National Aeronautics and
Space Administration

John C. Stennis Space Center
Stennis Space Center, MS
39529-6000

SCWI-8838-0002 Rev. A
February 2011

John C. Stennis Space Center
Hot Work Program Procedure

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Approval/Concurrence

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Document History Log

Status/Change/ Revision	Change Date	Originator/ Phone	Description
Basic	02/25/2009	Clyde Dease, ext. 8-1905	Initial Release This issuance supersedes and replaces instruction on the subject previously provided in SPR 8715.3, released Nov. 15, 2004
A	02/10/2011	Clyde Dease, ext. 8-1905	Section 5: Added exclusions for soldering equipment and heat guns; added process for permit review and approval. Section 6: Added firewatch requirements. Added Section 7.0 and Appendix D for use of Sterno. Formatted in accordance with SPR 1400.1. Updated references throughout. Updated records section.

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Table of Contents

1.0 Purpose 4

2.0 Applicability 4

3.0 References and Applicable Documents 4

4.0 Responsibilities 5

4.1 NASA Center Operations 5
4.2 Fire Protection Services 5
4.3 Civil Servant Personnel 5
4.4 Contractors and Tenants 5

5.0 Procedure/Process 5

6.0 Hot Work on Propellant Systems 8

7.0 Use of Sterno Fuel or Similar Products 10

8.0 Records and Forms 11

9.0 Acronyms and Abbreviations 11

Appendix A – Criteria for Fire Extinguishers 13

Appendix B – Hot Work Permit Program Audit Points 14

Appendix C – Sample Form, SSC-68 Hot Work Permit 15

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1.0 Purpose

This work instruction establishes the requirements and procedures for the Hot Work Permit Program at Stennis Space Center (SSC) whereby strict protocols are followed to reduce the risk of fire injuries and damage to life and property.

2.0 Applicability

This instruction is applicable to all NASA/SSC organizations including civil service and support contractors, and to other tenants of NASA/SSC to the extent formal agreement is reached between NASA and the tenant.

This document covers all hot work operations involving, but not limited to, electric arc welding, oxy-acetylene cutting/welding/heating operations, operations of electrical pneumatic or mechanical tools in hazardous classified areas that are not intrinsically safe, soldering torches powered by flammable gases, and open-flame-producing devices or devices that produce hot sparks during operations.

3.0 References and Applicable Documents

All references are assumed to be the latest version unless otherwise specified.

a. 29 CFR 1910.252, *Welding, Cutting and Brazing, General Requirements*
b. 29 CFR 1910.253, *Welding, Cutting and Brazing, Oxygen-fuel Welding and Cutting*
c. Form SSC-90, Process Plan
d. Form SSC-68, Flame “Hot Work” Permit
e. FOSC document ST-P-46, *Employee Certifications*
f. FOSC document ST-P-20, *Hazard Assessment*
g. FOSC document MT-P-03, *Welding/Cutting/Brazing Operations*
h. NASA-STD-8719.7, *Facility System Safety Guidebook*
i. NASA-STD-8719.11, *Safety Standard for Fire Protection*
j. NASA-STD-8719.12, *Safety Standard for Explosives, Propellants, and Pyrotechnics*
k. NFPA 51B, *Standard for Fire Prevention during Welding, Cutting, and other Hot Work*
l. NPR 8715.3, *NASA Safety Manual*
m. SCWI-8715-0012 *Work in Hazardous Classification Areas*
n. MSDS #11305, Sterno Brand Wick Food Warming Material

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4.0 Responsibilities

4.1 NASA Center Operations

The NASA/SSC Center Operations Fire Protection Program Manager has overall responsibility for development of this instruction and approves all organizations requesting approval of facilities or construction sites for hot work without daily permits. Organizations requesting authorization to issue Hot Work Permits (Form SSC-68) shall make formal requests in writing to the Fire Protection Program Manager.

4.2 Fire Protection Services

The SSC Fire Chief of the Facility Operating Services Contract (FOSC) will provide support to the NASA Fire Protection Program Manager by reviewing, updating, implementing, and maintaining the SSC Hot Work Program Procedure.

4.3 Civil Servant Personnel

Civil servant personnel will not be assigned tasks that include potential exposure to hot work. If assignments are made in the future, civil servants will comply with this instruction.

4.4 Contractors and Tenants

Contractors and tenants will identify any hot work tasks and comply with this instruction.

5.0 Procedure/Process

a. Hot Work Permits (Form SSC-68) provide documented approval to conduct welding, cutting, brazing, or other spark/flame/heat-producing operation. Electric soldering equipment is excluded from the hot work permitting process, by the direction of the Fire Protection Program Manager.

b. Daily Hot Work Permits are required for all welding, cutting, brazing, and spark/heat/flame-producing operations in all areas at SSC, except those unique areas suitable for hot work operations that qualify for permanent and specific duration permits.

c. Hot Work Permits issued are valid for the duration of the work shift unless otherwise limited by the Permit Authorizing Individual (PAI). Such limitations will be noted on the form in the expiration (date/time) block of Form SSC-68.

d. Requests for permanent permits for welding or designated welding facilities will be processed through the SSC Fire Department and approved by the NASA SSC Fire Protection

Program Manager. Requests shall consist of a copy of the written Facility Safety Plan and inspection criteria. Such welding or designated welding facilities will be issued permanent permits for a maximum of 24 months. These facilities must meet the following requirements as a minimum:

1. A written Facility Safety Plan (as outlined in NPR 8715.3 and NASA-STD-8719.7) shall be maintained and address the hazards in the area associated with hot work operations.
2. The facility must be constructed and maintained in such a manner that hot work operations do not jeopardize the fire safety of the facility.
3. Appropriate fire detection and fire alarm systems must be operational at all times as approved by the SSC Fire Department.
4. The facility will be inspected at least annually to ensure compliance with the requirements of the authorization letter for operating the facility without a daily permit. SSC Fire Department will document and maintain inspections.
5. The responsible supervisor for the unique facility shall ensure specific conditions, unique to the site and location, to remain in continual compliance with original permit requirements.

e. The SSC Fire Department is responsible for controlling and issuing Hot Work Permits, and is thereby the Hot Work Permit Program Administrator.

f. The SSC Fire Department will maintain a list of PAIs. PAIs will be certified to issue Hot Work Permits through the SSC Fire Department. Approval for all other PAI authorization will be in accordance with Section 4.1.

g. The SSC Fire Department will brief SSC subcontractors on the Hot Work Permit Program and its requirements at all preconstruction briefings. FOSC Safety and NASA S&MA will brief SSC contractors during preconstruction briefings.

h. Facility Managers or their designees shall approve Hot Work Permits for their assigned areas, before the PAI will issue the permit. If the Facility Manager or designee is unavailable, the person responsible for the system/facility area or hot work operation (such as Test Operations Engineer (TOE), construction engineer, lead person) will approve the Hot Work Permit.

i. In Test Complex areas, the TOE shall approve Hot Work Permits for their assigned areas. TOEs will:
   1. Help identify potential flammable sources for safe atmospheric checks.
   2. Coordinate test stand activity around the hot work activity.
   3. Notify the lead person listed on the Hot Work Permit and the PAI to void the permit if it is necessary to change configuration of the system involved.

j. All personnel engaged in welding, cutting, spark-producing, or heat-producing operation are responsible for knowing the exact locations of the nearest telephone and/or nearest fire alarm pull station to be used in case of an emergency.

k. Welding, brazing, or cutting on lines containing pressure is prohibited. Operational requirements may dictate blanket purge pressures to be maintained. Slight inert purge(s) may be maintained during open system work for cleanliness, but shall not exceed an audible "hiss" level.

l. Welding, cutting, brazing, spark-producing, or heat-producing operations are prohibited at all times (except with prior approval of the cognizant safety representative) within 100 feet of a propellant storage vessel, transfer or vent line, or vessels that contain a propellant or a flammable atmosphere. In the event heat/spark/flame operations are required within the 100-foot limit, the following precautions must be verified as in place before issuing a Hot Work Permit:
   1. Propellant system is in, and will remain in, a static mode configuration with integrity established (no leaks). The system configuration shall be verified with the system owner.
   2. System pressure relief (venting) will not be accomplished during the heat/spark/flame work. A qualified operator will monitor the system for excessive pressure buildup. In the event that emergency venting is necessary, the heat/spark/flame work will be discontinued until the system is again in a static-mode configuration.
   3. The affected area's atmosphere will be evaluated to verify the absence of flammable/combustible vapors and hazardous chemical substances in the work area. Samples will be taken with approved portable gas (vapor) detectors. Periodic samples will be taken if the heat/spark/flame work is required for an extended period of time. All measurements will be recorded on Form SSC-68, Hot Work Permit, and applicable hazard assessment report.
   4. Heat/spark/flame work will not be performed directly on propellant containers or on lines containing pressure. Containers or lines will be depressurized at near-ambient pressure and inerted.
   5. Adequate fire extinguishers will be in serviceable condition and easily accessible in the work area for emergency use.
   6. The welding, cutting, or brazing operations will be segregated to ensure limited access to the area. Placards reading, "WELDING, CUTTING OR BRAZING OPERATIONS IN PROGRESS" will be prominently displayed for warning purposes at all approaches approximately 35 feet from the job being performed.

m. The Fire Department shall audit the Hot Work Permit Program annually and document the results of the audit(s). Audit points are listed in Appendix B, Hot Work Permit Program Audit Points.

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n. The authorization to work shall become invalid if the supervisor/lead person in charge of a heat/spark/flame producing operation fails to comply with the precautions listed on the permit.

o. Requests for specific duration permits (such as for specific duration construction sites, unique operations, etc) shall be submitted in writing to the NASA/SSC Fire Protection Program Manager. These specific duration permits will allow hot work operations to proceed without requiring daily Hot Work Permits. These permits will be approved only under certain conditions depending upon location and will be addressed on a case-by-case basis. These areas will be subject to continual audit, for specific duration permits exceeding 7 days, to ensure specific conditions unique to the site and location, and will remain in compliance with original permit requirements. A master original of the specific duration hot work permit will be kept at the work site. The "fire watch" and "hot work operator" signature blocks will be left blank on the specific duration permit. Prior to each day's work, the hot work operator(s) and fire watch will review, sign and date a photocopy of the master specific duration permit indicating they have ensured all the conditions of the hot work permit have been met.

p. Exception: Heat gun operations do not require a fire watch during and 30 minutes after the operation, since they do not produce flames, slag, sparks, molten metal, etc, which may result in secondary fires or sources of ignition, contingent upon operator's adherence to SCWI-8715-0012 *Work in Hazardous Classification Areas*.

6.0 Hot Work on Propellant Systems

a. Before contacting the SSC Fire Department to conduct a Hot Work Permit inspection, the organization performing the hot work shall ensure:
   1. The job site is ready for inspection.
   2. All signing authorities for the work are present.
   3. All pertinent paperwork and tools are on site and ready for inspection.

b. Before starting work, an event that requires heat/spark/flame operations on any propellant system or any component thereof requires approval from the cognizant S&MA Office.

c. The performing organization shall introduce and maintain an inert gas purge in the unit/system to inert the system. (Use of personal atmospheric monitors is prohibited for final verification of inert atmosphere. Sample analysis by a qualified laboratory is required to verify inert atmospheres, with samples taken as close to the point of operation as possible and under supervision. Portable atmospheric monitors shall be used for repeatable checks of the system's inert status.)

d. The performing organization shall notify all non-operating personnel in the vicinity of the heat/spark/flame work that the work is to be performed and precautions should be taken.

e. SSC Fire Department and FOSC S&MA, or other PAI, approved by the SSC Fire Protection Program Manager, shall:
   1. Inspect the work site, review the Hazard Assessment, and ensure a safe atmosphere has been determined prior to issuing a Hot Work Permit. Record the findings information on the Hot Work Permit.
   2. Document the specific location and time period, required preparations, precautions and related permit requirements using Form SSC-68, Hot Work Permit.

f. The PAI shall complete the Hot Work Permit with required information, giving special attention to the necessary safety precautions. Assessment of special instructions or precautions to be observed due to the nature of work to be performed, or the area in which the work will be accomplished should be notated on Form SSC-68. The cognizant safety officer of the performing organization or other representative may make notations on the hazard assessment form, if applicable.

g. Facility Manager or designee, the performing organization, and the hot work operator shall sign the completed Form SSC-68.

h. Performing organization shall:
   1. Display at the work site a duplicate copy of the Hot Work Permit. At the end of each shift, or upon completion of the job, attach the Hot Work Permit to the Form SSC-90 (Process Plan) or Work Authorizing Document. The copy will become a permanent record of the performing organization.
   2. Make fire extinguishers available for use during all welding, cutting, brazing, spark-producing, or heat-producing operations. Select the type of fire extinguisher according to Appendix A.
   3. Remove combustibles from the immediate vicinity (within 35 feet) of open flame/spark/heat work to reduce possibility of fire. Cover adequately with a fire retardant blanket any items that cannot be removed. Remove fire retardant blankets from the site at the completion of each work project, unless otherwise instructed by the shop supervisor.
   4. Ensure that cables from electrical welding machines and similar equipment are in serviceable condition and that grounding cable(s) are adequately connected before starting operations.
   5. Fire watch Requirements:
      a) The fire watch shall have fire extinguishing equipment readily available and be trained in its use. Ref. Section 6.h.2.
      b) The fire watch shall be familiar with the facility and procedures for alerting/notification in the event of a fire.
      c) The fire watch shall look out for incipient fires in all exposed areas and attempt to extinguish the fire only when within the capability of the available equipment and training received. In all other instances, sound the alarm immediately and evacuate.

d) The fire watch shall remain on-site at the vicinity of hotwork for 30 minutes after the hot work has been completed.

i. Welding operations supervisors shall ensure cables are inspected and are maintained in good working condition.

j. Performing organization/individual shall:
   1. Use fire retardant blankets or other suitable materials as catchments during operations producing hot slag, sparks, etc., to reduce potential fire hazard. This is especially important when performing welding/cutting/brazing operations overhead.
   2. Check areas where welding, cutting, spark-producing, or heat-producing operations are performed after completion to detect smoldering fires that may have gone unnoticed. **NOTE**: If a smoldering fire occurs, use the fire extinguisher at hand and notify the SSC Fire Department immediately.
   3. Protect nearby workers from welding "flashes," especially in operations involving heli-arc. Flash panels are required in congested personnel areas.

k. If heat/spark/flame work is interrupted, the hot work operations supervisor shall verify that no changes or other hazardous conditions have been introduced into the work operation before resuming work.

l. If work is in test complex area, the lead person overseeing hot work shall notify TOE when hot work is complete.

7.0 Use of Sterno Fuel or Similar Products

The sterno fuel handling tips below shall be followed at all SSC events that utilize sterno fuel or similar products:

a. Always make sure cans are placed securely in sterno holder before lighting.

b. Always use a long-handled match or butane lighter to light cans.

c. Decorative materials on the tables with sterno should be flame-resistant.

d. Flammable items such as napkins, paper and plastic cups, plastic table wares, and similar products should be separated a minimum of three feet from the sterno.

e. All SSC food preparation staff and those who may operate sterno on site shall notify the SSC Fire Department of the planned use/location/time, be knowledgeable of the hazards, and be trained in the proper use of sterno fuels.

f. The SSC Fire Chief will consult with the users, the Cafeteria or Conference Center staff and any other appropriate department(s) or individual(s) at their request regarding all Sterno Fuel Use Policy or to address issues and/or policy violation.

g. In the event that any fire ensues, pull the fire alarm, exit the building, then call 911 from an onsite telephone (or 228-688-3636 from a cell phone) immediately to report the fire. The Fire Department shall be dispatched even if the fire is extinguished before they arrive.

8.0 Records and Forms

All records and forms are assumed to be the latest version unless otherwise indicated. Quality Records are identified in the SSC Master Records Index. The following records must be maintained in accordance with this instruction:

Record	Description	Responsible Individual or Organization	Media, Location, and Indexing Method	Minimum Retention Time	Disposition
SSC-68	Hot Work Permit Original	Fire Department	Hard copies on file for 45 days in captain's office, then transferred to chief's office	1 year	Destroy
SSC-68	Hot Work Permit Red Copy	Performing organization	Display on site	Duration of the project, then attach to Process Plan	N/A
SSC-90	Process Plan	Performing organization	Hard copy on file in administrative area	1 year	Destroy
SSC-717	SSC Test Preparation Sheet	NASA and NTOG	Hard copy on file in administrative area	1 year	Destroy

9.0 Acronyms and Abbreviations

CFR	Code of Federal Regulations
FOSC	Facility Operating Services Contract/Contractor
MSDS	Material Safety Data Sheet
NFPA	National Fire Protection Association

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NPR	NASA Procedural Requirements
PAI	Permit Authorizing Individual
S&MA	Safety and Mission Assurance
SSC	Stennis Space Center
TOE	Test Operations Engineer

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Appendix A – Criteria for Fire Extinguishers

TYPE OF POTENTIAL FIRE	EXTINGUISHING AGENT
CLASS A – Combustibles (wood, paper, rubbish, grass, etc.)	Water, foam, Multipurpose Dry chemical
CLASS B – Volatile flammables (oil, grease, paint, etc.)	CO_2, Foam, Dry Chemical
CLASS C – Electrical	CO_2, Dry Chemical
CLASS D – Combustible Metals	Dry Chemical – Purple K Powder

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Appendix B – Hot Work Permit Program Audit Points

1. Review of completed Hot Work Permits to ensure accuracy of form completion.
2. Review of listing of designated PAIs to ensure adequate training and certification is in place.
3. Review of unique facilities (those not requiring daily permits) to ensure facility conditions are in compliance with authorization letter.
4. Review of specific duration permits and construction site permits to ensure compliance with established requirements.

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Appendix C – Sample Form, SSC-68 Hot Work Permit

National Aeronautics and Space Administration
John C. Stennis Space Center

SSC Hot Work Permit

No._____

Date and Time Issued	Expiration *(Date and Time)*	Exact Location Permit is issue for:
Issued To *(Company)*	Work Authorization Document No. or Contract Number	

Type of Operation *(Flame Producing)*

- ☐ Spark-producing Grinders/Tools
- ☐ Brazing
- ☐ Other Open Flame-producing Devices *(Explain)*
- ☐ Welding
- ☐ Fuel-fired Heaters
- ☐ Internal Combustion Engine Used Within a "Hazardous *(Classified)* Area"
- ☐ Oxy-fuel Cutting
- ☐ Soldering
- ☐ Benzomatic Torch

Type of Operation ☐ ***(Non-Flame Producing)*** but Occurring within a "Hazardous *(Classified)* Area" and Requiring Safe Atmospheric Verification *(Explain Below)*

— ATTENTION —

Before approving any cutting, welding, grinding, brazing, soldering, open flames, or other type of hot work, the responsible Permit Authorizing Individual (PAI) for the area shall inspect the proposed work area and identify the precautions taken. Any special instructions required will be addressed on the back of this form.

— Site Preparation —

Yes	No	N/A	
☐	☐	☐	Is installed sprinkler system in service?

If no, Fire Department must be notified and sign permit

☐	☐	Is a safe atmospheric check required?

If yes, complete Safety Engineer to record %LEL section and sign permit.

— Safe Atmospheric Verification —
Percent (%) LEL

Instrument Reading:_____ %LEL

Time Area Was Checked _____ AM/PM

Frequency Required

☐ Initial ☐ Continuous ☐ Hourly

— Precautions Within 35 ft of Work —

Fire extinguishers available: ☐ Multipurpose ☐ Water ☐ CO_2 ☐ Dry Chemical

Known location of nearest phone: _____

☐	☐	☐	Floors cleaned of combustibles and combustible materials removed.
☐	☐	☐	Combustible materials wet down or covered with fire resistant shields.
☐	☐	☐	Wall and floor openings, cracks, holes, etc. covered.
☐	☐	☐	Cable trays and/or nonmetallic wire covered with fire-resistant shields. HVAC ducts/chutes covered with fire-resistant shields.
☐	☐	☐	Combustible materials removed or covered on other side of walls, ceilings, roof, or partitions to prevent heat transfer via conduction or radiation.

— Work on Enclosed Equipment —

☐	☐	☐	Enclosed equipment cleaned of all combustibles, flammables.
☐	☐	☐	Containers purged of flammable/combustible liquids, vapors, or gases.
☐	☐	☐	No pressure in piping/storage of vessels.
☐	☐	☐	Piping/pressure vessels purged with inert gas and verified.

Printed last name and signature of individual responsible for fire watch:	Printed last name and signature of individual responsible for Hot Work:
Safety Eng. printed name and signature (if required)	Fire Department printed name and signature (if required)

Facility Manager or Construction Engineer printed name and signature ***(I permit this work to be performed in the location noted.)***

Printed name, signature, date and organization of Permit Authorizing Individual issuing Permit ***(I verify all proper precautions have been taken and the area is ready for Hot Work.)***

In Case of Fire—Call 911
or
Use Your radio to Notify SSC Security Dispatch by Depressing the Emergency Alarm on Top of the Radio

SSC-68 (05/2004) Previous Versions Shall Not be Used.

EXAMPLE