

HPS-Vertex 24-hour Operation Safety Review

Project Information

Project / experiment name	Heavy Photon Search commissioning	Location:	B084, room 231		
Requester	Jaros, John	Phone	2852	E-mail	john@SLAC.Stanford.EDU
Responsible person	Jaros, John	Phone	"	E-mail	"
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ESH coordinator	Kenny, Joe	Phone	2201	E-mail	jck@SLAC.Stanford.EDU

Statement of Work

The Heavy Photon Search experiment's Silicon Vertex Tracker (SVT) is being set up in the Group C Lab for commissioning prior to being sent to Jefferson Lab for operations. The tracker consists of an aluminum enclosure, support structures which hold a total of 36 silicon detector modules with readout hybrids, electronics for digitizing the output of the hybrids, cables to connect the hybrids to the electronics and the electronics to a vacuum flange and external power and DAQ, and cooling systems to cool the sensors/hybrids and the in vacuum electronics. Mechanical movers are in place to control the positions of the silicon support structures.

In addition to the tracker itself, the lab contains MPOD power supplies, two chillers, data acquisition electronics, and a dry air supply all connected to the SVT. At JLAB, the SVT will be operated in vacuum on the beamline. For tests at SLAC, the SVT will operate in a dry air environment to prevent condensation and frost accumulating on SVT components when the cooling system is operating.

Work will include full assembly of the SVT and its support equipment, checkout, and establishing the interlock systems. Then comes commissioning the entire device and its electronics and DAQ, and eventually long term runs of the full apparatus. We expect to exercise the DAQ extensively, studying trigger rate capability, overall data throughput capability, and long term error rate and stability issues. The device and its ancillary power supplies, chillers, and dry air supply will be set-up with the actual cables to be used at JLAB. The long term tests are expected to run overnight and weekends and potentially over the 2014 Christmas break. The crew conducting these tests has much experience with this apparatus, building its subsystems, and creating interlocks.

Threshold Review

If, based on review, the determination is yes on one or more of the broad thresholds below then the experiment/project must be referred to one or both of the external review processes (conventional and experimental).

Broad Thresholds	Determination	Comments / Clarification / Qualifiers
1. Some or all of the activity's characteristics having possible safety consequences are new to the responsible organization.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
The proposed activity represents a significant change of scope of the existing operation.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Only change is to allow unmanned operation, providing no additional hazards
The proposed activity introduces hazards not previously analyzed and for which there are no institutional protocols and procedures to mitigate them (e.g. hazards not addressed in the ESH Manual).	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
The proposed activity represents a significant change in the hazard of operation.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
The proposed activity is sufficiently complex that a review would be prudent.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
The proposed activity triggers Building Inspection Office (BIO) requirements* or is required by DOE order (e.g. DOE O 423) or Stanford institutional review boards. *BIO Review triggers are listed at the end of this form.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Hazard Discussion

The system operations are low hazard activities. The power supply is overcurrent protected, and supplies low voltages for the electronics and "high" voltage (100-200 v) for the silicon sensors. All connections are safe and insulated. The power supply is interlocked to the chillers, so power is removed in the event the flow of coolant is below threshold. This will prevent any damage to the electronics in the event of a chiller failure. The cooling system will have been pressure and leak tested prior to use, so loss of coolant should not occur. Even in the event of a leak, the coolant (HFE-7000, a nonflammable thermal management fluid) does not present hazards. DAQ crates are protected from overcurrent conditions. All electrical systems are SLAC/EEIP-approved. Dry air is ensured by measuring the dew point in the SVT volume. In the event the dew point is below the chiller temperature, power and chiller are turned off.

Applicability Determination


	Determination	Comments / Clarification / Qualifiers
Experiment/project can be designated a work activity? (Note: if no then please indicate below which (or both) review process applies)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Conventional construction project review process applicable?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Experimental review process applicable?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Preparers

Responsible person	Signature	Date
ESH coordinator	Joseph C. Kenny <small>Digitally signed by Joseph C. Kenny DN: cn=Joseph C. Kenny, o=USACE, email=Joseph.C.Kenny@usace.army.mil, c=US</small>	

Approvers

Building or area manager	Signature	Date
Requester's department head		

HPS PM, Marco Oriunno, 

Building Inspection Office Review Triggers

The triggers below are intended for quick reference. Modifications to science or experimental equipment, devices, or systems do not require Building Inspection Office (BIO) review and authorization, except that attachment/support and interface of the equipment and devices to building structures and building systems. For additional guidance, see the [BIO Project Review and Authorization Manual](#) (SLAC-I-730-2A24Z-001) and/or contact BIO (ext. 4113).

General Aspects of a Project That Trigger BIO Review

1. Construction, enlargement, alteration, moving, or demolishing a building or structure

Any element under review that has a known code violation (as an existing condition)

A change of character, use or occupancy of a space, building, parking lot, road, or structure

Tents, temporary structures, and membrane structures, including construction trailers and fences

Excavations, grading, and fill, or other earth moving activities

Partitions greater than 5'9"

Installations or modifications of science and experimental equipment as follows: BIO review and authorization required for the attachment/support/interface of the equipment and devices to building structures and building systems

Installation or alteration of a chemical or biological laboratory

Installation, alteration, repair, or replacement of pressure vessel, cryogenic, vacuum, or compressed gas systems

Initial installation or modification of piping or tubing used to deliver highly toxic or reactive (for example, unstable, pyrophoric, water reactive) fluids (gaseous or liquid) from a source container to the process/research equipment

Depending on the specific hazards, ESHQ may request that a formal process hazard analysis be conducted on the design of the system, before acquisition and installation of the hardware. During the initial installation, a procedure must be developed with BIO input for further modification and testing (for example, pressure testing, leak checking). Subsequent modifications falling within the scope of this procedure may be carried out and documented by the line organization without further review by ESHQ.

Installation, alteration, repair, relocation, or replacement of a hazardous materials storage, delivery, or use system

Work in or adjacent to a vehicular way

Structural Aspects of a Project That Trigger BIO Review

Installation, alteration, repair, or replacement of a structural element; any change that would affect loading or seismic resistance of a structure

Equipment/objects weighing 400 lbs or more will require engineered seismic restraints and consequent BIO review

Equipment/objects less than 400 lbs attached to the walls, ceilings, or floors may require seismic restraints and therefore BIO review. Please contact BIO for determination.

Electrical Aspects of a Project That Trigger BIO Review

Installation, alteration, repair, relocation, or replacement of an electrical element; any change that would affect the electrical loading of a system

New installation, connection of, or relocation of facility wiring, equipment (e.g. load centers, MCC, panels, etc.), transformers, or utilization equipment (except cord and plug connected equipment)

Exception: maintenance or replacement of like-for-like utilization devices such as light fixtures and receptacles does not require BIO review.

Mechanical (Piping, Plumbing, HVAC) Aspects of a Project That Trigger BIO Review

Installation, alteration, repair, relocation, or replacement of a mechanical element; any change that would affect loads on a system

Any facilities equipment change affecting quantities of air flow or a reduction in outside air

Repair or alteration of facilities piping, (e.g. steam, air, water, sewer, storm, process piping, process effluent, etc.) exceeding a materials value of

\$500

Exception: equipment maintenance or replacement of like-for-like does not require BIO review.

Fire Aspects of a Project That Trigger BIO Review

Installation, alteration, repair, relocation, or replacement of

Fire-resisting building elements (fire barrier walls)

Egress system components (aisle ways, corridors, exit doors, exit signs, emergency lighting, etc.)

Fire suppression, alarm, detection or reporting systems

Increases in fire loading beyond that typical for the existing building, structure, or area in question

Changes to fire department access (examples include narrowing of roads; alteration of trestles; installation of bollards; placement of anything that may block fixed fire response equipment such as fire hydrants, sprinkler risers or fire department connections)

Exception: equipment maintenance or replacement of like-for-like does not require BIO review

Environmental Aspects of a Project That Trigger BIO Review

Generation of significant and large quantities of hazardous waste that will have an immediate effect on fees/taxes imposed by the state and county and/or impact Waste Management labor and resources (such as waste drums and bins), or requires special disposal/treatment

Installation of equipment/containers that hold 55 gallons or more of oil

Removal of asbestos-containing material, and/or working where asbestos-containing material is, or may become, friable

Use of hazardous materials on a project during construction or operation

Proposed operations/experiments that may result in airborne emissions and/or liquid effluents

Operation of portable equipment powered by fossil fuel (for example, a standby generator)

Americans with Disabilities Act Aspects That Trigger BIO Review

Additions to or alteration of any accessible element, including paths of travel, ramps, walkways, doors, restroom facilities, exit paths, parking lots, sidewalks, stairs, required signage, elevators, break rooms, kitchenettes, or new elements