

# **INSTRUMENT READINESS PLAN (IRP)**

**FOR THE**

## **NSLS-II 12-ID (SMI) BEAMLINE**



**OCTOBER 2016**

**NSLSII-12ID-PLN-001**

**PREPARED BY**

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**FOR THE**

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

# INSTRUMENT READINESS PLAN (IRP)

FOR THE

## NSLS-II 12-ID (SMI) BEAMLINER

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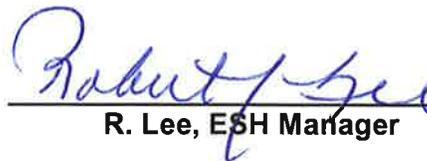


A. Ackerman, Instrument Readiness Coordinator

APPROVED AS A PLAN TO ACHIEVE READINESS BY:

 for Steven Hulbert  
S. Hulbert, IRR Technical Authority

CONCURRENCE BY:

 10/17/16  
R. Lee, ESH Manager

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

 4-NOV-2016

S. Hulbert, IRR Technical Authority

CONCURRENCE BY:

 11-4-16  
R. Lee, ESH Manager

**REVISION HISTORY**

<b>REVISION</b>	<b>DESCRIPTION</b>	<b>LIST OF REVIEWERS</b>	<b>DATE</b>
1	First Issue	See completed tables	October 2016

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### ATTACHMENTS

Attachment A, *Pillar I Documentation, 12-ID Beamline*

Attachment B, *Pillar II Hardware, 12-ID Beamline*

Attachment C, *Pillar III Personnel, 12-ID Beamline*

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 12-ID (Soft Matter Interfaces [SMI]) Beamline ready for commissioning. The Front End (FE) and Insertion Device (ID) for this beamline were reviewed and commissioned in February 2016.

The scope of this IRP is divided as follows, into two phases.

Phase 1 includes planning, design, and installation of all beamline systems on the experimental floor side of the accelerator enclosure sawtooth with the following exceptions:

- The beamline PPS
- The front end EPS
- The SAXS Sub-Assembly in the experimental end-station 12-ID-C

All PPS and EPS hardware will be installed, and final systems testing and certification of these will not be complete. Completion of this phase of the IRP will not result in a request for authorization to operate with the photon beam.

Phase 2 includes testing and certification for the PPS and EPS to satisfy the readiness criteria for those systems along with completion of all personnel readiness criteria. At the completion of this phase of the IRR, a request for authorization to proceed with technical commissioning will be submitted in accordance with NSLS II policy and procedure.

This IRP will be used as a tool for planning and certifying readiness. The completion of this IRP will proceed in the two phases describes and will require that the listed actions and documentation are complete.

### 1.2 12-ID Beamline

The 12-ID Beamline is an insertion device beamline. The scientific objective of SMI is to deliver beam from the high brightness NSLS-II source with variable focus and divergence for the purpose of small- and wide-angle x-ray scattering studies of interfaces of soft- and bio-materials and liquids. The installed source has a 23 mm period in-vacuum undulator (IVU23) in the downstream, inboard-canted position. The first fixed aperture mask accepts fans in the horizontal of 0.62 (0.58) mrad and in the vertical of 0.35 (0.30) mrad from the inboard (future outboard) source and reduces both inboard and outboard fans to 0.1(v)×0.1(h) mrad incident upon the vertical bounce double crystal Si monochromator (inboard) (the outboard beam proceeds to the white beam stop). The beamline vacuum is windowless to the final end-station experimental chamber. Credited controls include shielding, oxygen monitor and alarm system, a PPS aperture burn-through device, 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 12-ID Beamline 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 12-ID Beamline.

## **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.

### **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 12-ID Beamline 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**

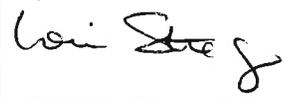
- 4.1 PS-C-ESH-PRC-001, *Instrument Readiness Review Procedure*
- 4.2 PS-C-ESH-ROASE-001, *NSLS-II Accelerator Safety Envelope (ASE)*

**ATTACHMENT A – PILLAR I DOCUMENTATION**  
**12-ID BEAMLINE**

	<b>READINESS CRITERIA</b>	<b>RESPONSIBLE PERSON</b>	<b>ACTIONS</b>	<b>DOCUMENTED EVIDENCE</b>	<b>CERTIFICATION OF READINESS*</b>
<b>PILLAR I DOCUMENTATION (PLANNING &amp; PROCEDURES)</b>	<b>Functional Description</b> An overview presentation is prepared that defines the scope of the IRR and includes the following FE, IVU23 and Beamline specific information: <ul style="list-style-type: none"> <li>- Primary capabilities</li> <li>- Physical layout and location (includes Beamline location on the experiment floor)</li> <li>- Design reviews and performance parameters</li> <li>- Source characteristics</li> <li>- Photon beam performance goals</li> <li>- Radiation Safety Committee reviews</li> <li>- Self-identified pre-start findings</li> <li>- Description and status for each item listed in this Instrument Readiness Plan</li> </ul>	E. DiMasi SMI Lead Beamline Scientist	<ul style="list-style-type: none"> <li>• Develop the presentation described for the Beamline</li> </ul>	<ul style="list-style-type: none"> <li>• Presentation</li> <li>• Functional Description Document</li> </ul>	Signature:  
		G. Fries Accelerator Division Liaison Engineer	<ul style="list-style-type: none"> <li>• Develop the presentation described for the FE and IVU23</li> </ul>	<ul style="list-style-type: none"> <li>• Presentation</li> </ul>	Signature:  N/A KR 10/17/16
	<b>Beamline, FE &amp; ID Design</b> 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> .	E. DiMasi SMI Lead Beamline Scientist	<ul style="list-style-type: none"> <li>• Complete Engineering Design Reviews for the Beamline, FE and IVU23 that address thermal management, mechanical support, configuration control, and vacuum</li> </ul>	Beamline: <ul style="list-style-type: none"> <li>• Internal and contractor supplied design review documents and reports</li> </ul>	Signature:  
		S. Sharma Mechanical Engineering Group Leader			Signature:  
		T. Tanabe Insertion Devices Group Leader			Signature:  
				FE and IVU23: <ul style="list-style-type: none"> <li>• Requirements, Specifications, and Interface report (RSI)</li> <li>• Internal design review documents</li> </ul>	

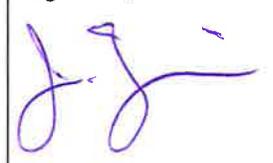
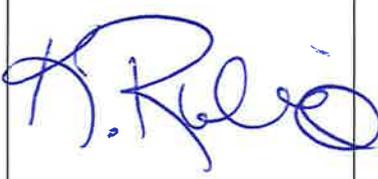
\*Signature certifies that the readiness criteria are met. The Responsible Person shall not sign prior to completion.

**ATTACHMENT A – PILLAR I DOCUMENTATION**  
**12-ID BEAMLINE**

READINESS CRITERIA		RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
<b>PILLAR I DOCUMENTATION (PLANNING &amp; PROCEDURES)</b>	<b>Radiation Safety Components Design</b> Radiation Safety Components for the Beamline and FE 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. DiMasi SMI Lead Beamline Scientist	<ul style="list-style-type: none"> <li>Complete requirements analysis and design of radiation safety components for the Beamline</li> </ul>	<ul style="list-style-type: none"> <li>Internal design review documents and reports</li> <li>RSC Report</li> </ul>	Signature: 
	<b>Top-Off Safety System (TOSS)</b> 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"> <li>Complete TOSS analysis</li> </ul>	<ul style="list-style-type: none"> <li>TOSS Analysis Report</li> <li>Updated FE layout drawings</li> <li>Updated <i>Beamlines Approved for Top-Off Operations</i> list</li> </ul>	Signature: 
	<b>Ray Traces</b> Bremsstrahlung and Synchrotron Ray Traces generated in accordance with PS-C-XFD-PRC-008, <i>Synchrotron and Bremsstrahlung Ray Trace Procedure</i> .	E. DiMasi SMI Lead Beamline Scientist	<ul style="list-style-type: none"> <li>Prepare the Ray Traces for the Beamline</li> </ul>	<ul style="list-style-type: none"> <li>Approved Primary Bremsstrahlung Ray Traces</li> <li>Approved Maximum Synchrotron Ray Traces</li> <li>RSC Report</li> </ul>	Signature: 
	<b>Secondary Radiation Scatter Analysis</b> 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"> <li>Complete FLUKA analysis</li> <li>Complete STAC8 analysis</li> </ul>	<ul style="list-style-type: none"> <li>BNL Technical Note Report</li> <li>RSC Report</li> </ul>	Signature: 
	<b>National Environmental Protection Act (NEPA) Evaluation</b> NEPA requirements evaluation completed.	L. Stiegler ESH Operations Group Leader	<ul style="list-style-type: none"> <li>Complete a NEPA evaluation</li> </ul>	<ul style="list-style-type: none"> <li>NEPA Evaluation Report</li> </ul>	Signature: 

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

**ATTACHMENT A – PILLAR I DOCUMENTATION  
12-ID BEAMLINE**

	<b>READINESS CRITERIA</b>	<b>RESPONSIBLE PERSON</b>	<b>ACTIONS</b>	<b>DOCUMENTED EVIDENCE</b>	<b>CERTIFICATION OF READINESS*</b>
<b>PILLAR I DOCUMENTATION (PLANNING &amp; PROCEDURES)</b>	<p><b>Unreviewed Safety Issue (USI) Evaluations/ Screenings</b> Authorization basis hazard identification is managed through USI evaluation/screening.</p>	<p>S. Moss Authorization Basis Manager</p>	<ul style="list-style-type: none"> <li>• Verify that the SAD and ASE accurately cover the hazards associated with the subject Beamline, FE and IVU23; including temporary systems</li> </ul>	<ul style="list-style-type: none"> <li>• SAD and ASE USI screenings/evaluations</li> <li>• Applicable waivers</li> </ul>	<p>Signature: </p>
	<p><b>Resolution of Open Action Tracking System (ATS) Actions</b> 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"> <li>• ATS action items for the instrument are satisfied.</li> <li>• ATS action items from previous IRRs are evaluated for impact to the instrument</li> </ul>	<ul style="list-style-type: none"> <li>• ATS System</li> </ul>	<p>Signature: </p>
	<p><b>Procedures</b> 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"> <li>• Develop any system specific procedures</li> <li>• Verify that existing procedure are sufficient for any new hazards introduced</li> </ul>	<ul style="list-style-type: none"> <li>• 12-ID Radiological Interlock Test Checklist</li> <li>• Search and Secure Sketch</li> <li>• Cryocooler Procedure</li> </ul>	<p>Signature: </p>

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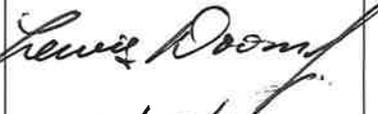
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	<b>READINESS CRITERIA</b>	<b>RESPONSIBLE PERSON</b>	<b>ACTIONS</b>	<b>DOCUMENTED EVIDENCE</b>	<b>CERTIFICATION OF READINESS*</b>
<b>PILLAR I DOCUMENTATION (PLANNING &amp; PROCEDURES)</b>	<p><b>Commissioning Plans</b> Commissioning plans have been generated for the Beamline to address the task sequence required for technical commissioning (safe photon transport).</p>	<p>E. DiMasi SMI Lead Beamline Scientist</p>	<ul style="list-style-type: none"> <li>• Prepare a Beamline Commissioning Plan to define technical objectives and operational readiness requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Approved Beamline Commissioning Plan</li> </ul>	<p>Signature:</p> 
	<p><b>Radiation Survey Procedure</b> 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>.</p>	<p>M. Benmerrouche Radiation Physicist</p>	<ul style="list-style-type: none"> <li>• Prepare the Radiation Survey Procedure for the Beamline</li> </ul>	<ul style="list-style-type: none"> <li>• Approved Beamline Radiation Survey Procedure</li> </ul>	<p>Signature:</p> 
	<p><b>Proposal Allocation Safety &amp; Scheduling (PASS)</b> The instrument is active within PASS with approvals to proceed with Technical Commissioning.</p>	<p>E. DiMasi SMI Lead Beamline Scientist</p>	<ul style="list-style-type: none"> <li>• Assure that PASS is configured to administer the instrument</li> </ul>	<ul style="list-style-type: none"> <li>• Defined resource within PASS</li> <li>• Submitted Technical commissioning proposal</li> <li>• Submitted Safety Approval Form</li> </ul>	<p>Signature:</p> 

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**ATTACHMENT B – PILLAR II HARDWARE**

**12-ID BEAMLINE**

READINESS CRITERIA		RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
<b>PILLAR II SAFETY CRITICAL HARDWARE (INSTALLATION)</b>	<b>Radiation Safety Components: Installation</b> Radiation Safety Components, including Top Off components are installed in accordance with the Traveler.	E. DiMasi SMI Lead Beamline Scientist	<ul style="list-style-type: none"> <li>• Generate and execute Traveler</li> </ul>	<ul style="list-style-type: none"> <li>• Completed Traveler</li> </ul>	Signature: 
		L. Doom Accelerator Coordination	<ul style="list-style-type: none"> <li>• Generate and execute Top-Off Traveler</li> </ul>	<ul style="list-style-type: none"> <li>• Completed Traveler</li> </ul>	Signature:  10/17/16
	<b>Radiation Safety Components: Configuration Control</b> 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. DiMasi SMI Lead Beamline Scientist	<ul style="list-style-type: none"> <li>• Develop Radiation Safety Component Checklist</li> </ul>	<ul style="list-style-type: none"> <li>• Approved beamline specific Radiation Safety Component Checklist</li> </ul>	Signature: 
		L. Doom Accelerator Coordination Group Engineer	<ul style="list-style-type: none"> <li>• Verify that the existing FE Radiation Safety Component checklist includes the subject FE and IVU23</li> </ul>	<ul style="list-style-type: none"> <li>• Approved Storage Ring Radiation Safety Component Checklist Template</li> </ul>	Signature:  10/17/16

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ATTACHMENT B – PILLAR II HARDWARE

12-ID BEAMLINE

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR II SAFETY CRITICAL HARDWARE (INSTALLATION)	<p><b>Area Radiation Monitors (ARMs)</b>                      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>	<p>M. Benmerrouche                      ARM Technical Authority</p>	<ul style="list-style-type: none"> <li>• Install, calibrate, and test (EPICS integration) ARMs</li> <li>• Certify (PPS)</li> </ul>	<ul style="list-style-type: none"> <li>• ARM Layout Drawing ✓</li> <li>• ARM calibration certificates ✓</li> <li>• ARM EPICS Interface Integration Test Sheet ✓</li> <li>• ARM PPS Test checklist ✓</li> </ul>	<p>Signature:</p> 
	<p><b>Personnel Protection System (PPS) Interlocks: Installed and Certified</b>                      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>	<p>G. Ganetis                      Electrical Engineering Group Leader</p>	<ul style="list-style-type: none"> <li>• Generate system schematics and logic diagrams</li> <li>• Install PPS components</li> <li>• Certify PPS</li> </ul>	<ul style="list-style-type: none"> <li>• Overall PPS Checklist</li> <li>• Executed Beamline Radiological Interlock Certification Checklist</li> </ul>	<p>Signature:</p> 
	<p><b>O2 Sensors: Install</b>                      Oxygen sensors and alarms required to alert personnel to oxygen deficiency hazard (ODH) conditions installed in accordance with the design drawing.</p>	<p>S. LaMarra                      ODH Technical Authority</p>	<ul style="list-style-type: none"> <li>• Generate design drawing</li> <li>• Generate and execute Traveler</li> </ul>	<ul style="list-style-type: none"> <li>• Design drawing</li> <li>• Completed Traveler</li> </ul>	<p>Signature:</p> 
	<p><b>O2 Sensors: Certify</b>                      ODH monitoring system has been certified in accordance with PS-C-XFD-PRC-005, <i>Beamline Enclosures and Cryogen Fill Station ODH Monitoring and Alarm System Certification and Inspection.</i></p>	<p>B. Heneveld                      ESH Engineer</p>	<ul style="list-style-type: none"> <li>• Perform certification</li> </ul>	<ul style="list-style-type: none"> <li>• Certification Report</li> </ul>	<p>Signature:</p> 

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**ATTACHMENT B – PILLAR II HARDWARE**

**12-ID BEAMLINE**

	READINESS CRITERIA	RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
<b>PILLAR II SAFETY CRITICAL HARDWARE (INSTALLATION)</b>	<p><b>Hutch Structures</b> 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>	<p>E. Haas Beamline Engineer</p>	<ul style="list-style-type: none"> <li>• Generate and execute Traveler for inspection</li> </ul>	<ul style="list-style-type: none"> <li>• Completed Traveler</li> </ul>	<p>Signature: <i>Edwin Haas</i> 10/17/2016</p>
	<p><b>Electrical Power</b> SBMS electrical power distribution requirements are satisfied. SBMS Electrical Equipment Inspection (EEI) requirements are satisfied.</p>	<p>A. Boerner Electrical Distribution Engineer</p>	<ul style="list-style-type: none"> <li>• Generate and approve one-line drawings</li> <li>• Complete system electrical inspection</li> <li>• Complete needed EEI inspections</li> </ul>	<ul style="list-style-type: none"> <li>• Approved AC Power one-line drawings</li> <li>• EEI database entries</li> </ul>	<p>Signature: <i>[Signature]</i> 10/17/16</p>
	<p><b>Utilities</b> Permanent utility systems are installed and tested (i.e., Compressed Air, DI Water, Gaseous Nitrogen, Process Chilled Water) in accordance with design drawings.</p>	<p>J. Gosman Mechanical Utilities Group Leader</p>	<ul style="list-style-type: none"> <li>• Generate system schematics</li> <li>• Generate and execute Traveler</li> <li>• Perform pressure test</li> </ul>	<ul style="list-style-type: none"> <li>• Approved system schematics</li> <li>• Completed Traveler</li> <li>• System pressure testing reports</li> </ul>	<p>Signature: <i>[Signature]</i> 10-12-16</p>

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

**ATTACHMENT B – PILLAR II HARDWARE**

**12-ID BEAMLINE**

	<b>READINESS CRITERIA</b>	<b>RESPONSIBLE PERSON</b>	<b>ACTIONS</b>	<b>DOCUMENTED EVIDENCE</b>	<b>CERTIFICATION OF READINESS*</b>
<b>PILLAR II OTHER HARDWARE (INSTALLATION)</b>	<p><b>Other FE Components, Photon Transport Components, Optics, and Diagnostics</b> 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.</p>	<p>E. DiMasi SMI Lead Beamline Scientist</p>	<ul style="list-style-type: none"> <li>• Generate and execute Traveler</li> <li>• Complete acceptance inspections</li> </ul>	<ul style="list-style-type: none"> <li>• Completed Traveler</li> <li>• Acceptance inspection documentation, as needed</li> </ul>	<p>Signature: </p>
	<p><b>Equipment Protection System (EPS) Interlocks</b> Hardware/Software installed and tested in accordance with the Traveler.</p>	<p>R. Kadyrov Controls Infrastructure Group Leader</p>	<ul style="list-style-type: none"> <li>• Generate and execute Traveler</li> <li>• Verify EPICS integration</li> <li>• Test system performance</li> </ul>	<ul style="list-style-type: none"> <li>• Test Report</li> <li>• Completed Traveler</li> </ul>	<p>Signature: </p>
	<p><b>Front End Equipment Protection System (FEEPS)</b> (Phase 2 Installation needed for beamline operation) Hardware/Software installed and tested in accordance with the traveler.</p>	<p>G. Ganetis Electrical Engineering Group Leader</p>	<ul style="list-style-type: none"> <li>• Verify integration</li> <li>• Test system performance</li> </ul>	<ul style="list-style-type: none"> <li>• Test Report Phase 2 Installation</li> </ul>	<p>Signature: </p>
	<p><b>Controls</b> Hardware/Software installed and tested in accordance with NSLS-II requirements.</p>	<p>S. So SMI Controls Group Engineer</p>	<ul style="list-style-type: none"> <li>• Test system performance</li> <li>• Complete integral testing</li> </ul>	<ul style="list-style-type: none"> <li>• Performance and integral testing documentation</li> </ul>	<p>Signature: </p>

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

**ATTACHMENT B – PILLAR II HARDWARE  
12-ID BEAMLINE**

READINESS CRITERIA		RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
<b>PILLAR II OTHER HARDWARE (INSTALLATION)</b>	<p><b>Vacuum</b> 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"> <li>• Generate and execute Top Level Traveler</li> <li>• Identify overpressure devices</li> <li>• Test system performance</li> </ul>	<ul style="list-style-type: none"> <li>• Completed Top Level Traveler</li> <li>• Test Report</li> </ul>	<p>Signature:</p> 

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

ATTACHMENT C – PILLAR III PERSONNEL

12-ID BEAMLINE

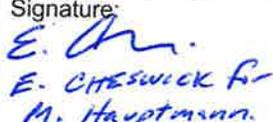
READINESS CRITERIA		RESPONSIBLE PERSON	ACTIONS	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
PILLAR III PERSONNEL	<b>Lead Beamline Scientist (LBS) / Cognizant Space Manager (CSM)</b> LBS and CSM personnel are assigned and Trained/Qualified.	B. Lein Training Group Leader	• Assign JTA for LBS and CSM	• BTMS record	Signature: * <i>Bruce Lein</i>
	<b>Authorized Beamline Staff</b> Sufficient personnel to begin commissioning are assigned and Trained/Qualified.	B. Lein Training Group Leader	• Assign JTA	• BTMS record	Signature: * <i>Bruce Lein</i>
	<b>Support Staff</b> Other, non-beamline dedicated personnel needed to begin commissioning (e.g., Beamline Engineers and Controls Personnel) are assigned and Trained/Qualified.	B. Lein Training Group Leader	• Assign JTA	• BTMS record	Signature: * <i>Bruce Lein</i>
	<b>Lead Operators, Scientific Operators &amp; FLOCOS (Accelerator Division)</b> Trained/Qualified to: – Execute the Beamline Enable procedure – Perform roles assigned in any Beamline-specific procedures	B. Lein Training Group Leader	• Train Operators	• BTMS record	Signature: <i>Bruce Lein</i>

* READINESS CERTIFICATION	E. DiMasi – SMI Lead Beamline Scientist	Signature: <i>Eliane DiMasi</i>
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\* TRAINED IN ALL REQUIREMENTS EXCEPT FOR BEAMLINE ENCLOSURE SEARCH AND SECURE - THIS TRAINING REQUIRES PPS TO BE CERTIFIED AND THEREFORE IS PART OF PHASE II. *Bruce Lein 10-18-16*

\*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  
12-ID BEAMLINER**

READINESS CRITERIA		RESPONSIBLE PERSON	DOCUMENTED EVIDENCE	CERTIFICATION OF READINESS*
<b>IRR PRE–START FINDINGS</b>	<b>Actions Complete</b> All actions associated with the 12-ID Beamline IRR pre-start findings are completed and the ATS Actions are closed.	S. Hulbert IRR Technical Authority	<ul style="list-style-type: none"> <li>• ATS</li> </ul>	Signature:
	<b>Actions Closed</b> All actions associated with the 12-ID Beamline IRR pre-start findings have been verified complete and the ATS Condition is closed.  (ATS Condition No. _____)	R. Lee ESH Manager	Beamline: <ul style="list-style-type: none"> <li>• ATS</li> </ul>	Signature:
	<b>Actions Verified</b> Actions associated with the 12-ID Beamline IRR pre-start findings have been satisfactorily completed.	M. Hauptmann Independent Verifier	Beamline: <ul style="list-style-type: none"> <li>• ATS</li> </ul>	Signature:
	<b>No Pre-Start Findings Identified</b> No pre-start findings have been identified by the Review Team and therefore the previous lines do not require sign-off.	R. Lee ESH Manager	<ul style="list-style-type: none"> <li>• IRR Preliminary Report</li> </ul>	Signature: 
		M. Hauptmann Independent Verifier	<ul style="list-style-type: none"> <li>• IRR Preliminary Report</li> </ul>	Signature: 

– END –

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