INSTRUMENT READINESS REVIEW (IRR)
FOR THE
NSLS–II LARGE AREA RAPID IMAGING ANALYTICAL TOOL I (LARIAT I), MICROCAL AND I0_UP AT THE 7-ID-1 (SST-1) BEAMLINE

TAILORED REVIEW PLAN

NSLSII-7ID1-PLN-006

PREPARED BY

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FOR THE

U.S. DEPARTMENT OF ENERGY
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BROOKHAVEN NATIONAL LABORATORY

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Tailored Review Plan

APRIL 24, 2019

PREPARED BY:

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Andrew Ackerman
Instrument Readiness Review Coordinator

APPROVED BY:

4/24/2019

X _____

John Hill
NSLS-II Director

By approving this plan, I acknowledge the requirements set forth herein and agree with its implementation.

VERSION HISTORY

VERSION	DESCRIPTION	LIST OF REVIEWERS	DATE
1	First Issue	M. Bebon M. Benmerrouche D. Fischer C. Jaye E. Johnson R. Lee C. Weiland P. Zschack	24APR2019

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ACRONYMS

ARR	Accelerator Readiness Review
CCD	Charge-Coupled Device
ESH	Environment, Safety & Health
FATS	Family Action Tracking System
IRP	Instrument Readiness Plan
IRR	Instrument Readiness Review
LARIAT I	Large Area Rapid Imaging Analytical Tool I
NSLS-II	National Synchrotron Light Source II
SME	Subject Matter Expert
SST-1	Spectroscopy Soft and Tender 1

1.0 INTRODUCTION

Processes for performing Accelerator Readiness Reviews (ARRs) and Instrument Readiness Reviews (IRRs) have been established for transitioning NSLS-II additions and modifications from construction and installation to readiness for commissioning. These processes include the *NSLS-II Process Description: Review Process for Facility Additions and Modifications* (NSLSII-DPT-PDN-012), the *NSLS-II Process Description: Instrument Readiness Reviews* (NSLSII-DPT-PDN-008) and the BNL Accelerator Safety Subject Area requirements for Accelerator Readiness Reviews.

This document provides the strategy for review of the LARIAT-I, Microcal, and I0_Up chamber additions to the SST-1 beamline. This Tailored Review Plan meets the requirements established in the NSLS-II IRR Process Description and the BNL Accelerator Safety Subject Area.

This plan will assure readiness to commission the LARIAT-I, Microcal, and I0_Up instrumentation and provides details for managing the review process. The LARIAT-I, Microcal, and I0_Up chambers are being added to the existing SST-1 beamline. The chamber installation changes the radiological control configuration, but presents no significant radiological risk to this operating beamline. The risks presented by installation of these chambers are common to this beamline.

2.0 REVIEW PROCESS TAILORING AUTHORITY

The *NSLS-II Process Description: Review Process for Facility Additions and Modifications* (NSLSII-DPT-PDN-012) provides the basis for tailoring the review process for an NSLS-II facility addition or modification project and identifies the NSLS-II Director as the approval authority. The process description allows the Cognizant Scientist or Engineer, or the Project Manager, to propose a tailored review process to the NSLS-II Director for approval. Once approved, the tailored review process is documented and used for the project or the remaining activities under the project.

3.0 TAILORED REVIEW READINESS SCOPE

The Large Area Rapid Image Analysis Tool, MK-I (LARIAT I) is the 3rd experimental station downstream of the exit slits on the SST-1 beamline. LARIAT I is designed for full-field soft X-ray partial electron-yield imaging, over a 1 cm x 1 cm field of view. The equipment includes a dither mirror, a pair of water-cooled electromagnets, a micro-channel plate, a phosphor screen, a CCD camera, a high vacuum chamber with turbo pumps and vacuum gauging, a sample load-lock chamber, a motorized in-vacuum sample manipulator, and associated electrical equipment. The Microcal is immediately upstream of and contiguous to LARIAT I. The Microcal is designed for soft X-ray emission spectroscopy. It includes a phosphor screen, a CCD camera, a high vacuum chamber with turbo pumps and vacuum gauging, a sample load-lock chamber, a motorized sample manipulator, and associated electrical equipment. The I0_up is located upstream of the Microcal and is used as diagnostics for both LARIAT I and Microcal. It consists of a phosphor screen, photodiodes, slits, meshes, a mask, and fast and window gate valves.

4.0 TAILORED REVIEW READINESS PROCESS

Analysis of the risks presented indicates that readiness to begin technical commissioning with the LARIAT-I, Microcal, and I0_Up chambers is best managed through development of an Instrument Readiness Plan (IRP). The standard IRP template customized to the LARIAT-I, Microcal, and I0_Up circumstance will be used, and owners will affirm that their systems are ready for safe commissioning to begin.

The LARIAT-I, Microcal, and I0_Up chamber installations include re-use and modification of older equipment for which no design documents are available. A modified traveler was developed to guide several Subject Matter Experts (SMEs) through physical inspection of the instruments and to capture findings. That traveler will be used as objective evidence for design review of the re-purposed equipment.

Standard installation travelers were developed to support equipment assembly at the beamline. There are no unique systems involved or new hazards introduced. Most of the standard beamline readiness criteria are included in the IRP.

LARIAT-I, Microcal, and I0_Up review will emphasize:

- Radiation safety component design, installation and configuration control
- Mechanical integrity
- Electrical safety

Declaration of readiness will be documented through signature of the IRP. Owners will sign for each system. The completed IRP will be approved and signed by the beamline Program Manager. The NSLS-II ESH Program Oversight staff will manage readiness preparation, coordinate completion of the IRP, and lead readiness verification with a team of ESH and Systems SMEs.

The NSLS-II Photon Science Division Director has line authority for final readiness approval to begin commissioning.

5.0 REVIEW TEAM CHARGE

The Review Team will be charged to interview personnel, review documents and inspect installed equipment. The Review Team will verify systems readiness and identify findings to be managed by NSLS-II Family Action Tracking System (FATS). Findings will be provided in two categories – pre-start and post-start. A preliminary report will be issued to identify any pre-start findings identified. A final report will be generated to document review specifics and post-start findings.

SMEs for mechanical and electrical engineering, radiation physics, controls, interlocks, quality assurance, management and industrial safety will be included on the review team.

If you have any questions or feedback regarding this document, please click this link.