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

Version 3

December 8, 2011

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DISCLAIMER

Photon Sciences Directorate

National Synchrotron Light Source II (NSLS-II)

LINAC COMMISSIONING

ACCELERATOR SAFETY ENVELOPE

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

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Date

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VERSION CONTROL SHEET

VERSION	DESCRIPTION OF ANY CHANGES	DATE	PREPARER	Approved by
1	For presentation to the BNL Laboratory ESH Committee	March 3, 2011	Nicholas F. Gmür	See above
2	Incorporates the changes requested by the BNL Laboratory ESH Committee on April 12, 2011. For presentation to the BNL Deputy Director of Operations and DOE/BHSO.	May 11, 2011	Nicholas F. Gmür	See above
3	Revised sections 2, 3 and 4 to match language in the Booster Commissioning Accelerator Safety Envelope.	December 8, 2011	Nicholas F. Gmür	See above

1. Introduction

This Linac Commissioning Accelerator Safety Envelope (LCASE) governs the commissioning with electron beam of the National Synchrotron Light Source II (NSLS-II) Linac system, which consists of an electron gun, linear accelerator and klystron assembly, Linac-to-Booster transfer line, safety shutter, and beam stops. NSLS-II derived Credited Controls from the safety analyses described in the NSLS-II Linac Commissioning Safety Assessment Document (LCSAD).

NSLS-II considers failure to meet the Credited Control requirements established by this document during the commissioning period an LCASE violation and NSLS-II 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.

Unreviewed Safety Issues (USI) are managed through application of the BNL SBMS.

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

2. Linac Equipment Maximum Hardware Capabilities

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

- Energy = 250 MeV
- Current = 22 nC/pulse
- Pulse Rate = 10 Hz (results in 220 nC/s)
  [*Ref*. LCSAD 4.15.2.2.1]

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.* LCSAD 3.3.2.8 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.* LCSAD 3.10.1 and 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.* LCSAD 3.3.2.8 and 3.10.4 and 3.10.4.1 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.* LCSAD 3.10.3 and 4.15.3.2 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.* LCSAD 3.10.1 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*. LCSAD 4.15.3.1.2 and 5.4]

e. The power supply to the LB-B2 magnet and the position of the LB-SS safety shutter shall be locked and tagged in the safe position during linac commissioning. Note: this Credited Administrative Control is cancelled once the Booster Ring commissioning starts in order to allow Linac electrons to be injected into the Booster Ring.
[*Ref.* LCSAD 4.15.2.2.1 and 4.15.3.1.2 and 5.4]

f. At least one qualified, trained Linac operator shall be on-duty during Linac commissioning with electron beam.
[*Ref.* LCSAD 1.4.2 and 4.15.3.2.1 and 5.4]