

NSLS Un-reviewed Safety Issue No. 3

X-RAY RING ACCESS CONTROL INTERLOCK TEMPORARY MECHANICAL BYPASS

Note:

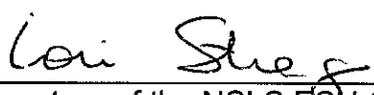
Signature of this cover sheet indicates agreement with the attached Un-reviewed Safety Issue (USI) analysis. It has been determined that temporary bypass of the X-ray ring access control interlock does not alter the safety basis of NSLS operations as stated in the NSLS Safety Assessment Document and does not require a modification of the NSLS Accelerator Safety Envelope.



8/4/10

Signature of the NSLS ESH/Q Manager

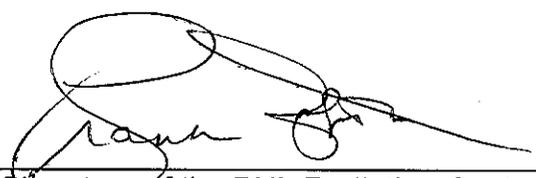
Date



8/20/10

Signature of the NSLS ESH Committee Chair

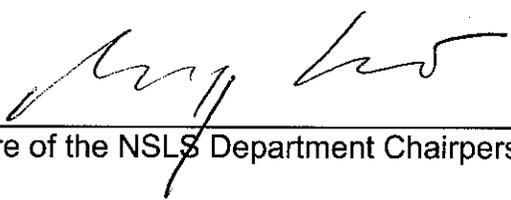
Date



8/30/10

Signature of the BNL Radiation Control Division
NSLS Facility Support Representative

Date



8/15/10

Signature of the NSLS Department Chairperson

Date

NATIONAL SYNCHROTRON LIGHT SOURCE
UN-REVIEWED SAFETY ISSUE (USI) ANALYSIS

X-RAY RING ACCESS CONTROL INTERLOCK
TEMPORARY MECHANICAL BYPASS

Introduction

This document is prepared as an addendum to the existing National Synchrotron Light Source (NSLS) Safety Assessment Document (SAD); dated August 14, 2006. It is intended to provide risk analysis for temporary mechanical bypass of the personnel protection interlocks that control access to the X17 front end section of the X-ray ring enclosure. The interlock bypass and associated X17A beam line installation is analyzed here as an Un-reviewed Safety Issue (USI) as defined in the DOE Order for Accelerator Safety; DOE O 420.2B.

Executive Summary

A new beam line, X17A, is being constructed for connection to the X-ray storage ring X17 front end. The schedule for completion of the line can be much advanced by allowing access to an area normally secured during storage ring operation and so allowing work to progress during X-ray ring operations. Analysis of the risks and available controls shows that safe entrance to this area can be achieved during ring operation, but will involve mechanical bypass of the personnel protection interlocks.

The safety impact of temporary bypass of the X-ray ring radiation enclosure at the front end of X17 is outlined below. It is concluded that this work can be accomplished without significant impact to the safety basis for the NSLS and that no change to the Accelerator Safety Envelope (ASE) will result.

Risk Analysis

The source for the NSLS X17 photon beam line is the superconducting wiggler insertion device within the X-ray electron storage ring. The beam line front end is divided into X17A, B, and C. X17B is further divided into X17B1, B2, and B3 to provide for a diverse suite of experiment stations. The X17A portal has always been locked closed, but is now being used for installation of a new X17A beam line and side station. Beam line layout drawings are attached below.

The X17A beam line will pass through the X17 transport hutches which have been modified to accommodate that installation. Personnel access to the transport hutches is controlled through action of the personnel protection interlocks and is contingent on the presence of ionizing radiation resulting from X-ray ring operation. Construction of the new beam line requires installation of a monochromator within the, "Small Transport Enclosure" where access is denied during ring operation.

The schedule for installation of the new line can be advanced by several months if access to the Small Transport Enclosure can be made during storage ring operations. That access involves temporary mechanical bypass of the personnel protection interlocks.

Safe entrance to the Small Transport Enclosure can be made with the following conditions:

- The wiggler magnetic field must be disabled. This will remove the synchrotron X-ray source and any heat load from that source. This can be accomplished by Lock Out / Tag Out of the power supplies that service that device.
- The X17 Front End Safety Shutters (FESS) must be locked closed with application of the standard NSLS Lock Out Tag Out procedure.

Note: Radiation surveys performed earlier in the year with the wiggler magnetic field disabled and the FESS closed indicated no ionizing radiation fields above background.

- The interlocks controlling access to the Small Transport Enclosure must be overridden by mechanically closing the six switches attached to the two doors for entrance to that enclosure. Clamping the switches closed and placing them in a locked box will assure adequate control while not impacting the electrical configuration of the system.
- A written procedure for temporary mechanical bypass of the interlocks must be approved by the NSLS ESH&Q Manager and the NSLS Chairman.

NSLS SAD and ASE Review

Appendix 1 of the NSLS SAD describes the personnel protection interlocks at the facility and includes a section on configuration control. That section allows for circumstances that extend beyond established practice and refers review and approval to the NSLS Interlock Working Group and the NSLS ESH Committee. Both those committees have reviewed and approved proposal for the interlock work described above.

Section 3.1 of the NSLS ASE indicates that the facility radiation protection interlocks must conform to BNL ESH requirements. The BNL Standards Based Management System (SBMS) includes provision for an, "Internal Waiver Request and Approval" in the, "Requirements Management" subject area intended for review of proposals that involve deviation from SBMS requirements. A waiver request in conformance with that subject area has been submitted. No work will proceed until that request is approved.

Conclusion

Temporary bypass of the X-ring access control interlocks at X17 presents no impact to the NSLS facility safety basis and requires no change to the ASE. This Unreviewed Safety Issue analysis indicates that the interlock work can be managed with existing NSLS procedures and presents no substantive impact to the existing SAD.