Project Progress Report

National Synchrotron Light Source II

September 2013 Activity

A large cloud casts a corresponding shadow near the NSLS-II ring building early afternoon on the last day of September.

report due date:
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OVERALL ASSESSMENT

The National Synchrotron Light Source II Project continued to make satisfactory progress overall with the current-month schedule performance index (SPI) of 1.00, +$24.4K. The cumulative cost and schedule indices are 0.99 and 0.97. The project is 91% complete with 50% of contingency and management reserve for the remaining BAC, including all scope additions. The project has 47% (10 months) of schedule contingency for the remaining duration of 21 months before the CD4 milestone date of June 2015.

Accelerator Systems had very good schedule performance this month, continuing to recover from previous delays on installation of the storage ring (SR) and integrated testing. The monthly SPI for Accelerator Systems in September was 2.02, +$1.96M, with a cumulative SPI of 0.95. Installation of Accelerator Systems is about 94% complete.

Experimental Facilities experienced some delays in installation of major beamline components, resulting in a monthly SPI of 0.61 (-$1.11M). These delays are understood and anticipated to fall within the overall schedule delay of 2 months with respect to the baseline schedule. The cumulative schedule variance is -$6.6M with an SPI of 0.90. Experimental Facilities' cumulative CPI remains at 1.00.

Conventional Facilities activities continue with the completion of punchlist items on the NSLS-II buildings and the construction of Satellite Endstation Building 2 (SEB2). In September, several months' worth of punchlist work, the resolution of longstanding change orders with the ring building contractor, along with SEB2 work resulted in charges to the project of $1.49M. The cumulative SPI and CPI for Conventional Facilities' scope remains at 1.00.

The injector commissioning Instrument Readiness Review (IRR) was held September 16–20. There were 105 findings, including 50 pre-start and 55 post-start, all of which are being addressed. Prestart findings will be closed before the Accelerator Readiness Review for injector commissioning and plans will be established and formally tracked to completion for the post-start findings.

UPCOMING EVENTS

NSLS-II Early Experiments workshop: IXS Focus	Oct 1
IXS Beamline Advisory Team (BAT) meeting	Oct 2
SMI BAT meeting	Oct 21
ESM Beamline BAT meeting	Oct 21–22
Final Design Review (FDR) Phase I for Steel Hutches	Oct 22
In-Situ Methods of X-ray Absorption Spectroscopy workshop	Oct 24–26
FDR, NEXT and ABBIX Lead Hutches	Oct 29–30
FDR, Phase II for Steel Hutches	Oct 30
CSX2 BAT meeting	November
Accelerator Readiness Review for NSLS-II Booster	Nov 4–7
ISR BAT meeting	Nov 8
ABBIX Final Design Review	Nov 14-15
EPICS4 Area Detector meeting	Dec 4–6
NEXT Final Design Review	Dec 11–12
Photon Sciences Science Advisory Committee meeting	Dec 18–19

ACCELERATOR SYSTEMS

Magnets. Seventy of the 90 fast correctors have been installed and 80 corrector magnets have been assembled.

Front ends (FEs). Among the remaining drawings that have been finalized and released are the tungsten blade clamp design on all Day 1 slits, drift pipe support assembly, drift pipe assemblies for all Day 1 FEs, and shadow/burn-thru flanges for the CSX and SRX front ends (Figs. 1 and 2).

Figure 1. CSX Beamline front end (FE).

Figure 2. SRX Beamline FE.

Production installation collimators have been reworked at BNL Central Shops to meet new PPS (personnel protection system) requirements and are being cleaned. The plumbing of air and water circuits in insertion devices (IDs) 23, 28, 3, 5, and 10 is completed for the components that did not need rework. Plumbing in 11-ID is in process. The air circuit is tied into the header for both air circuits in 23-ID. Overhead pipe racks have been installed in 8-ID and 18-ID. Forty of the 59 ratchet wall collimator penetrations are filled in with

concrete blocks. Drawings for the NEXT FEs within the NSLS-II project scope that have been finalized and released include the SIX beamline's ray tracing and ISR beamline's fixed mask. Among the components received from Central Shops were flange absorbers for the FXI and ISS beamlines, and Invar slit stands for all NEXT FEs.

Continuing **vibration** measurements led to the conclusion that the increased levels are due to heavy truck traffic on the Long Island Expressway, approximately 2 miles away.

Vacuum systems. One set of un-coated damping wiggler (DW) chambers were received and installed at C28 and are being prepared for in-situ baking. After the installation of scrapers, C30 is being set up for baking. The installation of compressed air for RF gate valves has started. Most storage ring RTDs (resistance temperature detectors) were installed and are readable through the SR PLC (programmable logic controller). Cell-to-cell PLC cables and additional vacuum cables were pulled, and termination has started. The vacuum systems team is assisting the FE and beamline teams with cable termination and bakeout. Five FE vacuum PLC chassis have arrived and been tested. The interface and logic between FE vacuum PLCs and EPS (equipment protection systems) PLCs have been agreed upon. The new lockout/tagout procedures and training have been implemented. Bakeout of the vacuum straights is continuing: For the cells, 29 of the 30 are complete; 22 of the 30 straights are complete. Bakeout for C28 and C30 will start in early October. The C16 straight is being reconfigured to provide adequate pumping and will then need to be re-baked. It was decided to install the Day 1 vacuum chamber in the C11 (CHX) straight as a placeholder until the ID is received. The running of copper tubing from the isolation valves to the SR gate valves has started. Cable termination in the front ends is in process.

Power supplies. The two main dipole power supplies have been integrated with the control system and have been tested using a temporary load. All thermal switch interlock circuits have been tested and are connected to the main dipole PLC. High-potential tests on the magnet circuit have begun. Sixty percent of the regulators for the fast corrector and 35 mm dipole trim coils have been tested. The AC-powered amplifier first articles have been tested and the vender has received approval to start production. The installation of BtS transport line power supplies continues (Fig. 3). We now have all the magnets connected to water and power.

Electrical utilities. All electrical work in the RF building is finished. Numerous new tasks were added to support the RF installation. Cable tray in the RF straight in the storage ring tunnel will begin soon. All electrician work for the DWs is finished. Routers and antennas in the booster and linac tunnels have been installed and the wireless network should be operational early in October. Installation of the wireless network for the storage ring has begun.

PPS and EPS. The interlock group continues to complete testing for the linac, booster, and P1 and 2. The Technical Change Request that required changes to the PPS due to the linac mis-steering event has been more difficult to implement than anticipated. Also, the planned pretesting did not occur, adding to the difficulty with certification testing. The interlock team is developing better plans for future testing and also will supply some technicians to help with PPS installation and testing. Job shop technicians are continuing to build PPS PLC panels for the project beamlines. Much of the conduit work on the hutches has finished, but recent changes for water flow and vacuum PPS interlocks will require more work. All the EPS chassis are onsite and ready for installation, complete with documentation. Technicians will begin to assemble the electrical connection to the flow meters next month.

Figure 3. BtS Transfer Line Part 2.

High-level installation schedule. The end date of installation without insertion devices is currently January 2014. A list of remaining accelerator installation activities with completion dates has been compiled. Areas of concern include completing the SR shielding, PLC programming resources, survey resources, completing the cooling tower, front end components, the injection straight kicker chambers, and the ID installation schedule.

Mechanical utilities. The layout of the DI piping to the RF cavity is in process; installation will start in mid-October. The cooling tower will be drained in early October and piping will be dropped to allow installation of the bypass valves, which are needed to commission the cooling tower. This is expected to be complete by the end of October. The installation of the insulation for the P1 and P4 PCHW heat exchangers will be starting (pending on the delivery of insulating devices from Facilities and Operations).

The capillary tubing installation is in process for the flow meters: pulling through the offset conduits (which involves plumbers) is ~95% complete; tunnel tie-ins are in process in P2 (this involves technicians). SR mezzanine tie-ins are in process in P2. The P1 aluminum pump skid will be started and pressure tested in early October. Installation of the P2 and P3 aluminum pump skid polishing systems is complete. Pentants 4 and 5 are in process and will be complete in mid-October.

Electrical utilities. Installation of the ODH (oxygen deprivation hazards) system (electrician work) in the RF building is complete. Installation of cable tray in the cell 24

RF straight is in process. AC power tie-in for the DW racks in all three cells is complete. Correcting RF cleanroom vendor-installed AC power to meet code is complete.

Insertion devices. The cell 28 DW vacuum chamber has been installed; bakeout will begin in early October. The first two DWs have been transported from Bldg 832 to SB (service bldg.) 5 and will be transported from SB-5 to C28 in early October. The electronics for the first DW have been installed in the rack on the C27 SR mezzanine. The third DW is now in the magnetic measurement lab. The fourth DW has been completed and installed. The fifth DW has arrived, and the last one is in transit and expected to arrive in mid-Ocober. Tunnel floor survey of the C8 and C18 DW straights is complete.

Front end utilities. Cable pulling is finishing in cells 5, 10, and 11. Cells 23, 28, and 3 are complete; cells 8 and 18 will be started next. Compressed air tie-ins are complete in cells 23, 28, and 3. Water piping installation is in process, as is the survey of stands. Collimator 1 rework is almost complete and installation will follow. Collimator 2 needs to be replaced due to the new fan following the front end PPS analysis. Vacuum chambers will be manufactured for installation in place of the slits, which have been delayed until Dec/Jan. The decision on when to install the ratchet wall collimators still needs to be finalized.

Mechanical. The beamline ratchet wall penetration concrete shielding installation is in process (41 of the 60 items have been installed). The fast correctors are being assembled and installed (70 of 90 have been installed; 10 are ready for installation once their coils arrive. The P4 flow restrictors have been installed and pressure tested.

Survey. Profiling of the SR magnet/girders is continuing (20 of 30 are complete). Other survey work includes the DW straights, RF vacuum stands, energy slit, transverse feedback system, kicker magnet, front ends, and beamline support.

RF. The installation of the cryoduct to the blockhouse is complete. The cryoduct has been rigged into position on the C24 SR mezzanine and connections are in process (Fig. 4). However, modifications to the tunnel roof through-holes are required. The spare booster (warm) cavity has been cleaned and prepped for installation into the SR for installation in the SR tunnel late in October. Commissioning of the liquid nitrogen system will start in mid-October.

Diagnostics and instrumentation. Rework of the SR RF BPM (beam position monitor) receivers is in process (P1 is in final testing; P2 is in rework, P3 is being removed). Installation of horizontal and vertical scrapers in cells 1 and 30 is complete; cable termination is in process. Installation of the beam loss monitors is in process. Bending of the SiO_2 cables for the SR BPM pick-ups has started. The pulling of x-ray BPM cables is in process.

Electronics and cable pulling. Low current power supply testing is complete in P5; high-current testing is in process. Low-current testing of the dipole power supplies is underway. Testing of the fast corrector power supply amplifier first articles is complete and production has started.

Table 1. NSLS-II Accelerator installation progress at the end of August 2013.

	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13
Mechanical Utilities	61%	62%	68%	73%	74%	78%	80%	88%	91%	92%	92%	100%
Electrical Utilities	80%	85%	91%	95%	96%	99%	99%	100%	100%	100%	100%	100%
Magnets	78%	87%	93%	99%	100%	100%	100%	100%	100%	100%	100%	100%
Vacuum	28%	35%	37%	41%	50%	61%	77%	78%	80%	87%	90%	92%
Power Supplies	36%	43%	48%	54%	65%	70%	81%	87%	95%	99%	100%	100%
Instrumentation	46%	53%	58%	63%	66%	74%	80%	83%	85%	89%	95%	96%
Frontends	1%	2%	6%	6%	11%	15%	23%	32%	34%	36%	36%	40%
RF	40%	45%	47%	49%	52%	57%	59%	64%	75%	77%	77%	78%
Inje Straight	0%	0%	0%	0%	0%	0%	0%	1%	4%	27%	35%	47%
LINAC+Booster	82%	92%	95%	96%	97%	97%	99%	100%	100%	100%	100%	100%
Total	**57%**	**62%**	**67%**	**71%**	**74%**	**78%**	**83%**	**86%**	**89%**	**91%**	**92%**	**94%**

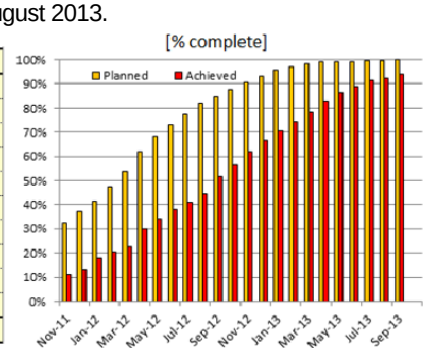


Figure 4. Views of the RF cryoduct work.

EXPERIMENTAL FACILITIES

In September, Experimental Facilities made significant progress in installations and Factory Acceptance Testing (FAT) for major beamline optics and components. For example, monochromators were successfully installed by FMB-Berlin for the CSX-1 coherent branch and CSX-2 polarization control branch. The gratings and mirrors have been installed and the chambers will be baked out to achieve the required vacuum performance. The monochromator for the HXN beamline was also installed, by FMB-Oxford, and the motion tests were completed. The IXS KB Mirror System from Toyama Co. was delivered to BNL on September 27. Installation is scheduled to start October 7. The FAT for the CHX optics package took place at Bruker ASC, followed immediately by the FAT of major components for the SRX Optical package. (Bruker is fabricating beamline components for CHX, SRX, and IXS.) Except for a few items, most beamline components have made excellent progress and met the contract specifications. Controls were tested and the motions operated as expected; delivery of these is now planned for November. The utility installations in the optics and experimental hutches has progressed at an excellent pace to hold to vendor installation schedules. The overall progress of the beamlines remains just 2 months behind the baseline schedule.

CHX. The FAT for the CHX optics package took place at the Bruker ASC site in Cologne, Germany September 3–5 with the FAT team (Daron Chabot, CHX Controls Engineer, Lutz Wiegart, CHX beamline scientist, and Andrei Fluerasu, CHX Group Leader) present to witness the progress made over the past few months. Shipment of the first container will follow shortly, with installation scheduled to start in early November. The final design of the beam transport lines that will also be provided by Bruker ASC was thoroughly reviewed and approved during a teleconference meeting led by Mary Carlucci-Dayton, CHX Lead Engineer and Engineering Group Leader. A technical preliminary design meeting led by Wiegart and Carlucci-Dayton was held with GNB, Inc. During this meeting, the design details of the SAXS table were thoroughly discussed; that design is now in a very advanced stage. A Preliminary Design Review (PDR) was held via teleconference with JJ-Xray Inc. (Denmark) for the Be CRL Transfocator. Both meetings showed excellent progress and a great spirit of collaboration between the CHX team and the contractors.

Utilities installation has made tremendous progress due to the dedication of the installation crew and Kelly Roy, the CHX designer who provided constant input and support, assisted by Joe Sullivan, the CHX beamline technician—who, also coordinates vacuum installation activities for the entire experimental division. Thanks to their hard work, the utilities installation is now complete in hutch 11ID-B and all but complete in hutch 11ID-A, with all vacuum equipment—controllers, gauges, cables, etc.—available in preparation for the upcoming installation activities.

In preparation for the CHX Early Science program, the scientific capabilities of our beamlines as well as some interesting recent scientific results were presented by Andrei Fluerasu during an invited seminar at the University of Pennsylvania. This led to discussions with several teams studying the dynamics of materials; the outcome may be some interesting science projects and possible future proposals for experiments at the CHX beamline.

CSX. September saw the successful installation of both the coherent and polarization control branches' monochromators by FMB-Berlin. After the systems passed the site acceptance tests, the CSX team started the 3-week process of vacuum baking the systems. Installation of utilities has completed at CSX, with all mechanical and electrical systems being fully integrated. Thermal testing of the 19-inch rack enclosures is underway. Cable pulling for both the FOE and the coherence branch was completed, and integration and testing and of the beamline equipment is well underway.

IXS. The IXS KB Mirror System from Toyama Co. was delivered to BNL on Sept 27. Installation is scheduled to start October 7. Utilities installation is progressing well: mechanical utilities for all hutches except the FOE were completed. Electrical utilities for Hutch D were started and will be completed prior to installation of the KB Mirror System, to minimize interference. The remaining utilities installation is slated for completion by the end of October.

The procurement of the mini-Montel multilayer collimating mirror also is on track. The mirror is designed with a small transverse profile in order to accommodate multiple analyzers for future upgrade of the IXS spectrometer. We completed the final design review in September. Delivery of the mirror is scheduled for May 2014. The motion mechanism for the multilayer mirror has been contracted to Square One. At the kick-off meeting on Sept 20, the program plan was discussed. The system is scheduled for delivery in April of 2014.

HXN. The monochromator for the HXN beamline was installed and the motion tests were completed. During the cold commissioning, it was apparent that silver foils used to cool the second crystal were interfering with its motion. The HXN team decided to use the more conventional method, braids. The proposal evaluation group finished evaluating vendor proposals for the x-ray microscope vacuum enclosure and awarded the contract. The contract for the shielded beam transport pipe also has been awarded.

SRX. The SRX team visited the vendor Bruker-ASC for a FAT of major components for the SRX Optical package. All components met the specifications set up by the SRX team; all parts were in extremely good condition, controls were established, motors moving as specified. Figures 5-7 show the beamline components lined up on the granite support. WinlightX is encountering further delays in deliveries of necessary invar pieces from their subcontractors. These pieces are primarily the flexures responsible for movement of the mirrors and thus they must be manufactured to extremely high precision. A FAT is now scheduled for the beginning of December. The SRX team continues to closely monitor the work progress of both vendors. Measurements of the performance of the sample stage for the high-flux setup are finished; the results have influenced design details for the

high-resolution stages. Procurement is now underway. The SRX team is continuing discussions with the scientific community regarding complex sample environments and early science experiments that might be intertwined with commissioning tasks.

Figure 5. Granite support carrying the horizontally focusing mirror and the horizontally deflecting double crystal monochromator as major parts of the SRX beamline. *Right and front*: vacuum chamber of the monochromator, *left and back*: vacuum chamber of the mirror.

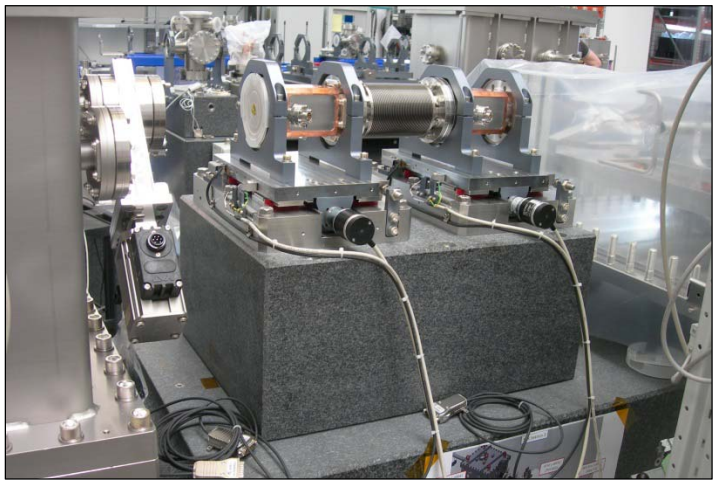


Figure 6. White beam slits for the SRX beamline, located on the big granite support visible in Figure 5. X-ray beam direction is from right to left.

NEWLY HIRED

Milinda Abeykoon – Associate Physicist – XPD-2, XFD

Masood Dalil – Quality Analyst – Quality Office, PSD

Robert Todd – Vacuum Engineer – Beamline Engineering, XFD

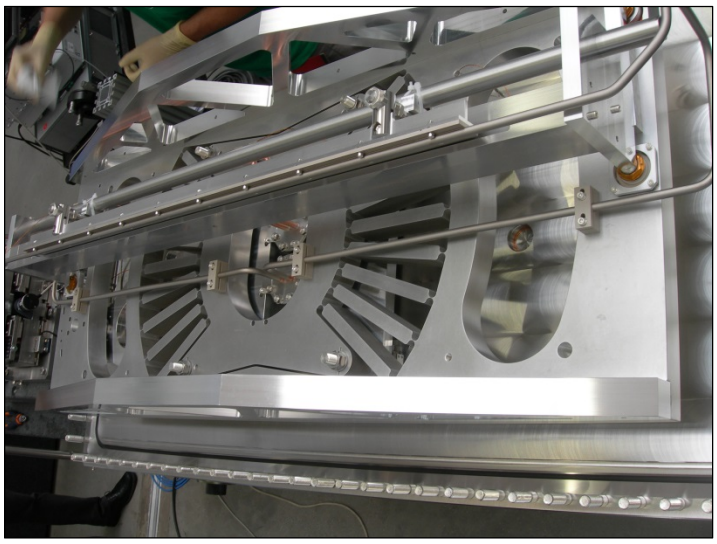


Figure 7. Mechanics for the horizontal focusing mirror, showing the spokes for the high-resolution pitch movement and the cooling lines for the mirror. Mirror and bender mechanism are not visible here.

XPD. Phase 2 installation in the **first optical enclosure** and its survey were finished on September 20. This includes the filter array (Fig. 8), white beam slits and filter assembly, white beam stop and bremsstrahlung stop, and the monochromatic beam slits, fluorescent screen, and beam position monitor assembly. Phase 3 is due to start on November 4. The last components of this package, the fixed aperture mask (leak testing recently failed and design has been modified) and a second bremsstrahlung collimator will be delivered in December, together with the Laue-Laue monochromator.

Figure 8. The array of actuated filters. The five high-power filters are water-cooled SiC and pneumatically driven in and out of the beam, allowing the incident power on the downstream monochromator crystal to be controlled.

XPD lead/steel enclosures 28-ID. Racks on the hutch roofs are being populated (Fig. 9). The new staircase is installed (Fig. 10). Mechanical utilities in the D-hutch are complete except for the transmitters. External hutch electrical utilities work on the D hutch roof is done. Electrical work for exterior locations (user space) is in progress. Trays in the C hutch must be shifted to accommodate cable runs. Cable pulling and cable

termination are in progress. Control station layout is underway.

Figure 9. View of enclosures 28-ID-C through A showing the control racks installed on the roofs.

Figure 10. The new stairs at hutch 28-ID-D make the ladders obsolete.

For the **Laue-Laue monochromator**, the new rollers design is being implemented and final testing of the crystal cage is underway at FMB-O. The assembly of Part 2 in the factory is progressing: the Huber stage has been delivered but some parts are still missing (Phytron motors, capacitive sensors, and controls). The granite support columns for the diagnostic tower were out of specification and have been sent by FMB-O for rework. The FAT is scheduled for November 5–8 and delivery is due on December 4.The XPD **vertical focusing mirror** has been completed by contractor Winlight-X.

The **XPD diffractometer assembly** is in its final stages (Fig. 11) with no major elements left to manufacture or purchase. Sub-assemblies have been tested individually and as part assemblies without any issues. A full calibration set of tests will commence on October 5 under fully assembled conditions with the test weights and counterbalance weights in place. The vibration tests are to take place on October 11. The diffractometer and associated equipment (sample table, camera mount, etc.) will be fully assembled and finished in time for the FAT, October 15–18. If the FAT is successful, the equipment is scheduled to be dispatched on October 28 and the installation is scheduled to start on December 2.

Figure 11. The three platens of the diffractometer above the granite base

COST/SCHEDULE BASELINE STATUS

September's current-period schedule variance (SV) for the overall project was (-$24K), with an associated schedule performance index of 1.0 due primarily to positive performance in Accelerator Systems, +$2.0M. The cumulative SV for the project had green status, with an SPI of 0.97 (-$23.3M).

The current-month cost performance index (CPI) for the NSLS-II project in September was 0.82 (-$2,052K), red status, due to Conventional Construction and Pre-Operations in Accelerator. The cumulative project CV (cost variance) increased to (-$11.5M), green status with CPI of 0.99.

For Experimental Facilities, WBS 1.4, schedule performance in September was negative for the month with an SPI of 0.61 (-$1,109K), red status, due to delays in beamline installation. The cumulative SPI remained at 0.90 (-$6.6M), green status.

For Conventional Facilities, WBS 1.5, schedule performance for September was positive with an SPI of 2.46, $350K, which is minor relative to the total cost of the construction contracts. The cumulative SV is (-$438K), with an SPI of 1.00, green status. The cumulative CV is (-$1,345K), with a CPI of 1.00, green status.

Accelerator Systems, WBS 1.3, continued its excellent schedule performance in September with a monthly SPI of 2.20, +$1.969K, and cumulative SPI of 0.95 (-$13.6M). The cumulative CPI remained at 0.95 (-$14.4M); the current-month CPI was 0.95 (-$206K), green status.

Pre-Ops, WBS 1.6, is showing a negative current-period SV of (-$1,235K), SPI 0.73. This is primarily due to planned costs for spares lagging behind the actual receipt and the credit of actual performance. The current-period CV is negative (-$954.7K), CPI 0.78, while the cumulative CV is positive $7,123K, due to previous under-runs in project management.

The project was approximately 91% complete as of September 30, with approximately 50% remaining contingency/Management Reserve (MR) on BAC work remaining. The project EAC was $900,303K, and MR/Contingency was approximately 36.7% of EAC work remaining. Project percent complete is 88%, based on EAC work remaining. At the end of September there was approximately $39.9M remaining of Contingency and MR for the project.

The critical path was updated in September and now runs through Injector ARR, Booster Commissioning; SR Shielding; Safety Assessment Document/Accelerator Safety Envelope (SAD/ASE) activities for SR Commissioning; IRR/ARR preparation activities for SR Commissioning; SR Commissioning; Insertion Device Installation; Integrated Test and SR Cavity Installation; and Project Closeout activities. There are 10 months of float between the project's August 2014 early completion of original scope (Sept 2014 for all new scope additions) and CD-4.

ENVIRONMENT, SAFETY, AND HEALTH

Commencement of injector commissioning continues to be the main focus in the areas of ESH. To date, the revised Accelerator Safety Envelopes (ASEs) for the linac and booster have been approved by BHSO, along with associated Unreviewed Safety Issue (USI) documents that addressed the Extent of Condition Review for supplemental shielding. In September two additional USIs were identified during commissioning readiness activities. The first issue was discovered during implementation of the Instrument Readiness Plan and concerned the depth of the soil berm over the linac and booster. Surveys of the berm showed that places where the soil depth was less than the designed level (maximum deviation: 1.2 feet). A USI was prepared, presented to and approved by the Laboratory ESH Committee (LESHC), and approved by BHSO. Since the berm is behind a fence and locked gate managed under the Personnel Protection System (PPS), protection of staff was determined to be adequate. The second issue was noticed during the Instrument Readiness Review (IRR) and concerned the PPS interlock of the B2 bending magnet in the BtS TL (booster-to-storage-ring transport line). As described in the Safety Assessment Document (SAD), the magnet was to be included in the PPS protection system logic and be physically locked out. At the time of the IRR the PPS interlock was not yet installed and would not be installed prior to booster commissioning. A USI evaluation and resolution was prepared, submitted to the LESHC, and approved. The document is pending DOE approval.

The booster IRR was completed during the week of September 16. The review was led by F. Kornegay, a former Spallation Neutron Source employee and a prominent figure in the DOE accelerator community, and included a team of BNL staff from across the complex, including the accelerator and ESH directorates. The IRR Plan of Action was completed and Lines of Inquiry were developed by each team member, then used as instruments to guide the review. The review identified 105 findings categorized as either prestart (50) or post-start (55). Substantial effort has been applied to addressing these findings. Due to the extent and nature of the findings, PS senior management decided to postpone the Accelerator Readiness Review to ensure that all actions were appropriately addressed and the NSLS-II project could declare readiness for commissioning.

Planning continues for the ARR scheduled for early November, with potential team candidates being identified, preliminary discussions held, and documents prepared to help the ARR team complete its review effectively and efficiently. Actions identified in the Corrective Action Plan (CAP) for the linac event are essentially complete, with approval still required for a few documents and approval of the Conduct of Operations Matrix by the BNL Conduct of Operations Board (COB) and DOE. The BNL COB has performed an extensive review of the PS Conduct of Operations Matrix and recommended changes that are in the process of being implemented.

Construction of the Satellite Endstation Building 2 continues, with installation of utilities and pouring of the concrete footings and floor slab. The facility will house the Soft Inelastic X-ray experimental facility. An Operational Readiness Evaluation (ORE) for Lab-Office Building 1 was performed in September as the Photon Sciences Directorate begins to relocate and consolidate staff from other buildings into that facility. The ORE and BORE (Beneficial Occupancy Readiness Evaluation) processes ensure that life safety, code compliance, and work planning/controls are in place prior to commencing with laboratory work. Progress continues on the build-out of several of the six project beamlines. To date, all 18 hutches have been completed, and utility installations are well underway. Experimental equipment is being installed at several hutches.

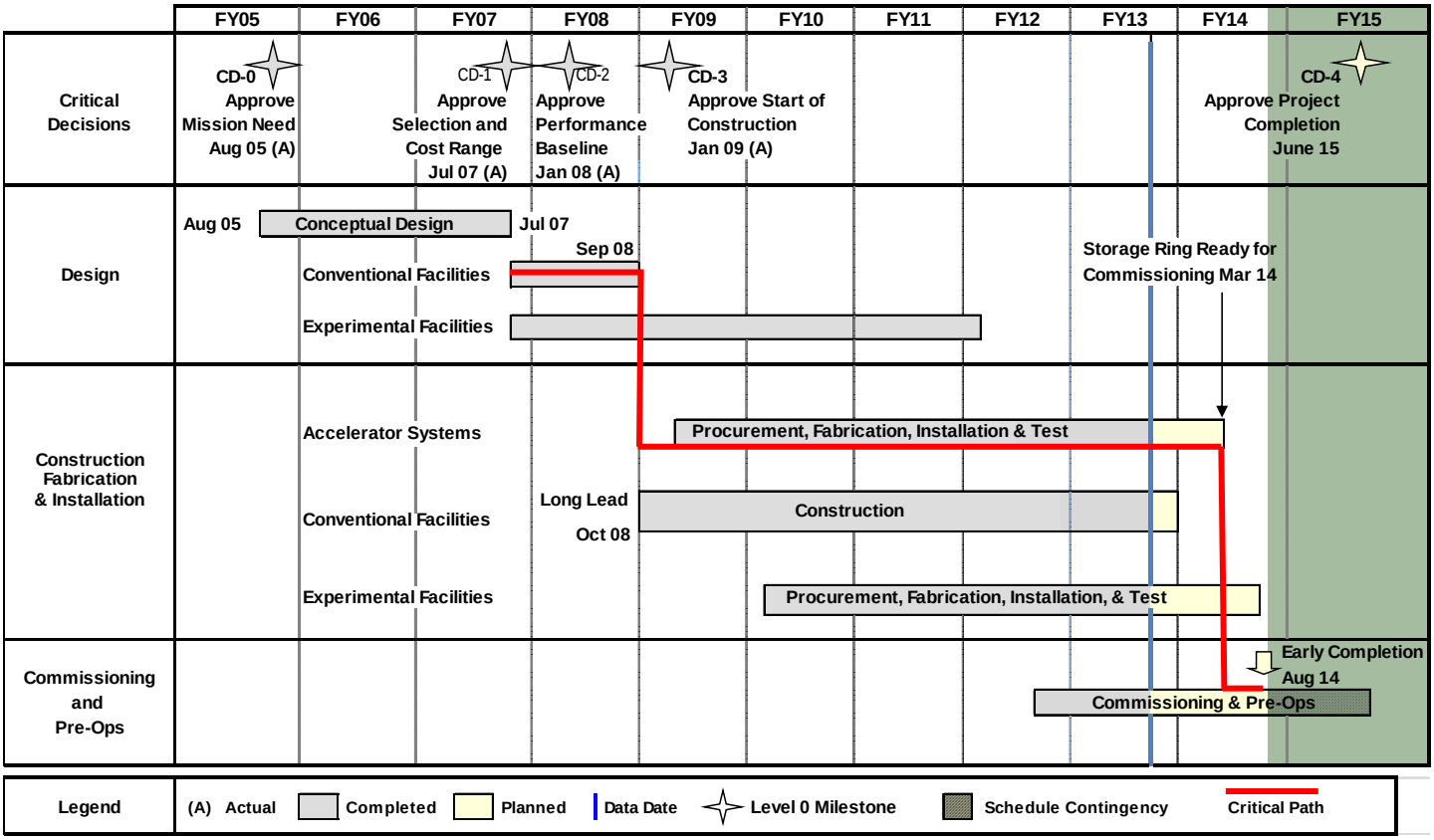
Safety performance continues to be excellent, with no first aid, reportable, or day-away injury cases reported.

ACRONYMS AND ABBREVIATIONS

AC	Alternating Current
ACWP	Actual Cost of Work Performed
ARR	Accelerator Readiness Review
ARRA	American Recovery and Reinvestment Act
BAC	Budget At Completion
BCWP	Budgeted Cost of Work Performed
BCWS	Budgeted Cost of Work Scheduled
BHSO	Brookhaven Site Office
BNL	Brookhaven National Laboratory
BORE	Beneficial Occupancy Readiness Evaluation
BPM	Beam Position Monitor
BST	Booster to Storage Ring Transport Line
CAP	Corrective Action Plan
CD4	Critical Decision 4
CHX	Coherent Hard X-ray beamline
COB	Conduct of Operations Board
CPI	Cost Performance Index
CSX	Coherent Soft X-ray beamline
DC	Director Current
DI	Deionized (water)
DOE	Department of Energy
EAC	Estimate at Completion
ESH	Environment, Safety and Health
EVMS	Earned Value Management System
FAT	Factory Acceptance Test
FDR	Final Design Review
FOE	First Optics Enclosure
HVAC	Heating, Ventilation and Air Conditioning
HXN	Hard X-ray Nanoprobe beamline
ID	Insertion Device
IPT	Integrated Project Team
IRR	Instrument Readiness Review
ISR	In-Situ Resonant X-ray Studies beamline
IXS	Inelastic X-ray Scattering beamline
LESHC	Laboratory ESH Committee
LOB	Lab–Office Building
LtB TL	Linac to Booster Transfer Line
NEXT	NSLS-II Experimental Tools (beamlines)
ODH	Oxygen Deprivation Hazard
OPC	Other Project Costs
ORE	Occupancy Readiness Evaluation
P1, P2	Pentant 1, Pentant 2, etc.
PCHW	Process Chilled Water
PCR	Project Change Request
PDR	Preliminary Design Review
PLC	Programmable Logic Controller
PPS	Personnel Protection System
PS	Photon Sciences; also, power supply
RTD	Resistance Temperature Detector
SAXS	Small-Angle X-ray Scattering
SPI	Schedule Performance Index
SRX	Submicron Resolution X-ray Spectroscopy
TCR	Technical Change Request
WBS	Work Breakdown Structure
XPD	X-ray Powder Diffraction beamline

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	27.4		60.2
Total NSLS-II Project	1.0	4.8	25.0	49.7	253.3	141.0	152.8	159.1	71.6	53.7		912.0

Key Personnel

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