

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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For Word Doc

Title:	CLAS12 Low-Threshold Cherenkov Counter (LTCC) System		
Location:	Hall-B	Type:	<input checked="" type="checkbox"/> OSP <input type="checkbox"/> 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:	Oct. 19, 2016
Document Owner(s):	Maurizio Ungaro (ungaro@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 LTCC detector is used by the particle identification system in CLAS12 to discriminate between electrons and pions, for polar angles between 5 deg and 35 deg. 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 LTCC system is composed of 6 identical sectors. Each sector is a hermetically sealed container filled with C4F10, and contains 36 PMTs energized by a HV power supply. Each PMT produces two outputs, connected to VME electronics (FADCs, TDCs). The LTCC Group is responsible for ensuring the system is fully operational for each physics running period with CLAS12. Only system experts as defined in the LTCC Operations Manual are authorized to work on the hardware, change system parameters, or perform any servicing work. Only named trained Hall-B staff can operate the LTCC gas system, detailed in the LTCC Gas Manual and the Hall B Gas Controls Manual.

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

The LTCC sectors are installed in the Hall-B Forward Carriage. Access to the PMTs can be achieved by use of a man-lift. Access to the HV power supply and the electronics is available through 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 LTCC system. 1) Electrical hazard when the HVPS is energized for the PMTs, 2). Fall hazards from using man-lifts or ladders to access system elements during maintenance and testing operations. 3) Gas pressure hazards when the detector is pressurized with C4F10, typically 1-4 inches of water pressure.

5. Authority and Responsibility:

5.1 Who has authority to implement/terminate

Maurizio Ungaro. Gas System: George Jacobs.

5.2 Who is responsible for key tasks

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Maurizio Ungaro, authorized LTCC experts, Hall B technicians, Hall B Work Coordinator. Gas System: George Jacobs, Denny Insley.

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](#))

Ed Folts

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

SAF111, fall protection training (if using a ladder or man-lift), ladder training (if using a ladder), harness training (only if going up in a man-lift), man-lift training (only for man-lift operators), electrical worker required (only for HV system service work), SAF103 (ODH).

The procedures to control the Hall-B gas system are detailed in the LTCC Gas Manual and the Hall B Gas Controls Manual. Only named trained Hall-B staff can operate the LTCC gas system.

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.)

For servicing, ladder training, manlift training, harness training, electrical worker, SAF103 (ODH) (see list in 5.4)

7. List of Safety Equipment:

7.1 List of Safety Equipment:

No personnel protective equipment is needed for testing or operating the LTCC 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 LTCC system experts are detailed in full in the LTCC System Operations Manual (link once available). The gas system controls are detailed in the LTCC Gas Manual and the Hall B Gas Controls Manual.

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 LTCC servicing work on the detector hardware. Routine signal checkout and VME electronics work should be done only by LTCC system experts.

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

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

In particular:

1. Turn on the power on the crates (if it was off)
2. Start the slow control and monitoring system
3. Monitor the status of alarm handler, cooling, purging system, and environment readings.
4. Turn on gas flow (named trained Hall-B staff only)

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 LTCC system is in its fully safe condition.

1. Exit the online monitoring system
2. Turn off DAQ system
3. Turn off HV
4. Turn off gas flow (named trained Hall-B staff only).
5. If maintenance is needed in one or more sectors, switch to N2 flow and flush and recover C4F10 gas for those sectors (named trained Hall-B staff only).

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.)

Call Maurizio Ungaro 7578, Cell: (714) 609 6355

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 LTCC System Operations Manual for instructions to operate and interact with the system. Check with George Jacobs, the LTCC Gas Manual and the Hall B Gas Controls Manual for an overview

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of the gas system.

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

None

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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

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