

Booster Commissioning Accelerator Safety Envelope For the National Synchrotron Light Source II Photon Sciences Directorate

Version 2



December 8, 2011

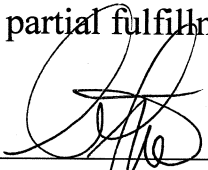
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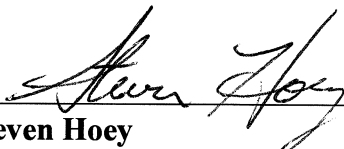
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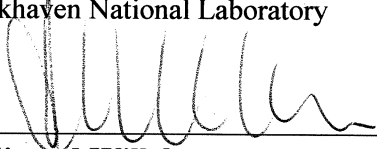
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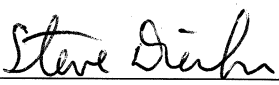
Photon Sciences Directorate
National Synchrotron Light Source II (NSLS-II)
BOOSTER COMMISSIONING
ACCELERATOR SAFETY ENVELOPE

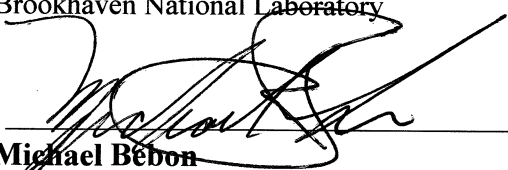
Submitted as partial fulfillment for Critical Decision-4 (CD-4)

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VERSION CONTROL SHEET

VERSION	DESCRIPTION OF ANY CHANGES	DATE	PREPARER	Approved by
1	For presentation to the NSLS-II and LESHC review committees	November 14, 2011	Nicholas F. Gmür	See above
2	Includes edits from the above two reviews. For presentation to the BNL DDO and DOE/BHSO	December 8, 2011	Nicholas F. Gmür	See above

1. Introduction

This Booster Commissioning Accelerator Safety Envelope (BCASE) governs the commissioning with electron beam of the National Synchrotron Light Source II (NSLS-II) Booster system, which consists of the Booster Ring, portions of the Linac-to-Booster and Booster-to-Storage Ring beam transport lines, and the Booster Ring beam stop (and the associated the Booster RF system). NSLS-II derived Credited Controls from the safety analyses described in the NSLS-II Booster Commissioning Safety Assessment Document (BCSAD).

Note: The Linac Commissioning Accelerator Safety Envelope will continue as a separate document, operating in parallel with this BCASE.

NSLS-II management considers failure to meet the Credited Control requirements established by this document during the commissioning period a BCASE violation. NSLS-II management will immediately cease commissioning and will terminate the electron beam. NSLS-II will immediately notify Department of Energy - Brookhaven Site Office (DOE-BHSO), Brookhaven National Laboratory (BNL), and Photon Sciences Directorate management personnel. NSLS-II will analyze violations using BNL Standards Based Management System (SBMS) policies and subject areas. Photon Sciences Directorate line management will authorize activity restart. NSLS-II line management will notify DOE-BHSO personnel before restart. Any activity that was shut down by DOE-BHSO must not recommence until DOE-BHSO approves the activity [ref. DOE Order 420.2C, Attachment 1, section 1.c].

Unreviewed Safety Issues (USI) are managed through application of the BNL SBMS and PSD procedures. Activities involving identified Unreviewed Safety Issues must not commence before DOE-BHSO has provided written approval [ref. DOE Order 420.2C, Attachment 1, section 3].

This BCASE is maintained and revision controlled within the Photon Sciences Directorate configuration management system.

2. Booster Equipment Maximum Hardware Capabilities

The following calculated hardware capabilities describe the limits of the equipment operation.

Energy = 3.2 GeV

Charge = 22 nC/pulse

Pulse Rate = 2 Hz (results in 44 nC/s)

[Ref. BCSAD sections 3.3.2.5 and 3.3.2.6]

3. Credited Controls; Engineered

For commissioning with electron beam, the following engineering control programs must be implemented and each must be documented, meet applicable BNL SBMS requirements, and be approved by line management to be acceptable.

- a. A personnel protection interlock system (PPS) for radiation hazard control must be operational.

[Ref. BCSAD 3.3.2.7 and 3.10.4 and 3.10.4.1 and 4.15.3.1.1 and 5.3]

- b. Radiological shielding and fencing must be in place.

[Ref. BCSAD 3.10.1, 4.15.3.1.2 and 5.3]

4. Credited Controls; Administrative

For commissioning with electron beam, the following administrative control program must be documented, meet applicable BNL SBMS requirements, and be approved by line management to be acceptable.

- a. Personnel protection interlocks must be tested and maintained in accordance with the requirements specified in the BNL Standards Based Management System and Radiological Control Manual.
[Ref. BCSAD 3.3.2.7, 3.10.4, 4.15.3.2.1 and 5.4]
- b. The active, interlocked radiation monitors must be calibrated and maintained in accordance with the requirements specified in the BNL Standards Based Management System and Radiological Control Manual.
[Ref. BCSAD 3.10.3 and 4.15.3.2.2 and 5.4]
- c. A radiation protection configuration control program must be in place to protect the functions provided by the PPS and the radiation shields.
[Ref. BCSAD 3.10.1, 4.15.3.2.3 and 5.4]
- d. A radiation monitoring and control program must be in place to verify adequacy of shielding and operational control of radiation exposure.
[Ref. BCSAD 3.10.3, 4.15.3.2.4 and 5.4]
- e. The power supply to the BS-B2 magnet and the position of the BS-SS safety shutter shall be locked and tagged in the safe position during Booster commissioning. Note: this Credited Administrative Control is cancelled once the Storage Ring commissioning starts in order to allow Booster electrons to be injected into the Storage Ring.
[Ref. BCSAD 3.10.4.1, 4.15.3.1.1.2, 4.15.3.1.2 and 4.15.3.2.5 and 5.4]
- f. At least one qualified, trained Accelerator Operator shall be on-duty during Booster commissioning with electron beam.
[Ref. BCSAD 1.4.2 and 4.15.3.2.6 and 5.4]