Jefferson Lab	Operational Safety Procedure Form (See <u>ES&H Manual Chapter 3310 Appendix</u> <u>T1 Operational Safety Procedure (OSP) and</u> <u>Temporary OSP Procedure</u> for instructions.)	Click For Word Doc	

Title:	Bi	BigBite GRINCH for the SBS experiments					
Hall A on BigBite detector stack Location: Highest Risk Risk Classification (per Task Hazard Analysis attached) (See ES&H Manual Chapter 3210 Appendix T3 Risk Code Assignment.) Highest Risk Mitigation		Hall A or	A on BigBite detector stack			• OSP	
		Туре:	ं TOSP				
		Highest Risk Code Before Mitigation		3			
		H I	Highest Risk Code after Mitigation (N, 1, or 2):		1		
Owning Organization: Hall A			Data: August C th		0001		
Docume	ent Owner(s): Jack Segal, Bradley Yale, Eric Fuchey		2021				

DEFINE THE SCOPE OF WORK

1. Purpose of the Procedure – Describe in detail the reason for the procedure (what is being done and why).

This document describes the GRINCH detector which will be used in the BigBite spectrometer for the SBS experiments. This detector will be sitting in the BigBite detector stack in Hall A, and is produced by the College of William and Mary.

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

Operation of the GRINCH in the Hall A SBS experiments. The scope of this OSP encompasses electrical issues associated with the GRINCH, work conducted under Covid-19 elevated MEDCON levels, and access to the detector by use of the ladder.

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



The GRINCH will be installed in the Bigbite detector stack, sitting between the two stacks of GEM planes (see illustration on the left). This detector stack is located in Hall A, on the BigBite platform. The GRINCH is composed of a tank filled with C4F8 gas for Cherenkov radiator. The light radiated by the charged particles is reflected by mirrors and collected by a matrix of 510 photomultiplier tubes. The signal from the PMTs are processed by NINO front-end cards, and are conveyed to the GRINCH DAQ located in the DAQ bunker in Hall A through 17-pair flat cables. In order to mitigate the signal attenuation along the 100 ft cables, an LVDS to ECL converter is also required in the hall between the detector package and the DAQ bunker. At the DAQ bunker there is a corresponding ECL to LVDS converter to convert the signals back to the correct format. The high voltage power supplies for the PMTs are also sitting in the DAQ bunker, and also requires cables running from the DAQ bunker to the detector stack. The

low voltage for the NINO cards is located in the GEM electronics bunker connected via shielded pair cables to the low voltage distribution panel on the BigBite frame.

	ANALYZE THE HAZARDS and IMPLEMENT CONTROLS				
4.	Hazards identified on written Task Hazard Analysis				
	Electrical shock, pressurized gas containers, oxygen displacement, potential for ladder work and work under Covid-19 elevated MEDCON.				
5.	Authority and Responsibility:				
	5.1 Who has authority to implement/terminate				
	Hall A/C leader, Hall A work coordinator, Todd Averett, Bradley Yale, Jack Segal				
	5.2 Who is responsible for key tasks				
	Todd Averett, Bradley Yale				
	5.3 Who analyzes the special or unusual hazards including elevated work, chemicals, gases, fire or sparks (See <u>ES&H</u> <u>Manual Chapter 3210 Appendix T1 Work Planning, Control, and Authorization Procedure</u>)				
	Work Coordinator or designee				
6.	Personal and Environmental Hazard Controls Including:				
	6.1 Shielding				
	N/A				
	6.2 Barriers (magnetic, hearing, elevated or crane work, etc.)				
	GRINCH may need to be accessed by ladder. Safety training will be adhered to and working in pairs will be advisable to assist				

For questions or comments regarding this form contact the Technical Point-of-Contact Harry Fanning

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6.3 Interlocks					
N/A					
6.4 Monitoring systems					
The high voltage will be monitored with the help of the high voltage GUI. The gas will be monitored using a camera fixed on the pressure gauge.					
6.5 Ventilation					
N/A					
6.6 Other (Electrical, ODH, Trip, Ladder) (Attach related Temporary Work Permits or Safety Reviews as appropriate.)					
Use of current limited high voltage supply at 2kV. Use of shielded HV cables and connectors. Gas supplied through a pressure regulator attached to the gas bottle with flow limited by a flow meter.					
7. List of Safety Equipment:					
7.1 List of Safety Equipment:					
N/A					
7.2 Special Tools:					
N/A					
8. Associated Administrative Controls					
Setup, removal, or changes to the BigBite timing hodoscope setup may be coordinated through Todd Averett, Bradley Yale					
9. Training					
9.1 What are the Training Requirements (See List of Training Skills)					
Hall A walk through, Radiation Worker I, ODH training, Ladder safety training if requiring access by ladder, Pressure system training SAF130A, SAF 130C. Current electrical training with subject to change as new training is developed at the lab, equipment specific training					
DEVELOP THE PROCEDURE					
10. Operating Guidelines					
Normal operation of the system high voltage is documented in the HV "how-to" attached. Any other non-routine operation on the system shall not be made unless authorized by an individual in Section 5 and with training as noted above.					
11. Notification of Affected Personnel (who, how, and when include building manager, safety warden, and area coordinator)					

Contact Hall Work Coordinate prior to start of work

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12. List the Steps Required to Execute	e the Procedure: from start to finish.
 GRINCH installation provide the gas system Connect the gas system Install GRINCH HV and Connect the electronics, Gain match the PMTs, v 	ior to start of experiments in the BigBite detector stack. to the GRINCH d data acquisition in the SBS DAQ bunker. data acquisition and high voltage. which requires access to the front end NINO cards (ladder / lift required)
13. Back Out Procedure(s) i.e. steps ne	ecessary to restore the equipment/area to a safe level.
 Turn off high voltage an Stop gas flow Reassess the job before to 	d low voltage turning power and gas back on
14. Special environmental control requ	uirements:
14.1 List materials, chemicals, Subject Mater Experts) and	, gasses that could impact the environment (ensure these are considered when choosing d 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 (second	ary containment or special packaging requirements)
N/A	
15. Unusual/Emergency Procedures (e	e.g., loss of power, spills, injury, fire, etc.)
In the event of injury, or an immediat • Guards (x5822) • Occupational Medicine (x7539) • Crew Chief (x7045) (if inside th In case of an injury follow standard JJ emergency phone numbers. Additiona at <u>https://jlabdoc.jlab.org/docushare/c</u>	te emergency exists, call 911 and also notify:) he fence) LAB procedures. Initial response cards are located with each phone for appropriate al information can be found <u>dsweb/Get/Document-24400/*.pdf</u> .
16. Instrument Calibration Requirem	ents (e.g., safety system/device recertification, RF probe calibration)
 Access to front end NIN Gas leak rate check, via 	O cards for gain matching PMTs, including the top ones via ladder / lift access to the gas panel
17. Inspection Schedules	
None	

18. References/Associated/Relevant Documentation

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Bigbite "how-to" high voltage

lational Accelerator Facility

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

Submit Procedure for Review and Approval (See <u>ES&H Manual Chapter 3310 Appendix T1 OSP &</u> TOSP Instructions – Section 4.2 Submit Draft Procedure for Initial Review):

- Convert this document to .pdf
- Open electronic cover sheet: https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-24048/3310T1Form.doc
- 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 1.7 – 02/25/2021 – Corrected link to Word doc; updated 'ESH&Q' to "ES&H'; other minor edits. No approval						
required.	required.					
Revision 1.6 – 06/23/2020 – Update section 15 to reflect guard number, what to do in an emergency, crew chief numbers, e	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	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 <u>3210 T3 Risk Code Assignment</u> .						
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 Harry Fanning 04/11/18 02/25/24 1.6						
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