

INSTRUMENT READINESS PLAN (IRP)

FOR THE

NSLS-II 7-ID BEAMLINES (SST-1 AND SST-2)



FEBRUARY 2018

NSLSII-7ID-PLN-002

PREPARED BY
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FOR THE
U.S. DEPARTMENT OF ENERGY
OFFICE OF SCIENCE BASIC ENERGY SCIENCE
UNDER CONTRACT DE-SC0012704

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FOR THE

NSLS-II 7-ID BEAMLINES (SST-1 AND SST-2)

FEBRUARY 2018

PREPARED BY:



1/2/2018

A. Ackerman, Instrument Readiness Coordinator

APPROVED AS A PLAN TO ACHIEVE READINESS BY:



1/9/2018

A. Broadbent, IRR Technical Authority

CONCURRENCE BY:



1/9/18

R. Lee, ESH Manager

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



2/15/18

A. Broadbent, IRR Technical Authority

CONCURRENCE BY:



2/16/18

R. Lee, ESH Manager

VERSION HISTORY LOG

VERSION	DESCRIPTION	DATE
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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 NSLS-II 7-ID Beamlines [Spectroscopy Soft and Tender (SST-1 and SST-2)] ready for commissioning. The scope of this IRP includes the 7-ID Beamlines (SST-1 and SST-2) and End Stations with appropriate diagnostics, and was prepared in accordance with the *Instrument Readiness Review Procedure* (PS-C-ESH-PRC-001). The Front End and Insertion Device were evaluated in a previous IRR, in November 2017.

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 7-ID Beamlines

SST-1 and SST-2 are canted undulator beamlines which can operate simultaneously. SST-1 will be served by a soft X-ray undulator and, with the use of a plane grating monochromator (PGM), will provide an energy range of 100 – 2200 eV. SST-2 will be served by a tender X-ray undulator and a double crystal monochromator (DCM) to provide an energy range of 1000 – 7500 eV. The beamlines will eventually house 6 unique experimental stations (four on SST-1 and two on SST-2) which enable X-ray spectroscopy and microscopy of a large variety of materials often at the nanoscale. Two of the experimental stations will be able to utilize both the soft and tender X-ray undulators sequentially or even simultaneously via a transfer line to enable the continuous selection of X-rays from 100 – 7500 eV. The scope of the IRR will include just one experimental station on each branch; HAXPES on the tender branch, and NEXAFS on the soft branch. The beamlines are designed with 2 precision exit slits and 14 deflecting and focusing mirrors to deliver the high brightness NSLS-II source with focal spot sizes of 2-2000 μm range (at the different experimental stations) and to offer efficient ways of expanding a 1000 μm beam to 20000 μm . The credited controls include shielding, oxygen deficiency monitors and personal protection (PPS) interlocks and aperture device in accordance with the NSLS-II Accelerator Safety Envelope (ASE) (PS-C-ESH-ROASE-001).

1.3 Instrument Readiness Review (IRR)

As part of the verification of readiness for commissioning, an IRR is required in accordance with the *Instrument Readiness Review Procedure* (PS-C-ESH-PRC-001). An independent IRR Team will use the readiness criteria developed as part of this IRP to verify that the 7-ID Beamlines are ready for commissioning in accordance with the Beamline Commissioning Plan. 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 7-ID Beamlines.

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 the *Instrument Readiness Review Procedure* (PS-C-ESH-PRC-001).

The readiness criteria for the 7-ID Beamlines 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 Readiness Team

A Readiness Team will be appointed by the NSLS-II Director in accordance with the *Instrument Readiness Review Procedure* (PS-C-ESH-PRC-001). The Readiness Team members that have responsibility for completing the IRP are listed as the Responsible Person in the Attachments.

3.2 Achieving Readiness – Responsibilities

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

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

3.3 Execution of the IRP

The Readiness 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 Readiness 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 Readiness Team members will certify that the criteria for which they are responsible for are complete by signing the Attachments in the appropriate section. The Attachments shall not be signed until the readiness criteria have been fully achieved.

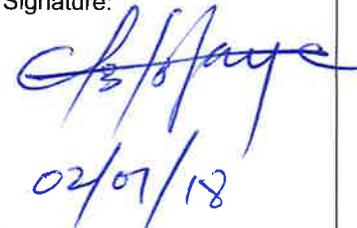
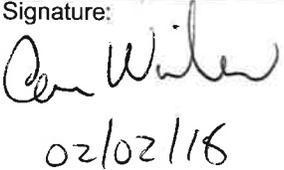
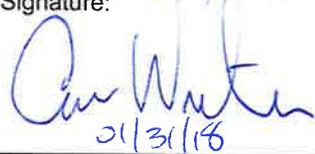
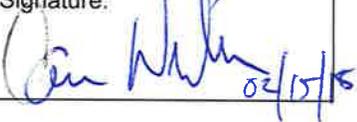
For completion of the IRR pre-start findings, the IRR Technical Authority and the ESH Manager will certify that all IRR pre-start findings relative to the 7-ID Beamlines have been completed, and that the associated ATS Actions have been closed by signing Attachment D in the appropriate section. The Independent Verifier will concur that these actions have been adequately completed and closed by signing Attachment D in the appropriate section.

4.0 REFERENCES

4.1 PS-C-ESH-PRC-001, *Instrument Readiness Review Procedure*

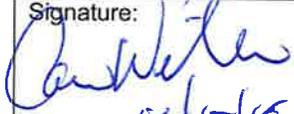
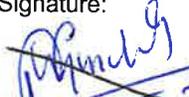
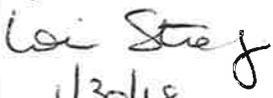
4.2 PS-C-ESH-ROASE-001, *NSLS-II Accelerator Safety Envelope (ASE)*

**ATTACHMENT A – PILLAR I DOCUMENTATION
7-ID BEAMLINES (SST-1 AND SST-2)**

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR I DOCUMENTATION (PLANNING & PROCEDURES)	Functional Description An overview presentation is prepared that includes the following beamline specific information: <ul style="list-style-type: none"> - Primary research capabilities - Beamline layout (includes location on the experiment floor) - Design reviews - 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. Jaye SST-1 Lead Beamline Scientist	<ul style="list-style-type: none"> • Develop the presentation and document described 	<ul style="list-style-type: none"> • Presentation • Functional Description Document 	Signature:  02/07/18
		C. Weiland SST-2 Lead Beamline Scientist			Signature:  02/02/18
	Beamline Design Beamline components are designed in accordance with PS-QAP-0412, <i>Design Reviews</i> and PS-C-QAS-PRC-010, <i>Engineering Design by Others</i> .	C. Jaye SST-1 Lead Beamline Scientist	<ul style="list-style-type: none"> • Complete Engineering Design Reviews for the Beamline that address thermal management, mechanical support, configuration control, and vacuum 	<ul style="list-style-type: none"> • Internal and contractor supplied design review documents and report 	Signature:  01/31/18
		C. Weiland SST-2 Lead Beamline Scientist			Signature:  01/31/18
	Radiation Safety Components Design Radiation Safety Components designed in accordance with NSLS-II requirements.	C. Jaye SST-1 Lead Beamline Scientist	<ul style="list-style-type: none"> • Complete requirements analysis and design of radiation safety components for the Beamline 	<ul style="list-style-type: none"> • Internal design review documents and reports • RSC Report 	Signature:  2/15/18
		C. Weiland SST-2 Lead Beamline Scientist			Signature:  02/15/18

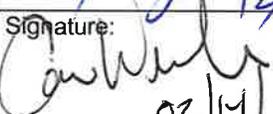
*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

**ATTACHMENT A – PILLAR I DOCUMENTATION
7-ID BEAMLINES (SST-1 AND SST-2)**

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR I DOCUMENTATION (PLANNING & PROCEDURES)	Top-Off Safety System (TOSS) Top-Off Safety System components designed in accordance with PS-R-ASD-RPT-DRV-001, <i>Top-Off Safety Analysis and Requirement of Hazard Mitigation for NSLS-II Facility.</i>	R. Filler Coordinator for Top Off Safety	<ul style="list-style-type: none"> Complete TOSS analysis 	<ul style="list-style-type: none"> TOSS Analysis Report Updated FE layout drawings Updated <i>Beamlines Approved for Top-Off Operations</i> list 	Signature:  1/29/18
	Ray Traces Bremsstrahlung and Synchrotron Ray Traces generated in accordance with PS-C-XFD-PRC-008, <i>Synchrotron and Bremsstrahlung Ray Trace Procedure.</i>	C. Jaye SST-1 Lead Beamline Scientist	<ul style="list-style-type: none"> Prepare the Ray Traces 	<ul style="list-style-type: none"> Approved Ray Trace drawings 	Signature:  02/15/18
		C. Weiland SST-2 Lead Beamline Scientist			Signature:  04/15/18
	Secondary Radiation Scatter Analysis Secondary Bremsstrahlung and Synchrotron scatter is analyzed in accordance with LT-C-ESH-STD-001, <i>Guidelines for the NSLS-II Beamline Radiation Shielding Design.</i>	S. Chitra Health Physics	<ul style="list-style-type: none"> Complete FLUKA analysis Complete STAC8 analysis 	<ul style="list-style-type: none"> BNL Technical Note Report 	Signature:  1/16/18 recorded 2/15/18
	National Environmental Protection Act (NEPA) Evaluation NEPA requirements evaluation completed.	L. Stiegler ESH Operations Group Leader	<ul style="list-style-type: none"> Complete a NEPA evaluation 	<ul style="list-style-type: none"> NEPA Evaluation Report 	Signature:  1/30/18

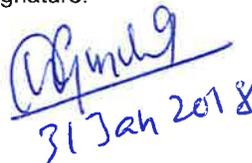
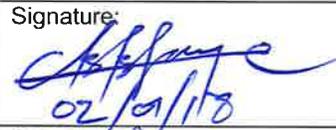
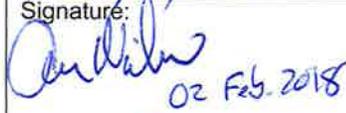
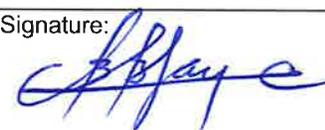
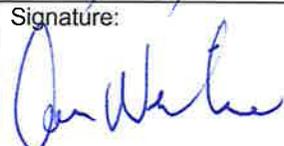
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**ATTACHMENT A – PILLAR I DOCUMENTATION
7-ID BEAMLINES (SST-1 AND SST-2)**

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR I DOCUMENTATION (PLANNING & PROCEDURES)	<p>Unreviewed Safety Issue (USI) Evaluations/ Screenings Authorization basis hazard identification is managed through USI evaluation/screening.</p>	<p>S. Moss Authorization Basis Manager</p>	<ul style="list-style-type: none"> Verify that the SAD and ASE accurately cover the hazards associated with the subject beamline; include temporary systems 	<ul style="list-style-type: none"> SAD and ASE USI screening/evaluation Applicable waivers <p><i>Steve Moss OK 02/15/18</i></p>	<p>Signature:  02/02/2018 <i>Recorded 2/8/18 New Information TSCA</i></p>
	<p>Resolution of Open Action Tracking System (ATS) Actions Instrument specific action items from previous internal and external oversight groups (e.g., RSC, Design Reviews, etc.) are addressed. Previous IRR action items are addressed.</p>	<p>J. Zipper QA Engineer</p>	<ul style="list-style-type: none"> ATS action items shown as closed with supporting evidence 	<ul style="list-style-type: none"> ATS System 	<p>Signature:  2/15/18</p>
	<p>Procedures Procedures needed for safe, secure, and environmentally sound commissioning have been developed, reviewed, validated (where applicable), and approved. Existing procedures are verified as sufficient for new hazards introduced by this Beamline, if any.</p>	<p>K. Rubino Procedure Support</p>	<ul style="list-style-type: none"> Develop any system specific procedures Verify that existing procedure are sufficient for any new hazards introduced, if any 	<ul style="list-style-type: none"> 7-ID Radiological Interlock Test Checklist Search and Secure Sketch Cryocooler Operations (NSLSII-ROS-PRC-001) Superconducting Magnet Work Instruction <p><i>Not within IRR scope (YER)</i></p>	<p>Signature:  1/30/18</p>
	<p>Commissioning Plan A commissioning plan generated for the beamline to address the task sequence required for technical commissioning (safe photon transport).</p>	<p>C. Jaye SST-1 Lead Beamline Scientist</p> <hr/> <p>C. Weiland SST-2 Lead Beamline Scientist</p>	<ul style="list-style-type: none"> Prepare a commissioning plan 	<ul style="list-style-type: none"> Approved commissioning plan 	<p>Signature:  12/14/18</p> <p>Signature:  02/14/18</p>

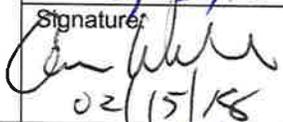
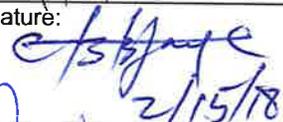
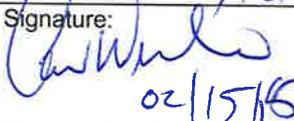
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ATTACHMENT A – PILLAR I DOCUMENTATION
7-ID BEAMLINES (SST-1 AND SST-2)

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR I DOCUMENTATION (PLANNING & PROCEDURES)	Radiation Survey Procedure A survey procedure has been generated for the Beamline in accordance with PS-C-XFD-PRC-004, <i>NSLS-II Beamlines Radiation Safety Commissioning Plan</i> .	S. Chitra Health Physics	<ul style="list-style-type: none"> Prepare the Radiation Survey Procedure for the Beamline 	<ul style="list-style-type: none"> Approved Beamline Radiation Survey Procedure 	Signature:  31 Jan 2018
	Experiment Safety Review An Experiment Safety Review has been submitted, executed and approved within the BNL ESR system.	C. Jaye SST-1 Lead Beamline Scientist	<ul style="list-style-type: none"> Complete submission and pursue approval of an Experiment Safety Review through use of the BNL electronic system 	<ul style="list-style-type: none"> Approved BNL ESR 	Signature:  02/01/18
		C. Weiland SST-2 Lead Beamline Scientist			Signature:  02 Feb 2018
	Proposal Allocation Safety & Scheduling (PASS) The instrument is active within PASS with approvals to proceed with Technical Commissioning.	C. Jaye SST-1 Lead Beamline Scientist	<ul style="list-style-type: none"> Assure that PASS is configured to administer the instrument 	<ul style="list-style-type: none"> Defined resource within PASS Submitted Technical commissioning proposal Submitted Safety Approval Form 	Signature:  02/01/18
		C. Weiland SST-2 Lead Beamline Scientist			Signature:  02 Feb, 2018

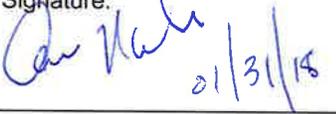
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**ATTACHMENT B – PILLAR II HARDWARE
7-ID BEAMLINES (SST-1 AND SST-2)**

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 Traveler.	C. Jaye SST-1 Lead Beamline Scientist	<ul style="list-style-type: none"> • Generate and execute Traveler • Standard stainless steel blank flange to replace PHS6 	<ul style="list-style-type: none"> • Completed Traveler 	Signature:  02/15/18
		C. Weiland SST-2 Lead Beamline Scientist			Signature:  02/15/18
	Radiation Safety Components: Configuration Control A Radiation Safety Component Checklist template generated in accordance with PS-C-ESH-PRC-025, <i>NSLS-II Radiation Safety Component Inspection Procedure</i> .	C. Jaye SST-1 Lead Beamline Scientist	<ul style="list-style-type: none"> • Develop Radiation Safety Component Checklist 	<ul style="list-style-type: none"> • Approved beamline specific Radiation Safety Component Checklist 	Signature:  2/15/18
		C. Weiland SST-2 Lead Beamline Scientist			Signature:  02/15/18
	Area Radiation Monitors (ARMs) ARMs are installed in accordance with PS-C-ESH-ARN-SPC-001, <i>NSLS-II Area Radiation Monitor (ARM) System Description</i> and PS-C-ESH-STD-002, <i>Technical Basis Document for Interlocked Area Monitors Placement Outside the Accelerator and Beamlines Enclosures</i> .	M. Benmerrouche ARM Technical Authority	<ul style="list-style-type: none"> • Install, calibrate, and test (EPICS integration) ARMs • Certify (PPS) 	<ul style="list-style-type: none"> • ARM Layout Drawing • ARM calibration certificates • ARM EPICS Interface Integration Test Sheet • ARM PPS Test checklist 	Signature:  01/31/2018
	Personnel Protection System (PPS) Interlocks: Installed and Certified Hardware/Software installed in accordance with PS-C-XFD-SPC-PPS-001, <i>Beamline Personnel Protection System (BLPPS) and Front End Personnel Protection System (FEPPS) Design Description</i> .	G. Ganetis Electrical Engineering Group Leader	<ul style="list-style-type: none"> • Generate system schematics and logic diagrams • Install PPS components • Certify PPS 	<ul style="list-style-type: none"> • Overall PPS Checklist • Executed Beamline Radiological Interlock Certification Checklist 	Signature:  1/31/18

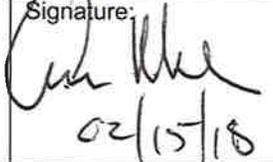
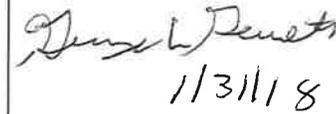
*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

**ATTACHMENT B – PILLAR II HARDWARE
7-ID BEAMLINES (SST-1 AND SST-2)**

READINESS CRITERIA		RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR II SAFETY CRITICAL HARDWARE (INSTALLATION)	Hutch Structures Hutch structures installed with adequate provision for life safety issues (egress and fall protection) in accordance with LT-SOW-XF-HU-0001, <i>Statement of Work for NSLS-II Beamline Shielding Enclosures (“Hutches”)</i> , LT-C-XFD-SPC-HU-001, <i>NSLS-II Lead/Steel Beamline Shielding Enclosures</i> , and LT-C-XFD-SPC-HU-002, <i>NSLS-II Steel Beamline Shielding Enclosures</i> .	A. Broadbent Beamline Engineer	<ul style="list-style-type: none"> • Generate and execute Traveler for inspection 	<ul style="list-style-type: none"> • Completed Traveler 	Signature: 
	Electrical Power SBMS electrical power distribution requirements are satisfied. SBMS Electrical Equipment Inspection (EEI) requirements are satisfied.	A. Boerner Electrical Distribution Engineer	<ul style="list-style-type: none"> • Generate and approve one-line drawings • Complete system electrical inspection • Complete needed EEI inspections 	<ul style="list-style-type: none"> • Approved AC Power one-line drawings • EEI database entry 	Signature:  1/31/18
	Utilities Permanent utility systems are installed and tested (i.e., Compressed Air, DI Water, Gaseous Nitrogen, Process Chilled Water) in accordance with design drawings.	J. Gosman Mechanical Utilities Group Leader	<ul style="list-style-type: none"> • Generate system schematics • Perform pressure test • Assure SBMS and NSLS-II labeling and hardware attachment requirements are met. 	<ul style="list-style-type: none"> • Approved system schematics • System pressure testing reports 	Signature:  2/6/18
		C. Jaye SST-1 Lead Beamline Scientist			Signature: 
C. Weiland SST-2 Lead Beamline Scientist		Signature:  01/31/18			

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

**ATTACHMENT B – PILLAR II HARDWARE
7-ID BEAMLINES (SST-1 AND SST-2)**

READINESS CRITERIA		RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR II OTHER HARDWARE (INSTALLATION)	Other Photon Transport Components, Optics, and Diagnostics Photon transport 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. Jaye SST-1 Lead Beamline Scientist	<ul style="list-style-type: none"> • Generate and execute Traveler • Complete acceptance inspections 	<ul style="list-style-type: none"> • Completed Traveler • Acceptance inspection documentation, as needed 	Signature:  2/15/18
		C. Weiland SST-2 Lead Beamline Scientist			Signature:  02/15/18
	Equipment Protection System (EPS) Interlocks Hardware/Software installed and tested in accordance with the Traveler.	G. Bischof Controls Infrastructure Group Leader	<ul style="list-style-type: none"> • Generate and execute Traveler • Verify EPICS integration • Test system performance 	<ul style="list-style-type: none"> • Test Report • Completed Traveler 	Signature: 
Front End Equipment Protection System (FEEPS) (Phase 2 Installation needed for beamline operation) Hardware/Software installed and tested in accordance with the traveler.	G. Ganetis Electrical Engineering Group Leader	<ul style="list-style-type: none"> • Verify integration • Test system performance 	<ul style="list-style-type: none"> • Test Report Phase 2 Installation 	Signature:  1/31/18	

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

**ATTACHMENT B – PILLAR II HARDWARE
7-ID BEAMLINES (SST-1 AND SST-2)**

READINESS CRITERIA		RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR II OTHER HARDWARE (INSTALLATION)	<p>Controls Hardware/Software installed and tested in accordance with NSLS-II requirements.</p>	<p>J. Kirkland Controls Group</p>	<ul style="list-style-type: none"> • Test system performance • Complete integral testing 	<ul style="list-style-type: none"> • Performance and integral testing documentation 	<p>Signature:</p>  <p>2/1/2018</p>
	<p>Vacuum Vacuum hardware has been installed and tested in accordance with the Traveler and has the capability of achieving full vacuum needed during commissioning.</p>	<p>R. Todd Vacuum Engineer</p>	<ul style="list-style-type: none"> • Generate and execute Top Level Traveler • Identify overpressure devices • Test system performance 	<ul style="list-style-type: none"> • Completed Traveler • Test Report 	<p>Signature:</p>  <p>2/5/18</p>

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

**ATTACHMENT C – PILLAR III PERSONNEL
7-ID BEAMLINES (SST-1 AND SST-2)**

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: 2-15-18 <i>Bruce Lein</i>
	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: 2-15-18 <i>Bruce Lein</i>
	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.	B. Lein Training Group Leader	• Assign JTA	• BTMS record	Signature: 2-6-18 <i>Bruce Lein</i> * NO BSS DRE IDENTIFIED AS NEEDED FOR COMMISSIONING
	Lead Operators, Scientific Operators & FLOCOS (Accelerator Division) Trained/Qualified to: – Execute the Beamline Enable procedure – Perform roles assigned in any Beamline-specific procedures – Perform tasks related to FE commissioning	B. Lein Training Group Leader	• Train Operators	• BTMS record	Signature: 2-6-18 <i>Bruce Lein</i>

* READINESS CERTIFICATION	C. Jaye – SST-1 Lead Beamline Scientist	Signature: <i>C. Jaye</i> 2/15/18
* READINESS CERTIFICATION	C. Weiland – SST-2 Lead Beamline Scientist	Signature: <i>C. Weiland</i> 02/15/18

*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
7-ID BEAMLINES (SST-1 AND SST-2)**

READINESS CRITERIA		RESPONSIBLE PERSON	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
IRR PRE-START FINDINGS	No Pre-Start Findings Identified (SST-1) No pre-start findings associated with the SST-1 Beamline have been identified by the Review Team and therefore the following lines do not require sign-off.	R. Lee ESH Manager	<ul style="list-style-type: none"> • IRR Preliminary Report 	Signature:
		C. Gortakowski Independent Verifier		Signature:
	No Pre-Start Findings Identified (SST-2) No pre-start findings associated with the SST-2 Beamline have been identified by the Review Team and therefore the following lines do not require sign-off.	R. Lee ESH Manager	<ul style="list-style-type: none"> • IRR Preliminary Report 	Signature:
		C. Gortakowski Independent Verifier		Signature:
	Pre-Start Actions Complete (SST-1) All actions associated with the SST-1 Beamline IRR pre-start findings are complete.	A. Broadbent IRR Technical Authority	<ul style="list-style-type: none"> • Pertinent closure evidence 	Signature: 
	Pre-Start Actions Complete (SST-2) All actions associated with the SST-2 Beamline IRR pre-start findings are complete.	A. Broadbent IRR Technical Authority	<ul style="list-style-type: none"> • Pertinent closure evidence 	Signature: 
	Pre-Start Actions Verified (SST-1) All actions associated with the SST-1 Beamline IRR pre-start findings have been verified complete.	R. Lee ESH Manager	<ul style="list-style-type: none"> • Pertinent closure evidence 	Signature:
	Pre-Start Actions Verified (SST-2) All actions associated with the SST-2 Beamline IRR pre-start findings have been verified complete.	R. Lee ESH Manager	<ul style="list-style-type: none"> • Pertinent closure evidence 	Signature:
	Pre-Start Actions Independently Verified (SST-1) Actions associated with the SST-1 Beamline IRR pre-start findings have been satisfactorily complete.	C. Gortakowski Independent Verifier	<ul style="list-style-type: none"> • Pertinent closure evidence 	Signature:
Pre-Start Actions Independently Verified (SST-2) Actions associated with the SST-2 Beamline IRR pre-start findings have been satisfactorily complete.	C. Gortakowski Independent Verifier	<ul style="list-style-type: none"> • Pertinent closure evidence 	Signature:	

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