Person: Lumanog, Andrew (andrewl@jlab.org)
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Jefferson Lab
Thomas Jefferson National Accelerator Facility

Operational Safety Procedure Review and Approval Form # 103652
(See ES&H Manual Chapter 3310 Appendix T1 Operational Safety Procedure (OSP) and Temporary OSP Procedure for Instructions)

Type:	***OSP*** Click for OSP/TOSP Procedure Form Click for LOSP Procedure Form Click for LTT-Individual Information Click for LTT-Group Information		
Serial Number:	***ENP-20-103652-OSP***		
Issue Date:	***7/28/2020***		
Expiration Date:	***7/28/2023***		
Title:	***Physics Fabrication Shop (Hot Work)***		
Location: (where work is being performed) Building Floor Plans	***98 - Physics Fabrication - 1*** ***98 - Physics Fabrication - 1A***	Location Detail: (specifics about where in the selected location(s) the work is being performed)	***A machine shop area will be established on the South/East corner of the building near the overhead door on the south side of the building. A welding area for Halls' A and B will be located on the north wall of the building (opposite side of the building from restrooms).***

Risk Classification: (See ES&H Manual Chapter 3210 Appendix T3 Risk Code Assignment)	Without mitigation measures (3 or 4):	***4***
	With mitigation measures in place (N, 1, or 2):	***1***

Reason:	This document is written to mitigate hazard issues that are : ***Determined to have an unmitigated Risk code of 3 or 4***
Owning Organization:	***PHALLA***
Document Owner(s):	***Lumanog, Andrew (andrewl@jlab.org)*** Primary ***Butler, Jessie (jbutler@jlab.org)*** ***Insley, Denny (dinsley@jlab.org)***

Supplemental Technical Validations

Gas Cylinders (Robert Myles, Tim Minga)
High Noise (Imani Burton, Jennifer Williams)
Machine Tools (Bert Manzlak, Paul Collins)
Fire Protection (Tim Minga)
ESH&Q Liasion (Bert Manzlak)

Document History

Revision	Reason for revision or update	Serial number of superseded document

Lessons Learned	Lessons Learned relating to the hazard issues noted above have been reviewed.
Comments for reviewers/approvers:	

Attachments

Procedure: ***OSP_Form Bldg. 98.pdf***
THA: ***THA for Bldg. 98..pdf***
Additional Files: ***COVID Pre-Job Checklist for OSP Attachments.pdf***

Review Signatures

Additional Authorization : Fire Protection - other than current engineered safeguards or fire watch	**Signed** on 6/22/2020 2:05:38 PM by Tim Minga (minga@jlab.org)
Subject Matter Expert : Gas Cylinders	**Signed** on 6/22/2020 2:05:38 PM by Tim Minga (minga@jlab.org)
Subject Matter Expert : High Noise	**Signed** on 6/22/2020 2:33:02 PM by Imani Burton (iburton@jlab.org)
Subject Matter Expert : Machine Tools	**Signed** on 6/22/2020 1:45:59 PM by Bert Manzlak (manzlak@jlab.org)

Approval Signatures

Division Safety Officer : PHALLA	**Signed** on 6/22/2020 2:38:17 PM by Ed Folts (folts@jlab.org)
ESH&Q Division Liasion : PHALLA	**Signed** on 6/22/2020 2:50:03 PM by Bert Manzlak (manzlak@jlab.org)
Org Manager : PHALLA	**Signed** on 7/28/2020 3:56:14 PM by Cynthia (Thia) Keppel (keppel@jlab.org)
Safety Warden : Physics Fabrication - 1	**Signed** on 6/22/2020 2:37:01 PM by Robert Tucker (retucker@jlab.org)
Safety Warden : Physics Fabrication - 1A	**Signed** on 6/22/2020 2:37:01 PM by Robert Tucker (retucker@jlab.org)

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Operational Safety Procedure Form

(See ES&H Manual Chapter 3310 Appendix T1 Operational Safety Procedure (OSP) and Temporary OSP Procedure for instructions.)

Click

Title:	Physics Fabrication Shop (Hot Work)		
Location:	Building 98	**Type:**	☐OSP ☐TOSP
Risk Classification (per Task Hazard Analysis attached) (See *ESH&Q Manual Chapter 3210 Appendix T3 Risk Code Assignment*.)		**Highest Risk Code Before Mitigation**	4
		Highest Risk Code after Mitigation (N, 1, or 2):	1
Owning Organization:	Physics – Hall A & Hall B		
Document Owner(s):	Andrew Lumanog: andrewl@jlab.org Jessie Butler: jbutler@jlab.org Denny Insely: dinsely@jlab.org	**Date:**	June 16, 2020

DEFINE THE SCOPE OF WORK

1. Purpose of the Procedure – Describe in detail the reason for the procedure (what is being done and why).

The purpose of this document is to designate building 98 as a hot work area and to establish operational and safety guidelines for worker to adhere to by doing such.

2. Scope – include all operations, people, and/or areas that the procedure will affect.

Hall A and Hall B technical staff will be using this area for the fabrication and modification of many different types of material. The area's primary focus will be welding, cutting, grinding, machining and soldering; which is done on a regular basis.

1. Welding: TIG, MIG and ARC.
2. Cutting: Hand tools (cutting wheel, Porta-Band, Jig-Saw, etc.), Plasma Arc Cutting, Band Saw and Oxy/Acetylene Torch.
3. Grinding: Includes hand tools, belt sanders, 4"- 7" grinders. Sanding and grinding will precede welding and/or machining and will produce sparks; majority will be carbon steel.
4. Machining: Lathe and Milling machine work.
5. Soft Soldering (Brazing): Includes 600-1500 degrees F; Handy Harmon brazing flux (paste). Copper to stainless steel (silver solder joints)
6. Hard Soldering (Brazing): Includes 600-1500 degrees F; Handy Harmon brazing flux (paste). Copper to stainless steel (silver solder joints) 3

3. Description of the Facility – include building, floor plans and layout of the experiment or operation.

Building 98 is located on the Accelerator Site directly in front of the Counting House for Halls A, B and C. The primary work processes for this building is a fabrication and machine shop for Halls A and B.

A machine shop area will be established on the South/East corner of the building near the overhead door on the south side of the building.

A welding area for Halls' A and B will be located on the north wall of the building (opposite side of the building from restrooms).

All flammables/combustibles that are not currently in-use must be stored in a flammable locker, outside in gas
Bottle racks or at a minimum of 35ft away from hot work area.

Building 98 has a built in air handling unit, three overhead roll-up doors and three personnel passageway doors which can all aid in ventilation and egress in emergency situations.

ANALYZE THE HAZARDSand IMPLEMENT CONTROLS

4. Hazards identified on written Task Hazard Analysis

5. Authority and Responsibility:

5.1 Who has authority to implement/terminate

Fire Marshal

5.2 Who is responsible for key tasks

Hall A and Hall B work coordinator(s) or designee

5.3 Who analyzes the special or unusual hazards including elevated work, chemicals, gases, fire or sparks(See ES&H Manual Chapter 3210 Appendix T1 Work Planning, Control, and Authorization Procedure)

Hall A and Hall B work coordinator(s) or designee

6. Personal and Environmental Hazard Controls Including:

6.1 Shielding

Welding screens and fire blankets will be used as needed.

6.2 Barriers (magnetic, hearing, elevated or crane work, etc.)

N/A

6.3 Interlocks

N/A

6.4 Monitoring systems

N/A

6.5 Ventilation

Building 98 is outfitted with an air handling unit. Additional ventilation will be used as needed (portable fan/blower and/or opening overhead doors)

6.6 Other (Electrical, ODH, Trip, Ladder) (Attach related Temporary Work Permits or Safety Reviews as appropriate.)

All other necessary training has to be assessed on a job-by-job basis. Worker should ensure that he/she has all the required training before beginning a job.
Example: If a job requires you to use a ladder, then you would need to take the “Ladder Safety” and "Personal Fall Protection” training.

7. List of Safety Equipment:

7.1 List of Safety Equipment:

- Welding Shield
- Hearing Protection
- Safety Glasses (clear and tinted)
- Hats
- Gloves
- Face Shield
- Welding Shirt / Jackets
- Fire Extinguisher

- **Special Tools:**

Welding Machine, Torches, Milling Machine, Lathe, Cutoff Saw, Cutters and Grinders

8. Associated Administrative Controls

This OSP, associated THA, and COVID-19 Pandemic Controls OSP Checklist, Equipment OSP that is associated with tools that will be use to do the hot work.

9. Training

9.1 What are the Training Requirements (See List of Training Skills)

- SAF 100 – ES&H Orientation
- SAF 108 – Fire Safety
- SAF 150 – Hot Work: Welding, Cutting, Brazing, and Grinding Safety Program
- SAF 102kd – Emergency Management (if applicable) 6

DEVELOP THE PROCEDURE

10. Operating Guidelines

This OSP and Chapters 6120, 6121, 6122, 6150, 6540, 6610, 6620 and 6640 of the EHS Manual

1. Clear work area of all explosive, flammable and hazardous materials.
2. Assess the need for a fire watch (each job).
3. Inspect fire extinguishers
4. Don proper PPE
5. Ensure adequate ventilation (use additional ventilation as needed).
6. Check all equipment before use to ensure proper operation.
7. Ensure the following dangers have been eliminated or specifically addressed before proceeding.
   (a) Cutting, grinding, machining or welding on a pressurized system.
   (b) Cutting, grinding or machining on a container of hazardous material.
   (c) Working on an item that is potentially radioactive.
   (d) The possibility of property damage.
   (e) Welding of hazardous materials (refer to material MSDS). Lead is prohibited.
8. Stop all welding ½ hour prior to end of shift and check for fires and gas leaks.

11. Notification of Affected Personnel (who, how, and when include building manager, safety warden, and area coordinator)

Self and Fire Watch (when applicable)

12. List the Steps Required to Execute the Procedure: from start to finish.

Various depending on specific operation.

13. Back Out Procedure(s) i.e. steps necessary to restore the equipment/area to a safe level.

Stop Work. Secure Power. Re-assess Job

14. Special environmental control requirements:

14.1 List materials, chemicals, gasses that could impact the environment (ensure these are considered when choosing Subject Mater Experts) and explore EMP-04 Project/Activity/Experiment Environmental Review below

Gases used in welding

14.2 Environmental impacts(See EMP-04 Project/Activity/Experiment Environmental Review)

None

14.3 Abatement steps (secondary containment or special packaging requirements)

Fire Blanket (if necessary)

15. Unusual/Emergency Procedures (e.g., loss of power, spills, fire, etc.)

In the event of injury, call 911 and also notify:

□ Guards (x5822)

□ Crew Chief (x7045) (if inside the fence)

□ Occupational Medicine (x7539)

In case of an injury follow standard JLAB procedures. Initial response cards are located with each phone for appropriate emergency phone numbers. Additional information can be found at https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-24400/*.pdf. If an immediate emergency exists, call 911.

16. Instrument Calibration Requirements (e.g., safety system/device recertification, RF probe calibration)

Welding machine (yearly)

17. Inspection Schedules

- Person performing the hot work must inspect area, associated equipment and tools prior to and at the end of every shift; 30 minutes after welding operations have ended.
- Yearly exhaust system inspection (Facility Maintenance)
- Monthly safety inspection (Safety Warden)
- Monthly fire extinguisher inspections (Appointed Personnel)
- Weekly Eyewash Station inspection (Safety Warden)

18. References/Associated/Relevant Documentation

Chapters 6120, 6121, 6122, 6150, 6540, 6610, 6620 and 6640 of the EHS Manual
COVID-19 Pandemic Controls OSP Checklists

19. List of Records Generated (Include Location / Review and Approved procedure)

N/A

Submit Procedure for Review and Approval (See ES&H Manual Chapter 3310 Appendix T1 OSP & TOSP Instructions – Section 4.2 Submit Draft Procedure for Initial Review):

- Convert this document to .pdf
- Open electronic cover sheet: https://mis.jlab.org/mis/apps/mis_forms/operational_safety_procedure_form.cfm
- Complete the form
- Upload the pdf document and associated Task Hazard Analysis (also in .pdf format)

Distribution: Copies to Affected Area, Authors, Division Safety Officer
Expiration: Forward to ESH&Q Document Control

Form Revision Summary

Revision 1.5 – 04/11/18 – Training section moved from section 5 Authority and Responsibility to section 9 Training
Revision 1.4 – 06/20/16 – Repositioned "Scope of Work" to clarify processes
Qualifying Periodic Review – 02/19/14 – No substantive changes required
Revision 1.3 – 11/27/13 –Added "Owning Organization" to more accurately reflect laboratory operations.
Revision 1.2 –09/15/12 – Update form to conform to electronic review.
Revision 1.1 – 04/03/12 – Risk Code 0 switched to N to be consistent with 3210 T3 Risk Code Assignment.
Revision 1.0 – 12/01/11 –Added reasoning for OSP to aid in appropriate review determination.
Revision 0.0 – 10/05/09 – Updated to reflect current laboratory operations

ISSUING AUTHORITY	FORM TECHNICAL POINT-OF-CONTACT	APPROVAL DATE	REVIEW DATE	REV.
ESH&Q Division	Harry Fanning	04/11/18	04/11/21	1.5

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Task Hazard Analysis (THA) Worksheet

(See ES&H Manual Chapter 3210 Appendix T1
Work Planning, Control, and Authorization Procedure)

Click For Word

Author:	Andrew Lumanog	**Date:**	June 16, 2020	**Task #:** If applicable	N/A

Complete all information. Use as many sheets as necessary

Task Title:	Hot Work in Hall A/B Machine Shop			**Task Location:**	Building 98
Division:	Physics	**Department:**	Hall A and Hall B	**Frequency of use:**	Daily
Lead Worker:	Jessie Butler and Denny Ensley				
Mitigation already in place: Standard Protecting Measures Work Control Documents	Building sprinkler system, fire alarm pull boxes located at each exit, building fire extinguishers, flammables have designated location (flammable locker(s) or outside cylinder racks, machine guards, welding screens, eyewash station and equipment/machine operating manuals.				

Sequence of Task Steps	Task Steps/Potential Hazards	Consequence Level	Probability Level	Risk Code (before mitigation)	Proposed Mitigation (Required for Risk Code >2)	Safety Procedures/ Practices/Controls/Training	Risk Code (after mitigation
	Fire	M	M	4	✓ All unused gases stored outside of work area ✓ Flammable gases stored >35ft away from oxidizers ✓ Refersil Fire Retardant cloth is used to cover combustibles that cannot be moved >35ft away ✓ Use of fire watch is assessed for each job ✓ Fire blankets located in work area ✓ Fire extinguishers are located in work area	• Attached OSP • SAF 100 – EH&S Orientation • SAF 108 – Fire Safety Training • SAF 150 – Hot Work: Welding, Cutting, Brazing and Grinding Safety Program • Read EH&S Manual 6900	1

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Task Hazard Analysis (THA) Worksheet

(See ES&H Manual Chapter 3210 Appendix T1
Work Planning, Control, and Authorization Procedure)

Sequence of Task Steps	Task Steps/Potential Hazards	Consequence Level	Probability Level	Risk Code (before mitigation)	Proposed Mitigation (Required for Risk Code >2)	Safety Procedures/ Practices/Controls/Training	Risk Code (after mitigation
	Electrical Shock	H	H	4	✓ All welding machine must have an up-to-date inspection ✓ All equipment and its connecting plug should be inspected prior to each use.	• This OSP • Read Equipment Operation Manuals • SAF 100 – ES&H Orientation • SAF 104 – Lock, Tag and Try • SAF 108 - Fire Safety Training • ES&H Manual 620	1
	Eye Injury	M	M	3	✓ Wear proper safety glasses for task ✓ Wear face shield (if applicable) ✓ Use machine guards properly	• This OSP • SAF 100 – ES&H Orientation • SAF 102kd - Emergency Management • EH&S Manual 6620	1
	Photochemical and Thermal Burns	M	L	2	✓ Welder's Gloves ✓ Long Sleeves ✓ Heavy duty cotton or fire retardant clothing ✓ Use welding screens to protect others ✓ Welding Shades and hood	• This OSP • SAF 102kd - Emergency Management • SAF 108 - Fire Safety Training	1
	ODH	M	L	2	✓ Ensure cylinders and Dewars are turned off after each use ✓ Store unused cylinders and Dewars outside	• This OSP • SAF 103 - ODH Training • Building assessed to be "ODH 0" • EH&S Manual 6500	1
	Noise	L	M	2	✓ Wear hearing protection for high noise operation	• This OSP • EH&S Manual 6620 • EH&S Manual 6640	1

Task Hazard Analysis (THA) Worksheet

(See ES&H Manual Chapter 3210 Appendix T1 Work Planning, Control, and Authorization Procedure)

Sequence of Task Steps	Task Steps/Potential Hazards	Consequence Level	Probability Level	Risk Code (before mitigation)	Proposed Mitigation (Required for Risk Code >2)	Safety Procedures/ Practices/Controls/Training	Risk Code (after mitigation
	Chemical and Radiation Exposure	L	M	2	Monitor chemical inventory Welding, grinding or machining is prohibited on radioactive or toxic materials	• This OSP • SAF 100 – EH&S Orientation • SAF 801C – RAD Worker I • EH&S Manual 6610 • EH&S Manual 6300 • EH&S Manual 6400	1

Highest Risk Code before Mitigation:	4	Highest Risk Code after Mitigation:	1

When completed, if the analysis indicates that the Risk Code before mitigation for any steps is "medium" or higher (RC≥3), then a formal Work Control Document (WCD) is developed for the task. Attach this completed Task Hazard Analysis Worksheet. Have the package reviewed and approved prior to beginning work. (See ES&H Manual Chapter 3310 Operational Safety Procedure Program.)

Form Revision Summary

Periodic Review – 08/29/18 – No changes per TPOC
Periodic Review – 08/13/15 – No changes per TPOC
Revision 0.1 – 06/19/12 - Triennial Review. Update to format.
Revision 0.0 – 10/05/09 – Written to document current laboratory operational procedure.

ISSUING AUTHORITY	TECHNICAL POINT-OF-CONTACT	APPROVAL DATE	REVIEW DATE	REV.
ESH&Q Division	Harry Fanning	08/29/18	08/29/21	0.1

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Operational Safety Procedure Form

(See ES&H Manual Chapter 3310 Appendix T1 Operational Safety Procedure (OSP) and Temporary OSP Procedure for instructions.)

Click

Title:	COVID-19 Pandemic Controls
OSP Checklists	

Pre-job Checklist for Task or Area-Specific (T)OSP/LOSP

Obtain COVID-19 OSP and THA, OSP and THA for Work or Task-Specific (T)OSP and/or LOSP. Attach to this pre-job briefing.

(T)OSP and /or LOSP Number(s):

Brief Job Description: Physics Fabrication Shop (Hot Work)

_____

Lead worker or Supervisor/Manager General Pre-job Talking-points:

1) **Do you understand the requirements for performing work?**
   - Remember to stay within scope of work and work to your document as written.
   - If you find yourself outside the scope of work, or are unable to work to the document as written, use your stop/pause work authority and bring it to my attention immediately.
2) **PPE for work at distances of less than 6 ft. from your next nearest coworker:** Tyvek® coveralls with hood, nitrile gloves, face shield, N95 respirator
3) **Other task-specific PPE:**

_____

_____

_____

_____

Additions for (T)OSPs or LOSPs that result from careful application and consideration of this checklist shall be recorded in the Additional Notes section or appended as a separate form.

Those who sign this checklist in the Signature Section verify that they understand and agree to abide by the (T)OSPs and or LOSPs identified above and any additions to those (T)OSPs and/or LOSPs as appended or listed in the Additional Notes section of this checklist.

Discuss steps associated with planned work

☐ use the (T)OSP and/or LOSP description of work to discuss the steps involved

☐ use the (T)OSP and/or LOSP THA to review the consequences and mitigations associate with work

☐ special attention to most hazardous task steps OR elevated hazards

☐ discuss the overall risk

- ☐ what controls are needed AND what controls are already in-place
- ☐ are there any Credited Controls involved

Discuss human performance implications of planned work - including potential error traps (additional requirements that increase the likelihood of an error, e.g. increased task requirements, resource limitations, new requirements, lack of familiarity)

Are there issues related to

☐Training – do any of the instructions in ESH003, COVID-19 Hazard Awareness and Controls create complications or present conflicts for existing training, how are they resolved

☐Communications – what additional communications may be needed to augment your work, and how frequent

☐Planning and Scheduling

- ☐ time differential between work planning and work execution
- ☐ added time for staging, donning, doffing and storing PPE for reuse
- ☐ added time for cleaning work surfaces, tools, commonly reused surfaces

☐Design/Process Change – what new processes are required to implement COVID-19 controls in your work area, during your work

☐ Are there adequate resources to perform the work

☐Values, Priority, Policies – do you have a clear understanding of the priority and the role for COVID-19 controls

☐Procedural Development or Work Practices – what general changes do you anticipate and do these changes require additional instructions for work

☐Supervisory Involvement – what additional roles have supervisory staff taken on

☐Organizational Interfaces – do you have clear lines of communication worked out with the primary resource providers for COVID-19 controls?

What are the unique task demands associated with COVID-19 controls?

- ☐ time / schedule pressure
- ☐ high workload
- ☐ simultaneous multiple or complex interrelated tasks
- ☐ unclear requirements
- ☐ PPE resource limitations / need for PPE cleaning procedure for reuse
- ☐ reliance on other groups or dependencies on other unfinished work?
- ☐ other_____

Are there challenges with respect to individual capabilities – are there new limitations due to any inability to use COVID-19 PPE?

- ☐ new techniques
- ☐ lack of knowledge
- ☐ unfamiliar or first time task
- ☐ illness, fatigue, heat stress from PPE
- ☐ fear of COVID-19 or COVID-19 controls?
- ☐ other_____

Are there challenges with respect to the work environment during the implementation of COVID-19 controls?

- ☐ distractions and interruptions
- ☐ changes
- ☐ possible unexpected conditions?
- ☐ other _____

Are there tendencies or habit patters that can interfere with implementation of COVID-19 controls; can they contribute to errors?

- ☐ habit patterns
- ☐ assumptions
- ☐ complacency
- ☐ peer pressure to return
- ☐ anxiety / mental health issues
- ☐ other _____

When working indoors,

- ☐ contact FM&L for increased ventilation **or**
- ☐ open windows and/or doors, where possible, to increase air flow and ventilation?

Discuss possible interferences / complications related to COVID-19 controls with planned work

- ☐ added time to complete work (include PPE donning / doffing)
- ☐ additional physical stress from PPE use
- ☐ emotional stress form new working conditions (conditions at home)
- ☐ task steps in THA most impacted by COVID-19 controls
  - ☐ added complexity
  - ☐ limited dexterity

- ☐ obstructed vision
- ☐ limited assistance

☐ discuss how tasking can be adjusted to respond to interferences / complications

☐ avoid sharing work equipment and tools to the greatest extent possible

- ☐ if you need to share tools/equipment – clean/disinfect before and after use and consider the use of gloves. Don't share personal items.
- ☐ Clean/disinfect your work surfaces/area frequently, e.g. workstations, keyboards, telephones, door handles, routinely.

☐ Discuss whether a P95® or an N95® respirator is specifically required for this work and for which tasks if not all tasks

- ☐ organize tasks to minimize the number of times you don / doff covering N95® respirator
- ☐ focus on avoiding touching the inside of your face covering or N95® respirator
- ☐ clean hands with soap and water or an alcohol-based hand sanitizer (≥60% alcohol) before and after donning/doffing or adjusting your face covering or N95® respirator.
- ☐ facial hair interferes with the ability to generate a good seal between your face and an N95® respirator which reduces the effectiveness of the protection provided by the N95® respirator - make sure you have a good seal between your face and your N95 respirator prior to starting work
- ☐ inspect N95® respirator for physical damage each time prior to use
- ☐ replace N95® respirator when it becomes damaged, soiled or if it becomes difficult to breathe through
- ☐ store N95® respirator in a clean paper bag according to the JLab PPE Reuse Policy and discard paper bag after use
- ☐ if N95® respirator causes labored breathing, discomfort or irritation, or thermal fatigue, rest and to allow your breathing to return to normal

☐ contact Occ. Med. and consult with IH on thermal stress during respirator use and for ways to adjust respirator to minimize discomfort or irritation

Additional Notes on issues that develop during the pre-job briefing**:**

Signature Section:

Name	Signature	E-mail address

Work authorized by: _____

By signing this page, you testify that you have read, understand, and agree to abide by the procedure specified in the above referenced work control document:

Serial Number: ENP-20-103652-OSP

Title: Physics Fabrication Shop (Hot Work)

Name	Signature	Date