PREPARING FOR FIRST LIGHT TO BEAMLINES

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WHAT WE HAVE ACCOMPLISHED

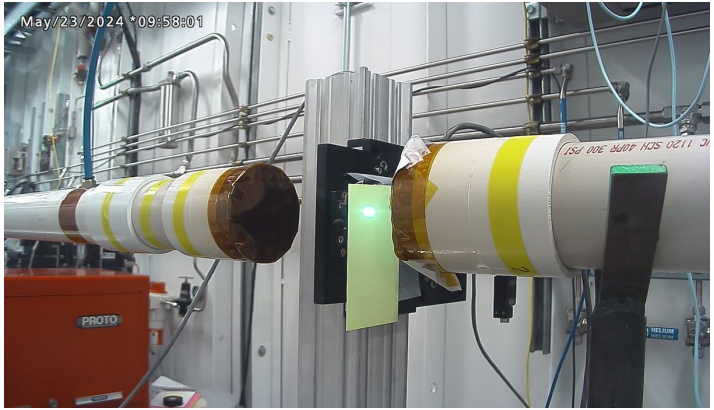
Preparing beamlines for the new APS storage ring

- Technical teams have been working since early 2023 to ready every beamline for the new APS
- Work has included building entirely new beamlines, adding new infrastructure, new beamline components, new optics, new instrumentation, and new controls systems
- We are currently surveying beamlines to optimize alignments to the new storage ring lattice

WHAT WE ARE WORKING ON NOW

Preparing every beamline for first X-rays

- Last week, we began work at the 35-BM accelerator diagnostics beamline
- Next week, we start bringing the first user beamlines online (27-ID and 29-ID)
- We will bring beamlines back online safely and as rapidly as possible according to the plan developed by APS management
- All beamline enclosures must pass shielding validations by the Commissioning Readiness Review Team (CRRT) in coordination with Health Physics before scientific commissioning



GETTING READY FOR X-RAYS

Many important steps before first light

Tracking all beamline readiness tasks:

- ❑ **FDR approved**

Final Design Report (FDR) has been approved by the PSC Design Review Committee and all outstanding issues have been addressed and verified

Approval Memo from PSC Deputy ALD for Operations

GETTING READY FOR X-RAYS

Many important steps before first light

Tracking all beamline readiness tasks:

- ✓ FDR approved
- ❑ **Survey model approved**

Survey model is based on FDR Component Reference Table (CRT) positions and beamline ray traces

This step involves a verification of the fiducial data for existing components

Model is approved by beamline representatives and survey engineers

(RE)ALIGNING BEAMLINES

- All beamlines will be aligned to the new storage ring lattice based on the approved ray tracings and component reference tables (CRT) from the Final Design Report (FDR)
- All ID beamlines will be adjusted horizontally and vertically (X shift and Y shift of only a few millimeters)
- All BM beamlines will be shifted ~42 mm inboard horizontally plus an angular adjustment, and vertically (X shift with θ_Y rotation and Y shift)

GETTING READY FOR X-RAYS

Many important steps before first light

Tracking all beamline readiness tasks:

- ✓ FDR approved
- ✓ Survey model approved
- ❑ **Infrastructure complete (shielded enclosures, utilities)**
- ❑ **Beamline components installed**

We are working with you to ensure that your beamline is ready for operation

GETTING READY FOR X-RAYS

Many important steps before first light

Tracking all beamline readiness tasks:

- ✓ FDR approved
- ✓ Survey model approved
- ✓ Infrastructure complete (shielded enclosures, utilities)
- ✓ Beamline components installed
- ❑ **Beamline controls verified**

All beamline controls necessary for delivering beam to the entire beamline must be operational

Please work with your Beamline Controls and Data Acquisition (BCDA) and IT representatives to ensure that your beamline systems are ready

GETTING READY FOR X-RAYS

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- ✓ FDR approved
- ✓ Survey model approved
- ✓ Infrastructure complete (shielded enclosures, utilities)
- ✓ Beamline components installed
- ✓ Beamline controls verified
- ❑ **Beamline surveyed**

A beamline representative should be available to assist the survey team

After the beamline is aligned, a final alignment document will be approved by the survey engineer, the APS-U engineer liaison, and the beamline lead

GETTING READY FOR X-RAYS

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- ✓ FDR approved
- ✓ Survey model approved
- ✓ Infrastructure complete (shielded enclosures, utilities)
- ✓ Beamline components installed
- ✓ Beamline controls verified
- ✓ Beamline surveyed
- ❑ **Beamline vacuum verified**
- ❑ **Air lines installed**
- ❑ **Water system installed and verified**

As part of the beamline final checkout, these systems will be verified in consultation with beamline staff

Residual gas analyzer (RGA) scan will be required for all windowless beamlines

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- ✓ Beamline controls verified
- ✓ Beamline surveyed
- ✓ Beamline vacuum verified
- ✓ Air lines installed
- ✓ Water system installed and verified

- ❑ **Front end equipment protection system (FEEPS) verified**
- ❑ **Beamline equipment protection system (BLEPS) verified**
- ❑ **Personal safety system (PSS) validated**

As part of the beamline final checkout, these systems will be verified by the Safety Interlocks group

GETTING READY FOR X-RAYS

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- ✓ Infrastructure complete (shielded enclosures, utilities)
- ✓ Beamline components installed
- ✓ Beamline controls verified
- ✓ Beamline surveyed
- ✓ Beamline vacuum verified
- ✓ Air lines installed
- ✓ Water system installed and verified
- ✓ FEEPS system verified
- ✓ BLEPS system verified
- ✓ PSS system validated
- ❑ **E-traveler completed**

All beamlines have an electronic traveler (e-traveler) that documents the work that has been performed

GETTING READY FOR X-RAYS

Many important beamline readiness steps before first light

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- ✓ Infrastructure complete (shielded enclosures, utilities)
- ✓ Beamline components installed
- ✓ Beamline controls verified
- ✓ Beamline surveyed
- ✓ Beamline vacuum verified
- ✓ Air lines installed
- ✓ Water system installed and verified
- ✓ FEEPS system verified
- ✓ BLEPS system verified
- ✓ PSS system validated
- ✓ E-traveler completed
- ❑ **Front-End administrative restriction for shutter locks lifted/ PSS Access Control Interlock System End to End**
- ❑ **Install/Realignment Configuration Control Work Permit completion**
- ❑ **Radiation Safety Systems devices tagged**
- ❑ **Experiment Facilities Operations Group ready for enable**

Administrative controls and verifications prior to the start of Operations Commissioning of the beamline

GETTING READY FOR X-RAYS

Many important steps before first light

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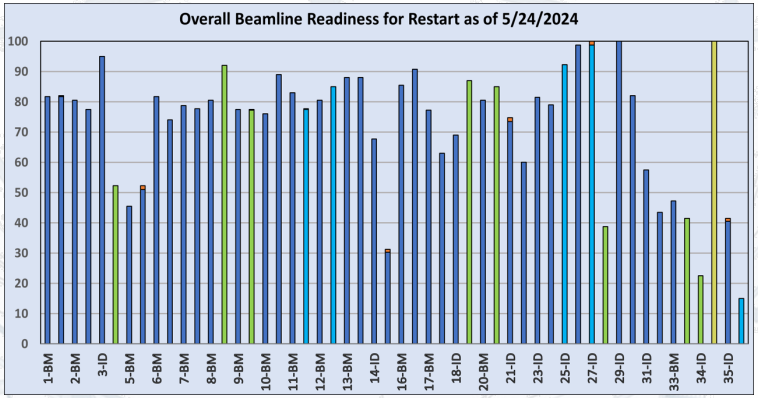
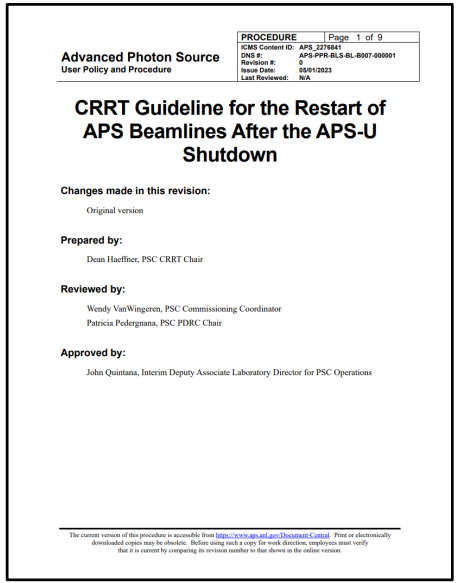
- ✓ Beamline controls verified
- ✓ Beamline surveyed
- ✓ Beamline vacuum verified
- ✓ Air lines installed
- ✓ Water system installed and verified
- ✓ FEEPS system verified
- ✓ BLEPS system verified
- ✓ PSS system validated
- ✓ E-traveler completed
- ✓ Front-End administrative restriction for shutter locks lifted/ PSS ACIS E2E
- ✓ Install/Realignment CCWP completion
- ✓ RSS devices tagged
- ✓ EFOG ready for enable



GETTING READY FOR X-RAYS

Operations Commissioning

- Beamline FDR approved by the Deputy Associate Laboratory Director for Operations, with all relevant recommendations appropriately resolved
- Front End for the beamline is operational
- At least one operational insertion device (ID) for the beamline (ID beamlines only)
- Installation and checkout of all beamline components, controls and systems relevant to Ops Commissioning is complete
- Survey and alignment of beamline RSS components is complete
- Operational PSS and BLEPS systems



Advanced Photon Source
User Policy and Procedure

PROCEDURE	Page 1 of 9
ICMS Content ID:	APS_2276841
DNS #:	APS-PPR-BLS-BL-B007-000001
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Last Reviewed:	N/A

CRRT Guideline for the Restart of APS Beamlines After the APS-U Shutdown

Changes made in this revision:

Original version

Prepared by:

Dean Haeffner, PSC CRRT Chair

Reviewed by:

Wendy VanWingeren, PSC Commissioning Coordinator
Patricia Pedergnana, PSC PDRC Chair

Approved by:

John Quintana, Interim Deputy Associate Laboratory Director for PSC Operations

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GETTING READY FOR X-RAYS

Operations Commissioning

- All relevant beamline RSS components tagged and logged into the configuration control database by the Experimental Facilities Operations Group (EFOG)
- Any required temporary supplemental shielding to perform safe commissioning is in place and documented as required by APS procedures
- Any required oxygen deficiency alarms (ODH) are in place, functionally verified, and logged into the EFOG configuration control tracking system
- Beamline specific CRRT procedure for Operations Commissioning is approved
- **Authorization by the PSC Deputy ALD for Operations for the beamline to be brought online**

THANK YOU

We are working as quickly and safely as possible to get your beamlines ready.

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