

C-AD Unreviewed Safety Issue (USI) Determination Form

Title of USI Determination: Temporary Installation of E864 Calorimeter Modules in RHIC Tunnel

Description of USI Determination (use attachments): Following an Experimental Safety Committee review and completion of action items, this test does not impact the RHIC safety envelope. See attached.

Title and Date of Relevant SAD: 2011 C-AD SAD

Associate Chair for A&R or A&R Division Head must initial all applicable determinations and actions. Write N/A for non-applicable. Leave no blanks.

Determinations and Actions	Initial or Indicate N/A
Determination: The current SAD and/or ASE addresses the hazard associated with the proposed work, event or activity.	[X]
Determination: This activity does not constitute a USI.	[X]
Action: Use this Form, the USI Checklist and attached description, if any, to document the USI Determination until the next revision of the SAD.	[X]
Action: Include this USI Determination as a reference on the A&R Division website "Authorization Bases" after approval by the C-AD Associate Chair for A&R.	[X]
Determination: The hazard associated with the proposed work is not analyzed or is not correctly bounded in the C-AD SAD and/or it is not controlled by an ASE.	[N/A]
Action: Submit the USI Determination or a revised SAD and/or ASE to the BNL ESH Committee.	[N/A]
Action: Do not perform activity until BNL has approved.	[N/A]
Action: Do not perform activity until DOE has approved.	[N/A]

Signature on File
Signature of C-AD A&R Division Head

6-15-16
Date

Signature on File
Signature of C-AD Associate Chair for A&R

6-15-16
Date

From: [Sivertz, Michael](#)
To: [Hoffman, Caitlin](#)
Cc: [Sivertz, Michael](#); [Beavis, Dana](#); [Bergh, Paul J](#); [Christie, William](#); [Cirnigliaro, Peter P](#); [Craner, Francis](#); [Drees, Angelika](#); [Etkin, Asher](#); [Folz, Charles](#); [Gaffney, Michael](#); [Greene, G Alanson](#); [Karol, Raymond C](#); [Kretschmann, Michael](#); [Kusche, Karl](#); [Lambiase, Robert](#); [Lessard, Edward T](#); [Lynch, Don](#); [Makdisi, Yousef I](#); [Needrith, William](#); [Pearson, Charles E](#); [Pile, Philip H](#); [Roser, Thomas](#); [Sampson, Paul](#); [Sullivan, Patrick T \(DOE\)](#); [Tuozzolo, Joseph E](#); [VanEssendelft, Melvin J](#); [Pak, Robert](#); [Crawford, Hank](#); [Bland, Leslie C](#); [Rusek, Adam](#)
Subject: Re: Moving the E864 calorimeter modules into the RHIC tunnel.
Date: Wednesday, June 15, 2016 3:09:44 PM

Minutes of the Experimental Safety Review Committee Meeting

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15 June 2016 MCR Conference Room

Subject: Moving the E864 calorimeter modules into the RHIC tunnel.

Abstract:

There is a desire to take advantage of the extra RHIC run time to do R&D with some E864 calorimeter modules in the tunnel just beyond the vapor barrier on the east side of STAR. Les Bland and Hank Crawford are leading this effort, which involves moving a cart with the modules (overall dims: 6 feet long X 2 feet wide X 2.5 feet high) through the PASS gate in the power supply building on the 5 o'clock side of STAR down the tunnel, under the beam pipe to position it behind the PASS gate leading into STAR IR. The proposal is to do this during the next scheduled RHIC access between the 39 GeV dAu and 200 GeV AuAu running (approximately June 17th).

Les Bland made a presentation available at:

http://www.andy.bnl.gov/Fresnel_Lens/20160615.2.pptx
http://www.andy.bnl.gov/Fresnel_Lens/20160615.2.pdf

Star is proposing to use the AGS-E864 spaghetti calorimeter to study full energy Au-Au collisions. The calorimeter is made up of 117-cm long module fabricated from 1mm scintillating fibers embedded in grooved lead sheets with 2mm pitch. This same detector was installed at the RHIC IP2 running as the AnDY experiment from 2011 to 2013. There was an extensive safety review of the AnDY experiment in January 2011. A 36 cell version of the calorimeter was installed in the west tunnel at STAR in 2014. In 2015, a 9-cell version was tested at FERMILab after extensive FNAL safety review.

For the 36-cell calorimeter used in STAR in 2014, the same calorimeter module was installed, but much smaller segmentation was employed, dividing each cell into 9 pixels. Attempts were made to reduce the magnetic field effects, with 120 Gauss along the axis of the PMTs.

In 2015 9-cell stack was moved to FNAL and tested in the test beam line there. Technical Scope of Work Document contains test results of all components

The components of the 2016 STAR test include:

6-cell spaghetti calorimeter stack,
strapped on a rolling cart with load capacity of 4000 lb.
The calorimeter is configured with high density pixelized light guides,

currently taking data with cosmic muons in the STAR Assembly Area.

It is read out in 27-pixels, 3 cells in a column.

There are 18 xp2972 photomultipliers viewing fresnel lens to compare with conventional acrylic light guides.

There are also 9 silicon photomultipliers to compare with conventional PMTs.

The high voltage is supplied from Cockroft-Walton bases on the PMTs.

The SiPMs are shielded using (possibly borated) polyethylene with less than 10 pounds total weight to shield SiPMs from neutrons.

Previous studies have shown that SiPM suffer from neutron exposure.

PMTs operate at ~1800 volts.

HV bases are produced from +/-6 and +/-12 V NIM power with each low voltage line fused separately.

The HV-generating bases are non-commercial.

EEL inspection (???) 1000 amp test (???)

Check with Yousef to see if the review of E864 still exists.

The trigger and data acquisition are built by the Berkeley group, used at IP2 during the 2011-2013 run, and at FNAL 2015.

All modules are powered from 108VAC

The Trigger/DAQ occupy 2 9U VME crates along with a commercial network switch, 5 Flash ADC boards,

CANBUS for remote control monitoring,

4 DSM FPGA boards and TCU FPGA Trigger, and a

1U control computer. There is also an unpowered

patch panel for photosensor connections to readout electronics.

Ed Lessard: Q: Does the work plan specifically state that there will be people present from the list of trained and qualified people who must be present any time the calorimeter is powered on?

Les will document that.

Les showed a schematic of the installation plan with the calorimeter in the RHIC tunnel behind the East STAR vapor barrier. Connections to the Trigger/DAQ run off the tunnel floor down to the east STAR WAH.

Rigging crew scheduled to move the calorimeter for friday 6/17/16.

1320 pounds of calorimeter, cart rated for 4000. It takes 20 pounds to make cart roll.

The path to the tunnel includes a ramp with a 7 degree incline.

Blocks will be used to ensure that the cart cannot run away down the ramp.

It was proposed to disconnect the existing setup in the Assembly Hall and move the calorimeter to 1005 on Thursday afternoon, saving ~45 minutes from the Friday move.

After the RHIC run. removal of the Trigger/DAQ rack may have to happen quickly.

Action items:

- 1) send around a copy of the work plan, and the list of authorized operators
- 2) signage for the calorimeter
- 3) wedge blocks to prevent rolling of cart in tunnel.

- 4) contact fire department to let them know the calorimeter is in the tunnel.
- 5) Ed Lessard will prepare a USI (Unreviewed Safety Issue) document to indicate negative USI.

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Collider-Accelerator USI Checklist Evaluation

Collider-Accelerator ESSHQ

Job or Project Title:E864 Calorimeter Modules in RHIC Tunnel
Point Of Contact: Leslie C. Bland
USI Determination: 0

Explanation of USI Determination 0: Negative. This project or job does not impact Credited Controls in the C-AD ASEs. Please ensure that you adequately address the hazards during work planning.

Explanation of USI Determination 1: Potentially Positive. Because of the work identified, this project or job has the potential to impact Credited Controls in the C-AD ASEs. Please contact Peter Cirnigliaro (x5636), Ray Karol (x5272) or Ed Lessard (x4250) for further assessment.

You answered YES to the following, which C-AD considers a potentially positive USI Determination:

You answered NO to the following, which C-AD considers a negative USI Determination:

1. Are any radiation barriers added, changed or modified by the job or project (for example concrete and steel blocks, earth shields, fencing)?
2. Will the project or job generate new sources of activated or radioactive material?
3. Will the project or job alter or change an interlocked or locked accelerator enclosure?
4. Will the job or project add, modify or otherwise affect an Access Control System?
 - 4a. Are critical devices changed?
 - 4b. Are gates or entrances changed or altered?
 - 4c. Are ACS networked devices added or removed?
 - 4d. Is the software or firmware for an ACS device altered or updated?
5. Are the large volume gas systems or their controls at AGS, RHIC, PHENIX, STAR or ERL being worked on?
6. Does the project or job involve altering, enlarging or otherwise changing an ODH area?
7. Are ODH fans or smoke removal fans or intakes in the RHIC tunnel or support buildings being modified in any way?
8. Are the smoke removal fans or intakes in the AGS tunnel being modified in any way?
9. Are environmental systems being worked on (stacks, filter banks or exhaust fans at BLIP, NSRL and Building 801)?
10. Are ventilation systems in Building 801, BLIP Building 931 or NSRL Building 956 being worked on?

Return to the USI Determination Questions

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