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Org: PHALLA

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Operational Safety Procedure Review and Approval Form # 104763  
(See [ES&H Manual Chapter 3310 Appendix T1 Operational Safety Procedure \(OSP\) and Temporary OSP Procedure](#) for Instructions)

Type:	<b>OSP</b> <a href="#">Click for OSP/TOSP Procedure Form</a> <a href="#">Click for LOSP Procedure Form</a> <a href="#">Click for LTT-Individual Information</a> <a href="#">Click for LTT-Group Information</a>					
Serial Number:	(Assigned after final approval)					
Issue Date:	(Assigned after final approval)					
Expiration Date:	< <i>Approximately 7/23/2023</i> >					
Title:	<b>Large Angle Detector (LAD)</b>					
Location: (where work is being performed) <a href="#">Building Floor Plans</a>	<b>96 - Experimental Hall C</b>	<b>Location Detail:</b> (specifies about where in the selected location(s) the work is being performed)	<b>Located on SHMS side of beamline approximately 6m from target around 127 deg off beamline.</b>			
Risk Classification: (See <a href="#">ES&amp;H Manual Chapter 3210 Appendix T3 Risk Code Assignment</a> )	Without mitigation measures (3 or 4):	<b>3</b>				
	With mitigation measures in place (N, 1, or 2):	<b>1</b>				
Reason:	This document is written to mitigate hazard issues that are : <b>Determined to have an unmitigated Risk code of 3 or 4</b>					
Owning Organization:	<b>PHALLC</b>					
Document Owner(s):	<b>Szumila-Vance, Holly (<a href="mailto:hszumila@jlab.org">hszumila@jlab.org</a>) Primary</b> <b>Wood, Stephen (<a href="mailto:saw@jlab.org">saw@jlab.org</a>)</b>					
Supplemental Technical Validations <input type="checkbox"/>						
<b>50V or Greater: De-energized Work (Phillip Stanley, Tim Fitzgerald)</b> <b>ESH&amp;Q Liasion (Bert Manzlak)</b>						
Document History <input type="checkbox"/>						
<table border="1"><thead><tr><th>Revision <input type="checkbox"/></th><th>Reason for revision or update <input type="checkbox"/></th><th>Serial number of superseded document <input type="checkbox"/></th></tr></thead></table>				Revision <input type="checkbox"/>	Reason for revision or update <input type="checkbox"/>	Serial number of superseded document <input type="checkbox"/>
Revision <input type="checkbox"/>	Reason for revision or update <input type="checkbox"/>	Serial number of superseded document <input type="checkbox"/>				
Lessons Learned	<a href="#">Lessons Learned</a> relating to the hazard issues noted above have been reviewed.					
Comments for reviewers/approvers: <input type="checkbox"/>						
Attachments <input type="checkbox"/>						

Procedure: [OSP\\_LAD.pdf](#)

THA: [THA\\_LAD.pdf](#)

Additional Files:

Review Signatures

This form entry has not been submitted for signatures.

Approval Signatures

This form entry has not been submitted for signatures.

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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**  
—

<b>Title:</b>	Large Angle Detector (LAD)		
<b>Location:</b>	Hall C	<b>Type:</b>	<input type="checkbox"/> OSP <input type="checkbox"/> TOSP
<b>Risk Classification</b> (per <a href="#">Task Hazard Analysis</a> attached) (See <a href="#">ESH&amp;O Manual Chapter 3210 Appendix T3 Risk Code Assignment.</a> )	<b>Highest Risk Code Before Mitigation</b>		3
	<b>Highest Risk Code after Mitigation (N, 1, or 2):</b>		1
<b>Owning Organization:</b>	Jefferson Laboratory	<b>Date:</b>	July 17, 2020
<b>Document Owner(s):</b>	Holly Szumila-Vance, Florian Hauenstein		

**DEFINE THE SCOPE OF WORK**

- Purpose of the Procedure** – Describe in detail the reason for the procedure (what is being done and why).  
The Large Angle Detector (LAD) is designed to detect protons in backward angles upstream to beam left of the target in the range of 90 – 160 degree. This detector is temporarily installed for the experiment E12-11-107 in Hall C.
- Scope** – include all operations, people, and/or areas that the procedure will affect.  
LAD consists of 55 refurbished CLAS6 TOF scintillator bars of various length (between 3.9-4.4m). Each bar has a 22cm x 5cm cross-section and is readout on both side by 3-in PMTs. Each PMT is powered with HV in the range from 1500-2200V. Each PMT provides two signal outputs (dynode and amplified) which are feed into FADCs and Discriminators/TDCs. Protons are identified by energy deposit and time-of-flight. System experts are defined in the ESAD. They are responsible for and authorize work on the hardware or change of system parameters.
- Description of the Facility** – include building, floor plans and layout of the experiment or operation.  
LAD is placed on the beam left side upstream of the target with a distance of 5.2 m or 6.2 m. The scintillator bars are arranged in 2 double layers and 1 single-layer with 11 bars in each layer. The single-layer covers backward angles from 92 – 116 degree while the double-layers cover ~114 - 157 degree. The top end of the detector is about 7 m above ground. The detector stands are about 1.2m tall. The closest patch panel for HV and signals is installed on the SHMS.

**ANALYZE THE HAZARDS and IMPLEMENT CONTROLS**

- Hazards identified on written Task Hazard Analysis**  
There are two hazards identified with the operation of LAD: 1) Electrical hazards when the HVPS is energized for the PMTs, 2) Fall hazard from using manlift or ladders to access parts of the detectors during maintenance and testing operation
- Authority and Responsibility:**

<b>5.1 Who has authority to implement/terminate</b>	Holly Szumila-Vance
<b>5.2 Who is responsible for key tasks</b>	

Authorized LAD experts, Hall C technicians, Hall C Work Coordinator

**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](#))

**6. Personal and Environmental Hazard Controls Including:**

**6.1 Shielding**

None

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

None

**6.3 Interlocks**

None

**6.4 Monitoring systems**

None

**6.5 Ventilation**

None

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

None

**7. List of Safety Equipment:**

**7.1 List of Safety Equipment:**

No personnel protective equipment is needed for testing or operating LAD from the Counting House or the Space frame. When accessing the detector using a manlift a harness is required; the detector is normally accessed using a ladder or platform.

**7.2 Special Tools:**

None

**8. Associated Administrative Controls**

Check all signs before entering the work area. Consult with the Hall C Work Coordinator before starting on and after finishing any servicing work related to the detector hardware.

**9. Training**

**9.1 What are the Training Requirements** (See [List of Training Skills](#))

SAF112, fall protection training (if using a ladder or manlift), ladder training (if using a ladder), harness training (only if going up the manlift), manlift training (only for manlift operators), electrical worker required (only for HV service work).

**DEVELOP THE PROCEDURE**

**10. Operating Guidelines**

The operation guidelines can be found in the LAD operation manual.

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

The Hall C Work Coordinator is to be consulted before any LAD servicing work on the detector hardware. Routine signal checkout should be done only by the LAD system experts.

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

All system operation steps are detailed in the LAD operation Manual

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

When the HV is turned off, the LAD system is in its fully safe condition.

**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

None

**14.2 Environmental impacts** (See [EMP-04 Project/Activity/Experiment Environmental Review](#))

None

**14.3 Abatement steps** (secondary containment or special packaging requirements)

None

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

In the event of injury, or an immediate emergency exists, call **911** and also notify:

- Guards (x5822)
- Occupational Medicine (x7539)
- Crew Chief (x7045) (if inside the fence)

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](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-24400/*.pdf).

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

None

**17. Inspection Schedules**

**18. References/Associated/Relevant Documentation**

see the LAD operation manual for instructions to operate and interact with the system.

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

**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](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 ES&H Document Control

### Form Revision Summary

**Revision 1.6 – 06/23/2020** – Update section 15 to reflect guard number, what to do in an emergency, crew chief numbers, etc. approved by H. Fanning

**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.
ES&H Division	<a href="#">Harry Fanning</a>	04/11/18	04/11/21	1.6

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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**

<b>Author:</b> Florian Hauenstein	<b>Date:</b> July 17, 2020	<b>Task #:</b> If applicable	
<b>Complete all information. Use as many sheets as necessary</b>			
<b>Task Title:</b> Large Angle Detector (LAD)	<b>Task Location:</b>		
<b>Division:</b> Physics	<b>Department:</b> HallC	<b>Frequency of use:</b>	continuously
<b>Lead Worker:</b>			
<b>Mitigation already in place:</b> <a href="#">Standard Protecting Measures</a> <a href="#">Work Control Documents</a>	All workers on the LAD detector must complete SAF112 (HallC walkthrough)		

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)
1	Energize LAD, HVPS(~1500-2000V, <1mA) – possible exposures to high voltage	M	L	2		SHV cables terminated properly at voltage divider and supply; supply properly grounded to racks. Manipulation of the SHV cables shall occur only when the HVPS is powered off.	0
2	Servicing detector components – man-lift, ladder, or platform access, potential fall hazards	H	M	3	Only those with proper training may access the system during servicing operation	Harness training, man-lift training, ladder training, platform training, fall protection training	1

<b>Highest Risk Code before Mitigation:</b>	<b>Highest Risk Code after Mitigation:</b>
---------------------------------------------	--------------------------------------------

## Task Hazard Analysis (THA) Worksheet

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

When completed, if the analysis indicates that the [Risk Code](#) before mitigation for any steps is “medium” or higher ( $RC \geq 3$ ), 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](#).)

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## Task Hazard Analysis (THA) Worksheet

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

### 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	<a href="#">Harry Fanning</a>	08/29/18	08/29/21	0.1

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For questions or comments regarding this form contact the Technical Point-of-Contact [Harry Fanning](#)

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