National Synchrotron Light Source II

Project Progress Report

January 2013 Activity

Noontime sun spotlights the NSLS-II facility; January 31, 2013.

report due date:
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OVERALL ASSESSMENT

The National Synchrotron Light Source II Project made excellent progress in January with the current month schedule performance index (SPI) for overall project at 1.39 (+$2.5M). The cumulative SPI for the overall project improved to 0.96 in January from 0.95 in previous month while the cumulative cost index remaining at 0.95. The Project was 86% complete with 48% of contingency and management reserve for the remaining EAC (59% for the remaining BAC). A number of Project Change Requests are in preparation according to the contingency spend plan, which was presented and concurred at the DOE mini-review held in December 2012.

Conventional construction activities continue to wind down as the contractors work through the remaining punchlist items and demobilize. The contractor work force at the construction site now totals around 25 persons and continues to maintain an excellent safety record. The Lab-Office Building (LOB) 3 was fully occupied and LOB 4 was completed.

Schedule performance for accelerator systems continued to improve, with a monthly schedule performance index of 1.58, +$1.4M, in January. The installation of the booster, storage ring magnet-girders, and transfer lines is now complete and integrated testing has started. Installation of power supplies, vacuum, diagnostics, and RF systems continued in pentants 3, 4, and 5 and in the RF building. Enhanced effort on radiation shielding analysis of the booster and storage ring and detailed planning for the storage ring commissioning continued. During the acceptance test for the first damping wiggler and the assembly of the EPU, a few minor issues were identified and are being resolved.

Schedule performance for experimental facilities in January has significantly improved, due to excellent progress made in hutch installation and the correction of previously under-reported progress for various vendor design and fabrication activities. The current month schedule variance for the experimental facilities is +$1.3M (monthly SPI of 1.71), resulting in a significant improvement of the cumulative SPI. Nearly all of the major beamline optical system design reviews are now completed, and utility and infrastructure installation is starting to slowly ramp up.

The early Project completion date remains at June 2014, maintaining 12 months of schedule float (41% schedule contingency) with respect to the Project's CD-4 milestone date of June 2015. The critical path of the project runs through booster Accelerator Readiness Review and DOE approval to start booster commissioning, followed by the commissioning of the booster and storage ring.

UPCOMING EVENTS

IXS Beamline Advisory Team (BAT) meeting	Feb 20
XPD BAT	Feb 20
BNL Director's Review of the NSLS-II Beamline Projects	Apr 4–5
Accelerator Readiness Review (ARR)	May
7th International Workshop on Radiation Safety at Synchrotrons	May 8–10
DOE Review of NSLS-II Project	July 16–18
DOE CD-2 Review of NEXT Beamlines Project	Jul 30–Aug 1

ACCELERATOR SYSTEMS

Accelerator physics. The Accelerator Physics Group is supporting the effort to determine requirements for the radiation shielding in the booster and storage ring (SR) by calculating the possible trajectories of electrons exiting the beam chamber but missing the iron yokes of the magnets. Work is continuing on the choice of working point for first commissioning of the SR without insertion devices. The development of high-level applications for commissioning and machine studies is ongoing.

Calculations are being prepared to characterize the higher-order modes of the Petra3 cavities, as it has become more likely that SR commissioning will start with this cavity only.

Injector status. Booster installation has been completed and integrated testing has begun. Testing of the booster main power supply was completed in January. All three power supplies reached the specified level of performance.

Status of installation and testing. During the QPS tests, the MOSFET bridge in the QF power source overheated due to a component failure. No further damage occurred, as the power had been turned off completely. The power supply is being repaired and needs retesting. Otherwise, all power supply testing is complete. Final testing of pulsed power systems reveals that additional fine tuning of the circuit is necessary to achieve the desired field flatness and amplitude level. Improved thermal switch mounting plates were installed on the booster dipoles. The booster equipment protection system (EPS) control panels will be reviewed on February 1.

Termination and connection of all quadrupole and corrector magnet cables in the Linac-to-Booster Transfer Line Phase I (LtBTL-I) has been completed and this transfer line is ready for integrated testing in February. Installation of the elements of the Booster-to-Storage Ring Transfer Line Phase I (BtSTL-I) continued with BST girders 0100 and 1000, after installation of the booster-to-SR penetration shielding (Fig. 1). All lead shielding material for the booster and the transfer line has been received and shielding installation is in progress. Carts for supporting moveable shielding are being manufactured. All parts are available and assembly can begin.

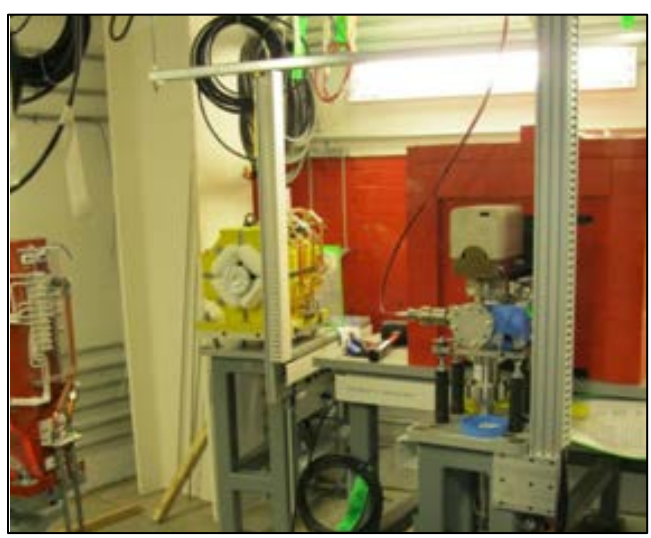


Figure 1: Booster dump and lead-shielded penetration to the storage ring.

Good progress was made on the pulsed magnets for storage ring injection. The event receiver has been installed and programmed. The fiber optic board has been populated and tested. Driver and switch boards have been built and bench tested. They are already installed in the pulser, which is ready for testing. The shaping diodes have arrived and will be integrated into the latest pulser assembly. The high-vacuum (HV) gate drive transformer design is completed and HV cables will be ordered soon. Parts for the "pingers" are in production. The pinger magnets are being built now.

Vacuum. Interconnecting bellows have been installed at 20 storage ring cells. The straight section chamber stands are available and installation has started. Cells C03, C07, and the straight section at C26 were successfully in-situ baked this month, bringing a total of 12 cells and 1 straight tested and in-situ baked. Pressure testing of the cell cooling lines has been transferred to vacuum technicians, who have had the appropriate training and qualification. The testing of cooling lines in pentant (P) 1 is almost completed. All vacuum systems in the booster and LtBTL-II have been completed. The vacuum programmable logic controller (PLC) test for the injector (from devices, wiring, and interlock logic to gate valve) is underway. Revised code for the linac vacuum PLC was successfully tested.

Flange absorbers with reduced openings for Injection and RF straights are under fabrication. The four damping wiggler exit pipes were completed, as were the BPM (beam position monitor) chambers for the injection straight. The layout of Day-1 RF straight 2 was completed and released, with detail design started. All 32 storage ring vacuum PLCs were received, and 15 were installed and connected. The collection of injector vacuum documentation for the Instrumentation Readiness Review (IRR) was completed. The evacuation and cleanup of vacuum work space in Bldgs. 902 and 905 is finished, with all equipment packed for moving.

Power supplies. Main dipole power work is progressing. The manufacturer is testing major subsystems, and final assembly of subsystems is in progress. The series pass subsystem shows signs of instability at high currents. This was investigated and the cause has been discovered and corrected. Delivery is estimated to take place at the end of February.

Power supply controller chassis for transport lines have been installed in all of P1, P2, and P3, and booster pulse power systems have been installed. Work on P4 cells is in progress, with cell 11 completed.

All regulators for P1, transport lines, and P2 have been tested. Resources have been added to test regulators at a faster rate. The peak rate of 20 regulators a week has been reached. All the cells for P3 are completed.

Power supply interfaces have been tested and configured for all of P1, P2, P3, transport lines, and the booster pulse power systems. Work started on P4.

The production and delivery of all the alignment corrector power amplifiers is complete. Most units have been tested and installed in P1, P2, and P3.

Procurement documents for the fast corrector AC-powered amplifiers were completed and the RFQ has been published.

All temperature sensor systems have been received and testing is progressing well. Testing takes less than a day for the three units that are needed for a cell.

P2 power supply installation is finished and electrical testing has started. Work is ongoing in P3; the first three cells have been completed. This is the halfway point for power supply installation.

Electrical Utilities. Cable pulling is continuing; P4 has been completed except for PPS (Personnel Protection System) cable. All network fiber optic cables are finished and work has begun on the fiber optic timing cables. P5 cables are being pulled. Preparations for installation of the large Helix RF cables are underway. Work for electrical power connection to the cryogenic compressors has started. Electricians have completed working in P5. They are now installing cable tray above the straight section in the SR tunnel, as well as cable tray for front end devices in the six Project beamlines and damping wigglers. Interlock electricians finished installing PPS conduit for P4 and P5 and are beginning to pull the PPS cables.

Controls. The glass fiber cables in P4 are terminated and tested. Controls equipment for monitoring the P4 vacuum system controls has been installed. Point-to-point checkout for the BPM (beam position monitor) system in P1 is complete. Programming of the PLCs for various systems has been performed and good progress has been made. The PLC controls for the copper de-ionized (DI) water system in P2 have been completed. Integrated testing of the PPS chain "B" is 70% complete for P1. Six cell controllers are now installed in P2. Glass fiber cables have been installed and testing is underway. The BPM temperature interlock has been designed and is under test. Flat panel displays and console computers for the NSLS-II control room have been received, as well as the network rack for the adjacent computer room. Desktop monitors have been ordered.

Insertion devices. Acceptance testing of the first article damping wiggler continued. Testing revealed several mechanical issues regarding control software and hardware; these are being resolved by the manufacturer. The assembly of the EPUs has progressed. Several smaller issues have been resolved with the manufacturer. Delivery of the devices is delayed by 4 weeks, reducing available built-in schedule float.

The PDR (preliminary design review) of the IXS-IVU is finally approved and the milestone payment was made after several post-PDR design iterations. The three-pole wiggler FAT (factory acceptance test) was conducted on January 31. The system does not fully satisfy the specifications. The vendor's measurement was done with a Hall probe with only limited range scans. BNL has requested that measurements be repeated, with flip coils.

Installation. Installation made very good progress and the installation rate is now higher than scheduled. Although installation is currently 4 to 5 months behind schedule, if it continues at the current rate the delay will continue to decrease. Overall completion is at ~71%, according to EVMS data. The critical path now runs through booster commissioning, with the SR power supplies, SR area monitors, injection straight, cable pulling, PPS, cryosystem, and RF cavity near the critical path (<60 days).

By the end of January, all 150 magnet/girders (89 multi-poles and 53 dipoles) had been installed in the SR tunnel. Initial survey of the SR cells was finishing. The experimental floor roof deck rework will continue between columns 113.5 and 3. The mezzanine roof deck rework has started between columns 104.5 and 107.75 (cell 22), and will continue for ~4 weeks in that cell before moving to P1. Pulling of timing fibers throughout the SR is in process. There is an emphasis to complete the HVAC commissioning, to allow girder profiling and final alignment to begin. The plan is to isolate the P1 and P2 PPS, to allow only those pentants to be interlocked while booster commissioning is in process. Installation of the front end (FE) and straight section cable tray is in process throughout. The FE stands at cell 23 have been placed. The Synchrotron Light Monitoring (SLM) hutch has been installed and is ready for an acceptance testing prior to installation of beam monitoring instruments.

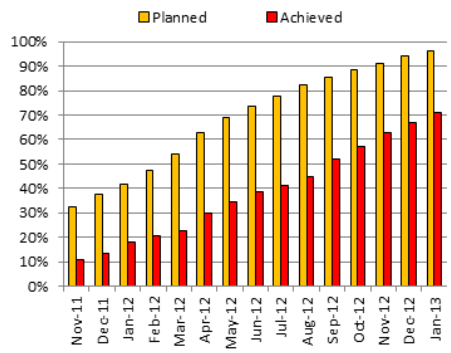
The cryogenic plant manufacturer was on site to finalize work planning for the cryosystem installation, which has been delayed until March. Planning for cryosystem utility requirements is in process. Testing of the spare SR RF transmitter KSU is in process. The installation of the suction diffusers on the RF pump skid is complete. The DI wet taps for the RF compressors are complete and the piping is in process. The HVAC ductwork obstructing the pipe bridge penetration in the RF building will be temporarily removed in February to route the cryo lines and reroute the DI lines. The compressors have been placed in the compressor building. Electrical disconnects in the compressor building are being moved.

Integrated testing. All power supplies (PS) for magnet systems in P1 have been tested up to 75 % of the maximum current, which includes the settings for operation. As a result of the tests, documentation for the wiring diagram of the PS cables has been corrected. Retesting was successful. The cooling airflow in the sealed equipment enclosures needed improvement in some areas; this was easily accomplished. PS testing in P2 has started. High-Pot tests on the magnets are complete. A number of small problems were resolved, such as stagnant water left in the magnets, which caused a low resistance to ground.

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

Achieved

	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13
Mechanical Utilities	38%	38%	38%	39%	60%	61%	62%	68%	73%
Electrical Utilities	61%	65%	69%	72%	75%	80%	85%	91%	95%
Magnets	50%	62%	65%	68%	73%	78%	87%	93%	99%
Vacuum	10%	13%	14%	15%	21%	30%	38%	39%	44%
Power Supplies	15%	18%	22%	27%	30%	36%	43%	48%	54%
Instrumentation	27%	31%	38%	36%	37%	46%	53%	58%	63%
Frontends	0%	0%	0%	0%	0%	1%	2%	6%	6%
RF	27%	32%	33%	35%	38%	40%	45%	47%	49%
Inje Straight	0%	0%	0%	0%	0%	0%	0%	0%	0%
LINAC+Booster	27%	33%	42%	55%	74%	82%	92%	95%	96%
Total	**35%**	**38%**	**41%**	**45%**	**52%**	**57%**	**63%**	**67%**	**71%**



EXPERIMENTAL FACILITIES

In January, a large fraction of the Photon Division was relocated from various buildings across the BNL campus to the new Laboratory Office Building (LOB3) adjacent to the NSLS-II ring building. This important transition for the experimental facilities co-located beamline staff, engineers, designers, project controls, and beamline control staff, and will greatly improve communications and coordination activities. The hutch installation continued in January with the hutch vendor adding additional work shifts to address schedule delays. In January, 23-ID-A was completed, and hutches 3-ID-A, 3-ID-B, and 5-ID-B were released for acceptance testing. Additional technician support was added to improve the acceptance test process and facilitate hutch completion. Plans to further increase the hutch installation workforce are also in place. Beamline components are being fabricated and assembled at vendor facilities around the world. Progress is monitored through weekly phone meetings and through periodic design reviews and site visits. Final design reviews held in January included the SRX K-B mirror system, the IXS K-B mirror system, and the CSX M1A/M3B mirror systems. Nearly all of the major beamline optical system design reviews are completed. Progress in utilities and control cable installation has been slow. Some of this delay can be attributed to delays in the hutch installation schedule.

Weekly installation meetings are managed by the beamline installation coordinator to plan and coordinate all beamline installation tasks. Steps to improve the utility installation schedules are being implemented to avoid delays in the installation of beamline components later this year.

CSX. In January the polarization group resumed communications with the vendors, especially for long-lead items for beamline optical components. The monochromators design presented in the FDR was approved; fabrication will begin as soon as possible. During the review, the beamline team realized the need for a zero-order mask in the monochromators; this will be included in the contract package. The specifications are being revised accordingly. For the second optics package, toroidal mirrors, the team is reviewing the

thermal loads on the different masks of the system. Weekly communications with the vendor should ensure that the FDR runs seamlessly. Although details in the beamline vacuum design are adjusted as safety considerations are incorporated, the team has started the procurement of a high percentage of the standard vacuum components; many components (those for the coherence branch) have arrived. Installation of the vacuum system and beam transport elements for the coherence branch was finalized. Installation of these items has been brought forward to May 2013, prior to vendor installation, to ease schedule pressure later in the year. Schedule updates from the optics manufacturers present some delays, yet are acceptable at this point. The set-up for the vacuum test of the differential pump was completed; it is currently pumping down to reach the desired vacuum levels for the performance test, which will take place in February. Beneficial occupancy of the CSX First Optic Enclosure hutch was obtained. Planning for the utilities installation is under-way, with the floor layout of racks and pylons finalized. Currently, weekly meetings are held with the beamline team to finalize utilities requirements, with an goal of beginning installation in March, once HXN activities abate.

HXN. Construction of 3-ID-A and 3-ID-B is complete. The designs for the mechanical utilities are complete, and installation work began in 3-ID-A. More than 40% of the beamline optical components are now fabricated. The HXN team is planning a factory acceptance test in February, 2013.

IXS. The IXS team continued to focus on procurement-related activities in January. The FDR of the IXS KB Mirror system was held on January 28-29 at BNL with Toyama and WinlightX. Delivery of the mirror chamber and motion mechanism is now scheduled for August, and the mirrors and benders in October 2013. System integration is scheduled for mid-November 2013. The final design of the IXS FOE components is progressing well, with the FDR scheduled for February 14-15. The IXS spectrometer contract was awarded to Blake Industries on January 10, and the kick-off meeting was held on January 31. In addition, the IXS team is evaluating the feasibility of a full system test at PETRA III of the prototype spectrometer system before the instrument is due to be moved back to BNL in July.

SRX. On January 30-31, the final design review of the SRX Beamline KB Mirror System Package with the company WinlightX took place at BNL. The company presented their plans; key personnel from BNL, together with the SRX team, reviewed this design related to controls, vacuum, utilities, radiation safety, and ESH. The overall design of the KB system with the two modes, high-resolution and high-flux, is either meeting BNL's specifications or even surpassing them. Figure 2a shows the final design of the vacuum vessel of the high-resolution setup, Figure 2b shows the interior with the two mirrors and the mechanical alignment parts. Vibration analysis has been conducted to determine the stability of the design. As an example, figures 3a and 3b show the final design of the flexure for the pitch movement of the horizontally focusing mirror of the high-resolution setup, and the FEA showing the stability of this design. The first mode lies at 240 Hz, well above the specified value of 100 Hz.

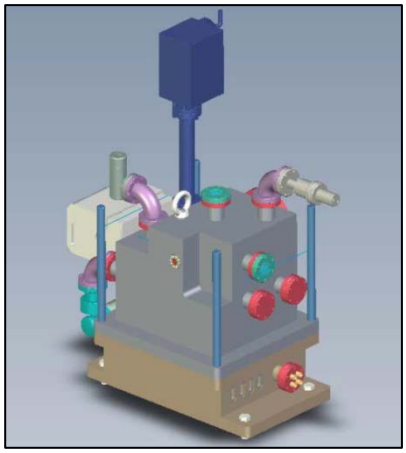


Figure 2a: Final design of the vacuum chamber for the high-resolution KB mirror system.

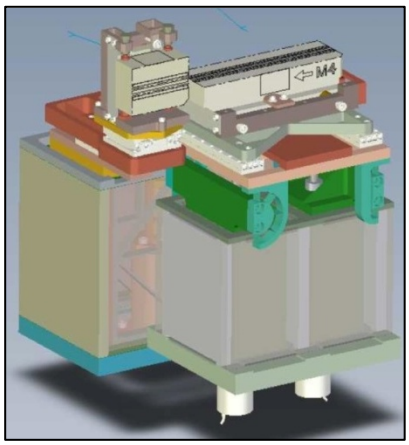


Figure 2b
Final design of the inside, comprising adjustment mechanics and mirror optics.

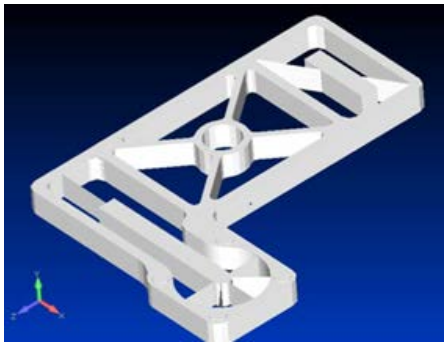


Figure 3a: Flexure design for the pitch movement of the horizontally focusing mirror of the high-resolution setup for SRX.

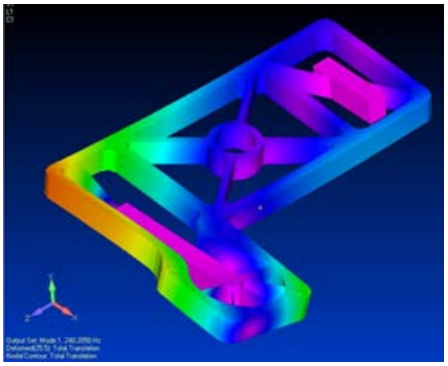


Figure 3b: FEA showing the stability of this design. The first mode lies at 240 Hz, well about the specified value of 100 Hz.

CHX. The CHX group worked with contractors for the optics package and the diffractometer, the two highest-value beamline procurements, to implement and validate all the changes agreed upon at the final design reviews held at the end of 2012. Both FDRs were approved and accrued in

January, marking an important milestone for the CHX instrument. The procurement of an ultra-fast pixelated x-ray detector for coherent scattering and x-ray photon correlation spectroscopy advanced to its very final stages; a contract award is anticipated and expected in early February. The CHX team has also made considerable progress with a number of small-value procurements, mainly for vacuum equipment.

XPD. Beamline components: Materials and subcontracted components have been placed on order by FMB. As of the end of January, 5% of material had been received. This is expected to will rise to 39% by the end of February. A number of assemblies are being prepared for vacuum brazing. Some parts are being nickel coated to ensure the surfaces are compatible with the gallium eutectic needed for high inter-facial heat transfer. The design for the shielded beam transport tube has been finalized; it reflects the changes requested by reviewers and team members. The beam transport tubes and bellows have been ordered and will be delivered to the subcontractor Innospec in early April. A purchase order has been placed with Innospec for the shielding. Therefore the shielded beam transport tube should be available for the FAT in early June.

Laue-Laue monochromator: The due date for the Final Design Approval of Part 2 is delayed from March 1 to March 19, but this has no negative effect on the schedule. The deliveries of Part 1 to Diamond Light Source and Part 2 to BNL meet the dates previously agreed: March 8 and September 11, respectively. The manufacture of Part 1 is going well (Fig. 4). The motions of the DLM Part 1 are currently being tested prior to vacuum and cryogenic testing.

Figure 4: Double-Laue Monochromator (DLM) Part 1 at FMB-Oxford, UK.

Vertical focusing mirror: Many parts have been ordered and are being delivered to Winlight-X in January-February, including the mechanical part of the bender, the granite, and the ion pump. The vacuum vessel (Fig. 5) has been ordered but the subcontractor encountered a problem; this component is now on the mirror system critical path, its due delivery time being changed from February 21 to March 25. The expected impact on the delivery time to BNL is only 2 weeks (from May 14 to May 30). The software development is in progress and on schedule.

Figure 5: Top part of the XPD mirror vessel at the factory in Pittsburgh.

Diffractometer: The designs for various components by RPI were released during December. The NSLS-II project requested several changes at the monthly technical and progress teleconference involving the sample table, camera mount, and the design and quantity of detector mounting points. The revised model drawings were submitted for the final PDR on January 29 and were approved. The RPI design office is currently working on the horizontal linear translation stage and implementing updates to the 3-axis spindle assembly.

Lead/steel enclosures 28-ID A, B and C: Wall labyrinths for 28-ID-B and C were fabricated. Crane cross rails and hoists for 28-ID-A, B, and C were installed and one air sock was completed for 28-ID-A. GPS reworked the 28-ID-A roof panels to add a roof labyrinth and block one off.

Multi-analyzer crystal x-ray detector: Final drafts of the Specification and Statement of Work were handed over to Procurement on January 23.

CONVENTIONAL FACILITIES

Conventional construction continued its excellent progress; Base scope construction activities in LOBs 1 through 3, including the HXN area, are completed (Fig. 6).

Figure 6. Completed LOB 3 and HXN addition (windowless block at right).

LOB 3 occupants moved in early January (Figs. 7, 8). The numerous new conference rooms have been put to good use by staff in the new building as well as from other NSLS-II locations on site. Some staff will move to LOB 4 (Fig. 9) in February, and a larger contingent will move to LOB 5 in March.

Figure 7. The LOB3 parking lot appears nearly full with the cars of staff newly situated in that wing.

Figure 8. Inside LOB3, staff members can be seen beyond the divider as they furnish their new workspaces with project files, art, and ever-important office plants.

The ring building contractor has completed the major work scope. All areas slated for accelerator equipment installation have been accepted from the contractor and are being utilized for installation work or for staging and storing equipment and materials being readied for installation. The remaining ring building contractor work includes resolution of all punchlist 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, final 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 March 2013, although they will continue to be available for any warranty work.

Sitework for the LOBs and the site overall is nearing completion. All major paving is now in place and the final site grading, topsoil distribution, and seeding are completed, although some areas may require touch-up in the spring.

Figure 9. LOB4 will be the site of the next staff move.

ENVIRONMENT, SAFETY, AND HEALTH

Work is ongoing for the corrective action plan associated with the beam mis-steering excursion that occurred at the linac on May 29. This CAP was approved by BHSO and a the project is providing routine status of the progress. Commissioning activities have been suspended and will not resume until all necessary corrective actions have been satisfactorily implemented and a successful Accelerator Readiness Review is conducted.

The final BOREs (Beneficial Occupancy Readiness Evaluations) for LOB 5 will be completed in early March time. The BORE process ensures 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. Operational Readiness Evaluations (OREs) are now being planned for the first three of ten laboratories in LOB 3. These labs will be used for beamline component assembly and component testing. The ORE process, similar to the BORE, will ensure that all life safety, code compliance, and work planning/controls are in place prior to commencing with laboratory work.

Conventional construction activity is substantially complete. The ring building and LOBs 1 through 4 are completed except for punchlist work. A roof deck painting job in P1 is ongoing to correct a paint delamination issue. This job is progressing well but will take an extensive coordination effort between the contractors and ongoing accelerator installation/testing work in the area. The contractor is working with the Accelerator Division to expand the work areas to accelerate completion of the work early. The focus of remaining conventional construction is now on LOB 5 with only finish work and punchlist items remaining. 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. Overall, the contractor work force totals about 25 persons.

COST/SCHEDULE BASELINE STATUS

The cumulative cost performance index (CPI) for the Project overall is 0.99, and the cumulative schedule performance index (SPI) is 0.96, both well within the acceptable range. The Project is approximately 86% complete, with approximately 48% of contingency and management reserve, based on EAC work remaining. The Project's current-month SPI is 1.39, +$2.5M, and current-month CPI is green at 0.93 (-$657K).

Conventional Facilities' SPI for January is green, at 1.39, +$26K. The cumulative Conventional Construction SPI is 1.00 (-$880K), and CPI is 1.01, +$4.4M, both green.

In Accelerator Systems (WBS 1.3), schedule performance for January is green, with a SPI of 1.58, +$1.4M, due to positive performance in most Accelerator Systems with exceptions in Storage Ring RF and Beamline Front Ends. Cost performance for the month is yellow with a CPI of 0.89 (-$477K). The cumulative schedule performance is green with a SPI of 0.92 (-$22.8M), and the cumulative cost performance is also green with a CPI of 0.95 (-$13.9M).

Experimental Facilities' cumulative SPI is 0.87, improving from the previous months, moving to yellow status from red. The improvement in performance is due primarily to FDR approvals for the CHX and SRX optics package and the FDR report for the CSX monochromator. These contributed to an overall WBS 1.4 schedule variance for the current month of +$1.3M and a SPI of 1.71.

The critical path for the project runs through booster ARR and BHSO approval to start booster commissioning. The critical path continues through booster commissioning, storage ring commissioning, and insertion device commissioning. 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 41% schedule contingency.

NEWLY HIRED

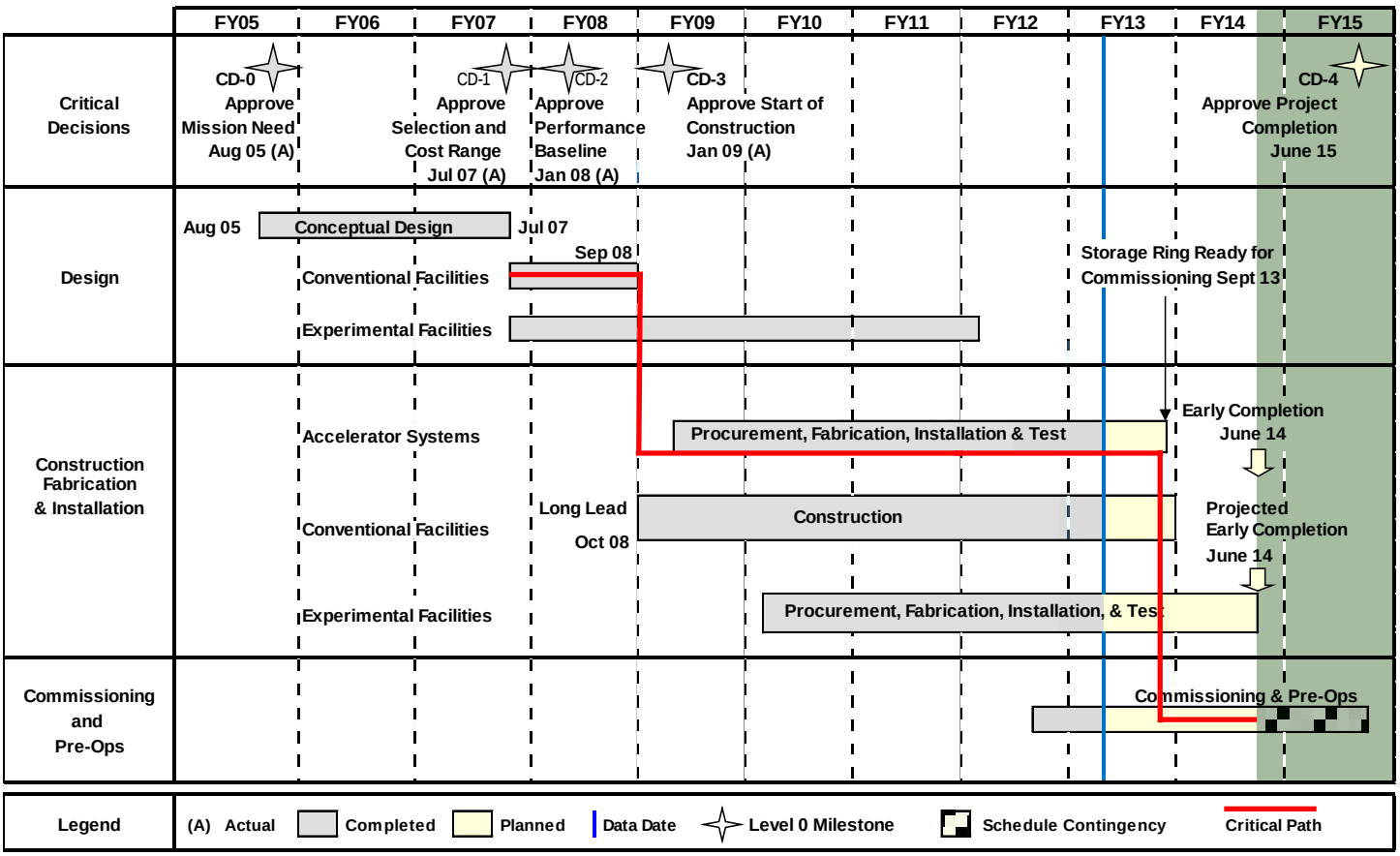
There were no new hires for the NSLS-II Project in January.

ACRONYMS

AC	Alternating Current
ARR	Accelerator Readiness Review
ARRA	American Recovery and Reinvestment Act
BAC	Budget At Completion
BORE	Beneficial Occupancy Readiness Evaluation
BPM	Beam Position Monitor
BtS	Booster-to-Storage Ring
CHX	Coherent Hard X-ray beamline
CPI	Cost Performance Index
CSX	Coherent Soft X-ray beamline
DI	Deionized
DLM	Double Laue Monochromator
EAC	Estimate at Completion
EPU	Elliptically Polarizing Wiggler (beamline)
EVMS	Earned Value Management System
FAT	Factory Acceptance Test
FDR	Final Design Review
FE	Front End
FEA	Finite Element Analysis
HVAC	Heating, Ventilation and Air Conditioning
HXN	Hard X-ray Nanoprobe beamline
IRR	Instrumentation Readiness Review
ISR	In-Situ Resonant X-ray Studies beamline
IVU	In-Vacuum Undulator
IXS	Inelastic X-ray Scattering beamline
LOB	Lab–Office Building
LtB	Linac-to-Booster
NEXT	NSLS-II Experimental Tools (beamlines)
ORE	Occupancy Readiness Evaluation
P1, P2…	Pentant 1, Pentant 2, etc.
PDR	Preliminary Design Review
PLC	Programmable Logic Controller
PPS	Personnel Protection System
PS	Power Supply
PSC	Power Supply Controller
RF	Radio Frequency
RFQ	Request For Quotations
SIX	Soft Inelastic X-ray Scattering beamline
SLM	Synchrotron Light Monitor
SPI	Schedule Performance Index
SR	Storage Ring
SRX	Submicron Resolution X-ray Spectroscopy
SV	Schedule Variance
TL	Transport Line
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	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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