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Jefferson Lab
Thomas Jefferson National Accelerator Facility

Operational Safety Procedure Review and Approval Form # 88391
(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		
Serial Number:	***ENP-19-88391-OSP***		
Issue Date:	***7/15/2019***		
Expiration Date:	***7/15/2022***		
Title:	***Physics division milling machines***		
Location: (where work is being performed) Building Floor Plans	***12 - CEBAF Center - B101***	Location Detail: (specifics about where in the selected location(s) the work is being performed)	***All Physics Division Work Areas***
Risk Classification: (See ES&H Manual Chapter 3210 Appendix T3 Risk Code Assignment)	Without mitigation measures (3 or 4): With mitigation measures in place (N, 1, or 2):		***3*** ***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:	***PADMIN***		
Document Owner(s):	***Folts, Ed (folts@jlab.org)*** Primary		

Supplemental Technical Validations

Machine Tools (Bert Manzlak, Paul Collins)
Sharp Edges (Bert Manzlak, Paul Collins)
Personal Protective Equipment (Jennifer Williams)
ESH&Q Liasion (Bert Manzlak)

Document History

Revision	Reason for revision or update	Serial number of superseded document
1	***Re-evaluation of requirements***	***ENP-16-60297-OSP***

Lessons Learned	Lessons Learned relating to the hazard issues noted above have been reviewed.
Comments for reviewers/approvers:	***An update is in process and a new OSP will be issued when the details of the new rules are available. This interim is authorized by Bill Rainey and Steven Smith***

Attachments

Procedure: ***Physics division Milling machines 2016.pdf***

THA: ***Physics division Mill THA 2016.pdf***

Additional Files: ***signature form for Machines.pdf***

Review Signatures

Additional Authorization : Personal Protective Equipment	**Signed** on 7/10/2019 4:29:17 PM by Jennifer Williams (jennifer@jlab.org)
Subject Matter Expert : Machine Tools	**Signed** on 7/12/2019 5:22:55 PM by Bert Manzlak (manzlak@jlab.org)
Subject Matter Expert : Sharp Edges	**Signed** on 7/12/2019 5:23:07 PM by Bert Manzlak (manzlak@jlab.org)

Approval Signatures

Division Safety Officer : PADMIN	**Signed** on 7/15/2019 7:42:22 AM by Ed Folts (folts@jlab.org)
ESH&Q Division Liasion : PADMIN	**Signed** on 7/12/2019 5:24:17 PM by Bert Manzlak (manzlak@jlab.org)
Org Manager : PADMIN	**Signed** on 7/12/2019 5:25:44 PM by Patrizia Rossi (rossi@jlab.org)
Safety Warden : CEBAF Center - B101	**Signed** on 7/15/2019 7:42:34 AM by Ed Folts (folts@jlab.org)

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Jefferson Lab
Thomas Jefferson National Accelerator Facility

Operational Safety Procedure Form

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

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DEFINE THE SCOPE OF WORK

Title:	Physics division Milling Machines		
Location:	Physics Division work areas	**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 (3 or 4):**	3
		Highest Risk Code after Mitigation (N, 1, or 2):	1
Owning Organization:	Physics	**Date:**	5/5/16
Document Owner(s):	Folts		

Document History (Optional)

Revision:	Reason for revision or update:	Serial number of superseded document
1	Document expiration no revisions needed	***ENP-13-24085-OSP***

ANALYZE THE HAZARDS

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

Jefferson Lab has determined that the use of a machine tool is inherently risky and carries an unmitigated Risk Code of 3 or higher. This OSP is used to ensure hazards are communicated and training is appropriate prior to use of this milling machine.

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

This OSP covers milling machines as described on the signature page of this document.

3. Description of the Facility – include floor plans and layout of a typical experiment or operation.

This milling machine is used for the shaping of metal and other solid materials. Milling involves movement of the work piece against the rotating cutter, which is able to cut on its flanks as well as its tip. Work piece and cutter movement are precisely controlled to less than 0.001 inches (.025 millimeters), usually by means of precision ground slides and lead screws or analogous technology. Milling machines may be manually operated, mechanically automated, or digitally automated via computer numerical control (CNC).

4. Authority and Responsibility:

4.1 Who has authority to implement/terminate

- Area coordinator
- DSO

4.2 Who is responsible for key tasks

- Physics Division Technical Staff

4.3 Who analyzes the special or unusual hazards (See ES&H Manual Chapter 3210 Appendix T1 Work Planning, Control, and Authorization Procedure)

- Industrial Hygiene
- Industrial Safety
- Rad Con

4.4 What are the Training Requirements (See http://www.jlab.org/div_dept/train/poc.pdf)

- Read operations manual
- Read and sign this OSP
- Operational checkout and familiarization by equipment owner

5. Personal and Environmental Hazard Controls Including:

5.1 Shielding

- Equipment guards installed and in position

5.2 Interlocks

- Magnetic safety switch for power, as required for equipment or application being used

5.3 Monitoring systems

- As required for equipment or application being used

5.4 Ventilation

- As required for equipment or application being used

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

- As required for equipment or application being used

6. List of Safety Equipment:

6.1 List of Safety Equipment:

- Wear safety glasses with side shields.
- When necessary, wear a respirator per MSDS, ear muffs or plugs. SAF-200 is required for respirator use.
- Use Kevlar gloves to change cutting tools. Remove gloves before operating the machine.
- Do not wear rings, watches, jewelry, loose clothing, neckties, or long hair not contained by a net or shop cap.

6.2 Special Tools:

- As required for equipment or application being used

DEVELOP THE PROCEDURE

1. Associated Administrative Controls

- This OSP, THA and the machine's operations manual
- On the job training and demonstrated proficiency
- Machining of lead, beryllium and other toxic metals is prohibited.

2. Operating Guidelines

- Ensure that all operator selector switches and buttons are clearly identified and that you know the function of every key, button, knob, or handle.
- Ensure that the chuck key has been removed from the spindle before starting the machine.
- Use the milling machine spindle brake to stop the spindle after the power has been turned off.
- Ensure that the power is off before adjusting tools, work pieces, or coolant hoses.
- Ensure that the spindle has stopped completely before taking any measurements.
- Ensure that the spindle has stopped completely before loading or unloading a work piece.
- Ensure that hands and arms are kept clear of the spindle start switch when changing tools.
- Ensure that cutters are sharp and in good condition prior to use.
- Ensure that the proper size and type of tool are being used for the job.
- Ensure that cutting tools have been removed prior to cleaning the machine.
- Use a hook or similar device to remove chips.
- Ensure that compressed air is only used to remove chips if the air hose is equipped with a pressure-reducing nozzle. Air must not be used if chips contain hazardous material, such as Radiation. Do not use compressed air to blow chips from personnel. This could embed chips into skin or worse air could enter the blood stream through a break in skin and cause an embolism
- Ensure that power drawbars and power-cutter adapter retention mechanisms do not release during power spindle rotation or as a result of power loss.
- Ensure that you are clear of pinch points created by moving slides before starting the machine.
- Ensure that work is done in a well-lit area.

3. Notification of Affected Personnel (who, how, and when)

- Notify equipment owner by pager, phone or email as appropriate in case of incident or malfunction

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

- Provide clearance between machines so that movement of one operator or helper will not interfere with the work of others.
- Provide ample room for handling of material, work pieces, and chips.
- Provide safe storage and handling of tooling and parts that could dislodge and fall or roll.
- Keep floor area around machine free of obstructions and maintained in safe condition.
- Use attached guard or shield to prevent chips and coolant from being thrown or splashed, except in areas not assigned as work areas or stations.
- Ensure that the spindle has stopped completely before opening safeguards or covers.
- Do not reach around a safeguard.
- Ensure that tool contact areas are inaccessible to the operator.

Ensure that all guards:

- Prevent body parts from entering the area being guarded.
- Do not create pinch points between the guards and other stationary or moving parts of the machine or tooling.
- Allow inspection, offer maximum visibility, and allow the use of coolant as necessary.
- Ensure that fixed guards are securely attached to the machine forms, components, or fixtures and, where possible, utilize fasteners removable by tools not normally at the disposal of the operator.
- Ensure that any loose parts or tools left on the machine are removed before operating the machine.
- Ensure that machine is prevented from moving unexpectedly. Start machine in manual mode. Disengage the power feed on manual machines when not in use.
- Ensure that the spindle rotates in the correct direction for the tool being used before cutting material.
- Ensure that rotating cranks and hand wheels are well lubricated and maintained.
- Hand wheels are located on retractable crank to ensure that crank is not protruding while the machine is operation.
- Ensure that the cut is not too heavy or the feed too rapid.
- Ensure that work is secured and located. Use stop-blocks where necessary. Keep clamps clear of cutter path.
- Ensure that the tool is not in contact with the work piece before the machine is started.
- Ensure that the correct table feed and spindle speed for the job is used. Reduce feed and speed if any unusual noise or vibration is noticed.
- Always stay at the machine while it is running.
- Ensure that power drawbars and power-cutter adapter retention mechanisms do not release during power spindle rotation or as a result of power loss.

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

- Notify equipment owner by pager, phone or email as appropriate in case of incident or malfunction

6. Special environmental control requirements:

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

- Reference; ENG-11-010-OSP, Handling, Storage, and Maintenance of Machine Shop Coolant.

6.2 Abatement steps (secondary containment or special packaging requirements)

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

- The emergency stop control overrides all other controls and does not create any hazards when actuated. Tested Daily.
- Each machine has a magnetic disconnect that must be reset manually after power failure.
- Contact equipment owner

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

- As required

9. Inspection Schedules

- Prior to each operation

10. References/Associated Documentation

- See signature page for manual location
- OSHA Standard 29 CFR 1910.212 Machinery and Machine Guarding

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

This OSP

Click
To Submit OSP
for Electronic Signatures

Distribution: Copies to: affected area, authors, Division Safety Officer
Expiration: Forward to ESH&Q Document Control

Form Revision Summary

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 – 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	02/19/14	02/19/17	1.3

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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 Doc

Author:	Folts	Date:	5/5/16	Task #: If applicable	

Complete all information. Use as many sheets as necessary

Task Title:	Physics division Milling Machines			Task Location:	Physics division work areas
Division:	Physics	Department:	Physics division	Frequency of use:	
Lead Worker:	Area Coordinator				
Mitigation already in place: Standard Protecting Measures Work Control Documents					

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
	Machine Tools: • Grinding • Cutting • Drilling • Rotating Parts	High	Low	3	Wear safety glasses with side shields. Do not wear rings, watches, jewelry, loose clothing, neckties, or long hair not contained by a net or shop cap. Follow operating guidelines found in the accompanying OSP	Use machine guards Wear proper work clothing Read and sign machine OSP Read and understand machine operators manual	1
	Dust • Hazardous • Nuisance	Medium	Low	2	Safety glasses Dust mask if necessary and trained	Respirator training SAF 200	N

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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
	Ergonomics including: • Lifting and Carrying Heavy Objects • Repetitive Motion	Medium	Low	2	Use mechanical assistance while lifting or transporting Take sufficient brakes to prevent stiffness	SAFE LIFTING (ERGONOMICS) MED 05	1
	Sharp Edges and Pinch Points	Medium	Low	2	Use Kevlar gloves to change cutting tools. Remove gloves before operating the machine.		N
	Compressed air	Medium	Low	2	Do not use air to blow chips from personnel. This could embed chips into skin or worse air could enter the blood stream through a break in skin and cause an embolism		N

Highest Risk Code before Mitigation:	3	**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
Revision 0.1 – 06/19/12 - Triennial Review. Update to format.

Task Hazard Analysis (THA) Worksheet

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

Revision 0.0 – 10/05/09 – Written to document current laboratory operational procedure.

ISSUING AUTHORITY	FORM TECHNICAL POINT-OF-CONTACT	APPROVAL DATE	EXPIRATION DATE	REV.
ESH&Q Division	Harry Fanning	06/19/12	06/19/15	0.1

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Physics Division
Operational Safety Procedure
Signature page

Equipment description	
Tag/model number	
Area coordinator	
Location of manual	
Location of machine	

Print Name	***Signature***	**Area coordinator Date**

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-19-88391-OSP

Title: Physics division milling machines

Name	Signature	Date