

INSTRUMENT READINESS PLAN (IRP)

FOR THE

NSLS-II 21-ID (ESM) BEAMLINE, FRONT END AND INSERTION DEVICE



JUNE 2016

PS-C-XFD-PLN-029

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FOR THE

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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 21-ID Electron-Spectro-Microscopy [ESM] Beamline, Front End and Insertion Device ready for commissioning. The scope of this IRP includes the 21-ID high energy Insertion Device, the Front End, the Beamline and the Angle Resolved Photoemission End Station. It was prepared in accordance with the *Instrument Readiness Review Procedure* (PS-C-ESH-PRC-001). The ESM Beamline features two *in-line* undulators; one covering higher energies (EPU57) and the other covering lower energies (EPU105). EPU105 is not in the scope of this review. Experimental equipment that is installed and operational in the End Station will be included in the scope of this plan.

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 21-ID Beamline

The 21-ID Beamline is an insertion device beamline, which will provide state-of-the-art soft x-ray spectroscopic tools for the NSLS-II User community. Sited in sector 21-ID, a low-beta straight section, it employs two *in-line* elliptically polarized undulators (EPU105 and EPU57) as sources with a period of 105 and 57 mm, and lengths of 2.8 and 1.4 m, respectively. Downstream of the insertion devices is the Front End section terminating at the storage ring ratchet wall. The first section of the Photon Delivery System (PDS-21ID-A) proper is the First Optical Enclosure (FOE), a lead hutch located just behind the ratchet wall. This contains the fixed, white-beam aperture mask (0.4 mrad fan), the first optical element – a directly water cooled plane mirror (M1) - and the first Photon Shutter. The FOE constitutes the only (lead) hutch featured by the ESM beamline. Following section A, the PDS continues with section B (PDS-21ID-B), comprising the Plane Grating Monochromator (PGM) and the M3 mirrors system. Downstream of the M3 chambers, the ESM beamline splits into two branches (A: outboard and B: inboard) which constitute section C of the PDS (PDS-21ID-C). Each branch consists of a Photon Shutter, vertical and horizontal precision slits and a refocusing mirror system (M4A, M4B). The end station terminating the A branch is the Angle Resolved Photoemission End Station (ARPES) and it constitutes section D of the PDS (PDS-21ID-D). The End Station terminating the B branch is the X-ray Photoemission Microscope (XPEEM). The credited controls include shielding, PPS

apertures 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 21-ID Beamline, Front End and Insertion Device 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 21-ID Beamline Front End and Insertion Device.

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 Insertion Devices Group Leader and the Mechanical Engineering Group Leader are responsible for certifying that all of the readiness criteria associated with the subject Front End and Insertion Device are achieved.

3.3 Execution of the IRP

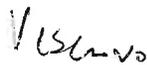
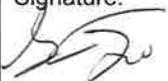
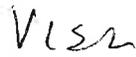
The Readiness Team members shall execute this IRP by preparing, installing, documenting, or training (as appropriate), the specific scope of work (readiness criteria) assigned to them as listed in the Attachments. The Readiness Team members shall develop, compile or assemble the documented evidence that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

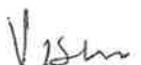
For completion of the IRR pre-start findings, if identified, the IRR Technical Authorities and the ESH Manager will certify that all IRR pre-start findings relative to the 21-ID Beamline, Front End and Insertion Device have been completed, and that the associated ATS Actions have been closed by signing 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.

**ATTACHMENT A – PILLAR I DOCUMENTATION
21-ID BEAMLINE, FRONT END AND INSERTION DEVICE**

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, ID and Beamline specific information: <ul style="list-style-type: none"> - 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 	E. Vescovo Lead Beamline Scientist	<ul style="list-style-type: none"> • Develop the presentation described for the Beamline 	<ul style="list-style-type: none"> • Presentation • Functional Description Document 	Signature: 
		G. Fries Accelerator Division Liaison Engineer	<ul style="list-style-type: none"> • Develop the presentation described for the FE and ID 	<ul style="list-style-type: none"> • Presentation 	Signature: 
	Beamline, FE & ID Design Beamline, FE & ID 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> .	E. Vescovo Lead Beamline Scientist	<ul style="list-style-type: none"> • Complete Preliminary and Final Design Reviews (PDR & FDR) for the Beamline, FE and ID that address thermal management, mechanical support, configuration control, and vacuum. 	<ul style="list-style-type: none"> • Requirements, Specifications, and Interface report (RSI) • Internal and contractor supplied design review documents 	Signature: 
		S. Sharma Mechanical Engineering Group Leader			Signature: 
		T. Tanabe Insertion Devices Group Leader			Signature: 

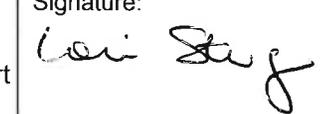
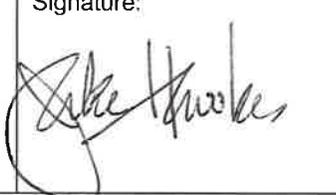
*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

**ATTACHMENT A – PILLAR I DOCUMENTATION
21-ID BEAMLINE, FRONT END AND INSERTION DEVICE**

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, <i>Design Reviews</i> and PS-C-QAS-PRC-010, <i>Engineering Design by Others</i> .	E. Vescovo 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 RSC Report 	Signature: 
		S. Sharma Mechanical Engineering Group Leader	<ul style="list-style-type: none"> Complete requirements analysis and design of radiation safety components for the FE 	<ul style="list-style-type: none"> Internal design review documents RSC Report 	Signature: 
	Top-Off Safety System (TOSS) FE has been analyzed for Top-Off Safety in accordance with PS-C-ASD-PRC-183, <i>Approval of New and Modified NSLS-II Beamline Front Ends for Top Off Safety</i> .	R. Fliller 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: 
	Ray Traces Bremsstrahlung and Synchrotron Ray Traces generated in accordance with PS-C-XFD-PRC-008, <i>Synchrotron and Bremsstrahlung Ray Trace Procedure</i> .	E. Vescovo Lead Beamline Scientist	<ul style="list-style-type: none"> Prepare the Ray Traces for the Beamline 	<ul style="list-style-type: none"> Primary Bremsstrahlung Ray Traces Maximum Synchrotron Ray Traces 	Signature: 
		S. Sharma Mechanical Engineering Group Leader	<ul style="list-style-type: none"> Prepare the Ray Traces for the FE 	<ul style="list-style-type: none"> Primary Bremsstrahlung Ray Traces Maximum Synchrotron Ray Traces 	Signature: 

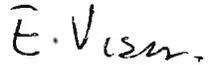
*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

ATTACHMENT A – PILLAR I DOCUMENTATION
21-ID BEAMLINE, FRONT END AND INSERTION DEVICE

	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, <i>Guidelines for the NSLS-II Beamline Radiation Shielding Design</i> .	M. Benmerrouche 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: 
	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: 
	Unreviewed Safety Issue (USI) Evaluations/ Screenings Authorization basis hazard identification is managed through USI evaluation/screening.	S. Moss Authorization Basis Manager	<ul style="list-style-type: none"> • Verify that the SAD and ASE accurately cover the hazards associated with the subject Beamline, FE and ID; including temporary systems 	<ul style="list-style-type: none"> • SAD and ASE USI screenings/evaluations • Applicable waivers 	Signature: 
	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.	J. Zipper QA Engineer	<ul style="list-style-type: none"> • ATS action items for the Beamline shown as closed with supporting evidence 	<ul style="list-style-type: none"> • ATS System * 	Signature: 
J. Hawkes QA Engineer		<ul style="list-style-type: none"> • ATS action items for the FE and ID shown as closed with supporting evidence 	<ul style="list-style-type: none"> • ATS System 	Signature: 	

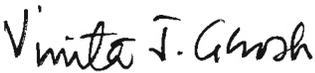
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**ATTACHMENT A – PILLAR I DOCUMENTATION
21-ID BEAMLINE, FRONT END AND INSERTION DEVICE**

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR I DOCUMENTATION (PLANNING & PROCEDURES)	<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, FE and ID, if any.</p>	<p align="center">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 	<ul style="list-style-type: none"> • Insertion Device LOTO Procedures (PS-C-ASD-PRC-213) • 21-ID Radiological Interlock Test Procedure (PS-C-XFD-PRC-059) • Search and Secure Sketch 	<p>Signature:</p> 
	<p>Commissioning Plans Commissioning plans have been generated for the Beamline and FEs and IDs to address the task sequence required for technical commissioning (safe photon transport).</p>	<p align="center">E. Vescovo Lead Beamline Scientist</p>	<ul style="list-style-type: none"> • Prepare a Commissioning Plan for the Beamline 	<ul style="list-style-type: none"> • Approved Beamline Commissioning Plan 	<p>Signature:</p> 
		<p align="center">T. Shaftan Accelerator Coordination Group Leader</p>	<ul style="list-style-type: none"> • Verify that NSLS-II ID and Front End Commissioning Sequence (PS-C-ASD-PRC-166) adequately covers commissioning for the FEs and IDs 	<ul style="list-style-type: none"> • NSLS-II ID and Front End Commissioning Sequence (PS-C-ASD-PRC-166) 	<p>Signature:</p> 

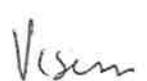
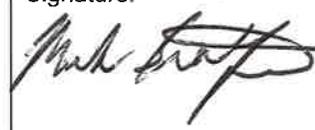
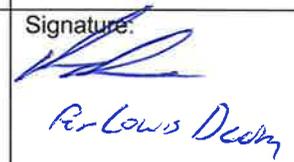
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ATTACHMENT A – PILLAR I DOCUMENTATION
21-ID BEAMLINE, FRONT END AND INSERTION DEVICE

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR I DOCUMENTATION (PLANNING & PROCEDURES)	Radiation Survey Plans A survey plan has been generated for the Beamline in accordance with PS-C-XFD-PRC-004, <i>NSLS-II Beamlines Radiation Safety Commissioning Plan</i> 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 and ID.	V. Ghosh Radiation Physicist	<ul style="list-style-type: none"> Prepare the radiation survey plan for the Beamline 	<ul style="list-style-type: none"> Approved Beamline Radiation Survey Plan 	Signature: 
		 V. Ghosh Radiation Physicist	<ul style="list-style-type: none"> Verify that the NSLS-II Insertion Devices and Front End Radiation Survey Plan (PS-C-ESH-PRC-061) adequately covers commissioning for the FEs and IDs 	<ul style="list-style-type: none"> NSLS-II Insertion Devices and Front End Radiation Survey Plan (PS-C-ESH-PRC-061) 	Signature: 

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

**ATTACHMENT B – PILLAR II HARDWARE
21-ID BEAMLINE, FRONT END AND INSERTION DEVICE**

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.	E. Vescovo Lead Beamline Scientist	<ul style="list-style-type: none"> • Generate and execute Traveler 	Beamline: <ul style="list-style-type: none"> • Completed Traveler 	Signature: 
		M. Breiffeller Mechanical Engineer	<ul style="list-style-type: none"> • Generate and execute Top Level Traveler 	FE: <ul style="list-style-type: none"> • Completed Traveler 	Signature: 
		L. Doom Accelerator Coordination	<ul style="list-style-type: none"> • Generate and execute Top-Off Traveler 	<ul style="list-style-type: none"> • Completed Traveler 	Signature: 
	Radiation Safety Components: Configuration Control A Radiation Safety Component Checklist template is generated in accordance with PS-C-ESH-PRC-025, <i>NSLS-II Radiation Safety Component Inspection Procedure</i> .	E. Vescovo 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: 
		L. Doom Accelerator Coordination Group Engineer	<ul style="list-style-type: none"> • Verify that the existing FE Radiation Safety Component checklist includes the subject FE and ID 	<ul style="list-style-type: none"> • Approved Storage Ring Radiation Safety Component Checklist Template 	Signature: 

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

ATTACHMENT B – PILLAR II HARDWARE
21-ID BEAMLINE, FRONT END AND INSERTION DEVICE

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR II SAFETY CRITICAL HARDWARE (INSTALLATION)	<p>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></p>	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: 
	<p>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></p>	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: 
	<p>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></p>	E. Haas Beamline Engineer	<ul style="list-style-type: none"> • Generate and execute Traveler for inspection 	<ul style="list-style-type: none"> • Completed Traveler 	Signature: 

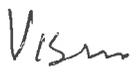
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**ATTACHMENT B – PILLAR II HARDWARE
21-ID BEAMLINE, FRONT END AND INSERTION DEVICE**

	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.	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 entries 	Signature:  6/27/16
	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 • Generate and execute Traveler • Perform pressure test 	<ul style="list-style-type: none"> • Approved system schematics • System pressure testing reports • Completed Travelers 	Signature: 

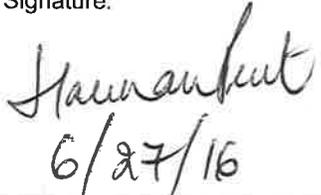
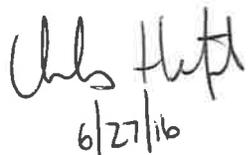
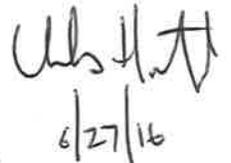
*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

**ATTACHMENT B – PILLAR II HARDWARE
21-ID BEAMLINE, FRONT END AND INSERTION DEVICE**

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.	E. Vescovo Lead Beamline Scientist	<ul style="list-style-type: none"> • Generate and execute Traveler • Complete vendor acceptance tests 	Beamline: <ul style="list-style-type: none"> • Completed Traveler • Vendor acceptance test documentation, as needed 	Signature: 
		M. Breitfeller Mechanical Engineer	<ul style="list-style-type: none"> • Generate traveler and drawing • Execute Traveler • Perform pressure test 	FE and ID: <ul style="list-style-type: none"> • Completed Traveler • System pressure testing reports 	Signature: 
	Equipment Protection System (EPS) Interlocks Hardware/Software installed and tested in accordance with the Traveler.	R. Kadyrov Controls Infrastructure Group Leader	<ul style="list-style-type: none"> • Generate and execute Traveler • Verify EPICS integration • Test system performance 	Beamline: <ul style="list-style-type: none"> • Test Report • Completed Traveler 	Signature: 
		G. Ganetis Electrical Engineering Group Leader	<ul style="list-style-type: none"> • Verify EPICS integration • Test system performance 	FE and ID: <ul style="list-style-type: none"> • Test Report 	Signature: 

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

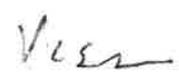
ATTACHMENT B – PILLAR II HARDWARE
21-ID BEAMLINE, FRONT END AND INSERTION DEVICE

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.	J. Ma Controls Group Engineer	<ul style="list-style-type: none"> • Test system performance • Complete integral testing 	Beamline: <ul style="list-style-type: none"> • Performance and integral testing checklist 	Signature: 
		H. Bassan Controls Group Engineer	<ul style="list-style-type: none"> • Test system performance • Complete integral testing 	FE and ID: <ul style="list-style-type: none"> • Performance and integral testing checklist 	Signature:  6/27/16
	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	<ul style="list-style-type: none"> • Generate and execute Top Level Traveler • Identify overpressure devices • Test system performance 	Beamline: <ul style="list-style-type: none"> • Completed Top Level Traveler • Test Report 	Signature: FOR ROB TODD  6/27/16
		C. Hetzel Vacuum Group Leader	<ul style="list-style-type: none"> • Generate and execute Top Level Traveler • Identify overpressure devices • Test system performance 	FE and ID: <ul style="list-style-type: none"> • Completed Top Level Traveler • Test Report 	Signature:  6/27/16

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

**ATTACHMENT C – PILLAR III PERSONNEL
21-ID BEAMLINE, FRONT END AND INSERTION DEVICE**

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: 
	Authorized Beamline Staff Sufficient personnel to begin commissioning are assigned and Trained/Qualified.	B. Lein Training Group Leader	• Assign JTA	• BTMS record	Signature: 
	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:  NONE IDENTIFIED
	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 and ID commissioning	B. Lein Training Group Leader	• Train Operators	• BTMS record	Signature: 

* READINESS CERTIFICATION	E. Vescovo - Lead Beamline Scientist	Signature: 
* READINESS CERTIFICATION	S. Sharma - Mechanical Engineering Group Leader	Signature: 
* READINESS CERTIFICATION	T. Tanabe - Insertion Devices Group Leader	Signature: 

*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
21-ID BEAMLINE, FRONT END AND INSERTION DEVICE**

READINESS CRITERIA		RESPONSIBLE PERSON	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
IRR PRE–START FINDINGS	Actions Complete All actions associated with the subject Beamline(s), FE & ID IRR pre-start findings are completed and the ATS Actions are closed.	S. Hulbert IRR Technical Authority (Beamline)	• ATS	Signature: <i>S. Hulbert</i> 21 July 2016
		F. Willeke IRR Technical Authority (FE & ID)	• ATS	Signature: <i>T. Shafiq</i> for <i>F. Willeke 7/21/16</i>
	Actions Closed All actions associated with the 21-ID Beamline, FE & ID IRR pre-start findings have been verified complete and the ATS Condition is closed. (ATS Condition No. <u>8657.6.1</u>)	R. Lee ESH Manager	• ATS 8657.6	Signature: <i>R. Lee</i> 7-21-16
	Actions Verified Actions associated with the 21-ID Beamline, FE & ID IRR pre-start findings have been satisfactorily completed.	E. Cheswick Independent Verifier	• ATS 8657.6	Signature: <i>E. Cheswick</i> 7-21-16
	No Pre-Start Findings Identified No pre-start findings have been identified by the Review Team and therefore the previous three lines do not require sign-off.	R. Lee ESH Manager	• IRR Preliminary Report	Signature:
		E. Cheswick Independent Verifier	• IRR Preliminary Report	Signature:

– END –

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