

# Advanced Photon Source Upgrade Project Update



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APS User Monthly Meeting  
March 26, 2013

# Outline

- Progress towards CD-2
- Recent Reviews
- Beamline and Front End Status Updates
- 150 mA Run

# CD-2 Status-Requirements List

TOTAL PROJECT COST (TPC)		Less than \$400M to \$100M	Status
DECISION / REQUIREMENTS <sup>1</sup> / APPROVAL <sup>2</sup>			
<b>CD-2 --APPROVE PERFORMANCE BASELINE</b>		SC-2	
	Approve updated Acquisition Strategy if changes are major	SC-1 with SC-28 concurrence	<b>COMPLETED</b> No major change to the strategy
<b>PRIOR TO CD-2--PRELIMINARY DESIGN</b>	Establish a Performance Baseline (PB)	FPD	Scheduled for 3QFY13 - Trial Baseline in place
	Approve updated PEP	SC-2	<b>DRAFT COMPLETED</b> incorporating comments
	Prepare a Baseline Fund. Profile & reflect in budget docs. & PEP. Consider full funding if TPC < \$50M	SC-2	Proposed funding profile provided by BES
	Approval of Long-Lead Procurement	SC-2	<b>COMPLETED</b> - CD-3A approved on 8/30/12
	Develop Project Management Plan, if applicable	N/A	<b>COMPLETED</b> - APS-U developed a Project Implementation Plan (PIP)
	Complete Preliminary Design	Project	<b>COMPLETED</b>
	Incorporate High Perf. & Sustainable Bldg. & Sustainable Environmental Stewardship	Project	N/A
	Conduct a Preliminary Design Review	Team external to project	<b>COMPLETED</b> (Reviewed 3/2012 to 8/2012)
	Complete Preliminary Design Report	Project	<b>COMPLETED</b>
	Perform Baseline Validation Review	ICE by OECM with OPA	<b>COMPLETED</b>
	Conduct a Project Definition Rating Index analysis as part of an EIR	N/A	N/A
	Conduct a Technical Readiness Assessment & develop a Technical Maturation Plan	N/A	N/A
	Employ an EVMS compliant with ANSI/EIA-748A, or as defined in the contract	Contractor	<b>COMPLETED</b> - APS-U will utilize the currently approved EVMS for Argonne
	Prepare a Hazard Analysis Report	Site Office or Lab	<b>COMPLETED</b>
	Continue with Quality Assurance Program	Site Office or Lab	<b>COMPLETED</b>
	Conduct Preliminary Security Vulnerability Assessment, if necessary	Site Office or Lab	<b>COMPLETED</b> - Formal report not required
Issue Final NEPA determination (i.e., FONSI)	SC-1 or Site Office	<b>COMPLETED</b> - CX approved	
Update budget documents and Exhibit 300 if applicable	SC-AD	<b>COMPLETED</b>	






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# CD-2 Status - Lehman Review Recommendations

## Responses required by CD-2:

Review the estimates of all of the Insertion Devices (U1.03.04), specifically the APPLE-II devices, to ensure adequacy and consistent contingency/uncertainty scoring before CD-2.	
Prior to CD2 approval, write a section of the Preliminary Design Report describing the R+D approaches and goals for nanofocusing R+D.	
Review the effort allocations for the beamline projects with the L3 leads prior to CD2 approval.	
Finalize and approve the draft APS-U Hazard Analysis Report by CD-2	
Define the path forward for SPX prior to CD-2	
The project scope included both accelerator and beamline hardware that will be turned over to operations. Some elements will require testing and acceptance after initial beams (electron or photon) are transported through the new hardware. There appears to be ambiguity in the handover to operations and their final acceptance of hardware which needs to be resolved.	
The Committee suggested the project, APS operation, and DOE/BES office reach a clear agreement collectively on the process of 'transfer' of systems	

Draft Transfer to Operations Plan Submitted to DOE



# Transition to Operations

- Generally, MIE projects do not pay for “commissioning”
  - Some sensitivity in correctly defining “Transition to Ops”
- Draft submitted to DOE – No comments
- Utilize standard APS processes (Add sign-offs by APS-U)
- Typical process for undulators
  - Installation Plan and Installation Review
  - Operator training as required
  - Acceptance testing of the mechanical motions including controls and interfaces to APS control system
  - Pre-installation magnetic measurement and magnetic alignment
  - Installation and alignment checklist
  - Completion of sign-offs by APS-U representative and APS operations representative
- Beamlines will have phased transition to operations
  - Efforts to minimize program downtime can blur clean TTO boundaries
  - Beamline acceptance document revised to include equipment added at each step
- Living document – will incorporate lessons learned along the way



# CD-2 Status - Lehman Review Recommendations

## Remaining steps for CD-2 approval

- Beamline Effort
  - Project controls this
  - Input from U1.04 L3s
  - “Naming” physicist resources to find redundancies
  - Management review to normalize
- Path forward for SPX
  - Receive final report from SPX programmatic review and complete response to CD-2 recommendation
  - Project needs to work with DOE to complete this

## Before the next Status Review (June)

- 3 Recommendations

## Required by CD-3:

- 18 Recommendations



# APS-U Reviews Since Last Update

- SPX Preliminary Design Review (Feb 27-March 1)
  - The committee acknowledged that SPX will provide a unique tool for material science while having technical challenges to be addressed through the SPX R&D (SPX0).
  - Both the project management and technical teams are on the right track to meet the goals. The committee does not recognize a 'show stopper' within the current SPX0 goal.
  - Overall the committee agreed that the SPX passed the PDR. The team assembled for SPX is strong and motivated and has already shown excellent progress. The amount of work done seemed impressive for the available time spent developing the design and prototyping to the level presented at the PDR.
  - However, the committee nonetheless did note some issues that the team should address.



# Update APS-U Reviews Since Last Update (Cont'd)

- Final Design Review of Grid BPM (March 8)
  - “In general, the design models and drawings are at or beyond the final design stage of completion, except for the design of detector support structures.”
  - A number of useful comments and recommendations are included in the review report
- APS Upgrade Short Pulse X-ray Programmatic Review (March 18)
  - The closeout presentation generally supported current APS-U plans
  - DOE is waiting for the final review report to determine if further steps are needed or review recommendation can be closed out

# Beamline Review Process

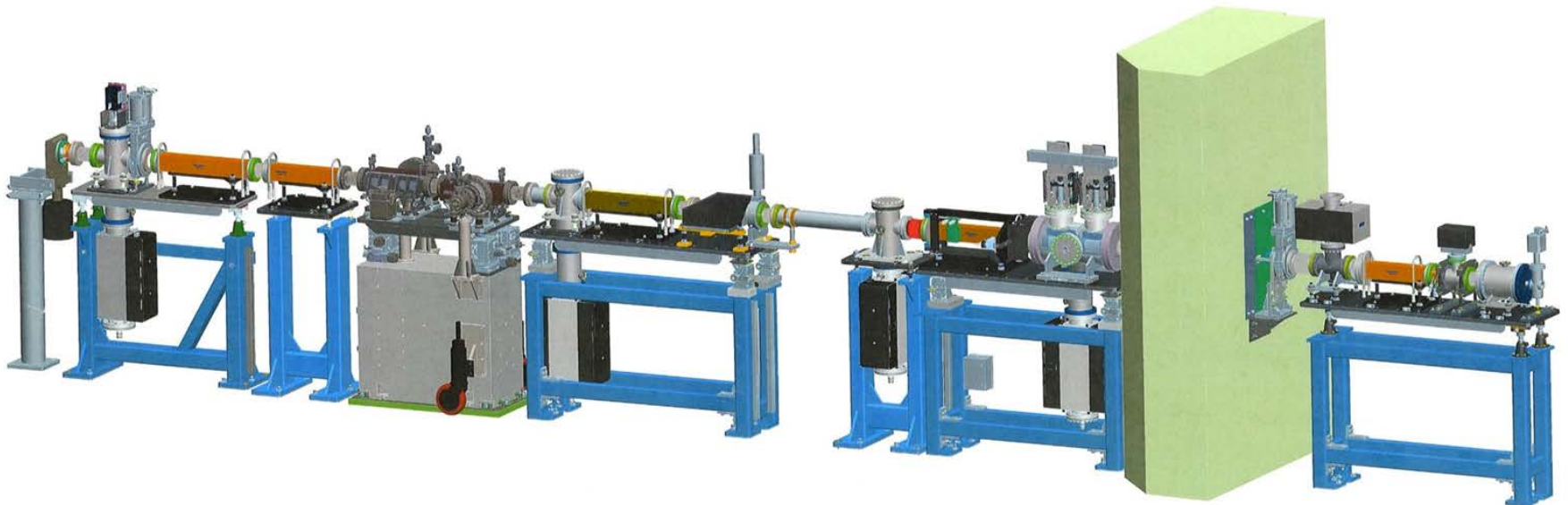
- Current process and APS-U process need syncing
  - One issue is multiple definitions of phrases
    - “CDR”, “PDR”, “FDR” mean different things to DOE, BSDRSC
  - Need coordination of technical reviews
- Working on a standard process for reviewing beamlines
  - Follow APS Design Review Procedure APS\_000031
  - Adapt guidelines in “APS Beamline Design and Construction Requirements: A Reference Manual for Designers and Builders” (ANL/APS/TB-14)
- First step is APS Directorate approval of beamline layouts
  - Usually done at Conceptual Design
  - Inadvertently circumvented in APS-U CDR process

# Beamlines Status Update

- Procurements for RIXS beamline (27-ID)
  - Enclosure construction should start in August
    - BO estimated to be 11/15/13
  - Monochromator being fabricated by Kohzu
  - Standard components PSS, BLEPS, Utilities, etc. well underway
- PCR for RIXS schedule update is imminent
  - On Dean's desk for review
- Thanks to President Obama for getting sector 27 cleared out
  
- Cleaning up preliminary design issues for several beamlines
- Final Design for ASL (25-ID) proceeding
- Final Design for XIS (28-ID) about to begin

# Front End Status Update

- The detailed design of the High Heat Load front end with the new XBPM is nearing completion
- Plan to install the first of these on 27-ID in the Dec-Jan shutdown
- Procurements of long lead components like the shutters and masks are completed with an expected delivery of August 2013
- A final design review of the Next generation X-ray BPM was conducted this month
  - Few issues were identified and actions are taken to rectify it



# 150 mA Run

- High current (150 mA) diagnostic run
  - April 24, 2013
  - 16 hours for studying performance at increased currents
- APS-U will increase APS storage ring current to 150 mA
  - Probably in 2019
  - Committed to helping beamlines resolve any HHL problems that arise
- Planning by the APS-U is underway and results from this study will help define the issues, budgets, etc.
  - We especially need information from bending magnets
  
- For details see distributed memo (3/26) by Julie Cross and Gary Navrotski
  - Direct questions on the run, participation, etc. to Julie and Gary

# Summary

- Good progress has been made towards meeting all CD-2 requirements
- Recent review have been successful
  - Many more to come
- Technical progress is made across the Project
- 150 mA run will help define high heat load issues