ACCELERATOR SAFETY ENVELOPE

PHOTON SCIENCES DIRECTORATE (PSD)
NATIONAL SYNCHROTRON LIGHT SOURCE (NSLS)

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1 Introduction

This Accelerator Safety Envelope (ASE) governs the operation of the National Synchrotron Light Source, including the electron gun, linear accelerator, booster ring, transport lines, VUV and X-Ray Rings, and beamlines. The controls are derived from analysis within the NSLS Safety Assessment Document (SAD)(LS-NSLS-0012; rev 3; June 2011).

Failure to meet the credited control requirements established by this document is considered an ASE violation and will result in immediate termination of electron beam use by line management and prompt notification to Department of Energy-Brookhaven Site Office (DOE-BHSO), and to Brookhaven National Laboratory (BNL) and Photon Sciences Directorate (PSD) management personnel. Violations will be analyzed as dictated by BNL SBMS policy. Activity restart is managed and authorized by PSD line management. DOE-BHSO personnel must be notified before restart.

Electron beam restart that was terminated by direction from the DOE-BHSO staff will be managed and authorized by that office.

Un-reviewed Safety Issues (USI) are managed through application of the BNL institutional SBMS process.

This document is maintained and revision controlled within the National Synchrotron Light Source (NSLS) configuration management system.

2 Hardware Limits

Analysis of existing accelerator hardware limits and the facility potential for ionizing radiation field generation forms the basis for establishing a minimum shielding thickness of eight inches of lead along any Bremsstrahlung beam path with two inches transverse to the point where any extreme ray strikes. The calculations are conservative and assume a total stored beam energy (~ 1133 joules) roughly 2.4 times what the NSLS accelerators can achieve (~476 joules).

Accelerator hardware is configuration controlled. Changes that could impact ionizing radiation exposures are managed as Un-reviewed Safety Issues.

3 Required Credited Controls

For operation with electron beam, the following control programs and systems must be implemented and each must be documented, meet applicable BNL SBMS requirements, and be line management approved.

3.1 An NSLS specific personnel protection interlock program that establishes system operation, function, and change control requirements. These interlock systems must be validated through functional tests every six months.

3.2 An NSLS specific radiation shielding program that defines shielding configuration and change control requirements.