

## NASA Glenn Safety Manual

### CHAPTER 28 - HOT WORK AUTHORIZATION

**Revision Date: 6/02 – Biannual Review**

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#### **28.1 SCOPE**

This chapter covers provisions to prevent loss of life, property and research capability caused by ignition from hot work operations, and specifies the requirements for prevention of such ignition. The chapter/process also provides a review of precautions/measures to be taken to assure that all occupational health requirements are met to protect the workers in the area. To facilitate these measures, prior to starting any hot work activity, a Hot Work Authorization Permit shall be required.

#### **28.2 DEFINITIONS**

**HOT WORK:** All heat, spark, or flame producing operations including cutting, welding, Thermit welding, brazing, soldering, grinding, thermal spraying, thawing pipe, torch-applied roofing, or any other similar situation. Operations such as chipping, chiseling, sandblasting, drilling, and power hand tool use in areas or on equipment where flammable or combustible gases, vapors, dusts, or liquids may be present, shall require the use of non-sparking tools. If non-sparking tools are not used, a Hot Work Authorization Permit shall be required.

**HOT WORK AUTHORIZATION PERMIT:** Process/application/signoff mechanism to assure that HOT WORK operations are carried out in a safe and controlled manner. The Permit represents the first step in conducting a HOT WORK operation. (See

Appendix A for Cleveland site HOT WORK AUTHORIZATION PERMIT and Appendix C for Plum Brook Permit)

**DAILY PRECAUTIONS/FIRE WATCH CHECK SHEET:** This check sheet is to be completed in field at the HOT WORK site by the requestor 's representative and will be posted along with the HOT WORK AUTHORIZATION PERMIT. The check sheet is a mechanism for verification of the required precautions to be taken and for the establishment of the needed fire watch for the required duration. (See Appendix B for this Cleveland site specific check sheet)

**FIRE WATCH:** An individual assigned to be in an area for the express purpose of preventing a fire from occurring, extinguishing small fires, protecting other individuals from fire or life safety dangers and notifying appropriate personnel in case of an emergency. This individual cannot be the worker performing the hot work.

**REQUESTOR:** The person/organization that needs the hot work completed and that are responsible for coordinating all hot work activities for a given task. Activities include completing the HOT WORK AUTHORIZATION PERMIT (including all the necessary signatures), maintaining all documentation in the field, and assuring that the daily precautions/fire watch checklist is completed/adhered to.

**DESIGNATED HOT WORK/WELD SHOP AREA:** Specific area equipped to provide safe and hazard controlled space for ongoing hot work/welding operations. Welding curtains, warning signage and fixed ventilation are typical of these designated areas.

## 28.3 APPLICABILITY

This chapter applies to:

- a. All NASA Glenn Research Center at the Cleveland site and the Plum Brook site organizations and employees.
- b. All Glenn contractors, other NASA contractors, non-NASA and non-contractor individuals present at Glenn in accordance with the terms of their contracts or agreements with NASA.
- c. Other Government organizational elements who are tenants at Glenn Research Center or any other locations under Glenn jurisdiction.

## 28.4 RESPONSIBILITIES

### 28.4.1 Requestor and/or Contractor Managers

- a. Identifies the need for Hot Work operations. If there is a need, applies for a Hot Work Authorization Permit. This application process requires the requestor to review the site/operation and to

- obtain specific signatures of the applicable and interested parties prior to the start of work.
- b. Shall verify that hot work is not being performed on a painted surface. If a surface is lead based paint, measures to mitigate any lead based paint must be undertaken as noted in Chapter 13 of the Environmental Programs Manual.
  - c. Ensures that a responsible manager, supervisor or designated employee is in the immediate area of work or somewhere on the jobsite during all hot work operations.
  - d. Ensures that all safety precautions specified are taken, including:
    1. Posting of Hot Work Authorization Permit near work area.
    2. Designation of the fire watch.
    3. Completion/posting/adherence to all aspects of the DAILY PRECAUTIONS/FIRE WATCH CHECK SHEET.
    4. Making appropriate safety and fire fighting equipment available.
    5. Properly protecting or removing flammable and combustible material within 35 feet of the work.
    6. Inspection of equipment includes: worn or cracked hoses; oil or grease on regulators; torches; helmet and lens conditions; gloves, long sleeved shirts, apron and long pants; welding screen condition; ventilation equipment; cylinders stored securely and upright; oxygen stored away from fuel gas cylinders by 20 feet; dented or cracked cylinders; check electrical plugs on electrical welders; fire extinguisher in good condition; condition of gages.
    7. Ensuring that workers comply with the required safety and occupational health regulations.

**28.4.2 Contracting Officer’s Technical Representative (COTR) or Construction Management Branch Representative (when applicable)**

- a. Communicates and ensures implementation of the Hot Work Authorization Permit program with contractors and subcontractors.
- b. Ensures a site specific Health and Safety plan is submitted by the contractor.
- c. Shall verify that hot work is not being performed on a painted surface. If a surface is lead based paint, measures to mitigate any lead based paint must be undertaken as noted in Chapter 13 of the Environmental Programs Manual.
- d. Is part of the Hot Work Authorization Permit application process.
- e. Provides an onsite review/verification of the DAILY PRECAUTIONS/FIRE WATCH CHECK SHEET prior to the start of any HOT WORK activities.

### **28.4.3 Glenn Safety Office**

- a. Serves as technical consultant for resolution of fire and life safety issues and concerns.
- b. Ensures that restrictions have been identified.
- c. Reviews and provides one of the approval signatures on the Hot Work Authorization Permit.
- d. At Cleveland site, via the First Response personnel, provides an onsite review/verification of the DAILY PRECAUTIONS/FIRE WATCH CHECK SHEET prior to the start of any HOT WORK activities.
- e. Maintains a record file of Hot Work Permits for a period of three (3) years.
- f. Terminate hot work operations when being performed in an unsafe manner and will contact the requestor management or the COTR (if applicable) and the Chief of the Glenn Safety Office.
- g. Monitors implementation and assesses effectiveness of Hot Work Authorization Permit program.

### **28.4.4 Environmental Management Office (Industrial Hygiene Team)**

- a. Serves as technical consultant for resolution of occupational health issues and concerns.
- b. Ensures that restrictions have been identified.
- c. Provides review of Hot Work Authorization Permit to assure that proper area ventilation, personal protective equipment and/or local exhaust ventilation is provided to protect workers for fumes generated by the hot work operation.
- d. Reviews and provides one of the approval signatures on the Hot Work Authorization Permit.
- e. Will terminate hot work operations when being performed in an unacceptable manner.

### **28.4.5 Workers Conducting Hot Work**

- a. Shall be familiar with the site and procedures for sounding a local alarm and notifying the dispatcher in the event of a fire. A phone shall be available at the work site.
- b. Shall be trained in the use of fire extinguishers. The workers shall have additional fire extinguishers present that are independent of the fire extinguishers that are present for protection of the building and occupants.
- c. At a minimum, one 2A-10BC multipurpose dry chemical fire extinguisher shall be provided at each hot work site.
- d. Conduct hot work operations in a safe and controlled manner, including all identified conditions and restrictions listed on the Hot

Work Authorization Permit and the DAILY PRECAUTIONS/FIRE WATCH CHECK SHEET

- e. Continue to perform hot work only so long as conditions are unchanged from those under which the Permit was granted.

#### 28.4.6 Fire Watch

- a. A fire watch shall be required any time or place when hot work is performed outside a designated weld shop area.
- b. Fire watch shall:
  - 1. Have fire extinguishing equipment readily available and be trained in its use. The extinguishing equipment refers to having additional fire extinguishers present at the hot work site that are independent of the fire extinguishers that are present for protection of the building and occupants.
  - 2. Perform required inspections in all areas of hot work operations, including the areas above and below the hot work area, for smoldering fires. These inspections shall be performed at least 30 minutes after completion of the hot work.
  - 3. Be familiar with the site and procedures for sounding a local alarm. In the event of a fire notifying the Emergency Dispatcher at the Cleveland site and Plum Brook, **Dial 911 on an internal phone or (216) 433-8888 from a cell/mobile phone.**
  - 4. Watch for fires in the exposed and hidden areas near to the hot work activity. Use proper fire extinguisher equipment to deal with small incipient fire incidents but be ready to sound the fire alarm immediately if a fire does not appear to be quickly extinguishable with hand extinguisher.

## 28.5 PROCEDURE

- a. Review Chapter 28 to determine if the restricted hot work operations apply. If they do, a site-specific Health and Safety Plan is required and shall be approved by the Glenn Safety Office and the Environmental Management Office (Industrial Hygiene Team) prior to start of the hot work.
- b. Determine if the hot work can be moved to an area designated for hot work (welding booth or weld shop area). If so, conduct the work in the designated area. Otherwise, commence the process to apply for a HOT WORK AUTHORIZATION PERMIT.
- c. A Hot Work Authorization Permit shall be secured in advance. (See Appendix A for Cleveland site Permit and Appendix C for Plum Brook Permit). The Permit will need to be completed, signed and approved by all the requesting personnel first. The Hot Work Authorization Permit will

- be submitted to the Glenn Safety Office for review and signature and is then conveyed to the Industrial Hygiene Team for review and signature.
- d. For Cleveland site Operations, the requestor is responsible for and will complete the **DAILY PRECAUTIONS/FIRE WATCH CHECK SHEET** for each specific hot work site and respective operation each day that a hot work operation occurs. The requestor, once the form is completed and the appropriate precautions assured, shall notify Cleveland site dispatcher at 3-2088 prior to the start of the **HOT WORK** for an onsite check of conditions.
  - e. A Glenn Research Center Safety Office Representative (First Responder) must physically visit the site to verify all the precautions indicated on the form prior to the commencement of work. The First Responder will review the site conditions and verify precautions documented on the **DAILY PRECAUTIONS/FIRE WATCH CHECK SHEET**. The First Responder can require additional fire extinguishing equipment to be provided at the site as a result an evaluation of the operation and site conditions. The First Responder will then sign the sheet.
  - f. At a minimum, one 2A-10BC multipurpose dry chemical fire extinguisher shall be provided at each hot work site.
  - g. The approved **HOT WORK AUTHORIZATION PERMIT** shall be posted at the site along with the **DAILY PRECAUTIONS/FIRE WATCH CHECK SHEET**. Hot Work Authorization shall be valid for the time and date indicated on the Permit. Thirty days is the maximum length of time that the authorization permit is valid for unless otherwise approved by the Chief of the Glenn Safety Office.
  - h. It may be necessary to disable the fire detection system in the work area before work is started. Request must be approved by the Glenn Safety Office and so designated on the approved **HOT WORK AUTHORIZATION PERMIT** and **DAILY PRECAUTIONS/FIRE WATCH CHECK SHEET**. An Area Clearance may be needed depending on the scope of the work. The Proprietary Protective Supervisory Systems (PPSS) contractor disables most systems. Detection system shall be restored as soon as possible after work is completed.
  - i. The requestor will notify the Cleveland site Dispatcher when Hot Work Operations are complete, to have any fire detection/suppression systems reset/restored.
  - j. If work conditions change other than what is identified on the Permit, all hot work shall stop immediately until the authorization has been updated and reviewed by the Glenn Safety Office and the Industrial Hygiene team.
  - k. All fires, no matter how small, must be reported to the Glenn Safety Office via the Cleveland site Dispatcher at **216-433-8888** or via Plum Brook Dispatcher at **911** on an internal phone. Fires that have been extinguished must still be reported.
  - l. Welding curtains and warning signage are required in congested personnel areas and whenever there is a possibility of passerby exposure to light from injurious light radiation.

## 28.6 REGULATIONS AND REFERENCES

The following requirements apply to NASA’s fire protection program. Where requirements are differ among the regulation, the most stringent shall apply as determined by the Glenn Safety Office.

- a. Code of Federal Regulations (CFR).
- b. NPD 8710.2 (April 2002) NASA Safety And Health Program Policy
- c. NASA STD 8719.11 (August 2000) "Safety Standard for Fire Protection".
- d. "NHB 7320.1 "Facilities Engineering Handbook".
- e. National Fire Protection Association (NFPA) Fire Codes and Standards.
- f. ANSI Z49.1 "Safety In Welding and Cutting".
- g. NASA Glenn Research Center Safety Manual
- h. NASA Glenn Research Center Environmental Programs Manual

### ***APPENDIX A***

**Glenn Hot Work Authorization Permit (NASA C-7a)**

### ***APPENDIX B***

**Daily Precautions/Fire Watch Check Sheet (NASA C-7b)**

### ***APPENDIX C***

**Plum Brook Hot Work Authorization Permit**

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