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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Serial Number: PHY-11-046-OSP / PHY-11-015-OSP
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[X] OSP [ ] TOSP

This document is written to mitigate hazard issues that are (check all that apply):
- [ ] Unable to comply with ES&H Manual requirements as written.
- [X] New/anticipated/previously unrecognized.
- [ ] Determined to have an unmitigated Risk Code of 3 or 4.

Issue Date:	12-14-11
Expiration Date: (No more than three years from Issue Date except TOSP which is three months from Issue Date)	12-14-14
Title:	Hall A Slow Raster OSP
Location:	Hall A
Risk classification (See *ESH&Q Manual Chapter 3210 Appendix T3 Risk Code Assignment*) — **Without mitigation measures (3 or 4):**	2
With mitigation measures in place (0, 1, or 2):	1
Document Owner(s):	R. Chris Cuevas / Alexandre Camsonne
Date:	14-December-2011

Supplemental Technical Validations:

Hazard Reviewed (per ES&H Manual 2410-T1):	Subject Matter Experts Signature:	Date:
Electrical Hazard	William Gunning	14-Dec-2011
Fast Shut Down	Rich Wright	14-Dec-2011

Approval Signatures:

	Print	Signature	Date:
Division Safety Officer:	Javier Gomez – Acting Physics DSO		12/14/11
Department or Group Head:	Robert Michaels – Acting Hall Leader		14 Dec 11
Safety Warden of Area:	Ed Folts		12-14-11
Other Approval(s):	Bert Manzlak – Physics Safety Liaison		12-14-11
	Arne Freyberger – Director of accelerator operations		14-DEC-2011
	Chris Cuevas – Head of Fast Electronics Group		14 DEC 2011

Document History:

Revision:	Reason for revision or update:	Serial number of superseded document

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

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After expiration: Forward original and log sheet of trained personnel to ESH&Q Document Control.

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1. Purpose of the Procedure

The procedure describes how to operate the slow raster during data taking requiring a large raster at the target. The procedure for removing and replacing a Raster power supply is also included.

2. Scope – include operations, people, and/or areas where procedure applies

. The Hall A slow raster magnets are installed in the Hall A beamline at locations MRC1H00VA (vertical) and MRC1H00HB (horizontal). The raster system produces a spiral raster pattern on the Hall A target and the raster must be ON whenever CW beam is delivered to the Hall A g2p polarized target. Hall A personnel control the Agilent Function Generator driving the Slow Raster power supply by entering the magnet current settings as appropriate for the beam energy and current, and MCC personnel verify the magnet current settings and then calculate the threshold limits, which are based on the magnet current settings. The Hall A Slow Raster screen is used to monitor the slow raster magnet current, set the current limit thresholds, and clear FSD faults.

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

Figure 1 shows the Hall A g2p beam-line diagram. The Hall A slow raster magnets are located in Region 1 and the magnet power supplies are located directly beneath the beam-line girder. Note the magnet ID labels

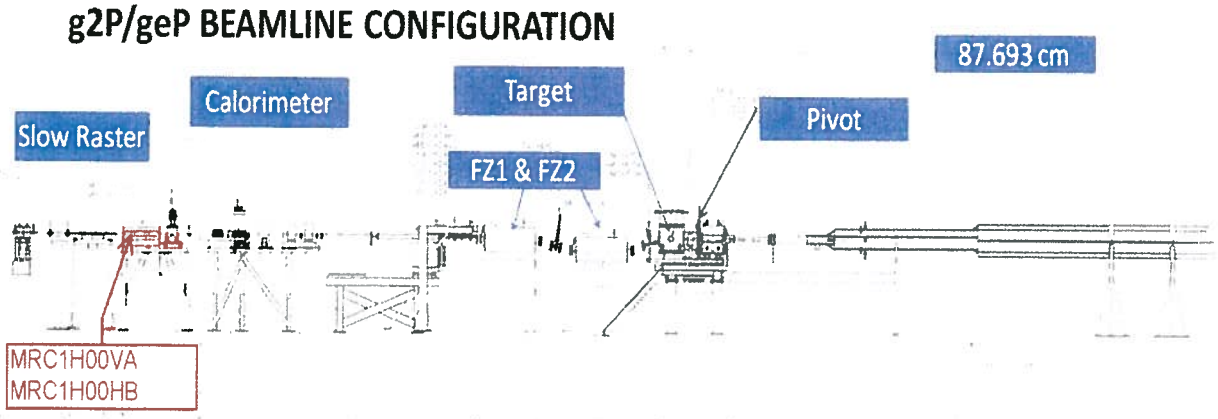

Figure 1: Hall A - g2P Slow Raster Location

The function generator is located in the middle room of the Hall A counting house, it is an Agilent 33522A.

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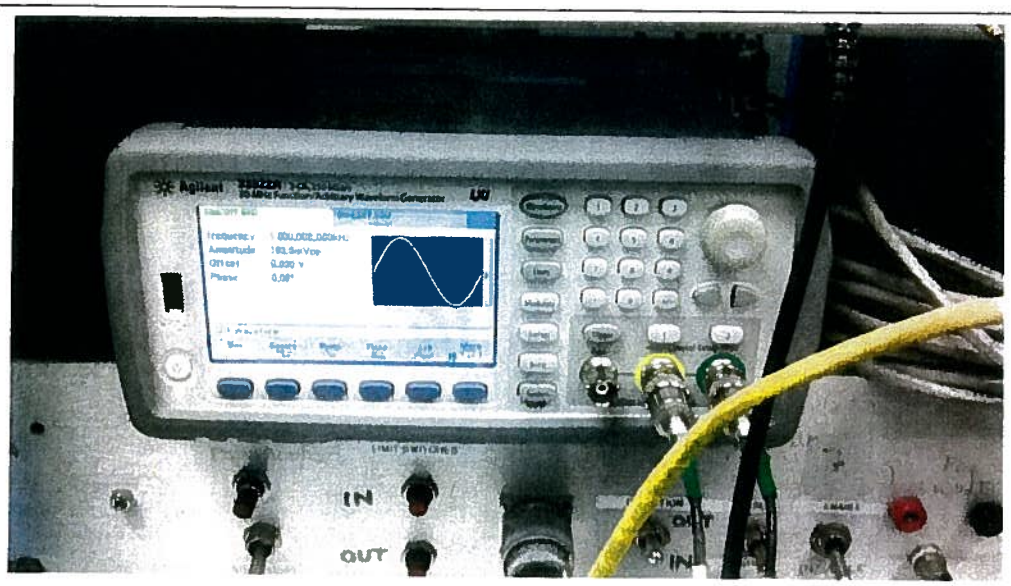

The FSD Beam Raster Monitor (BRM) is located in iochla and connected to the power supply for its current readout.

4. Authority and Responsibility:

4.1 Who has authority to implement/terminate

The Hall A Group Leader has the authority to implement or terminate this procedure.

4.2 Who is responsible for key tasks

Alexandre Camsonne is responsible of operation of the Slow Raster.
William Gunning has responsibility for the installation and maintenance of the Hall A Slow Raster power supplies.

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

6. Personal and environmental hazard controls including:

6.1 Shielding

The Hall A Slow Raster power supply chassis are located beneath the beam line girder in Region 1 as previously shown in Figure 1. A shielding enclosure surrounds these power supply chassis. The shielding is constructed of concrete blocks, so no special PPE is required for handling the shielding material.

6.2 Interlocks

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The Hall A Slow Raster power supply chassis contain an internal interlock relay that ensures the voltage levels within the chassis are zero if the chassis is opened. No external interlock is required.

6.3 Other

7. Monitoring systems

The Hall A Slow Raster power supply and magnet currents are monitored with the Beam Raster Monitor (BRM) circuit board and the operating conditions for magnet current, and threshold limits are displayed in the Machine Control Center

8. Ventilation

A single ventilation fan provides air flow to the slow raster power supply chassis enclosure. Two fans are attached to the Plexiglas magnet enclosure on the beamline and receive A/C power from the Slow Raster power supply chassis. Air flow is not monitored nor interlocked, and if they fail, the power supply outputs may diminish. The heat sink design internal to the power supply chassis includes a fan, and internal temperature sensor circuits will provide a controlled shutdown of the power supply

9. List of safety equipment (i.e: personal protective equipment or special tools)

10. Associated administrative procedures

11. Operating guidelines

The Hall A Slow Raster is operated during beam operations and is controlled remotely from the Hall A counting house. The Accelerator MCC operations group configures the Slow Raster magnet current limits per the Hall A experimental run coordinator. (See item 22 for MCC procedure reference)

12. Notification of Affected Personnel (How and Who)

In case of issues contact Alexandre Camsonne

13. List of steps required to execute the procedure from start to finish.

Turning Slow Raster On

1. Contact MCC to turn the beam off
2. Set the function generator up (MRC1H00VA and MRC1H00HB) to produce a spiral pattern on the Hall A target for the given beam current and beam energy..
3. Call MCC to enter the new FSD setting in the *Hall A Slow Raster* screen . The screen is located in **monticello.edl⇒Hall A⇒Hall A Slow Raster**
4. Ask for beam back and check raster size on target. In case of FSD trip double check the set values and values entered on the Hall A Slow Raster screen. If a FSD trip still occur call an expert from the

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list.

Turning Slow Raster Off

1. Contact MCC to turn the beam off
2. Turn function generator off or set amplitude to 0
3. Call MCC to enter the new FSD setting in the *Hall A Slow Raster* screen . The screen is located in **monticello.edl⇒Hall A⇒Hall A Slow Raster**
4. Ask for beam back and check raster size on target. In case of FSD trip double check the set values and values entered on the Hall A Slow Raster screen. If a FSD trip still occur call an expert from the list.

Power supply replacement procedure

1 Personnel notified that Hall A Slow Raster requires servicing/troubleshooting
2 Access Hall A during restricted access or controlled access
3 Remove power from the Hall A Slow Raster power supply
4 Unstack shielding blocks to access power supply chassis enclosure
5 Disconnect cabling to power supply chassis
6 Remove power supply chassis from enclosure
7 Install new power supply chassis
8 Re-connect all cabling to the new power supply chassis
9 Restore power to the power supply chassis
10 Verify power indicator and fans are functioning
11 Re-stack shielding blocks to cover the power supply chassis enclosure
12 Test new power supply chassis before leaving Hall
   a. Call MCC to verify that the Slow Raster magnet current is configured properly
13 Place bad power supply chassis in the proper area reserved for RadCon survey
Exit hall

14. Back out procedures, i.e., steps necessary to restore the equipment/area to a safe level.

Turn function generator off

15. Special environmental control requirements:

16. Environmental Impacts (See EMP-04 Project/Activity/Experiment Environmental Review

[Start Typing Here]

17. Abatement Steps – Secondary Containment, or Special Packaging requirements

18. Training requirements

Standard Hall A training for shift and read and sign this OSP

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19. Unusual/Emergency procedures e.g., Injury, Fire, Loss of power
Follow standard emergency procedures outlined in the Hall A Conduct Of Operations manual.
20. Instrument calibration requirements, e.g., safety system/device recertification, RF probe calibration
21. Inspection schedules
Verification of equipment functionality and inspection is required at the beginning of each Hall A experiment period.
22. References/Associated Documentation
Reference Accelerator Operations procedure documentation page: http://opsntsrv.acc.jlab.org/ops_docs/online_document_files/MCC_online_files/HallA_target_slow_raster_proc.pdf
23. List of Records Generated (Include Location / Review and Approved procedure)
[Start Typing Here]

Authorized/Trained Individuals:

Print Name/Signature	Date
Alexandre Camsonne	
William Gunning	
Chris Cuevas	14 Dec 2011

Form Revision Summary

Revision 1 – 12/01/11 - Added reasoning for OSP to aid in appropriate review determination.

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Revision 0 - 10/05/09 – Updated to reflect current laboratory operations

ISSUING AUTHORITY	FORM TECHNICAL POINT-OF-CONTACT	APPROVAL DATE	EXPIRATION DATE	REV.
ESH&Q Division	Harry Fanning	12/01/11	12/01/14	1

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Jefferson Lab

Hall A Slow Raster Setup Procedure

Document Number: MCC-PR-04-012

Revision Number: Rev. 1; December 5, 2011

Technical Custodian: William Gunning or Chris Cuevas

Estimated Time to Perform: 10 minutes

Procedure Overview

This procedure is for use by operators in the MCC Control Room and describes the threshold limit setup of the Hall A Slow Raster screen. The Hall A slow raster magnets are installed in the Hall A beamline at locations MRC1H00VA (vertical) and MRC1H00HB (horizontal). The raster system produces a spiral raster pattern on the Hall A target and the raster must be ON whenever CW beam is delivered to the Hall A g2p polarized target.

Hall A personnel configure the raster hardware and enter the magnet current settings as appropriate for the beam energy and current, and MCC personnel verify the magnet current settings and then calculate the threshold limits, which are based on the magnet current settings. The Hall A Slow Raster screen is used to monitor the slow raster magnet current, set the current limit thresholds, and clear FSD faults. See Figure 2 on page 4 for a block diagram of the raster system.

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Prerequisites

1. Contact the Hall A Shift Leader and verify that Hall A personnel have configured the raster magnets (MRC1H00VA and MRC1H00HB) to produce a spiral pattern on the Hall A target for the given beam current and beam energy. Ask the The Hall A Shift Leader for the intended magnet-current settings, and record these settings for use later in this procedure.

Procedure Steps

1. Stop the beam from entering Hall A by whatever means the MCC Crew Chief deems appropriate (beam off, switch to an upstream dump, insert Faraday Cup, etc.).

2. Open the *Hall A Slow Raster* screen (**monticello.edl⇒Hall A⇒Hall A Slow Raster**)(see Figure 1, below).

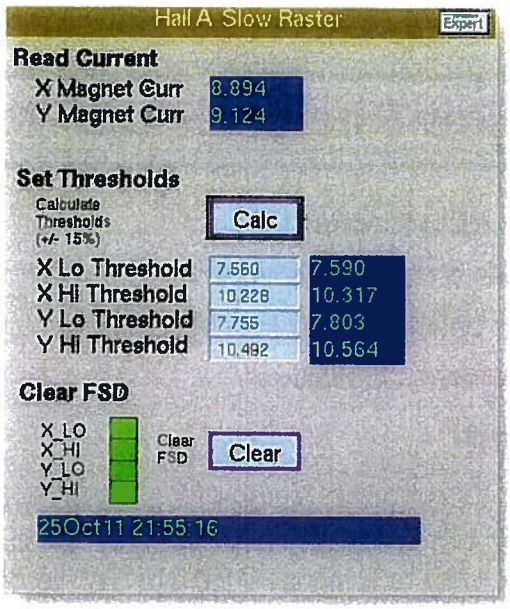

Figure 1: Hall A Slow Raster Screen

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3. Compare the present X and Y magnet current readbacks with the settings provided by the Hall A Shift Leader (see *Prerequisites*, Step 1 on page 1). Do the values match?

   YES NO → **A.** Contact the Hall Shift Leader and have him/her verify the present raster system setup is appropriate for the beam energy and current.

4. Click on the **Calc** button. The new threshold settings are automatically calculated based on the present magnet current settings. Verify that the thresholds make sense when compared to the X and Y magnet current readbacks (the thresholds should ±15% of these readbacks).
5. Make an ELog entry that includes a screen shot of the present *Hall A Slow Raster* screen.
6. Click on the Clear button to reset the Fast Shutdown (FSD).

7. Establish beam to the polarized target as requested by the hall. Did you get a raster system FSD trip?

   NO YES → **A.** Check the FSD status bits to see which limit caused the trip. Is the magnet current setting within the threshold limits?

   Go to Step 8

   YES NO → **B.** Call the Hall A Shift Leader and request the proper raster current setpoint. If a change is made, click on the Calc button, and try to establish beam again. Did you get another raster system FSD trip?

   Go to Step D

   YES NO → **C.** PROCEDURE COMPLETE

   D. Contact one of the following personnel for help with the system:.

	Extension	Cell/Pager	Home	Email
Bill Gunning	5017	879-2420		gunning@jlab.org
Pengjia Zhu	6279			pzhu@jlab.org
Chris Cuevas	5053	869-5704	865-0461	cuevas.jlab.org

8. PROCEDURE COMPLETE.

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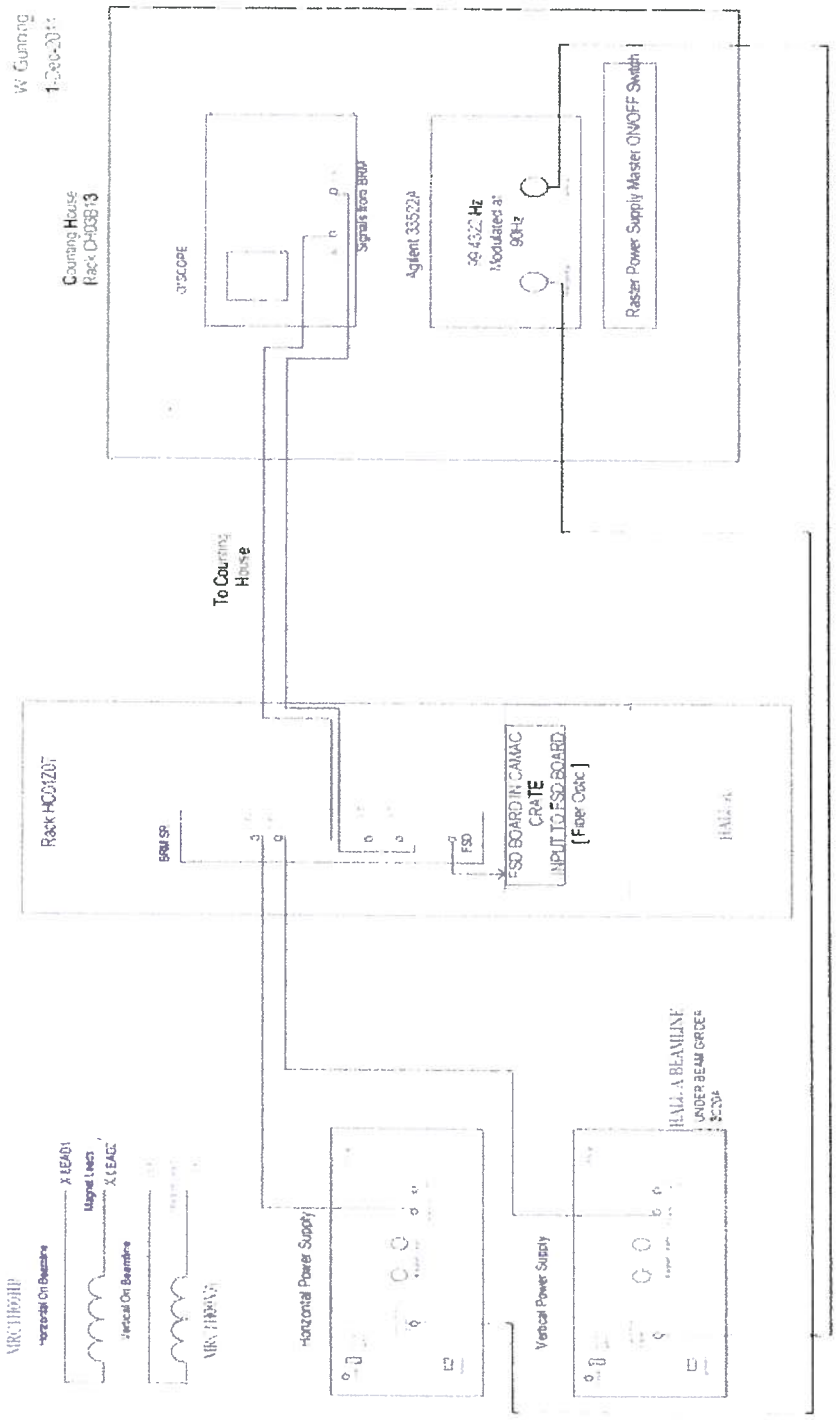

Figure 2: Hall A Slow Raster System Block Diagram

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3210Appendix T2
Task Hazard Analysis (THA) Worksheet

Click For Word Doc

Author:	Chris Cuevas / Alexandre Camsonne				
Date:	9-December-2011	**Task #:** If applicable		**Frequency of use:**	Use frequency is defined by Physics beam operations
Complete all information. Use as many sheets as necessary					
Task Location:	Hall A		**Task Title:**	Hall A Raster Operation	
Division:	Experimental Nuclear Physics		**Department:**	Fast Electronics Group \ Physics Hall A	
Lead Worker:	William Gunning x5017				
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
	Beam damage	2	2	2	Fast shut down system, ion chambers, beam off during changes	Procedure is designed to avoid any beam excursion	1
	Electrical hazard	2	1	2	Plastic guards, power supply interlock	Only authorized people can access	0
	Remove steel brick shielding	1	1	1	Gloves, safety shoes		1

	Highest Risk Code before Mitigation:	2		**Highest Risk Code after Mitigation:**	1

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3210Appendix T2
Task Hazard Analysis (THA) Worksheet

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.)

ISSUING AUTHORITY	FORM TECHNICAL POINT-OF-CONTACT	APPROVAL DATE	EFFECTIVE DATE	EXPIRATION DATE	REV.	
ESH&Q Division	Harry Fanning	10/05/09	01/01/09	10/05/12	0	

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