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Org: PHALLD

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Operational Safety Procedure Review and Approval Form # 141421
(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 LO SP Procedure Form Click for LOTO-COMPLEX Information Click for LOTO-GROUP Information
Serial Number:	ENP-22-141421-OSP
Issue Date:	9/16/2022
Expiration Date:	9/16/2025
Title:	Beam test of the FCAL2 / EIC calorimeter modules (and calorimeter prototypes) using Hall D Pair Spectrometer
Location: (where work is being performed) Building Floor Plans	203 - Experimental Hall D - 302 Location Detail: (specifics about where in the selected location(s) the work is being performed) Experimental Hall D behind the right arm of the pair spectrometer

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

Reason: This document is written to mitigate hazard issues that are :
Not Applicable

Owning Organization: **PHALLD**

Document Owner(s): **Somov, Alexander (somov@jlab.org) Primary**
Berdnikov, Vladimir (berdник@jlab.org)

Supplemental Technical Validations

Mode 1: Class 1, 2, and 3 Electrical Equipment (Bonnie Rodriguez, Phillip Stanley)
ESH&Q Liasion (Bert Manzlak)

Document History

Revision <input checked="" type="checkbox"/>	Reason for revision or update <input checked="" type="checkbox"/>	Serial number of superseded document <input checked="" type="checkbox"/>
1	No changes required.	ENP-19-94221-OSP

Lessons Learned [Lessons Learned](#) relating to the hazard issues noted above have been reviewed.

Comments for reviewers/approvers:

This SOP is an extension of the SOP 73917 (test of the PWO calorimeter prototype)

Attachments

Procedure: *Document-24048_crystals.pdf*

THA: *3210T1Form_crystals.pdf*

Additional Files:

Review Signatures

Subject Matter Expert : Electricity->Mode 1: Class 1-> 2-> and 3 Electrical Equipment **Signed** on 9/16/2022 8:02:16 AM by Phillip Stanley (pstanley@ilab.org)

Approval Signatures

Division Safety Officer : PHALLD **Signed** on 9/16/2022 8:08:06 AM by Ed Folts (folts@ilab.org)

ESH&Q Division Liasion : PHALLD **Signed** on 9/16/2022 9:48:09 AM by Bert Manzlak (manzlak@ilab.org)

Org Manager : PHALLD **Signed** on 9/16/2022 9:59:34 AM by Eugene Chudakov (gen@ilab.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.](#))

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Title:	Beam test of the FCAL 2 / NPS PWO crystals using Hall D Pair Spectrometer		
Location:	The test stand will be placed in the experimental Hall D behind the right arm of the pair spectrometer	Type:	<input checked="" type="checkbox"/> OSP <input type="checkbox"/> TOSP
Risk Classification (per Task Hazard Analysis attached) (See ESH&O Manual Chapter 3210 Appendix T3 Risk Code Assignment.)	Highest Risk Code Before Mitigation	1	
	Highest Risk Code after Mitigation (N, 1, or 2):	1	
Owning Organization:	Jefferson Lab, Hall D	Date:	10/27/2019
Document Owner(s):	Alexander Somov, Vladimir Berdnikov		

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 setup will be used to test quality and study light collection and energy resolution of PWO scintillator crystals using tagged electrons produced in a thin pair spectrometer converter. The PWO crystals will be used for the instrumentation of the Hall D FCAL 2 and NPS electromagnetic calorimeters. Each crystal has the following dimensions: 2 cm x 2 cm x 20 cm. The crystals will be placed in the light-tight box. Light from each crystals will be detected using a PMT powered by the standard CAEN HV unit at the maximum voltage of 1.5 kV. The standard GlueX electronics (HV units, cables, readout fadc module) will be used. This SOP is an extension of the SOP (73917) of the calorimeter prototype, which was previously installed behind the pair spectrometer
2. Scope – include all operations, people, and/or areas that the procedure will affect.
The test setup will be installed behind the pair spectrometer right arm. It will be operated in the stand alone mode (parallel to GlueX), and will not effect the GlueX performance. Work will be organized into several steps: <ol style="list-style-type: none"> 1. Install prototype in the Hall: Mark Stevens, Scot Spiegel, Timothy Whitlatch 2. Connect HV and read out electronics: Chris Stanislav, Nicholas Sandoval, Fernando Barbosa 3. Collect data and study the prototype performance: Alexander Somov, Vladimir Berdnikov
3. Description of the Facility – include building, floor plans and layout of the experiment or operation.
The prototype will be installed on the stand behind the pair spectrometer.

ANALYZE THE HAZARDS and IMPLEMENT CONTROLS

4. Hazards identified on written Task Hazard Analysis
Each prototype module are instrumented with Hamamatsu PMTs, which will be powered using the standard CAEN HV power supply (the maximum operational voltage is 1.5 kV). The standard SHV connectors and HV rated cables will be used. HV shielding will be checked before and after installing the prototype in the Hall.
5. Authority and Responsibility:

5.1 Who has authority to implement/terminate

Alexander Somov, Vladimir Berdnikov

5.2 Who is responsible for key tasks

Alexander Somov, Vladimir Berdnikov

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](#))

Vladimir Berdnikov, Alexander Somov, and active workers

6. Personal and Environmental Hazard Controls Including:

6.1 Shielding

N/A

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

N/A

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

HV sign

7. List of Safety Equipment:

7.1 List of Safety Equipment:

N/A

7.2 Special Tools:

N/A

8. Associated Administrative Controls

N/A

9. Training

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

Standard physics division trainings required to access Hall D

DEVELOP THE PROCEDURE

10. Operating Guidelines

N/A

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

HV sign will be attached to the prototype

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

1. The test setup will be installed on the existing stand
2. HV will be tested after installing in the Hall. HV sign will be attached before turning the power ON

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

N/A

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

N/A

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

N/A

14.3 Abatement steps (secondary containment or special packaging requirements)

N/A

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

N/A

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

N/A

17. Inspection Schedules

N/A

18. References/Associated/Relevant Documentation

Extension of the SOP 73917 (the setup previously used in Hall D)

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 TI](#)
[Work Planning, Control, and Authorization Procedure](#))

Click
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Author:	Alexander Somov, Vladimir Berdnikov	Date:	10/27/2019	Task #: if applicable	
Complete all information. Use as many sheets as necessary					
Task Title:	Beam test of the FCAL 2 / NPS PWO crystals using Hall D Pair Spectrometer				
Task Location:	Experimental Hall D behind the right arm of the pair spectrometer				
Division:	Physics	Department:	Hall D	Frequency of use:	Multiple
Lead Worker:	Alexander Somov, Vladimir Berdnikov				
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)
	High Voltage / Power Source	L	L	1		Use standard HV CAEN module, check shielding before use	1

Highest Risk Code before Mitigation:	1
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](#).)

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	Harry Fanning	08/29/18	08/29/21	0.1

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