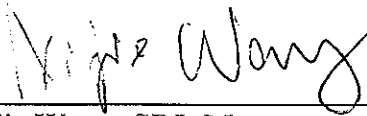


ACCELERATOR SAFETY ENVELOPE

Source Development Lab

1 October 2009


This ASE (Rev. C) supercedes Rev. B dated 1 October 2004



Xijie Wang, SDL Manager

8/31/2009


Date



Andrew Ackerman NSLS ESH&Q Manager

9/2/09

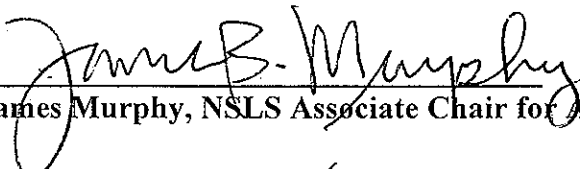
Date



Lori Stiegler, for NSLS ESH Committee

9/2/09

Date



James Murphy, NSLS Associate Chair for Accelerator

9/3/09

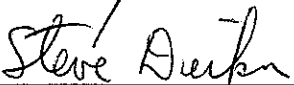
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Chi-Chang Kao, Chairman, NSLS

9/3/09

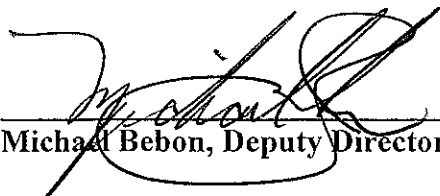
Date



Steven Dierker, ALD for Light Sources

9/16/09

Date



Michael Behon, Deputy Director of Operations

9/21/09

Date

1. Introduction

This Accelerator Safety Envelope (ASE) governs the operation of the Source Development Laboratory or SDL), including the photoinjector, linear accelerator, transport lines, Free Electron Laser (FEL) and beam stops.

Violation of this ASE's Limits listed in Section 2 requires an immediate halt of accelerator operations and notification of Department of Energy-Brookhaven Site Office (DOE-BHSEO), Brookhaven National Laboratory (BNL), SDL and National Synchrotron Light Source (NSLS) managements. Reviews will be undertaken and corrective actions developed, scheduled and tracked until all actions have been completed. Notification of BNL and DOE management and the approval of the NSLS/SDL managements are required to return to accelerator operation.

Sections 3 and 4 require the existence of a number of programs that ensure that the hazard evaluations of the SAD are maintained intact and controlled. Violation of a programmatic requirement listed in Sections 3 and 4 requires an immediate halt of the specific program activity and notification of DOE-BHSEO, BNL, SDL and NSLS managements. Reviews will be undertaken and corrective actions developed, scheduled and tracked until all actions have been completed. Notification of BNL and DOE management and the approval of the NSLS/SDL managements are required to restart the activity.

No activity or facility modification may compromise the Safety Assessment Document (SAD) or the ASE. Proposed changes are to be screened for hazards that lie outside the bounds of those considered in the SAD and in the development of the ASE, by implementing the Unreviewed Safety Issue Process. The USI process may result in rewriting portions of the SAD and modifying the ASE. Such revisions require applicable review and approval. Reportable events may also cause the USI process to be initiated.

This document, as well as the companion SDL Safety Assessment Document is subject to change control managed by the NSLS Department according to the Internal Controlled Documents Subject Area.

2. Safety Envelope Limits

The operation of the SDL must be carried out in a manner that ensures that the following safety envelope limit is not exceeded:

- 2.1 The dose equivalent to guests and staff members working in other BNL facilities adjacent to SDL Building 729 shall not exceed 25 mrem in one year as the result of SDL operations.
- 2.2 The dose equivalent to SDL guests, users and staff members working at the SDL shall not exceed 1250 mrem in one year as the result of SDL operations.

3. Engineered Safety Systems Requiring Calibration, Testing, Maintenance, and Inspection

- 3.1 Facility interlocks providing radiation and laser protection shall be designed, tested and maintained in accordance with BNL SBMS Subject Area 'Electrical Safety', Section 6, Interlock Safety for Protection of Personnel.
- 3.2 Personnel radiation monitors that annunciate locally shall be placed in locations subject to transient radiological conditions associated with SDL operations. Implementation of the radiation monitoring will be in accordance with SDL procedures (SDL Operator Response to HPI Beam Loss and Chipmunk Radiation Monitors; SDL Operation Check List). These monitors will be calibrated annually (not to exceed 15 months) and tracked through the NSLS Controlled Measurement and Test Equipment Database.

4. Administrative Controls

- 4.1 Two persons must be present at the facility during accelerator operation, at least one of whom must be a fully qualified operator. The operator shall follow guidelines and procedures as set forth in the SDL Procedures. The second person does not require operator training but does require NSLS facility specific and GERT training as well as SDL Facility-Specific Safety Awareness Briefing.
- 4.2 Configuration of radiation shielding and other radiation protection systems shall be controlled via the NSLS Safety System Work Authorization procedure.
- 4.3 All experiments conducted at the SDL shall be reviewed and approved using the NSLS Experiment Safety Review procedure. Any proposed experiment that would require operation outside of the approved SAD and ASE requires additional evaluation and/or revision of the SAD and ASE prior to its operation.
- 4.4 Work conducted at the SDL shall be controlled via the NSLS Work Planning and Control System Procedure. Hazard mitigation is through work planning.

5. Operating Envelope

The Operating Envelope denotes facility operating parameters or systems with a significant link to safety. Operation within the conditions identified in the Operating Envelope provides a buffer against exceeding the ASE Limits in Sections 2, 3 and 4 above. Operation of the facility in excess of the parameter identified in the Operating Envelope would not constitute a violation of the ASE, as long as other provisions of the ASE are not exceeded. Excursions beyond the levels of the Operating Envelope shall be recorded in the SDL Operations Log and can be tracked using the NSLS Nonconformance and Preventive & Corrective Action Reporting system.

- 5.1 The radiation dose Administrative Control Level to personnel working at the SDL is 100 mrem whole body dose during the calendar year. Permission to exceed this level must conform to the approvals defined in the NSLS Administrative Control Levels procedure.
- 5.2 The SDL shall not exceed the Maximum Electron Beam Energy of 300 MeV. Active monitoring of the beam energy will be provided during energy tune-up. Any increase in installed RF power will require review and approval of the ASE prior to such change.
- 5.3 The maximum average electron current during SDL operation shall be limited to 20 nA.
- 5.4 Radiation exposure to personnel in the building or in areas adjacent to the building is addressed in SDL procedure “SDL Operator Response to HPI Beam Loss and Chipmunk Radiation Monitors” and should not exceed a dose equivalent of 10 mrem from a fault condition.
- 5.5 Due to radiological concerns, all work within the building at heights greater than 96” (8’), and all work performed on the north shield wall or on the roof must be reviewed and approved by the SDL Work Control Coordinator.

Document Review Frequency	
5	Years

Review signatures on file with master copy of controlled document

LIGHT SOURCES DIRECTORATE REVISION LOG		
Document Number:		LS-SDL-0019
Subject:		Source Development Laboratory Accelerator Safety Envelope
Rev	Description	Date
A	First Issue	10/5/01
B	Changed 'SDL' to 'DUV-FEL' Links to new procedures added Rev. A sections 4.5 & 4.6 deleted Rev. A section 4.7 moved to Rev. B section 5.5 All references to 230 MeV changed to 300 MeV Rev. A section 5.4 deleted Rev. B section 5.4 enhanced to refer to new procedure	10/1/04
C	Changed 'DUV-FEL' to 'SDL' Added allowance for 15 month calibration frequency	