INSTRUMENT READINESS PLAN (IRP)

FOR THE

NSLS–II LARGE AREA RAPID IMAGE ANALYSIS TOOL II (LARIAT II) ENDSTATION AT THE 7-ID-1 (SST-1) BEAMLINE

NOVEMBER 2018

NSLSII-7ID1-PLN-002

PREPARED BY

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FOR THE

U.S. DEPARTMENT OF ENERGY
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UNDER CONTRACT DE–SC0012704

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PREPARED BY: 11/15/18

A. Ackerman, Instrument Readiness Coordinator

APPROVED AS A PLAN TO ACHIEVE READINESS BY:

11/20/18

A. Broadbent, IRP Manager

CONCURRENCE BY: 11-21-18

R. Lee, ESH Manager

APPROVED – IRP HAS BEEN FULLY IMPLEMENTED AND EQUIPMENT IS READY FOR COMMISSIONING:

11-28-18

A. Broadbent, IRP Manager

CONCURRENCE BY: 11-28-18

R. Lee, ESH Manager

REVISION HISTORY LOG

REVISION	DESCRIPTION	DATE
1	Initial Issue	November 2018

TABLE OF CONTENTS

ATTACHMENTS

1.0 INTRODUCTION

1.1 Purpose and Scope

The purpose of this Instrument Readiness Plan (IRP) is to establish the readiness criteria required to declare the LARIAT II Endstation at the NSLS-II 7-ID-1 (SST-1) Beamline ready for commissioning. The scope of this IRP includes the LARIAT II endstation equipment and was prepared in accordance with *Instrument Readiness Reviews* (NSLSII-DPT-PDN-008). Scope is limited to the chamber, associated equipment, and section of beampipe downstream of photon shutter 9.

This IRP will be used as a tool for planning and certifying readiness. The completion of this IRP requires that all procedures, documentation and hardware listed in the plan are completed, tested, and, where required, independently certified. In addition, Staff and Users that will be involved in commissioning shall be trained and qualified to conduct their work safely, securely and in an environmentally sound manner.

1.2 LARIAT II Endstation

The Large Area Rapid Image Analysis Tool, MK-II (LARIAT II) is the downstream-most experimental station on the SST-1 beamline. LARIAT II is designed for full-field soft x-ray, partial electron-yield imaging, over a 2 cm x 2 cm field of view. Equipment includes a pair of high temperature superconducting magnets, a high vacuum chamber with turbo pumps and vacuum gauging, a water-cooled CCD camera, sample-mounting platform, a motorized in-vacuum sample manipulator, and associated electrical equipment.

1.3 Instrument Readiness Review (IRR)

As part of the verification of readiness for commissioning, an IRR is required in accordance with *Instrument Readiness Reviews* (NSLSII-DPT-PDN-008). An independent IRR Team will use the readiness criteria developed as part of this IRP to verify that the LARIAT II endstation is ready for commissioning in accordance with the appropriate Commissioning Plans. Pre-start and post-start findings will be identified by the team.

1.4 Authorization to Proceed with Commissioning

The completion of this IRP, together with closure of any pre-start findings from the IRR, is used as the basis for the NSLS-II Director to authorize the start of commissioning of the LARIAT II endstation.

2.0 INSTRUMENT READINESS PLAN

2.1 Readiness Criteria

Readiness criteria are provided in Attachments A through D. The criteria were developed by the Instrument Readiness Coordinator (IRC) and Readiness Team members, using the *General Readiness Criteria* provided in Attachment A and the *Instrument Readiness Guide* provided in Attachment C of *Instrument Readiness Reviews* (NSLSII-DPT-PDN-008).

The readiness criteria are grouped into the following categories:

- Pillar I – Documentation
- Pillar II – Hardware
- Pillar III – Personnel
- Completion of IRR Pre–Start Findings

3.0 IRP IMPLEMENTATION

3.1 IRP Team

An IRP Team will be appointed by the NSLS-II Director in accordance with *Instrument Readiness Reviews* (NSLSII-DPT-PDN-008). The IRP Team members that have responsibility for completing the IRP are listed as the Responsible Person in the Attachments.

3.2 Achieving Readiness – Responsibilities

The IRP Team members are responsible for ensuring that their specific readiness criteria are achieved.

The Lead Project Scientist is responsible for certifying that all of the readiness criteria associated with the endstation is achieved.

3.3 Execution of the IRP

The IRP Team members shall execute this IRP by preparing, installing, documenting, or training (as appropriate), the specific scope of work (readiness criteria) assigned to them as listed in the Attachments. The IRP Team members shall develop, compile or assemble the documented evidence that clearly demonstrates that the readiness criteria have been met. This evidence shall be listed on the Attachments.

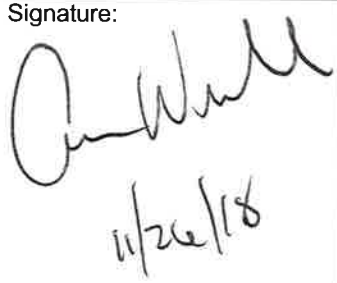
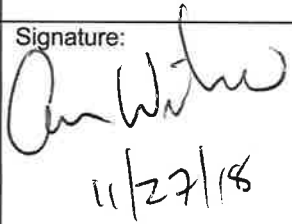
3.4 Certifying Readiness

Upon completion of the readiness criteria, the IRP Team members will certify that the criteria for which they are responsible for are complete by signing and dating the Attachments in the appropriate section. The Attachments shall not be signed until the readiness criteria have been fully achieved.

For completion of the IRR pre-start findings, if identified, the IRP Manager and the ESH Manager will certify that all IRR pre-start findings relative to the endstation have been completed, and that the associated ATS Actions have been closed by signing and dating Attachment D in the appropriate section. The Independent Verifier will concur that these actions have been adequately completed and closed by signing and dating Attachment D in the appropriate section.

ATTACHMENT A – PILLAR I DOCUMENTATION

LARIAT II ENDSTATION AT 7-ID-1

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR I DOCUMENTATION (PLANNING & PROCEDURES)	**Functional Description** An overview presentation is prepared that defines the scope of the IRR and includes the following specific information: – Primary capabilities – Physical layout and location (includes beamline location on the experiment floor) – Design reviews and performance parameters – Source characteristics – Photon beam performance goals – Radiation Safety Committee reviews – Self-identified pre-start findings – Description and status for each item listed in this Instrument Readiness Plan	C. Weiland Lead Project Scientist	• Develop the presentation and document described for the endstation	• Presentation • Functional Description Document	Signature: 
	Endstation Design Endstation components are designed in accordance with NSLSII-DPT-PDN-006, *Engineering Design for NSLS-II Structures, Systems and Components (SSCs)*	C. Weiland Lead Project Scientist	• Complete the endstation traveler and any documents that address thermal management, mechanical support, configuration control, and vacuum	• Endstation Traveler	Signature: 
	Radiation Safety Components Design Radiation Safety Components are designed in accordance with NSLS-II requirements.	C. Weiland Lead Project Scientist	• Complete requirements analysis and design of radiation safety components (beam stop)	• Internal design review documents and reports • RSC Report	Signature: 

*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

ATTACHMENT A – PILLAR I DOCUMENTATION

LARIAT II ENDSTATION AT 7-ID-1

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR I DOCUMENTATION (PLANNING & PROCEDURES)	**Secondary Radiation Scatter Analysis** Secondary Bremsstrahlung and Synchrotron scatter is analyzed in accordance with LT-C-ESH-STD-001, *Guidelines for the NSLS-II Beamline Radiation Shielding Design.*	S. Chitra Radiation Physicist	• Complete GB and SR analysis	• BNL Technical Note Report	Signature: 11/21/18
	National Environmental Protection Act (NEPA) Evaluation NEPA requirements evaluation completed.	L. Stiegler ESH Operations Group Leader	• Complete a NEPA evaluation	• NEPA evaluation report	Signature: 11/21/18
	Unreviewed Safety Issue (USI) Evaluations/ Screenings Authorization basis hazard identification is managed through USI evaluation/screening.	S. Moss Authorization Basis Manager	• Verify that the SAD and ASE accurately cover the hazards associated with the subject endstation, include temporary systems	• SAD and ASE USI screenings/evaluations • Applicable waivers	Signature: 11/28/18
	Resolution of Open Action Tracking System (ATS) Actions All action items from previous internal and external oversight groups (e.g., RSC, Design Reviews, etc.) have been closed. Previous IRR action items are addressed.	J. Zipper QA Engineer	• ATS action items for the endstation shown as closed with supporting evidence	• ATS System	Signature: 11/27/18

*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

ATTACHMENT A – PILLAR I DOCUMENTATION

LARIAT II ENDSTATION AT 7-ID-1

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR I DOCUMENTATION (PLANNING & PROCEDURES)	**Procedures** Procedures needed for safe, secure, and environmentally sound commissioning have been developed, reviewed, validated (where applicable), and approved. Existing procedures are sufficient for new hazards introduced by this endstation, if any.	K. Rubino Procedure Support	• Develop any system specific procedures/work instructions • Verify that existing procedures are sufficient for any new hazards introduced	• Operating the Superconducting Magnet (NSLSII-7ID-WIN-001) • Vent and Pump-down Work Instruction (NSLSII-7ID-WIN-003)	Signature: 11/19/18
	Radiation Survey Procedures A survey procedure has been generated for the Beamline in accordance with NSLSII-PSD-PDN-001, *Beamline Radiation Safety Commissioning*.	S. Chitra Health Physics	• Ensure that the SST Radiation Survey Procedure adequately covers the addition of LARIAT II	• Approved Beamline Radiation Survey Procedure (NSLSII-7ID-PRC-001)	Signature: 11/21/18
	Experiment Safety Review (ESR) An Experiment Safety Review has been submitted, executed and approved within the BNL ESR system.	C. Weiland Lead Project Scientist	• Complete submission and pursue approval of an Experiment Safety Review through use of the BNL electronic system	• Approved BNL ESR	Signature: 11/16/18
	Proposal Allocation Safety & Scheduling (PASS) The Equipment is active within PASS with approvals to proceed with Technical Commissioning.	C. Weiland Lead Project Scientist	• Assure that PASS is configured to administer the Equipment	• Defined resource within PASS • Submitted Technical commissioning proposal • Submitted Safety Approval Form	Signature: 11/16/18

*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

ATTACHMENT B – PILLAR II HARDWARE
LARIAT II ENDSTATION AT 7-ID-1

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR II SAFETY CRITICAL HARDWARE (INSTALLATION)	**Radiation Safety Components: Installation** Radiation safety components are installed in accordance with the assembly drawing.	C. Weiland Lead Project Scientist	• Install in accordance with assembly drawing • Confirm mechanical survey data meets design documents specifications	• Assembly Drawing • Survey Report • Discrepancy Reports	Signature: [signature] 11/27/15
	Radiation Safety Components: Configuration Control Update the current Radiation Safety Component Checklist template in accordance with NSLSII-ESH-PRC-004, *Radiation Safety Component Inspection Procedure.*	C. Weiland Lead Project Scientist	• Update Radiation Safety Component Checklist	• Approved beamline specific Radiation Safety Component Checklist with RSC review	Signature: [signature] 19 Nov. 2015
	Personnel Protection System (PPS) Interlocks: Installed and Certified Hardware/Software installed in accordance with PS-C-XFD-SPC-PPS-001, *Beamline Personnel Protection System (BLPPS) and Front End Personnel Protection System (FEPPS) Design Description.*	G. Ganetis Electrical Engineering Group Leader	• Generate system schematics and logic diagrams • Install PPS components • Certify PPS	• Overall PPS Checklist • Executed Beamline Radiological Interlock Test Checklist	Signature: [signature] PPS already installed and certified 11/21/15

*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

ATTACHMENT B – PILLAR II HARDWARE

LARIAT II ENDSTATION AT 7-ID-1

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR II SAFETY CRITICAL HARDWARE (INSTALLATION)	**Electrical Power** SBMS electrical power distribution requirements are satisfied. SBMS Electrical Equipment Inspection (EEI) requirements are satisfied.	G. Ganetis Electrical Engineering Group Leader	• Generate and approve one-line drawings • Complete system electrical inspection • Complete needed EEI inspections	• Approved AC Power one–line drawings • EEI database entries	Signature: 11/20/18
	Utilities Permanent facility and beamline utility systems are installed and tested (i.e., Compressed Air, DI Water, Gaseous Nitrogen, Process Chilled Water) in accordance with design, labeling, and attachment requirements.	J. Gosman Mechanical Utilities Group Leader	• Generate system schematics • Perform pressure test • Assure SBMS and NSLS-II labeling and hardware attachment requirements are met	• Approved system schematics • System pressure testing reports	Signature: 11/22/18
		C. Weiland Lead Project Scientist			Signature: 11/21/18

*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

ATTACHMENT B – PILLAR II HARDWARE

LARIAT II ENDSTATION AT 7-ID-1

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR II OTHER HARDWARE (INSTALLATION)	**Magnet Quench Protection** Interlock hardware for monitoring magnet heat load and interrupting power to device at set threshold level, and dumps circuit for safe release of stored energy in case of quench are installed in accordance with manufacturer's requirement.	C. Weiland Lead Project Scientist	• Complete system performance test • Complete integral testing	• Performance and integral testing documentation	Signature: 11/21/18
	Other Components, Optics, and Diagnostics Components that are not radiation safety components are installed and tested in accordance with the Travelers. Diagnostic equipment needed to begin technical commissioning is installed and tested.	C. Weiland Lead Project Scientist	• Generate and execute Traveler • Complete acceptance inspections	• Completed Traveler • Acceptance inspection documentation, as needed	Signature: 11/20/18
	Controls Hardware/Software installed and tested in accordance with NSLS-II requirements.	C. Weiland Controls Engineer	• Test system performance • Complete integral testing	• Performance and integral testing documentation	Signature: 11/21/18
	Vacuum Vacuum hardware has been installed and tested in accordance with the Traveler and has the capability of achieving full vacuum needed during commissioning.	R. Todd Vacuum Engineer	• Generate and execute Top Level Traveler • Identify overpressure devices • Test system performance	• Completed Endstation Traveler	Signature: 11/21/18

*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

ATTACHMENT C – PILLAR III PERSONNEL

LARIAT II ENDSTATION AT 7-ID-1

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR III PERSONNEL	**Lead Beamline Scientist (LBS) / Cognizant Space Manager (CSM)** LBS and CSM personnel are assigned and Trained/Qualified.	B. Lein Training Group Leader	• Assign JTA for LBS and CSM	• BTMS record	Signature: ** B Lein 11-27-18
	Authorized Beamline Staff Sufficient personnel to begin commissioning are assigned and Trained/Qualified.	B. Lein Training Group Leader	• Assign JTA	• BTMS record • Sufficient Staff Documentation	Signature: ** B Lein 11-27-18
	Support Staff Other, non-beamline dedicated personnel needed to begin commissioning (e.g., Beamline Engineers and Controls Personnel) are assigned and Trained/Qualified for the Beamline and FE/ID.	B. Lein Training Group Leader	• Assign JTA	• BTMS record	Signature: NA B Lein 11-27-18

* READINESS CERTIFICATION	**C. Weiland** **Lead Project Scientist**	**Signature:** C Weiland 11/28/18

** DUE TO A RECENT DOE ASSESSMENT MANY DOCUMENTS WERE REVISED AND NEW TRAINING REQUIREMENTS WERE DEVELOPED. THESE TRAINING REQUIREMENTS ARE BEING ASSIGNED TO PERSONNEL ON A DAILY BASIS WHICH MEANS THAT AT ANY TIME PERSONNEL CAN BE OUT OF STATUS. THE 7-ID-1 PERSONNEL HAVE BEEN COMPLETING THEIR NEWLY ASSIGNED TRAINING REQUIREMENTS AS SOON AS PRACTICAL TO MAINTAIN THEIR TRAINING CURRENT.
B Lein 11-27-18

*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

ATTACHMENT D – COMPLETION OF IRR PRE-START FINDINGS
LARIAT II ENDSTATION AT 7-ID-1

	READINESS CRITERIA	RESPONSIBLE PERSON	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
IRR PRE–START FINDINGS	**No Pre-Start Findings Identified** No pre-start findings associated with the LARIAT II Endstation have been identified by the IRR Team and therefore the following lines do not require sign-off.	R. Lee ESH Manager	• IRR Preliminary Report	Signature:
		E. Cheswick Independent Verifier		Signature:
	Pre-Start Actions Complete All actions associated with the LARIAT II Endstation IRR pre-start findings are complete.	A. Broadbent IRP Manager	• Pertinent closure evidence	Signature:
	Pre-Start Actions Verified All actions associated with the LARIAT II Endstation IRR pre-start findings have been verified complete.	R. Lee ESH Manager	• Pertinent closure evidence	Signature:
	Pre-Start Actions Independently Verified Actions associated with the LARIAT II Endstation IRR pre-start findings have been satisfactorily complete.	E. Cheswick Independent Verifier	• Pertinent closure evidence	Signature:

*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.