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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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Title:	CLAS12 Forward Electromagnetic Calorimeter (EC) System		
Location:	Hall B	**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**	2
		Highest Risk Code after Mitigation (N, 1, or 2):	1
Owning Organization:	Jefferson Laboratory	**Date:**	August 17, 2016
Document Owner(s):	Stepan Stepanyan (stepanya@jlab.org)		

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 EC system in Hall B is designed to detect high-energy electrons and photons for CLAS12 for polar angles in the range from 5 deg to 35 deg. The EC system provides information necessary to trigger readout of the CLAS12 spectrometer. This system is a standard subsystem to be used for all operations of the CLAS12 spectrometer.

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

The system includes 408 scintillator channels installed in each of the 6 sectors of CLAS12 on the Forward Carriage (for a total of 2248 counters). Each channel is readout using a PMT/voltage divider powered via a HV power supply. Each PMT is read out by VME electronics (ADCs, TDCs) through signal cables. The EC Group is responsible for ensuring the system is fully operational for each physics-running period with CLAS12. Only system experts as defined in the EC Operations Manual are authorized to work on the hardware, change system parameters, or perform any servicing work.

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

The EC system consists of two modules of counters in each sector of the Hall B Forward Carriage. These modules are referred to as PCAL (192 PMTs per module, attached to the sides of each module) and ECAL (216 PMTs per module, attached at the rear of each module). Access to nearly all of the ECAL PMTs and some of the PCAL PMTs is available from the three decks of the Forward Carriage. HV and signal cables connecting the PMTs to the electronics racks pass under the removable floor grating.

ANALYZE THE HAZARDS and IMPLEMENT CONTROLS

4. Hazards identified on written Task Hazard Analysis

There are three hazards identified with operation of the EC system. 1) Electrical hazard when the HVPS is energized for the PMTs, 2). Fall hazards from using manlifts or ladders to access system elements during maintenance and testing operations, 3) Fall hazards from Forward Carriage floor grating removal needed for occasional cable splice repairs or replacement.

5. Authority and Responsibility:

4.1 Who has authority to implement/terminate

Stepan Stepanyan

4.2 Who is responsible for key tasks

Stepan Stepanyan, authorized EC experts, Hall B technicians, Hall B Work Coordinator

4.3 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)

Ed Folts

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

SAF111, fall protection training (if using a ladder or manlift), ladder training (if using a ladder), harness training (only if going up in a manlift), manlift training (only for manlift operators), electrical worker required (only for HV system service work)

6. Personal and Environmental Hazard Controls Including:

5.1 Shielding

None

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

Warning cones, signage and ropes to identify open floor gratings during cable maintenance.

5.3 Interlocks

None

5.4 Monitoring systems

None

5.5 Ventilation

None

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

For servicing, ladder training, man-lift training, harness training, electrical worker (see list in 4.4)

7. List of Safety Equipment:

7.1 List of Safety Equipment:

No personnel protective equipment is needed for testing or operating the EC system from the Counting House or the Forward Carriage. When accessing the detectors using a man-lift a harness is required.

7.2 Special Tools:

None

8. Associated Administrative Controls

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

DEVELOP THE PROCEDURE

9. Operating Guidelines

The operating guides for both general Hall B Collaboration members and EC system experts are detailed in full in the EC System Operations Manual (https://clasweb.jlab.org/wiki/index.php/CLAS12_Forward_Electromagnetic_Calorimeter)

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

The Hall B Work Coordinator is to be consulted before any EC servicing work on the detector hardware. Routine signal checkout and VME electronics work should be done only by EC system experts.

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

All system operation steps are detailed in the EC System Operations Manual.

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

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

13. Special environmental control requirements:

13.1 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

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

None

13.3 Abatement steps (secondary containment or special packaging requirements)

None

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

None

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

None

16. Inspection Schedules

None

17. References/Associated/Relevant Documentation

See the EC System Operations Manual for instructions to operate and interact with the system.

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

None

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

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	06/20/16	06/20/19	1.4