National Synchrotron Light Source II

Project Progress Report

September 2012

September progress from a different perspective, snapped by staff member Juergen Thieme.

report due date:
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OVERALL ASSESSMENT

The National Synchrotron Light Source II Project continued to maintain satisfactory cost and schedule performance with cumulative cost and schedule indices of 0.99 and 0.95, respectively. At the end of September, the Project was 82% complete with 39.7% of contingency and management reserve for the remaining Estimate at Completion.

Conventional construction is on budget and on schedule and activities continue to wind down.

Monthly schedule performance for accelerator systems in September showed significant improvement, with a schedule performance index of 1.73 (+$2.7M). The accelerator physics group has been actively engaged in modeling storage ring commissioning and operations by generating magnet settings based on measurements and incorporating them into a realistic lattice model. Excellent progress was made with the booster, where the injection straight was installed and aligned, mechanical utilities were installed, and all extraction kickers were tested. Installation of both transfer lines (linac to booster and booster to storage ring) is also progressing well.

Production of the storage ring magnet was completed, and delivery and installation of other major components included power supplies, vacuum, diagnostics, RF, and cryogenic systems. The production of superconducting RF cavity and insertion devices also continued to make excellent progress.

The final report from the external, independent review team on the linac beam mis-steering excursion event was submitted on August 31 and the corrective action plan is being formulated and implemented.

Although progress on overall accelerator installation has been excellent, with an emphasis on heightened safety awareness, some installation activities are being stretched out. In addition, linac and booster supplemental shielding designs have been revised based on thorough analysis, and a number of weaknesses in current designs are being addressed.

Hutch installation is making good progress and preparation of the utility installation is gearing up. Some delays in procurements for beamline components and hutch installation resulted in a negative schedule variance of 0.67 (-$1M) for the experimental facilities in the month of September.

The early completion date for the overall project continues to be June 2014, maintaining 12 months of schedule float (36% schedule contingency) with respect to the Project's CD-4 milestone date. The schedule refinement for accelerator and beamline installation and the annual project-wide comprehensive Estimate at Completion review continued. ARRA-funded activities are now more than 99% complete and continue to be on schedule and on budget.

UPCOMING EVENTS

NEXT BAT for SIX beamline	Oct 4
PDR for the IXS KB Mirror Chamber and Motion Mechanism	Oct 9
NSLS-II Beamline Science Readiness Planning Review	Oct 25–26
PDR for the IXS KB Mirrors and Benders Mechanism	Nov 5
PDR for the IXS FOE Optical Components Package	Nov 13–14
DOE Mini-Review of NSLS-II Project	Nov 19
NEXT BAT for SMI Beamline	Dec 10
NEXT BAT for ISR Beamline	Dec 13

ACCELERATOR SYSTEMS

Accelerator Physics staff are actively engaged in developing a wiki and databases to provide needed information for the storage ring commissioning. The basic information needed is already in place. The group is also developing a suite of high-level application software programs for commissioning. At this point about 50% of the applications needed for commissioning have been designed, implemented, and tested. Work on impedance calculations is continuing. For about 70% of the storage ring components, impedance calculations and stability assessment are complete. The item of focus at this time is the horizontal scraper.

Accelerator Physics staff have analyzed the magnetic field properties of about 80% of the storage ring magnets and released them for installation on girders. Work is underway to process magnetic measurement data, to generate calibration data used by the control system to generate magnet settings and provide a realistic model of the storage ring lattice.

Booster. The injection straight is completely installed and aligned. Realignment of the booster arcs to the correct circumference is complete (Fig. 1).

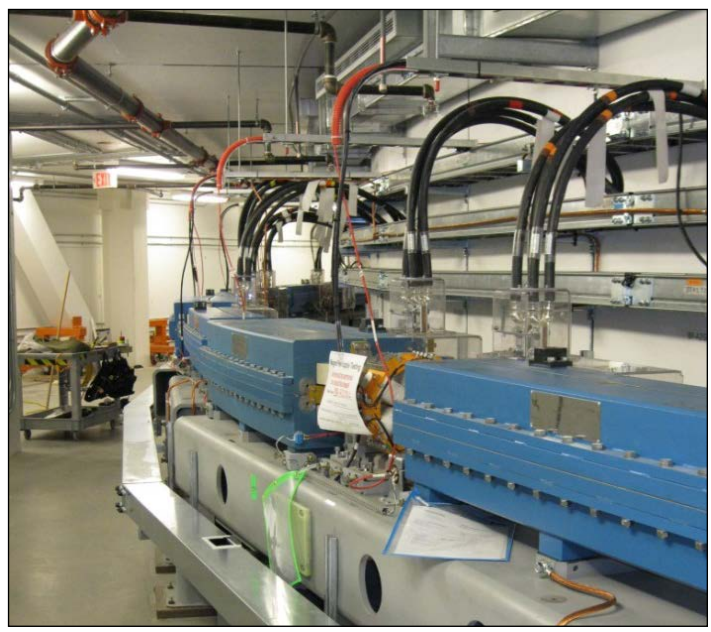


Figure 1. Booster arc 2.

The magnets have all been connected to power and testing has started. The issue with the third dipole power supply has been resolved and final testing at the manufacturer is scheduled for early October. All mechanical utilities in the tunnel are completed. Testing of all four extraction kickers at the nominal voltage in Bldg. 832 was completed. The extraction kickers were assembled on the girder and vacuum-tested. Both septa were tested, as well. All tests so far have been successful but the grounding scheme in the booster tunnel has been re-optimized. The flags in the booster tunnel have been tested and are all operational.

Transport lines. The installation of the components of LtB TL-I downstream of B2 was completed, including the chamber that passes through the shield wall into the booster

tunnel. All components were surveyed. The shielding around this beam pipe has been designed, built, and installed. The transport line stands for LtB TL-II have been delivered and prepared for installation. All magnets for this part of the line have been delivered. Cables have been pulled and everything is ready for installation.

All diagnostic and vacuum components are available. The cable pulling for BtS TL-II is complete and is in progress for BtS TL-I. Diagnostic equipment installation is in progress, including the safety shutter and BNL Faraday cup. Electronics installation is ~50% complete; all parts and materials needed for the installation are at hand. All transfer line magnets needed for booster commissioning are on site.

Storage ring injection system. The detailed design of the injection straight layout is complete and manufacturing of the transition vacuum chambers is underway. A technical review of the kicker magnets with external experts was performed on Sept. 17–18. The review endorsed the design but several possible improvement details emerged from the discussions. The injection septum mechanical layouts have been reviewed, improved, discussed with the manufacturer, and refinement details are being implemented in the design.

Vacuum. All long straight section chambers have been assembled and tested. The work area in Bldg. 905 was converted for dipole magnet-chamber integration and bake out. In the ring tunnel, cells 02 and 04 were assembled, baked, and reached 10^{-11} Torr. The chamber and absorber cooling lines were bent and test-installed in four cells in P1. C25 chamber cooling lines were welded and pressure tested. The detailed layouts of the RF straight have been generated for review. Booster injection and extraction straight sections were assembled, and the injection straight was pumped down and leak checked. Both BtS TL B3 bending chambers and all the drift pipes were completed by BNL Central Shops. The injection DC septum chamber model was generated and sent to BINP for fabrication. The order for the BtS TL fast valve was placed. The production of absorbers continues at BNL Central Shops, with ten crotch absorbers and two undulator absorbers available for installation. All P2 and P3 cell vacuum cables were terminated and tested. Installation of vacuum chassis continues in P4. Six SR vacuum PLCs were delivered and are being tested. All booster arc vacuum cables were terminated. An electrical technician was added to the staff.

Magnets and girders. The storage ring magnet production is completed. All magnets are available on site or are in transport. 825 of the 842 storage ring magnets have been received. The fast corrector magnet mounting scheme design is completed, drawings are released, and manufacturing is being quoted at BNL Central Shops.

An issue surfaced when magnets installed in the tunnels developed water leaks during water pressure testing. This caused delays in integrated testing and prevented progress with water utility integrated testing. All girders in P1 have been hydrostatically tested and leaks are being repaired and retested. Magnet girder assembly, alignment, and vacuum conditioning still proceed at a rate of almost two girders a week. The vacuum group is now proceeding with two lines of dipole magnet vacuum conditioning.

Front ends. Photon shutter bodies are brazed and leak checked. All ratchet wall collimators and all safety shutters have been released. All vacuum pumps have been installed on the front end support tables.

Radiation shielding. The linac supplemental shielding design has been revised based on thorough analysis. Several weaknesses of the previous designs were addressed and components have been redesigned. A final review of the linac supplemental shielding is scheduled for the end of October.

Diagnostics. BPM production is progressing well. All AFE and DFE units have been received, and testing is ~40% complete. The thirty cell controllers are complete and are being tested with the fast serial link. See Table 1 for details.

Table 1. Testing Storage Ring Hardware (includes Booster PTC)

Item	Rec'd.	Tested	Passed	Failed	Rejected	Complete
AFE	234	88	56	32	28/30 (orig. lot)	24%
DFE*	300	110	110	0	0	37%
SR PTC	246	120	116	4	4	49%
Booster PTC	43	43	43	0	0	100%
Chassis	300	300	300	0	0	100%

* Includes 50 CC boards

Central Shops has fabricated the remaining strip line electrodes, tapered chamber components for the transverse feedback for the tune monitor, and the BPM chamber components. We have received the chambers for the tune monitor strip lines, tapered chambers, and multi-BPM chamber, as well as the secondary supports for the strip line chambers. The synchrotron radiation protection issue for the BPM chamber/absorber needed in C16 has been settled and the absorber will be set at 20 mm from beam centerline. Detailed drawings for this chamber have been completed and will be released shortly.

The procurement of all components for the synchrotron light monitor is complete. We have received roughly 30% of the components. Figure 2 shows the right-angle chamber for the primary in-vacuum extraction mirror. The hutch procurement is progressing steadily; American Clean Rooms has been given approval to begin construction.

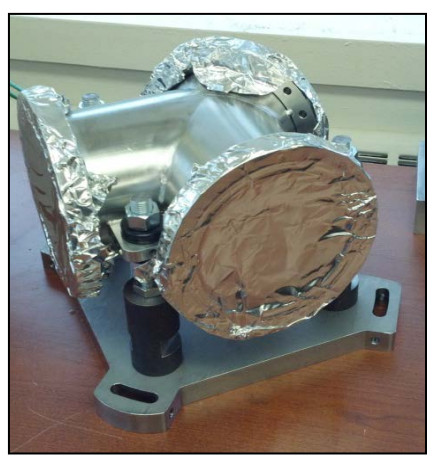


Figure 2: Right-angle chamber for the primary in-vacuum extraction mirror.

The reference drawings for the X-BPM have been completed. The vibration test on the prototype assembly was completed successfully. The SR flag design is complete and detailed drawings have been prepared. Two vendor drawings for the YAG screen and custom bellows have been completed and quotes were received for both items. Preliminary re-design of the horizontal scraper actuator is complete. A modified RF cage has been designed for the BPM AFE that allows better thermal control of the electronics hardware and analog components.

RF. The booster RF transmitter has become operational. The booster cavity has been fully RF conditioned up to an accelerating voltage of 1.4 MV (15% above the requirement of 1.2 MV). The cavity is pre-surveyed and will be moved into the ring before the end of October. The digital RF controller was used in high-power conditioning and performed high-power RF ramping of the fields with a simulated booster voltage ramp profile, which constitutes the successful field test of this system. The production of the digital RF controller is nearly complete, with the final stuffed boards in house and the first two undergoing production acceptance testing. All chassis, cables, and connectors are in house. Firmware (FPGA programs) have been completed for booster and storage ring "builds" and the compiler is configured to create either linac, booster, or storage ring controllers from a common library. The EPICS interface to the controller is now working for booster and storage ring configurations.

The niobium cavity production is going well; the most difficult pieces (coupling aperture, fluted beam tubes) have been produced. The final niobium cavity assembly is due in October. See Figure 3.

Figure 3. Niobium fluted beam tube assembly for cavity. All three units are complete.

The cryo-compressors and cold engine for the liquid He plant have been delivered. Installation on the mezzanine of the RF Bldg. will start as soon as the valve box (Fig. 4) has been delivered. The cryogenic plant is slightly behind schedule, with commissioning now scheduled to begin in March 2013 and final acceptance tests in April. A PLC program has been written for control of the valve box and the control valves for the RF cryo-module. Both level- and pressure-control loops have been tested. Conventional Facilities work for the RF lower mezzanine (concrete pour, railings) has been completed.

Figure 4 Manifold box "top hat" (technically, a valve box) in one of the two parallel production fixtures.

The FDR for the LN2 system has been completed. Delayed delivery of the LN2 phase separator (early January 2013) will impact installation of cryogenic equipment on the lower RF mezzanine. Landau cavity cold test planning is nearly complete, and the safety review has been requested. The SR transmitters are operational; however, we are working with Thomson and AFT to solve a control problem. The layout of the RF straight section in the storage ring progressed well. The sliding-joint layout is almost complete, with a preliminary design of the sliding joint to be used for the Landau cavity. Analysis of the relief sizing for the Landau cavity is completed for leaks into both the insulating vacuum and the beam vacuum.

Power supplies and electrical utilities. Low-power testing has started in P1, while more components are becoming available for installation in P2 and in the transfer lines. The modification of the AC input modules is now 99% complete. Power supply installation is progressing slowly in P2.

Most electrical engineering work occurred in the injector. Cable trays are almost complete, and cable pulling is 80% complete. All power supplies in the booster have been connected with the magnets. The low-precision temperature control chassis units have all been delivered and tested. The high-precision temperature controller chassis have all been received. All UPS units for the project have been received. We have powered up all UPSs in P1—P4, the RF, injector, and computer room. Electricians are installing UPSs in P5.

Mechanical utilities. The storage ring tunnel DI water headers are now 100% installed. Header end connections in pentants 2 through 5 are being installed by the utility technicians. The pump skid systems are now ~65% complete.

Controls. Storage ring installation work continues in pentants 2 and 3. All equipment for P3 has been moved to the computer room and is now being configured. Injector Area equipment installation is 80% complete. All subsystems required for BINP installation and testing are operational, with controls and timing support. Booster power supplies are now being tested with controls. The controls server for the booster LLRF controls has been provisioned and installed. A reduced and cleaned-up version of the alarm handler has been released for Operations' use in the 725 control room. This subset of alarms is for pump skid monitoring only. Network

fiber optic cables have been pulled for P1, P2, P3, and P5 in one direction. P2 fibers are now being terminated in the computer room. P2 network communications are anticipated in late October and P3 terminations will follow immediately. Pump skid PLC controls and alarms have been completed for RF, BR1, BR2, and BR3. SB1 controls are in progress. High-speed communications have been integrated and tested in the BPMs.

Installation is currently 5 months behind schedule; the end date is currently July 2013 compared to the baseline of Feb 2013, with the installation of the SR power supplies on the critical path. The installation of the injection straight and RF cavity are approaching the critical path. Table 2 shows the installation progress.

By the end of September, all booster arc girders had been installed and aligned in the tunnel. The remaining LtB TL-I magnets were installed. All TL magnets needed for booster commissioning had been received and inspected. The beam pipe through the linac/booster penetration was installed. The LtB TL-II and BtS TL stands will be installed once the table tops return from vendor rework. The booster magnet cable termination is complete. The installation of grounding planes in the booster tunnel is in process. Installation of power supply components in the racks and terminating of the booster magnet cables are in process. Pulling of pulsed power cable in the booster is complete. Cable pulling is complete for PPS interlock cables in the booster, BtS P1 corrector, and quads. Local testing of the booster flags is complete. Vacuum component installation in the booster is in process. Installation at the TL electronic racks is 50% complete. Survey work and booster lattice circumference adjustment are complete. The installation of the linac berm lighting is in process. The DI water is now flowing through the booster tunnel header, and designed flow rates were achieved. The booster injection straight vacuum is complete and under vacuum. The BPM cable penetrations have all been cut into the cable tray covers.

In P1, integrated testing is progress. The DI water system has been connected to the girders. In P2, power supply installation is in process in cells 29, 30, and 1. Magnet cable termination in the tunnel is in process. Surveying of completed cells is in process. Vacuum component installation is in process. The installation and cable termination of the diagnostic equipment is ongoing. In P3, verification of AC is complete and AC is locked out/tagged out. Pulling of PPS interlock cables and fiber optic cable is in process. The flushing of the P3 PCW tie-in is 40% complete. The vacuum group is terminating cables. Bellows installation and vacuum bake out are in process, as is surveying of the completed cells. In P4 (Fig. 5), process chilled-water assemblies and tie-ins are complete, and flushing and testing will follow the completion in P3. AC cabling to racks is in process. Installation of the interlock conduit on mezzanine is complete. UPSs are now powered.

Figure 5. Storage ring tunnel, pentant 4.

NSLS-II Accelerator Installation Progress

Achieved	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Sep-12
Mechanical Utilities	43%	49%	50%	50%	50%	80%
Electrical Utilities	37%	55%	61%	65%	69%	75%
Magnets	42%	43%	50%	62%	65%	73%
Vacuum	7%	8%	10%	13%	14%	21%
Power Supplies	11%	12%	15%	18%	22%	30%
Instrumentation	20%	23%	27%	31%	38%	37%
Frontends	0%	0%	0%	0%	0%	0%
RF	14%	21%	27%	32%	33%	38%
Inje Straight	0%	0%	0%	0%	0%	0%
LINAC+Booster	9%	15%	27%	33%	42%	74%
Total	24%	31%	36%	40%	43%	54%

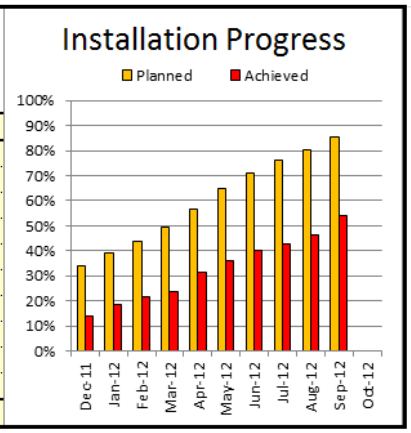


Table 2. Installation progress at the end of September 2012.

Experimental Facilities

Experimental Facilities work continues with several hutches nearing completion, utilities procurement well advanced with installation activity awaiting hand-over of the first hutches, active contract management of many optical component packages, and work continuing on controls and vacuum.

CHX. The CHX beamline advanced with several important procurements. The diffractometer manufactured by Huber GmbH and the high-precision positioners for the optics table manufactured by IDT, Ltd. are now past the final design stage and production has begun. The optics package procurement also is advancing on schedule.

The CHX team also focused on several other important procurements, the two most important being the pixelated area detectors that will be used for coherent SAXS and WAXS. The CHX team, with facility management staff, has dedicated much effort to establishing a final procurement plan. This includes a first detector target delivery date of September 2013 and several contract options for the second detector.

CSX. In September the full polarization branch held the PDR for the toroidal mirrors system, including the optics and mechanics. The CSX team also conducted the PDR for the beamline monochromator mechanics without the optics. The monochromator optics are in several packages: grating substrates are at the destination manufacturer's, and the internally water-cooled mirrors will be delivered at the end of the year. Excellent progress has been made in the beamline differential pump, and delivery is expected in the December-January time frame. Progress has been made also with the beamline vacuum design, calculations for the beamline vacuum elements, and in the design for other beamline components such as the chopper, the pinhole system, and the white beam slits.

IXS. Following the award of the IXS KB Mirror System to Toyama Co., the kick-off meeting was held on Sept. 5, where the preliminary design and schedule of the project were discussed with both Toyama and subcontractor WinlightX present. The PDR will be carried out in two parts: one for the mirror chamber and motion mechanism is scheduled for Oct. 9 at Toyama, and the other, for the mirrors and benders mechanism, is scheduled for Nov. 5 with WinlightX. The FDR for the entire system is scheduled for Jan. 9–11, 2013. The preliminary design of the system is proceeding well.

The contract for the IXS FOE optical components package was awarded to Bruker ACS and fully executed on Sept. 19, after some delay in contract negotiation. The kick-off meeting for the project was held on Sept 21. Despite the delay, the preliminary design was well advanced. The PDR is now scheduled for Nov. 13–14 at Bruker as originally planned, with the FDR set for around Jan. 21, 2013. The IXS team also is preparing for another session at SPring-8 in the first week of October to test the new high-resolution crystals recently procured from Sharan. These crystals provide the high-resolution crystal optics for the IXS beamline.

HXN. The utilities design for the HXN A-hutch is completed and most parts have been ordered. The HXN team and the Photon Division engineers are working on fine design details such as how the cryo-line for the monochromator will be connected through the hutch labyrinth and how the hutch crane should be installed to preclude potential collision with the beamline equipment and utilities fixtures. For development of the HXN x-ray microscope, the team began detailed performance testing using the assembled MLL microscope. Figure 6 shows the step scan performed using the sample stage. The data show capability to carry out 1.5 nm steps with a noise level well below 0.2 nm.

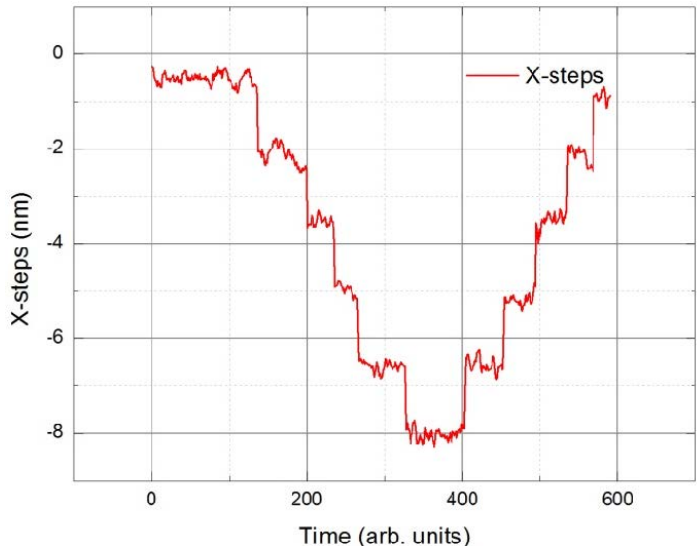


Figure 6. Step scan performed using the sample stage of the MLL module of the HXN microscope. Step size: 1.5 nm; noise level well below 0.2 nm.

SRX. Weekly video and telephone conferences are underway with Bruker and WinlightX, suppliers who are fabricating the SRX optics package and the SRX KB system, respectively. Many design details have been discussed and mistakes avoided. A first conceptual design of the high-flux KB system has been shown by WinlightX and is under review. A thorough discussion was held with Nick Simos about the transport of vibrations from the experimental floor through the large supports for the DCM and the HFM. The "Rock&Cell" workshop consisted of 16 talks from a wide range of scientific applications. A charge to the speakers about their expectations from SRX has been responded to in a very inspiring way, helping the SRX team to prepare for early science experiments. The first panels of the lead FOE hutch have been erected (Fig. 7).

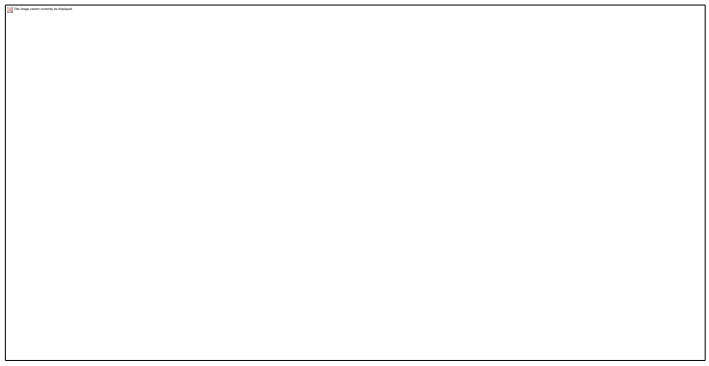


Figure 7. First panels of lead FOE hutch in place.

XPD. The FDR of the XPD Beamline Components took place at BNL on Sept. 5. The FDR of the XPD Laue monochromator Part I took place at BNL two days later. The contractor for both of these projects is FMB-Oxford.

The XPD diffractometer contract was awarded to Rotary Precision Instruments, UK. The final draft of the technical documentation for the XPD pixel detector was handed over to BNL procurement staff. The conceptual design of the XPD Multi-Analyzer Channel system is underway. Figure 8 shows a CAD model and a photo of the mirror after grinding.

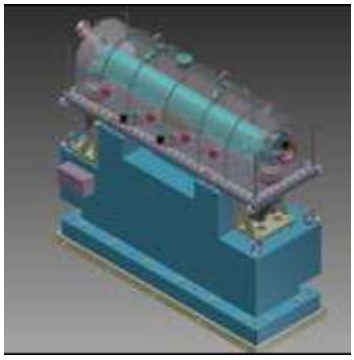


Figure 8.
Views of the XPD mirror.
Top: CAD model.
Bottom: Mirror just after grinding.

CONVENTIONAL FACILITIES

Conventional construction continued its excellent progress during September as three of the Lab–Office Buildings are substantially complete and beneficial occupancy is expected during October. The ring building contractor has completed basic contract work and continues to work down remaining punchlist items, moving closer to contract closeout.

With all areas of the ring building now occupied, the ring building contractor has completed the major work scope. All areas slated for the installation of accelerator equipment have been accepted from the contractor and are now being utilized for installation activities or staging and storing equipment and materials as they are readied for installation. The remaining ring building contractor work includes resolution of all punch-list items, completion of system commissioning and operator training, delivery of remaining operations and as-built documents, and final sitework. Following completion of all physical work at the site, demobilization and contract closeout will commence. The contractor has already partially demobilized, removing most field office trailers to enable final site restoration. It is anticipated that the ring building contractor's site presence will end by November 2012, although they will continue to be available for any warranty work.

Construction of the five LOBs continues to make excellent progress. Construction activities in LOBs 1, 2 and 3 are now completed and the pre-occupancy items identified during the June beneficial occupancy review are completed. Formal determination of beneficial occupancy for those LOBs will be in October.

The LOB 3 HXN beamline extension area, which had previously lagged the LOB 3 progress, underwent a beneficial occupancy review in September and will also be available for beneficial occupancy in October. Office furnishings and standard equipment delivery and installation for LOBs 1 and 3 have been contracted and are slated for installation in November, with move-in of building occupants to follow.

LOBs 4 and 5 are progressing on or ahead of schedule and are now fully enclosed with steel, concrete, and exterior enclosure work and interior HVAC well advanced. Interior partitions and finishes are just getting underway. Completion of the project scope for LOBs 4 and 5 is on track for December 2012.

Sitework for the LOBs and the site overall is nearing completion. All major paving is now in place. With building exteriors now nearly complete, the final site grading, topsoil distribution, and seeding are underway and nearly completed except for some touch-up areas. All sitework is expected to be completed by late October.

ENVIRONMENT, SAFETY, AND HEALTH

Beneficial occupancy readiness evaluations have been completed for Lab–Office Buildings 1, 2, and 3 (including the HXN beamline extension). Pre-start items are being closed out and occupancy will be taken in October. LOBs 4 and 5 will be completed in the late-December time frame. The BORE process will ensure that all life safety and code compliance requirements are in place prior to staff occupying the LOBs. Work to close out the remaining post-occupancy items from the ring building continues and is nearly complete.

A beam mis-steering excursion that occurred at the linac on May 29 was investigated by an external independent team who submitted their final report on August 31. The corrective action plan is being drafted and is expected to be finalized in early November 2012. Linac commissioning activities have been suspended and will not resume until all necessary corrective actions have been satisfactorily implemented.

Construction activity continues to wind down, as the ring building and LOBs 1, 2, and 3 are complete. The focus of construction is now at LOBs 4 and 5 and on finished site work. Increased emphasis is being given to safety as the contractor demobilizes. Historically, this phase of a construction project results in increased injuries and claims. Enhanced communications and job planning are being implemented to minimize this risk.

NEWLY HIRED

Christopher Stebbins – Installation Coordinator, Photon Division

COST/SCHEDULE BASELINE STATUS

The cumulative cost performance index for the Project overall is 0.99, and the cumulative schedule performance index is 0.95, both well within the acceptable range. The Project is 82.1% complete, with 39.7% of contingency and management reserve, based on EAC work remaining.

The project's current-period green schedule variance, with a current-month SPI of 1.04, $505K, is due to continued positive performance in Accelerator Systems. In WBS 1.3, the positive performance this month for most injection and storage ring systems resulted in a positive SPI of 1.73, +$2.7M. The cumulative ASD schedule performance has continued to improve, with an SPI of 0.90, green status. September 2012 is the first month since January 2009 that the cumulative ASD schedule variance was green; the cumulative SV (-$26.2M) showed steady improvement from the July cumulative SPI, 0.88, and August, 0.89. Accelerator Pre-Ops (WBS 1.6.2) is running slightly behind schedule in the current month (-$187K).

The Experimental Facilities cumulative SPI declined to 0.89—now yellow status (-$3.7M), from delays in the beamline component procurements contributing to an overall negative SV for the month (-$1.0M), for an SPI of 0.67, red status. The cumulative XFD CPI is green, at 1.01, $176K, but the current-period cost variance is red, at 0.83 (-$404K).

CFD's schedule performance for September is red, with a SPI of 0.48 (-$999K), due to work in LOBs 4 and 5 which was completed ahead of schedule but planned for the current month. The cumulative CFD SPI is 1.00, green (-$703K), due to work routinely performed ahead of schedule.

The current-month CPI for the NSLS-II project is a negative variance (-$4.4M), red status, with CPI 0.74 due to very large current-month cost variances in ASD (-$4.8M) resulting from September's large accruals in insertion devices, invoice payments for niobium, the start of cryo-assemblies 1 and 2, Linde's shipment of coldbox components, and storage ring magnet invoice payments. The Project-level cumulative CPI is 0.99 (cost variance -$5.3M), green status.

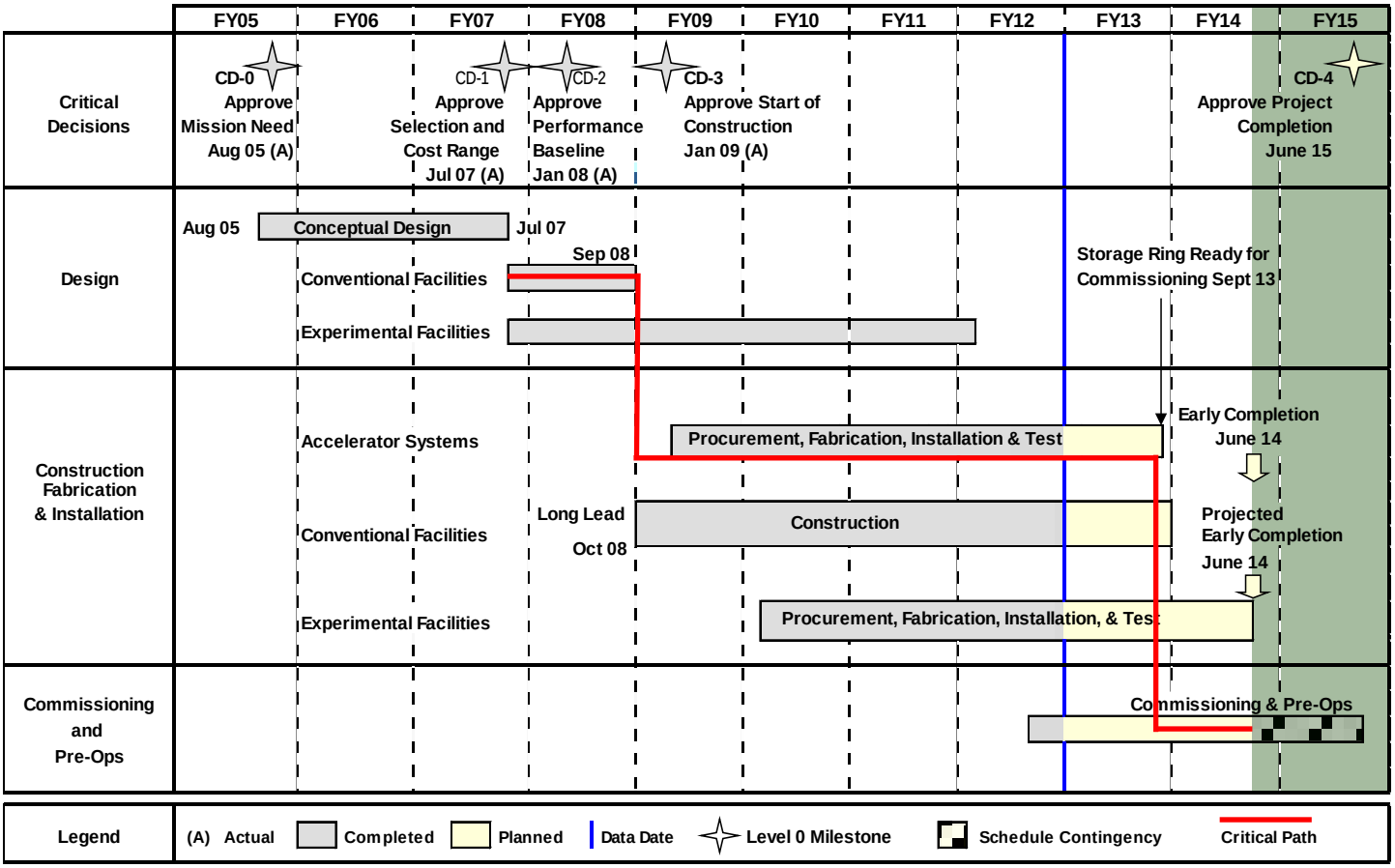
The critical path for the Project remains the same as last month and goes through the installation of power supplies and instrumentation in the racks. The critical path continues through EPU installation, integrated testing, final survey, and commissioning of the Accelerator Systems. The early Project completion date remains at June 2014, which is consistent with the baseline schedule. There are 12 months of float between the Project's early completion milestone and CD-4, with approximately 36% schedule contingency.

NSLS-II ACRONYMS

AC	Alternating Current
AFE	Analog Front End
ARRA	American Recovery and Reinvestment Act
ASD	Accelerator Systems Division
BAC	Budget At Completion
BAT	Beamline Advisory Team
BINP	Budker Institute of Nuclear Physics
BORE	Beneficial Occupancy Readiness Evaluation
BPM	Beam Position Monitor
BtS	Booster-to-Synchrotron
CFD	Conventional Facilities Division
CHX	Coherent Hard X-ray beamline
CPI	Cost Performance Index
CSX	Coherent Soft X-ray beamline
DCM	Double-Crystal Monochromator
DFE	Digital Front End
DI	Deionized
EAC	Estimate at Completion
EPICS	Experimental Physics & Industrial Control Sys.
FDR	Final Design Review
FOE	First Optics Enclosure
FPGA	Field-Programmable Gate Array
He	Helium
HFM	Horizontally Focusing Mirror
HXN	Hard X-ray Nanoprobe beamline
ISR	In-Situ Resonant X-ray Studies beamline
IXS	Inelastic X-ray Scattering beamline
LLRF	Low-Level RF
LOB	Lab–Office Building
LN2	Liquid Nitrogen
LtB	Linac-to-Booster
MLL	Multilayer Laue Lens
NEXT	NSLS-II Experimental Tools (beamlines)
P1, P2…	Pentant 1, Pentant 2, etc.
PCW	Process Chilled Water
PDR	Preliminary Design Review
PLC	Programmable Logic Controller
PPS	Personnel Protection System
SIX	Soft Inelastic X-ray Scattering beamline
SLM	Synchrotron Light Monitor
SMI	Soft Matter Interfaces beamline
SPI	Schedule Performance Index
SR	Storage Ring, also Synchrotron Radiation
SRX	Submicron Resolution X-ray Spectroscopy
SV	Schedule Variance
TL	Transfer Line
UPS	Uninterruptible Power Supply
XFD	Experimental Facilities Division
XPD	X-ray Powder Diffraction beamline
YAG	Yttrium Aluminum Garnet

The NSLS-II Project is being carried out to design and build a world-class user facility for scientific research using synchrotron radiation. The project scope includes the design, construction, and installation of the accelerator hardware, civil construction, and experimental facilities required to produce a new synchrotron light source. It will be highly optimized to deliver ultra-high brightness and flux and exceptional beam stability. These capabilities will enable the study of material properties and functions down to a spatial resolution of 1 nm, energy resolution of 0.1 meV, and with the ultra-high sensitivity necessary to perform spectroscopy on a single atom.

DOE Project Milestone Schedule



Funding Profile

Funding Type	NSLS-II Funding Profile ($M)											
	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	TOTAL
R&D			3.0	20.0	10.0	2.0	0.8					35.8
OPC	1.0	4.8	19.0									24.8
PED			3.0	29.7	27.3							60.0
Construction					216.0	139.0	151.3	151.4	47.2	26.3		731.2
Pre-Ops							0.7	7.7	24.4	22.4	5.0	60.2
Total NSLS-II Project	1.0	4.8	25.0	49.7	253.3	141.0	152.8	159.1	71.6	48.7	5.0	912.0

The NSLS-II Project Progress Report is prepared monthly for submission to the Department of Energy.

This condensed version is available to the public at the NSLS-II website in PDF format. For questions or comments contact the editor, Kathleen Robinson, at krobinson@bnl.gov,

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