INSTRUMENT READINESS PLAN (IRP)

FOR THE

NSLS–II 18-ID (FXI) BEAMLINE AND FRONT END

OCTOBER 2017

NSLSII-18ID-PLN-003

PREPARED BY

BROOKHAVEN NATIONAL LABORATORY
P.O. BOX 5000
UPTON, NY 11973–5000

MANAGED BY

BROOKHAVEN SCIENCE ASSOCIATES

FOR THE

U.S. DEPARTMENT OF ENERGY
OFFICE OF SCIENCE BASIC ENERGY SCIENCE
UNDER CONTRACT DE–SC0012704

BROOKHAVEN
NATIONAL LABORATORY

INSTRUMENT READINESS PLAN (IRP)

FOR THE

NSLS–II 18-ID (FXI) BEAMLINE AND PARTIAL FRONT END

OCTOBER 2017

REVIEWED BY: 9/28/17

A. Ackerman, Instrument Readiness Coordinator

APPROVED AS A PLAN TO ACHIEVE READINESS BY:

10/3/2017

J. Adams, IRR Technical Authority (Beamline)

10/3/17

T. Shaftan, IRR Technical Authority (Front End)

CONCURRENCE BY: 10/3/17

R. Lee, ESH Manager

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

10/18/2017

J. Adams, IRR Technical Authority (Beamline)

Greg Fries for T. Shaftan 10/18/17

T. Shaftan, IRR Technical Authority (Front End)

CONCURRENCE BY: 10/18/17

R. Lee, ESH Manager

REVISION HISTORY

REVISION	DESCRIPTION	LIST OF REVIEWERS	DATE
1	First Issue	See completed tables	October 2017

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 Purpose and Scope 1
1.2 18-ID Beamline 1
1.4 Authorization to Proceed with Commissioning 1
2.0 **INSTRUMENT READINESS PLAN** 2
2.1 Readiness Criteria 2
3.0 **IRP IMPLEMENTATION** 2
3.1 Readiness Team 2
3.2 Achieving Readiness – Responsibilities 2
3.3 Execution of the IRP 2
3.4 Certifying Readiness 3
4.0 **REFERENCES** 3

ATTACHMENTS

Attachment A, *Pillar I Documentation, 18-ID Beamline and Partial Front End*

Attachment B, *Pillar II Hardware, 18-ID Beamline and Partial Front End*

Attachment C, *Pillar III Personnel, 18-ID Beamline and Partial Front End*

Attachment D, *Completion of IRR Pre-Start Findings*

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 18-ID (Full Field X-ray Imaging [FXI]) Beamline and Front End (FE) ready for commissioning. The scope of this IRP includes the 18-ID Beamline and End Station, and partial FE, and was prepared in accordance with the *Instrument Readiness Review Procedure* (PS-C-ESH-PRC-001). Experimental equipment that is installed and operational in the End Station will be included in the scope of this plan. The 18-ID Damping Wiggler was previously reviewed in December 2014 and all components in the FE related to radiation safety were reviewed in August 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 18-ID Beamline

The 18-ID Beamline is a Damping Wiggler beamline at NSLS-II, which houses a Transmission X-ray Microscope (TXM) with 30 nm spatial resolution to serve the scientific community. The energy range of the instrument is 4-11 keV. The only vacuum window for the beamline is a Be window located at the upstream end of 18-ID-B at about 60 m. From upstream to downstream, the key optical components for the beamline are: (1) a white beam water cooled collimating mirror reflecting upwards, (2) a 25 mm fixed vertically offset cryogenically cooled Si(111) double crystal monochromator and (3) an uncooled toroidal mirror. These three main optical components reside in 18-ID-A. The toroidal mirror focuses the monochromatic beam onto a secondary source aperture at 61 m in 18-ID-B. The TXM resides in 18-ID-B. Typical sample sizes for the TXM are in the tens of microns range. The credited controls include shielding, oxygen deficiency monitors and personnel protection system (PPS) interlocks, 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 18-ID Beamline and FE are 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 18-ID Beamline and FE.

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 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 Beamline is achieved.

The Mechanical Engineering Group Leader is responsible for certifying that all of the readiness criteria associated with the subject Front End are 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, if identified, the IRR Technical Authorities and the ESH Manager will certify that all IRR pre-start findings relative to the 18-ID Beamline and FE 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

18-ID BEAMLINE AND FRONT END

	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 FE and Beamline 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	W. Lee Lead Beamline Scientist	Develop the presentation and document described	Beamline: • Presentation • Functional Description Document	Signature (Beamline): 10/11/17
		G. Fries Accelerator Division Liaison Engineer	• Develop the presentation described	FE: • Presentation	Signature (FE): 10/11/17
	Beamline & FE Design Beamline and FE components are designed in accordance with PS-QAP-0412, *Design Reviews* and PS-C-QAS-PRC-010, *Engineering Design by Others*.	W. Lee Lead Beamline Scientist	Complete Engineering Design Reviews for the Beamline and FE that address therma management, mechanical support, configuration control, and vacuum	Beamline: • Internal and contractor supplied design review documents and reports	Signature (Beamline): 10/11/17
		S. Sharma Mechanical Engineering Group Leader		FE: • Requirements, Specifications, and Interface report (RSI) Internal and contractor supplied design review documents	Signature (FE): 10/6/17

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

ATTACHMENT A – PILLAR I DOCUMENTATION

18-ID BEAMLINE AND FRONT END

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR I DOCUMENTATION (PLANNING & PROCEDURES)	**Radiation Safety Components Design** Radiation Safety Components for the Beamline and FE are designed in accordance with NSLS-II requirements, PS-QAP-0412, *Design Reviews* and PS-C-QAS-PRC-010, *Engineering Design by Others*.	W. Lee Lead Beamline Scientist	• Complete requirements analysis and design of radiation safety components for the Beamline	Beamline: • Internal design review documents and reports • RSC Report	Signature (Beamline): Wa Lee 10/12/17
		C. Amundsen Mechanical Engineer	• Complete requirements analysis and design of radiation safety components for the FE	FE: • Internal design review documents • RSC Report	Signature (FE): *Reviewed in August 2017 IRR
	Top-Off Safety System (TOSS) FE has been analyzed for Top-Off Safety in accordance with PS-C-ASD-PRC-183, *Approval of New and Modified NSLS-II Beamline Front Ends for Top Off Safety.*	R. Fliller Coordinator for Top Off Safety	• Complete TOSS analysis	• TOSS Analysis Report • Updated FE layout drawings • Updated *Beamlines Approved for Top-Off Operations* list	Signature: 10/17/17
	Ray Traces Bremsstrahlung and Synchrotron Ray Traces generated in accordance with PS-C-XFD-PRC-008, *Synchrotron and Bremsstrahlung Ray Trace Procedure*.	W. Lee Lead Beamline Scientist	• Prepare the Ray Traces for the Beamline	Beamline: • Approved Primary Bremsstrahlung Ray Traces • Approved Maximum Synchrotron Ray Traces	Signature (Beamline): Wa Lee 10/11/17
		C. Amundsen Mechanical Engineer	• Verify the Ray Traces for the Front End are sufficient	FE: • Approved Primary Bremsstrahlung Ray Traces • Approved Maximum Synchrotron Ray Traces	Signature (FE): *Reviewed in August 2017 IRR

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

ATTACHMENT A – PILLAR I DOCUMENTATION

18-ID BEAMLINE AND FRONT END

	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 Health Physics	• Complete FLUKA analysis • Complete STAC8 analysis	• BNL Technical Note Report	Signature: 10/5/17
	National Environmental Protection Act (NEPA) Evaluation NEPA requirements evaluation completed.	L. Stiegler ESH Operations Group Leader	• Complete a NEPA evaluation	• NEPA Evaluation Report	Signature: 10/5/17
	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 Beamline and FE; including temporary systems	• SAD and ASE USI screenings/evaluations • Applicable waivers	Signature (Beamline): 10/11/13 Signature (FE): 10/11/13

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

ATTACHMENT A – PILLAR I DOCUMENTATION

18-ID BEAMLINE AND FRONT END

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR I DOCUMENTATION (PLANNING & PROCEDURES)	**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.	J. Zipper QA Engineer	• ATS action items for the instrument are satisfied. • ATS action items from previous IRRs are evaluated for impact to the instrument	Beamline: • ATS System	Signature (Beamline): 10/12/17
		E. Cheswick QA Engineer	• ATS action items for the FE are satisfied. • ATS action items from previous IRRs are evaluated for impact to the instrument	FE: • ATS System	Signature (FE): 10/12/17
	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.	K. Rubino Procedure Support	• Develop any system specific procedures • Verify that existing procedure are sufficient for any new hazards introduced	• 18-ID Radiological Interlock Test Checklist • Search and Secure Sketch • Damping Wiggler LOTO Procedures (PS-C-ASD-PRC-122 and PS-C-ASD-PRC-177) • Cryocooler Operations (NSLSII-ROS-PRC_001)	Signature: 10/11/17

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

ATTACHMENT A – PILLAR I DOCUMENTATION

18-ID BEAMLINE AND FRONT END

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR I DOCUMENTATION (PLANNING & PROCEDURES)	**Commissioning Plans** Commissioning plans have been generated for the Beamline and FE to address the task sequence required for technical commissioning (safe photon transport).	W. Lee Lead Beamline Scientist	• Prepare a Beamline Commissioning Plan to define technical objectives and operational readiness requirements	Beamline: • Approved Beamline Commissioning Plan	Signature (Beamline): Wdlee 10/12/17
		G. Wang Accelerator Coordination Group Leader	• Verify that NSLS-II ID and Front End Commissioning Sequence (PS-C-ASD-PRC-166) adequately covers commissioning for the FE	FE: • NSLS-II ID and Front End Commissioning Sequence (PS-C-ASD-PRC-166)	Signature (FE): *Reviewed in August 2017 IRR
	Radiation Survey Procedures A survey procedure has been generated for the Beamline in accordance with PS-C-XFD-PRC-004, *NSLS-II Beamlines Radiation Safety Commissioning Plan* and the existing NSLS-II Insertion Devices and Front End Radiation Survey Plan (PS-C-ESH-PRC-061) has been reviewed and updated as necessary for the FE.	S. Chitra Health Physics	• Prepare the Radiation Survey Procedure for the Beamline • Obtain RSC review of the procedure	• Approved Beamline Radiation Survey Procedure	Signature (Beamline): 10/11/2017
		M. Benmerrouche Radiation Physicist	• Verify that the NSLS-II Front End Radiation Survey Plan (PS-C-ESH-PRC-061) adequately covers commissioning for the FE	• NSLS-II Insertion Devices and Front End Radiation Survey Plan (PS-C-ESH-PRC-061)	Signature (FE): 10/11/2017

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

ATTACHMENT A – PILLAR I DOCUMENTATION

18-ID BEAMLINE AND FRONT END

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR I DOCUMENTATION (PLANNING & PROCEDURES)	**Experiment Safety Review** An Experiment Safety Review has been submitted, executed and approved within the BNL ESR system.	W. Lee Lead Beamline Scientist	• Complete submission and pursue approval of an Experiment Safety Review through use of the BNL electronic system	• Approved BNL ESR	Signature: 10/11/17
	Proposal Allocation Safety & Scheduling (PASS) The instrument is active within PASS with approvals to proceed with Technical Commissioning.	W. Lee Lead Beamline Scientist	• Assure that PASS is configured to administer the instrument	• Defined resource within PASS • Submitted Technical commissioning proposal • Submitted Safety Approval Form	Signature: 10/11/17

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

ATTACHMENT B – PILLAR II HARDWARE

18-ID BEAMLINE AND FRONT END

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR II SAFETY CRITICAL HARDWARE (INSTALLATION)	**Radiation Safety Components: Installation** Radiation Safety Components, including Top Off components are installed in accordance with the Traveler.	W. Lee Lead Beamline Scientist	• Generate and execute Traveler	Beamline: • Completed Traveler	Signature (Beamline): 10/17/17 Wah Chu
		C. Amundsen Mechanical Engineer	• Complete partially executed Traveler	FE: • Completed Traveler	Signature (FE): 10/11/17
		L. Doom Accelerator Coordination	• Generate and execute Top-Off Traveler	Completed Traveler	Signature: 10/5/2017
	Radiation Safety Components: Configuration Control A Radiation Safety Component Checklist template is generated in accordance with PS-C-ESH-PRC-025, *NSLS-II Radiation Safety Component Inspection Procedure.*	W. Lee Lead Beamline Scientist	• Develop Radiation Safety Component Checklist	Beamline: • Approved beamline specific Radiation Safety Component Checklist w/ RSC approval	Signature (Beamline): Wah Chu 10/11/17
		L. Doom Accelerator Coordination	• Verify that the existing checklist adequately covers the subject FE	FE: • Approved Storage Ring Radiation Safety Component Checklist Template	Signature (FE): *Reviewed in August 2017 IRR

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

ATTACHMENT B – PILLAR II HARDWARE

18-ID BEAMLINE AND FRONT END

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR II SAFETY CRITICAL HARDWARE (INSTALLATION)	**Area Radiation Monitors (ARMs)** ARMs are installed in accordance with PS-C-ESH-ARN-SPC-001, *NSLS-II Area Radiation Monitor (ARM) System Description* and PS-C-ESH-STD-002, *Technical Basis Document for Interlocked Area Monitors Placement Outside the Accelerator and Beamlines Enclosures.*	M. Benmerrouche ARM Technical Authority	• Install, calibrate, and test (EPICS integration) ARMs • Certify (PPS)	• ARM Layout Drawing • ARM calibration certificates • ARM EPICS Interface Integration Test Sheet • ARM PPS Test checklist	Signature: 10/16/2017
	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 Certification Checklist	Signature: 10/11/17
	O2 Sensors: Install Oxygen sensors and alarms required to alert personnel to oxygen deficiency hazard (ODH) conditions installed in accordance with the design drawing.	S. LaMarra ODH Technical Authority	• Generate design drawing • Generate and execute Traveler	• Design drawing • Completed Traveler	Signature: 10/4/17
	O2 Sensors: Certify ODH monitoring system has been certified in accordance with PS-C-XFD-PRC-005, *Beamline Enclosures and Cryogen Fill Station ODH Monitoring and Alarm System Certification and Inspection.*	B. Heneveld ESH Engineer	• Perform certification	• Certification Report	Signature: 10/4/17

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

ATTACHMENT B – PILLAR II HARDWARE

18-ID BEAMLINE AND FRONT END

	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, *Statement of Work for NSLS–II Beamline Shielding Enclosures ("Hutches")*, LT-C–XFD-SPC-HU-001, *NSLS-II Lead/Steel Beamline Shielding Enclosures*, and LT-C-XFD-SPC-HU-002, *NSLS-II Steel Beamline Shielding Enclosures.*	L. Lienhard Beamline Engineer	• Generate and execute Traveler for inspection	• Completed Traveler	Signature: 10/6/2017
	Electrical Power SBMS electrical power distribution requirements are satisfied. SBMS Electrical Equipment Inspection (EEI) requirements are satisfied.	A. Boerner Electrical Distribution Engineer	• Approved one-line drawings • System electrical inspection • EEI inspection	• Approved AC Power one–line drawings • EEI database entries	Signature: 10/10/17
	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	• Generate system schematics • Perform pressure test	• Approved system schematics • System pressure testing reports	Signature (FE): 10/16/17
		W. Lee Lead Beamline Scientist			Signature (Beamline): 10/17/17

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

ATTACHMENT B – PILLAR II HARDWARE

18-ID BEAMLINE AND FRONT END

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR II OTHER HARDWARE (INSTALLATION)	**Other FE Components, Photon Transport Components, Optics, and Diagnostics** FE and 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.	W. Lee Lead Beamline Scientist	• Generate and execute Traveler • Complete acceptance inspections	Beamline: • Completed Traveler • Acceptance inspection documentation, as needed	Signature (Beamline): 10/17/17
		C. Amundsen Mechanical Engineer	• Generate traveler and drawing • Execute Traveler • Perform pressure test	FE: • Completed Traveler • System pressure testing reports	Signature (FE): 10/11/17
	Equipment Protection System (EPS) Interlocks Hardware/Software installed and tested in accordance with the Traveler.	H. Bassan Controls Infrastructure Group Leader	• Generate and execute Traveler • Verify EPICS integration • Test system performance	Beamline: • Test Report • Completed Traveler	Signature (Beamline): 10/10/17
	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	• Verify integration • Test system performance	FE: • Test Report Phase 2 Installation	Signature (FE): 10/11/17

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

ATTACHMENT B – PILLAR II HARDWARE

18-ID BEAMLINE AND FRONT END

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR II OTHER HARDWARE (INSTALLATION)	**Controls** Hardware/Software installed and tested in accordance with NSLS-II requirements.	H. Xu/K. Gofron Controls Engineer	• Test system performance • Complete integral testing	Beamline: • Performance and integral testing documentation	Signature (Beamline): 10/17/17
		D. Padrazo Instrumentation Group Leader	• Test system performance • Complete integral testing	FE: • Performance and integral testing checklist	Signature (FE): 10/12/17
	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	Beamline: • Completed Top Level Traveler • Test Report	Signature (Beamline): 10/11/17
		C. Hetzel Vacuum Group Leader	• Generate and execute Top Level Traveler • Identify overpressure devices • Test system • performance	FE: • Completed Top Level Traveler • Test Report	Signature (FE): *Reviewed in August 2017 IRR

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

ATTACHMENT C – PILLAR III PERSONNEL

18-ID BEAMLINE AND FRONT END

	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: Bruce Lein 10/11/17
	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: Bruce Lein 10/17/17
	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: Bruce Lein 10/17/17
	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: Bruce Lein 10/11/17

* READINESS CERTIFICATION	**W. Lee - Lead Beamline Scientist**	**Signature:** W. Lee 10/17/17
* READINESS CERTIFICATION	**S. Sharma - Mechanical Engineering Group Leader**	**Signature** S. Sharma 10/18/17

*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

18-ID BEAMLINE AND FRONT END

	READINESS CRITERIA	RESPONSIBLE PERSON	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
IRR PRE–START FINDINGS	**No Pre-Start Findings Identified (Beamline)** No pre-start findings associated with the 18-ID Beamline have been identified by the Review Team and therefore the following lines do not require sign-off.	R. Lee ESH Manager	• IRR Preliminary Report	Signature:
		M. Hauptmann Independent Verifier		Signature:
	No Pre-Start Findings Identified (Front End) No pre-start findings associated with the FE have been identified by the Review Team and therefore the following lines do not require sign-off.	R. Lee ESH Manager	• IRR Preliminary Report	Signature:
		M. Hauptmann Independent Verifier		Signature:
	Pre-Start Actions Complete (Beamline) All actions associated with the 18-ID Beamline IRR pre-start findings are complete.	J. Adams IRR Technical Authority (Beamline)	• Pertinent closure evidence	Signature:
	Pre-Start Actions Complete (Front End) All actions associated with the FE IRR pre-start findings are complete.	T. Shaftan IRR Technical Authority (Front End)	• Pertinent closure evidence	Signature:
	Pre-Start Actions Verified (Beamline) All actions associated with the 18-ID Beamline IRR pre-start findings have been verified complete.	R. Lee ESH Manager	• Pertinent closure evidence	Signature:
	Pre-Start Actions Verified (Front End) All actions associated with the FE IRR pre-start findings have been verified complete.	R. Lee ESH Manager	• Pertinent closure evidence	Signature:
	Pre-Start Actions Independently Verified (Beamline) Actions associated with the 18-ID Beamline IRR pre-start findings have been satisfactorily complete.	M. Hauptmann Independent Verifier	• Pertinent closure evidence	Signature:
	Pre-Start Actions Independently Verified (Front End) Actions associated with the FE IRR pre-start findings have been satisfactorily complete.	M. Hauptmann Independent Verifier	• Pertinent closure evidence	Signature:

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