C-AD Unreviewed Safety Issue (USI) Determination Form

Title of USI Determination: ERL Enclosure Shielding and Magnet Interlock Improvements for 3.5 MeV Beam Commissioning

Description of USI Determination (use attachments): See Attachment 1

Title and Date of Relevant SAD: C-AD Safety Assessment Document (SAD) dated May 2011

Associate Chair for ESSHQ or ESSHQ 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.	[RCK]
Determination: This activity does not constitute a USI.	[RCK]
Action: Use this Form, the USI Checklist and attached description, if any, to document the USI Determination until the next revision of the SAD.	[RCK]
Action: Include this USI Determination as a reference on the ESSHQ Division website "Authorization Bases" after approval by the C-AD Associate Chair for ESSHQ.	[RCK]
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.	[NA]
Action: Submit the USI Determination or a revised SAD and/or ASE to the BNL ESH Committee.	[NA]
Action: Do not perform activity until BNL has approved.	[NA]
Action: Do not perform activity until DOE has approved.	[NA]

Ray Karol — 10/15/2014

Signature of C-AD ESSHQ Division Head — Date

Edward T Lessard — 10-15-14

Signature of C-AD Associate Chair for ESSHQ — Date

Attachment 1
ERL Enclosure Shielding and Magnet Interlock Improvements for 3.5 MeV Beam Commissioning

1. As noted in Reference 1, no shielding upgrades are needed for the ERL Low Power testing program which is limited to 70W.
2. In preparation for a high current test of the ERL electron gun with up to 3.5 MeV electron beam, the ERL enclosure shielding has been reviewed and improvements either made or in-progress as of the date of this USI form as described in References 1 through 4. The upgrades are all based on conservative dose rate calculations. The improvements were focused on shielding holes such as the cryogenics piping ports and the laser port, the bulk side and roof shielding seams, the penetrations on the shield walls and roof and above the beam dump. The standard control for these upgrades will be to list them on the RSC Checklist for 3.5 MeV Beam Commissioning. The RSC Checklist is the method used to verify that all required shielding upgrades are completed before approval is given for beam operations. A stepwise increase in beam power will be specified by written procedures which include detailed radiation surveys to verify the effectiveness of these improvements. Each incremental power increase will only be approved after careful review of radiation survey results to ensure that the as-built shielding is adequate to proceed to each subsequent power increase. In preparation for the commissioning, radiation postings will be posted conservatively to ensure safe operations. Final postings will be based upon the completed 3.5 MeV commissioning program survey results. A history of all radiation safety reviews for the ERL project is given in Reference 5.
3. Based upon a review of the RSC Chair and with agreement of the RSC, the ERL project has added a requirement to interlock ERL dipole magnets with appropriate tolerance to prevent the electron beam from being bent in the wrong direction causing faulted beam to potentially steer towards insufficiently shielded areas in the bulk shielding or through bulk shield seams. This was discussed in the July 15, 2014 RSC minutes, Reference 6.

References:

1. D. Beavis, ERL Shielding Holes, Seams, and Penetrations for 3.5 MeV Beam, May 27, 2014 (Updated July 8, 2014)
2. D. Beavis, ERL Roof Shims, June 19, 2014
3. D. Beavis, Examination of Miscellaneous Shielding Changes at ERL, July 14, 2014
4. DRAFT - D. Beavis, ERL Roof Seam Upgrades, October, XX, 2014
5. Compendium of Radiation Safety Committee Reviews for ERL
6. D. Beavis, Closing Open ERL Items, July 15, 2014.