✓ Construction is noncombustible and without combustible covering or insulation.
- ✓ Combustibles on other side of walls moved away.

**WORK ON ENCLOSED EQUIPMENT:**

- ✓ Enclosed equipment cleaned of all combustibles.
- ✓ Containers purged of flammable liquid/vapors.

## Appendix D: Construction Safety Inspection Form

### Construction Safety Inspection Form

Name (print):					Phone:					ORG Code:				
Building/Location:										Date:				
Item	Ye s	No	N/ A	Fixed Date	Item	Ye s	No	N/ A	Fixed Date					
<b>Program Administration</b>					<b>Material Storage/Handling</b>									
OSHA Posting					Materials properly stored/stacked									
Emergency numbers/contacts posted					Dust protection adequate									
Hazard Communication Program					Loads lifted correctly									
Daily/Weekly safety meetings held					<b>Excavations &amp; Shoring</b>									
Housekeeping/sanitation					Shoring proper for soil & depth									
Work areas orderly					Adjacent structures properly shored									
Adequate lighting					Necessary ladders provided									
Hand washing/toilet facilities					Excavation barricaded									
Passage, entry & walkways clear					Spoil set back at least 2 feet									
Clean eating/dining area					Equipment away from edge									
<b>Fire Prevention</b>					Equipment ramps adequate									
Fire extinguishers available					<b>Ladders</b>									
Correct extinguishers for job					Ladders in good condition									
No smoking posted and enforced					Side rails extend 36" above landing									
<b>Electrical/Utility</b>					Proper for job & secure									
Electrical hazards posted					Ladders fully open when in use									
Drop cords protected					<b>Scaffolding</b>									
Underground electrical lines staked					Equipment in good condition									
Lockout procedures utilized					Scaffold is tied to structure									
Access to breaker box clear					Guardrails, top, mid, toe boards in place									
Underground gas lines staked					Connections sound & secure									
<b>Hand &amp; Power Tools</b>					Planking cleats in place									
Hand tools in good working condition					Worker protected from falling objects									
Cords in good condition					<b>Welding &amp; Cutting</b>									
All mechanical safeguards in place					Screen & shields in place									
Proper tools utilized for each job					Electrical equipment grounded									
Tools grounded or double insulated					Compressed gas cylinders secure/upright									
<b>Heavy Equipment</b>					Proper personnel protection utilized									
Operation manuals available					Fire extinguishers immediately available									
Brakes, lights, signals & alarms operable					Welding cables in good condition									
Wheels chocked when necessary					<b>Personal Protective Equipment</b>									
Seat belts worn					Hardhats worn									
Daily inspections documented					Gloves available & used									
<b>Barricades &amp; Fencing</b>					Steel toe footwear									
Site fenced					Eye protection utilized									
Roadways & sidewalks fenced					Ear protection utilized									
Floor openings planked or barricaded					Safety belts & lanyards utilized									
Access/traffic controlled					Respirators & masks utilized									

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## Appendix E: Unsafe Condition Noncompliance Notice

Date :

To: (COTR, Contracting Officer and the Safety Office Manager)

From: (Construction Safety Specialist)

Subject: Stop Work Order Notice

Re: (Identify Building number, Project Title)

The construction contractor currently working at (Building No.) has failed to resolve safety deficiencies as requested by our office. As a member of NASA's Safety Management Team for this project, please ensure that measures are taken immediately to correct the deficiencies.

(Description of job-site deficiencies).

Should you have any questions or concerns, please contact me at (extension no.).

(Name of Construction Safety Specialist)

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## Appendix F: Stop Work Order Notice

Date :

To: (COTR, Contracting Officer and the Safety Office Manager)

From: (Construction Safety Specialist)

Subject: Stop Work Order Notice

Re: (Identify Building number, Project Title)

A safety inspection was conducted at (Building No.) and has identified immediate concerns for people's safety, health, and/or the environment. The construction contractor currently working at (Building No.) has failed to take prompt corrective action of serious unsafe conditions. Please invoke the Suspension of Work provision of the contract and ensure that measures are taken immediately to correct the deficiencies. The Safety Division will not authorize work to resume until appropriate abatement measures are taken.

(Description of unsafe condition)

Should you have any questions or concerns, please contact me at (extension no.).

(Name of Construction Safety Specialist)

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