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Administrative Procedure

HLMI-PRO-FP-50564

Controls for Safe Hot Work

Revision 1, Change 1

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Technical Authority: Kester, Daniel
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- 222-S :
  Excluded from USQ
  Exclusion Reason:
  • N/A-4 applies under Fire Protection SMP as described in Table 3-8 of HNF-12125 per HLMI-PRO-NS-50488.

JHA: Administrative
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Change Summary

Description of Change

Identified low risk activities that are typically exempted from hot work controls, made Site Form number corrections, and updated the Record Identification section.

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1.0 PURPOSE AND SCOPE

This procedure applies to all Hanford Laboratory Management and Integration, LLC (HLMI) and subcontractor's hot work, and outlines required controls for safe hot work. Hot work is classified as "high hazard" or "low hazard."

- High hazard hot work includes electric arc, oxy-fuel gas welding/cutting operations, and heavy grinding.
- Low hazard hot work includes brazing, light grinding, tungsten inert gas (TIG) welding, flame/torch soldering, or similar low energy activities.

The following are low-risk activities that are typically exempted from hot work controls and from the Contractor Hot Work Permit (Site Form A-6008-468):

- Sanding using grinders with sanding discs
- Dremel tool grinding
- Pedestal or bench mounted grinders
- Pedestal or bench mounted sanders
- Rotary files
- Reciprocating saws
- Band saws
- Nibblers
- Electric soldering
- Heat gun.

2.0 IMPLEMENTATION

This procedure is effective on the date shown in the page 1 header.

3.0 RESPONSIBILITIES

Responsibilities are contained within Section 4.0.

4.0 PROCESS

If the classification of an operation is not clear, the Field Work Supervisor (FWS), in consultation with the Fire Protection Engineer (FPE), determines the hazard category (e.g., high or low).

If hot work must be performed outside designated hot work areas, a Contractor Hot Work Permit is required (Site Form A-6008-468). The Contractor Hot Work Permit will be prepared by the Planner, FWS, or designated responsible project person and maintained in the work package in accordance with HLMI-PRO-MAINT-50655, *222-S Operations Contractor Work Control*. Fire Protection Engineering can provide assistance as needed.

If hot work must be performed outside designated hot work areas, the location will be made fire-safe by removing combustibles or by protecting combustibles from ignition sources and providing designated trained fire watches.

The safety precautions for activities that are neither high nor low hazard (as defined in this procedure) will be determined by the FPE.

A fire watch is always required during the performance of hot work outside a designated hot work area unless otherwise authorized in advance by the FWS and the FPE.

If the hot work is to be performed in any Radiological Buffer Area, Radioactive Material Area, Soil Contamination Area, or radiological area, an Unreviewed Safety Question (USQ) evaluation is required to be performed.

The USQ evaluation can be on the Contractor Hot Work Permit alone, or the Contractor Hot Work Permit can be part of the USQ for the entire work scope. The FPE's signature is required on the Contractor Hot Work Permit, and the FPE will ensure the USQ evaluation has been performed on the intended work prior to signing the Contractor Hot Work Permit.

Those performing hot work must wear fire-retardant/resistant personal protective equipment (e.g., fire-retardant/resistant coveralls [colors vary for non-radiological areas; however, red is used for radiological areas], jacket, or leathers [in non-radiological areas only]) unless otherwise approved by the FWS and the FPE.

If taping is required for a radiological area, ordinary masking tape should be used. There is no code requirement to use a fire-retardant tape, and currently, there is no guidance from clothing manufacturers or HLMI Radiological Control for anything other than masking tape. Also, tape is used sparingly in limited areas (wrists and ankles), and in many cases, it is covered by gloves and the draping of the coveralls.

For low hazard hot work, cotton long-sleeved shirts and/or fire-resistant/leather full-front aprons may be utilized.

4.1 Prepare for Hot Work

WARNING!

Do not allow cutting, welding, or heating of (1) metal partitions, walls, ceilings, or roof assemblies with combustible covering(s) or with combustible sandwich-type panel construction or (2) any surface covered by a preservative coating with unknown flammability. Both activities require written safeguards from the Fire Marshal's Office in the form of a permit before the heat-producing activity is performed.

The FPEs are deputized fire marshals and inspect, act, and issue permits with the full authority of the Office of the Hanford Fire Marshal.

Any material that will ignite and burn is considered combustible. The most common materials likely to become involved in a fire are combustible building construction (e.g., floors, walls, partitions, roof assemblies), combustible contents (e.g., wood, paper, textiles, plastics, chemicals, flammable liquids, gases, furniture), and combustible ground cover (e.g., grass, brush).

The signed, approved Contractor Hot Work Permit (Site Form A-6008-468) shall be maintained in the job/task work package.

The valid period for a Contractor Hot Work Permit shall not exceed 24 hours.

Before starting, complete the Job Hazard Analysis Checklist (A-6008-219) in accordance with HLMI-PRO-SH-50885, *Job Hazard Analysis*; obtain FPE concurrence signature; and get approval from the FWS.

Complete a Contractor Hot Work Permit before each job. Authorize the hot work by approving the Contractor Hot Work Permit.

Actionee	Step	Action
FWS	1.	SURVEY the area to identify combustible materials and hazardous areas at the work site, AND PREPARE the work site for the job.
		NOTE: *The separation distance and protective measures for low hazard hot work shall be as determined by the FWS, in consultation with the FPE.*
	2.	IF combustibles are present in the work area, THEN:
		a. RELOCATE the job, OR
		b. MOVE the combustibles at least 35 feet away from the work, OR
		c. PROTECT the combustible materials within 35 feet of the work by using non-combustible/fire-retardant covers, shields, blankets or, if appropriate, wet the materials.

Actionee	Step	Action
FWS Hot Workers	3.	VERIFY the hot work equipment intended for use (e.g., torches, regulators, pressure-reducing valves, manifolds) is listed or approved by a nationally recognized testing laboratory for the intended use.
FWS	4.	VERIFY oxygen-fuel gas systems (e.g., oxygen/acetylene welders) are equipped with listed and/or approved backflow valves, flash arrester, and pressure-relief devices.
	5.	VERIFY there is no gas escaping from around the valve of the cylinder. a. IF leaking is observed, THEN STOP WORK, TAG CYLINDER out of service, AND CALL vendor to report condition.
	6.	IF the hot work will be performed on pipes or other metal, THEN VERIFY combustibles in contact with the metal are sheltered from ignition caused by heat conduction through the metal or are relocated away from the heat source.
	7.	IF pipes or other metal have any potential to involve flammable/combustible gas/liquids, THEN VERIFY the pipes or other metal are thoroughly purged using a noncombustible means approved by Engineering.
	8.	IF an automatic fire suppression system is installed, THEN VERIFY it is operable.
	9.	IF there is any question or chance of the hot work being performed in close proximity to an active sprinkler head, THEN CALL the Hanford Fire Marshal to provide special precaution support.
	10.	VERIFY the work site ventilation is performing its intended function.
	11.	VERIFY there are no flammable concentrations of gases, vapors, liquids, or dust in the atmosphere.
	12.	IF there are smoke detectors near the hot work job that may be affected by the work, THEN ARRANGE to have the Hanford Fire Marshal bypass the affected detectors before the hot work begins. a. ARRANGE to have the Hanford Fire Marshal restore the detectors to service as soon as possible after the job is finished or when the area becomes unoccupied for the day, whichever comes first. b. Depending on the operation, COVER OR REMOVE smoke detectors during the hot work operations.

Actionee	Step	Action
FWS	13.	ENSURE fire watches are assigned and dedicated to each hot work job. Persons assigned fire watch duties shall be dedicated to the fire watch throughout the assigned task. Assigned fire watch personnel are trained and understand the following: • The specific area to be fire watched • Potential fire hazards (to personnel and property) • Appropriate emergency procedures and actions • Methods for sounding the alarm(s) • Procedure for manually activating fire suppression systems • Fire watch training, which includes hands-on portable fire extinguisher training (Course 044400).

4.2 Before Starting Hot Work Outside Designated Areas

After preparing or verifying the work site, the FWS ensures necessary personnel are ready to begin work and gets the necessary approvals.

Actionee	Step	Action
		NOTE: *For hot work performed outside, verify the weather and fire danger are safe for the work planned.*
FWS	1.	COMPLETE a Contractor Hot Work Permit (Site Form A-6008-468) for hot work activities, including the following: • A description of the work being performed • Anticipated start and end time the work • Conditions for the work to be performed • Signatures of job supervisor, fire watch personnel, and welder.
	2.	VERIFY required fire watches are provided with a fully charged and operable fire extinguisher at the work site, and that it is kept available throughout the entire job.
	3.	ENSURE a separate extinguisher is brought to the work site, AND DO NOT TAKE a permanently mounted extinguisher in the facility from its storage rack except in case of fire.
	4.	GIVE advice to personnel involved with the hot work about flammable and combustible materials or hazardous conditions.
	5.	IF a job remains inactive for longer than one shift after the Contractor Hot Work Permit is approved, THEN VERIFY again the conditions AND INITIAL the Contractor Hot Work Permit before beginning work.

Actionee	Step	Action
FWS	6.	VERIFY employees have the appropriate personal protective equipment for the hazards (e.g., infrared and ultraviolet radiation, radiant heat, fumes, sparks, and hot slag).
	7.	ENSURE workers (e.g., cutters, welders, helpers, fire watches, and other personnel adjacent to the welding areas) are protected by leaving hazardous area or by using proper eye protection, protective clothing, shielding, screens, etc., as appropriate.
	8.	ENSURE signatures of job supervisor, fire watch personnel, and welder are obtained on the Contractor Hot Work Permit.
	9.	ENSURE final signed Contractor Hot Work Permit is included in the work package driving the hot work activity.

4.3 During Hot Work Outside Designated Areas

Actionee	Step	Action
Hot Workers	1.	PERFORM hot work only when the conditions required by the Contractor Hot Work Permit (Site Form A-6008-468) are met.
Oncoming FWS, Hot Worker, Fire Watch	2.	IF the shift changes or supervisors, hot worker(s), or fire watches are relieved, THEN REVIEW AND INITIAL the Contractor Hot Work Permit before starting the shift.
		NOTE: *The fire watch shall conduct only those duties of the fire watch. The fire watch shall not provide assistance as a welder's helper, supervisor, or any task that may detract from the duties of a fire watch.*
Fire Watch	3.	MONITOR the work in progress. Be alert for: • Smoke/fire in the clothing of the welder or other personnel in the hot work area • Combustible construction materials or building contents within 35 feet of the work • Openings that expose combustible materials in adjacent areas within 35 feet of the work • Combustible materials that could be ignited by sparks (even if the material is more than 35 feet from the work) • Combustible materials on the interior or on the other side of metal partitions, walls, floors, or ceilings that could be ignited by conduction or radiant heating.

Actionee	Step	Action
FWS	4.	MAINTAIN the fire watch for at least 60 minutes after stopping hot work. The fire watch shall: • Have no duties other than fire watch • Look for and extinguish smoldering fires caused by the hot work • Monitor the safety of the welder • Be assigned additional personnel as needed.
	5.	WHEN the job is completed OR WHEN the area is becoming unoccupied for the day, THEN: a. CONTACT the Hanford Fire Marshal's office to restore the system(s) to normal service if any detectors were bypassed, covered, or removed for the work; suppression systems were bypassed; or special precautions were taken to avoid accidental operation. b. REMOVE anything that may obstruct the fire system (e.g., covers over smoke detectors, obstructions to sprinkler pattern). c. RE-INSPECT the hot work area at least once per shift during the Contractor Hot Work Permit time period to ensure a fire-safe area. d. CLEAN UP the area, AND LEAVE IT in a safe condition.

4.4 Hot Work in Confined Spaces/Areas

These additional steps are required for hot work in or on confined spaces/areas (e.g., tanks, small rooms). Also, see DOE-0360, *Hanford Site Confined Space Procedure,* for confined space entry requirements.

Actionee	Step	Action
FWS	1.	IF the job requires hot work on/in piping, tanks, or similar confined spaces used for flammable/combustible liquids or gases, THEN: a. Before starting, COMPLETE the Job Hazard Analysis Checklist (A-6008-219) in accordance with HLMI-PRO-SH-50885, AND OBTAIN FPE concurrence signature, AND GET approval from the FWS. b. ENSURE the interior of items are cleaned of residue. c. HAVE the atmosphere monitored to ensure the applicable concentration does not exceed 10% of the lower explosive limit. Purging may be required to prevent ignition of flammable atmospheres.

Actionee	Step	Action
FWS		d. During the work, PERFORM atmospheric testing at least every 8 hours or more frequently if required by the job Hazard Analysis Checklist or work package.
		e. ENSURE adequate ventilation is provided where personnel entry is necessary. (Consult with an Industrial Hygienist.)
	2.	IF oxidizers are involved, THEN CONTACT the FPE for assistance.
Hot Workers	3.	IF arc welding in a confined space will be suspended or interrupted for any substantial period of time (such as during lunch, extended breaks, or overnight), THEN:
		a. REMOVE all electrodes from the holders.
		b. PLACE the holders where they will not be accidentally touched.
		c. DISCONNECT (turn off) the machine power supply.
	4.	IF gas welding or cutting in a confined space is to be suspended or interrupted for any substantial period of time (such as during lunch or overnight), THEN SHUT OFF the gas supply (and drain the lines) at some point outside the confined area to eliminate the possibility of gas escaping through leaks or improperly closed valves.
		a. REMOVE the torch and hose from the confined space if practical.

4.5 Designated Hot Work Areas

Actionee	Step	Action
FWS	1.	VERIFY the area has been reviewed and meets the requirements for a designated hot work area.
	2.	VERIFY a portable fire extinguisher is readily accessible.
	3.	VERIFY the designated hot work area ventilation is performing its intended function.
FWS/ Hot Workers	4.	VERIFY the hot work equipment to be used (e.g., torches, regulators, pressure-reducing valves, manifolds) is listed or approved by a nationally recognized testing laboratory for the intended use and is in good condition.
	5.	VERIFY oxygen-fuel gas systems (e.g., oxygen/acetylene welders) are equipped with listed and/or approved backflow valves and pressure-relief devices.

Actionee	Step	Action
		NOTE: *Hazards include, but are not limited to, infrared and ultraviolet radiation, radiant heat, fumes, sparks, and hot slag.*
FWS	6.	VERIFY employees have the appropriate personal protective equipment.
	7.	ENSURE all workers (e.g., cutters, welders, helpers, fire watches, and personnel adjacent to the welding areas) are protected by removing themselves from exposure to the hazards or by use of proper eye protection, protective clothing, shielding, screens, etc., as appropriate.
		NOTE: *The designated hot work area is described/defined by a permit issued by HLMI Fire Protection Engineering in the Hanford Fire Marshal permit system.*
	8.	Before beginning hot work activities, POST the area as a “Designated Hot Work Area.”
	9.	VERIFY there are no unprotected combustible materials (e.g., transient combustible material, furniture, documents, fabrics, dunnage, plastic) or combustible building features (e.g., floors, ceilings, wall, or duct openings) within 35 feet of the designated hot work area unless appropriately protected (e.g., fire blankets, fire screens) before commencing hot work.
	10.	Upon completion of hot work activities, DE-POST the designated hot work area by removing or putting away any signs, hot work equipment, and barriers returning the designated hot work area/room back to normal operation.

5.0 FORMS

Contractor Hot Work Permit (A-6008-468)

Job Hazard Analysis Checklist (A-6008-219)

6.0 RECORD IDENTIFICATION

The Record Capture table identifies the records generated during the performance of this procedure.

Table 1. Records Capture

Record Name	Record Processed By
Contractor Hot Work Permit (A-6008-468)	ERA-210517

Documents are controlled in accordance with HLMI-PRO-IRM-50386, *Document Control*.

Completed records are managed in accordance with HLMI-PRO-IRM-50387, *Records Management*.

Laboratory notebooks are managed in accordance with HLMI-PRO-ASYS-51031 (ATS-310, Section 2.32), *Laboratory Notebooks*.

7.0 SOURCES

7.1 Requirements

DOE-0360, *Hanford Site Confined Space Procedure*

DOE O 420.1C, *Facility Safety*

10 CFR 851, “Worker Safety and Health Program”

29 CFR 1910, Subpart Q, “Welding, Cutting, and Brazing”

29 CFR 1926.350, “Welding and Cutting”

29 CFR 1926.351, “Arc Welding and Cutting”

29 CFR 1926.352, “Fire Prevention”

29 CFR 1926.353, “Ventilation and Protection In Welding, Cutting, and Heating”

29 CFR 1926.354, “Welding, Cutting, and Heating in Way of Preservative Coatings”

NFPA 10, *Standard for Portable Fire Extinguishers*, National Fire Protection Association

NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work,* National Fire Protection Association

7.2 References

HLMI-PRO-ASYS-51031 (ATS-310, Section 2.32), *Laboratory Notebooks*

HLMI-PRO-IRM-50386, *Document Control*

HLMI-PRO-IRM-50387, *Records Management*

HLMI-PRO-MAINT-50655, *222-S Operations Contractor Work Control*

HLMI-PRO-SH-50885, *Job Hazard Analysis*

HLMI-STD-FP-50565, *Fire Marshal Permits, Combustible Controls, and Construction/ Occupancy Requirements*

APPENDIX A - DEFINITION OF A DESIGNATED HOT WORK AREA

A designated hot work area is any area that meets all criteria (as applicable) in items 1 through 6 below. A fire watch is normally not required for designated hot work areas but may be provided as determined appropriate or necessary by the FWS/Facility Manager.

Designated hot work areas are authorized by a Hanford Fire Marshal Permit. This applies to all contractors and subcontractors performing work for HLMI. To authorize a designated hot work area, no substitute process may be used.

The FPEs are deputies of the Hanford Fire Marshal's office, and they will issue the required permit. See HLMI-STD-FP-50565, *Fire Marshal Permits, Combustible Controls, and Construction/Occupancy Requirements*.

1. A Hanford Fire Marshal Permit shall be posted at the designated hot work area. The permit demonstrates the area has been reviewed to ensure it qualifies as a designated hot work area and will have any restrictions listed.
2. Combustible controls shall be implemented prior to beginning hot work operations in the designated hot work area, and remain in effect throughout hot work operations. The FWS/Facility Manager is responsible to ensure the area is maintained in accordance with the requirements in this procedure and the Hanford Fire Marshal Permit:
    a. The area will be fire resistive or non-combustible construction.
    b. If fire resistive or non-combustible construction is not provided, have non-combustible/fire-retardant barriers available for protection against hot slag and sparks.
    c. At the time the hot work is performed in the designated hot work area, there shall be no unprotected combustible materials (e.g., transient combustible material, furniture, documents, fabrics, dunnage, plastic) or building features (including floors, ceilings, wall, or duct openings) within 35 feet of the designated hot work area unless appropriately protected (e.g., fire blankets, fire screens).

    For low hazard hot work, the separation distance and protective measures for items b and c above shall be determined by the FWS and FPE.

    Combustible controls shall be implemented prior to beginning hot work operations in the designated hot work area, and remain in effect throughout hot work operations.
3. The hot work area shall be provided with a fully charged, permanently mounted, and serviced portable fire extinguisher (i.e., minimum 2A-10BC rating). The extinguisher shall be maintained in accordance with NFPA 10, *Standard for Portable Fire Extinguishers,* requirements.
4. The area shall have adequate operational ventilation (consult Industrial Hygiene, if necessary). Follow Section 4.4 of this procedure if applicable.
5. Inside buildings where high hazard hot work is performed, the designated hot work area shall be provided with visual protection, i.e., surrounded by a booth or screen constructed of one of the following materials:
    - Metal
    - Flame-resistant fabric that is opaque to most optical radiation

- Transparent-colored polyvinyl chloride material that is formulated with a flame-retardant and an ultraviolet-visible absorber in the range of 200 to 3000 nanometers.

6. Anyone performing high hazard hot work will wear fire-resistant/retardant personal protective equipment (e.g., fire-resistant/retardant coveralls, jackets, or leathers [non-radiological areas]). The FWS and the FPE must approve exceptions to wearing fire-resistant/retardant personal protective equipment. Such exceptions must be listed on the Contractor Hot Work Permit (Site Form A-6008-468) and include the signature of the FPE and FWS.

    - Under no circumstances will the dedicated fire watch AND the fire-resistant/retardant personal protective equipment requirement be waived.
    - If taping is required for a radiological area, ordinary masking tape should be used. There is no code requirement to use a fire-retardant tape, and currently, there is no guidance from clothing manufacturers or HLMI Radiological Control for anything other than masking tape.