National Synchrotron Light Source II

Project Progress Report

December 2012 Activity

Twilight lends dramatic flair to a winter evening.

report due date:
January 20, 2013

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OVERALL ASSESSMENT

The National Synchrotron Light Source II Project maintained satisfactory progress in December with cumulative cost and schedule indices for the overall project remaining at 0.99 and 0.95, respectively. The Project was 85% complete with 45% of contingency and management reserve for the remaining EAC (55% for the remaining BAC).

Conventional construction activities continue to wind down as the contractors work through the remaining punchlist items and demobilize. The Lab-Office Building (LOB) contractor is on track to complete LOBs 4 and 5 in early year 2013.

Schedule performance for accelerator systems continued to improve, with a monthly schedule performance index of 1.40, +$1.2M, in December. The installation of the booster, storage ring magnet-girders, and transfer lines is nearly complete. A total of 142 of 150 storage ring magnet girders have been installed, and delivery and installation of power supplies, vacuum, diagnostics, and RF systems continued in pentants 3, 4, and 5 and also in the RF building. Installation of all components in pentant 2 (P2) was followed by low-current power testing for the entire system, while high-current testing is in progress in P1. The gaseous helium tanks and the liquid nitrogen tanks were installed just outside of the ring building. Acceptance measurements for the first damping wiggler are in progress and various insertion device production activities continued to make good progress.

A number of design reviews for major beamline component contracts were conducted in December and hutch fabrication and installation started to recover from past schedule delays. However, previous delays in procurements for beamline components and hutch fabrication and installation continued to weigh down the schedule variance for Experimental Facilities. Potential under-reporting of progress due to the major milestone-based statusing is being addressed but has not yet been fully resolved. Schedule variance seen in Experimental Facilities continues to be a concern.

A successful mini-review of the NSLS-II Project was conducted. The overall progress, updated schedule, annual project-wide comprehensive EAC, and contingency spend plan were the main focus of the review. The critical path of the project now runs through booster ARR and DOE approval to start booster commissioning. The early completion date for the overall project remains to be June 2014, maintaining 12 months of schedule float (40% schedule contingency) with respect to the Project's CD-4 milestone date of June 2015.

UPCOMING EVENTS

Project Controls EVMS Training	Jan 8–9
CSX Beamline (BL) M1A and M3B Final Design Review (FDR)	Jan 24
SRX BL KB Mirror System – FDR with Winlight	Jan 30–31
DOE Mini Review of NSLS-II Project	Mar 5
ALD's PDR Review of ABBIX Project	Mar 19-20
BNL Director's Review of the NSLS-II Beamline Projects	Apr 4–5
DOE CD-2 Review of NEXT Beamlines Project	Apr 9-11
Accelerator Readiness Review (ARR)	April
DOE Review of NSLS-II Project	June 18-20

ACCELERATOR SYSTEMS

Linac. The radiation shielding analysis and final design has been completed and the design has been reviewed by the radiation shielding review committee. A committee report has been received and the action items in the report have been addressed.

Booster. The booster subsystems are fully installed. The booster vacuum system has been closed and pumped down. The vacuum is excellent and there are no leaks or other issues. Final power supply (PS) testing has been started and is continuing into January. The pulsed magnet systems that needed modification have been reassembled and tested. The development of ramping magnet PS control software has been finished. It is ready for the PS acceptance test, planned for January 2013.

The Booster Tune Measurement System has been tested by BINP specialists. The system is completely operational and ready for commissioning. Booster beam flags have been tested successfully by the BINP team. Remotely controlled mirror mounts for booster synchrotron light monitors have been installed and mechanically tested. All PTC modules for booster beam position monitors (BPMs) have been installed, and all long cables connecting PTCs to the BPM receivers have been pulled.

Transport lines. The Linac to Booster Transport Line-II (LtBTL-II) (in the booster tunnel) has been installed, including magnets, flags, current transformers, vacuum chambers, bellows, and breaks (Fig. 1). BPM system components, cameras, and other secondary components have been installed by the Diagnostic Group. Vacuum cabling and cable termination are in process.

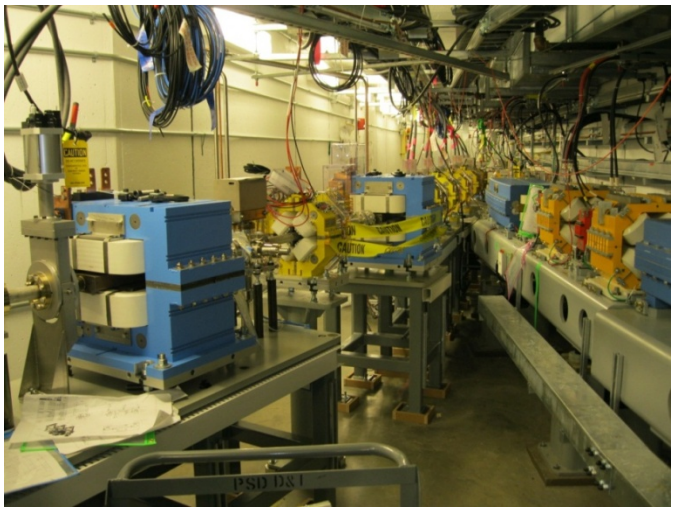


Figure 1. LtBTL work in progress.

The Booster to Storage Ring Transport Line-I (BtSTL-I) (in the booster tunnel) is approximately 70% installed. We are waiting for additional lead brick from the supplier, as well as supports for the BST Faraday Cup provided by the Diagnostic Group.

Support stands for BtSTL-II (in the storage ring tunnel) have been ordered. BNL Central Shops will begin to machine the top plates for the stands by mid-January. All transfer line

magnets are available, as are all of the diagnostic and vacuum components.

Completion of the supplemental shielding analysis, design, installation, and certification are on the critical path for the current IRR/ARR (Instrumentation Readiness Review/Accelerator Readiness Review) schedule for commissioning the injector systems.

Storage injection straight and pulsed injection magnet system. During December the final design of the kicker electronics was completed. The prototype pulser was tested successfully to 10 KV, approximately 10% greater than the required operating voltage. A prototype of the isolation transformer used to supply the IGBT drivers arrived on January 2. A requisition was issued for the high-voltage power supplies. Delivery of these is expected 6 weeks after the vendor receives the order. The mechanical design of the kicker magnets was completed. All kicker ferrites were received. Copper bus bar was purchased and arrangements were made to complete a prototype kicker magnet in early January. The vendor has completed production of six ceramic tubes for the kicker vacuum chambers and will proceed to braze vacuum flanges to them and apply titanium coating to the interiors. Finished chambers will be delivered as they are completed; the vendor's latest schedule indicates that the four chambers needed for the storage ring will be completed by the end of March.

Vacuum systems. The girder integration at B905 and B902 is almost completed, with only one multipole girder to go. In the storage ring tunnel, cell C05, together with photon exit port components, was in-situ baked. Cell C03 was assembled and is ready for in-situ bake. Modified fast corrector chambers were installed at the cell C26 straight section, which is complete and ready for in-situ bake. The cooling water manifolds for the aluminum vacuum chambers were completed in pentants 1 and 2. Installation of the manifolds started in P3.

The installation and pump down of all booster straight sections were completed, after two beam pipes at the RF straight were modified to accommodate changes at DCCT. LtBTL-II vacuum installation is complete and ready for pump down. The installation of BtSTL-I has begun.

The production of all stick absorbers and cell flange absorbers was completed. The fabrication of special flange absorbers for straight sections has started. The five undulator absorbers were completed and two of them have been installed at C03 and C05. The damping wiggler absorbers were machined and sent to a manufacturer for brazing. All the zero-opening crotch absorbers were completed; two aperture absorbers were available for installation.

Twenty-two PLC controllers (of 30) for the storage ring were received and tested. Installation of pump and gauge chassis in P5 has started. The installation of RTDs in the booster is completed. The collection of injector vacuum documentation for IRR has started.

Insertion devices. Acceptance measurements for the first damping wiggler are in progress in Bldg. 832, while the production for the components of the next five units is in progress at the manufacturer. The EPU manufacturer performs magnetic shimming on the first EPU unit. The EPU vacuum chamber design was modified and improved. SRX-IVU production continues for magnets, holders, beams, and other mechanical components.

SS-canting magnets. The contract for the SS-canting magnets was placed on Dec. 13. The production of U20-IVU continues for magnets, holders, beams, and other mechanical components. The final magnetic design for the IXS-IVU is in progress. The final assembly of the 3PW magnet and pole holders is nearly complete (Figs. 2, 3).

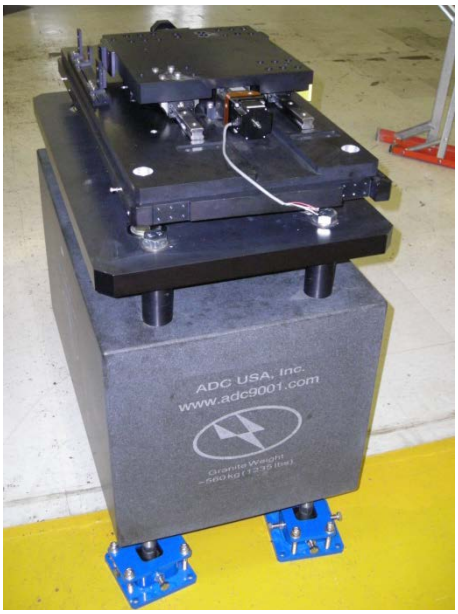


Figure 2. 3PW base assembly.

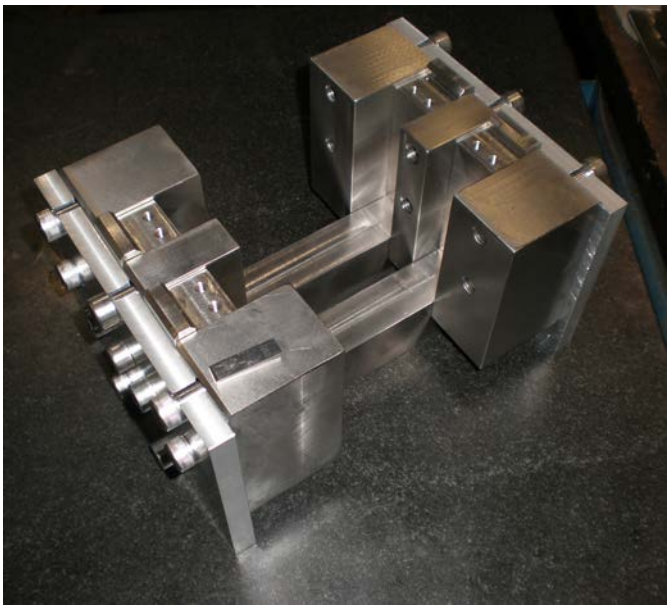


Figure 3. 3PW magnet pole holders.

Magnet power supplies. The manufacturer of the main power supply for the NSLS-II dipole magnet has resumed operations after recovering from the impact of severe weather. Subsystem testing is in progress. The delivery is delayed by 2 months, to February 2013.

All constituents for DC magnet power supply have been received from the manufacturers. Testing of the components is in progress. Power supply installation is complete in pentants 1 and 2. Power supply installation has started in P3. A critical effort is testing of the PS regulator cards. After adjusting resources, a test rate of 20 regulators per week is achieved now, which should enable us to meet the installation schedule. Production and delivery of the DC corrector power amplifier is 100 % complete. We have tested 228 units, which have been installed in P1 and P2 and delivered to Bldg. 740 for installation in the BtSTL. We have delivered units for cells 05, 06, 07, and 08 in P3.

The last PS production line comprises the so-called AC-powered amplifiers, needed for the fast corrector magnet. We have finished all procurement drawings for the AC-powered amplifiers; the purchase order was submitted to Procurement at the end of December.

Electrical utilities. Electricians have finished working on AC cables, cable tray grounding, and PPS (personnel protection system) cable conduits in P4. They are continuing to connect AC power cables into load panels in P5. We have powered up all the UPS (universal power supplies) in P1, P2, P3, P4, P5, RF, the Injector, and the computer room.

Controls. The fiber optic cable termination in P3 of the storage ring is complete. P4 fibers are terminated on the mezzanine level and will be terminated in the computer room by Jan. 11. Vacuum system point-to-point (p-to-p) checkout is complete through P3. Power supply controls p-to-p checkout is complete, as is integrated testing in P1. P2 installation is complete and p-to-p checkout is underway. BPM p-to-p checkout is complete in P1, with the exception of cell 28. SB1 water skid controls for the copper system are complete and alarms have been verified in the control room. Storage ring RF transmitter communications have been established and basic monitoring and control-of-state have been tested.

One-wire temperature/humidity monitoring installation and p-to-p checkout is complete in P1. Some parameters need to be entered by the PS group before integrated testing can be done.

Installation is 4 months behind schedule compared to the current baseline of Feb. 2013, but still on track to meet the CD-2 baseline schedule. The end date of installation is currently June 2013 with the installation of the SR power supplies on the critical path. The installation critical path continues to run through power supply installation; near the critical path (within 60 days) are booster shielding, SR area monitors, injection straight, cable pulling, PPS, and RF cavity.

By the end of December, 142 magnet/girders (89 multipoles and 53 dipoles) have been installed in the SR tunnel. Pulling of fiber optic cables throughout the SR is in process. In P1, high-current testing of the power supplies is in progress and will be completed at the end of January. Installation of the front end (FE) and straight cable tray at cell 23 is complete; starting at cell 28. The first FE (at cell 23) has been transported to the SR tunnel. The drilling of the vacuum straight section stand will start in January.

In P2, power supply installation in the pentant is complete and magnet cable termination is complete in the tunnel. Low-current testing of the power supplies is in progress, as is installation of the BPM electronics. The installation of the Synchrotron Light Monitor (SLM) hutch (Fig. 4) will be complete at the end of January. Installation of the copper P2 de-ionized (DI) water system drops is complete. Also completed is pressure testing of the magnet DI piping on the P2 multipoles.

Figure 4. SLM hutch installation should be completed by the end of January.

In P3 (Fig. 5), power supply installation is in progress; cell 05 is done. Testing of regulators, PSCs, and PSIs, is no longer limiting installation. The completed cells are being surveyed. Cable pulling is complete, excluding PPS cables. Bellows installation and vacuum bakeout are under way. Bakeout is happening in cell 05. The installation and cable termination of the diagnostic equipment is ongoing. Magnet flow restrictors and hardware are being installed.

Figure 5. SR Tunnel in pentant 3.

In P4, testing and flushing of the P4 process chilled water (PCW) tie-ins is complete. The installation of diagnostic equipment into the racks is in process. Pulling of vacuum cables is in progress. Pulling of sextupole cables is complete, and PPS conduit along the ratchet wall is complete. In P5, interlock conduit on ratchet walls and the tunnel is complete.

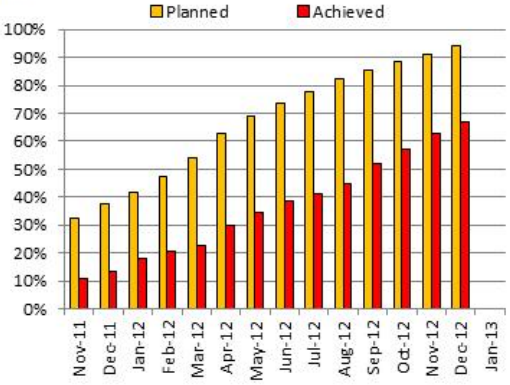
Testing and flushing of the P5 PCW tie-ins is in process. At the RF Bldg. the gaseous helium tanks have been installed (Fig. 6) and the compressors are in the process of being moved to the compressor building. The liquid nitrogen tank has arrived and has been installed (Fig. 7) on the concrete pad. Work planning for the cryo system installation by the vendors is in process.

Figure 6. Gaseous helium tanks.

Figure 7. Liquid nitrogen tank (on left)

Table 1. NSLS-II Accelerator installation progress at the end of November 2012.

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



EXPERIMENTAL FACILITIES

Hutch installation activities continued and good progress toward completion of several hutches was made in December. Soon, the 23-ID-A, 3-ID-A, 3-ID-B, and 5-ID-B hutches will be completed by the contractor. Adjustments to hutch doors on the lead-clad hutches have now resulted in opening and closing forces that are close to the expected values, and changes to the air supply plenum have improved the hutch ventilation performance. The rigorous evaluation of vendor component final designs continued throughout December with a series of final design reviews. These included the XPD monochromator, the CHX beamline components and optics package, the SRX beamline optics and component package, and the CSX-1 branch focusing mirror. To date, vendors have made good overall progress in design and fabrication of beamline optics and components. Following a technical review, the technical specifications and statement of work for the beamline shutters have now been finalized and will be released to prospective suppliers. The resulting shutter specification will be suitable for use on all the project beamlines. Planning for utility installation has also progressed with detailed designs and procurements for the HXN beamline. The structures that support the utility distribution along the HXN beamline between the hutches have been installed on the experiment hall floor and are now available for pipework and electrical distribution. Once the HXN hutches are released by the contractor, the HXN utilities will be installed.

CSX. During December, progress on the polarization branch was interrupted by the holiday break, but in anticipation of this the beamline team submitted the requested information regarding the toroidal mirrors package. Design work regarding space between optical components in the vacuum has progressed, and the procurement of vacuum hardware has begun. Advancement in the design of the beamline chopper and other components is underway.

HXN. Significant progress has been made for the HXN beamline infrastructure. The ventilation system, crane, and doors for the A-hutch are installed, as well as the utilities pylons. The HXN staff installed a prototype water-cooled instrument rack and is investigating the possible technical issues. The HVAC system is tuned, and noise from the ventilation system has been reduced substantially. Several beamline components already fabricated by the contractor include white beam filters, pink and monochromatic slits, and the support system for the mirrors.

IXS. The final design of the IXS KB Mirror System is being advanced and the FDR is now scheduled for Jan 28 – 30, 2013. The design of the high-resolution monochromator is being carried out in-house and is making excellent progress. The call for proposals for the vacuum chambers of the HRM received three proposals, which were evaluated. The IXS team is also advancing the detail design on other in-house projects, including the Be-CRL assembly, the analyzer and multilayer mirror systems.

SRX. On Dec. 6-7, the final design review of the SRX Beamline Optical Components Package with the company Bruker-ASC 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 beamline is either meeting BNL's specifications or even surpassing them. Figure 8 shows the final design of the arrangement of the two key components of the beamline, the horizontally focusing mirror and the horizontally deflecting mono-chromator. Both components are mounted on the same granite to avoid vibrations. Vibration analysis is being conducted to show the impact of this granite on the experimental floor, and vice versa. Figure 9 shows the final design of the SRX secondary source aperture (SSA), designed to ensure highest stability as well. This SSA will be erected in hutch 5-ID-B, a small hutch of roughly 2 m x 2 m x 2 m designed to just enclose the SSA. Weekly conference calls with the company WinlightX are continuing. In these discussions, progress toward the final design of the KB mirror system is presented by WinlightX and discussed.

Positioning and stability measurements of the sample stages have been performed, especially testing a new piezo scanning stage from a U.S. vendor. This is ongoing; results are expected in January.

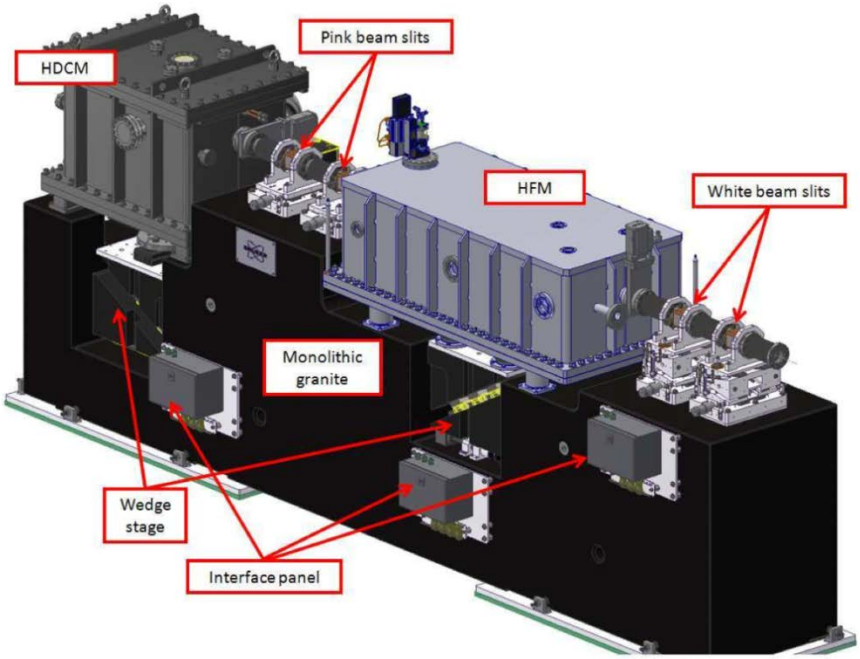


Figure 8: Final design of the SRX horizontally focusing mirror (HFM) and horizontally reflecting double crystal monochromator (DCM) on one granite slab.

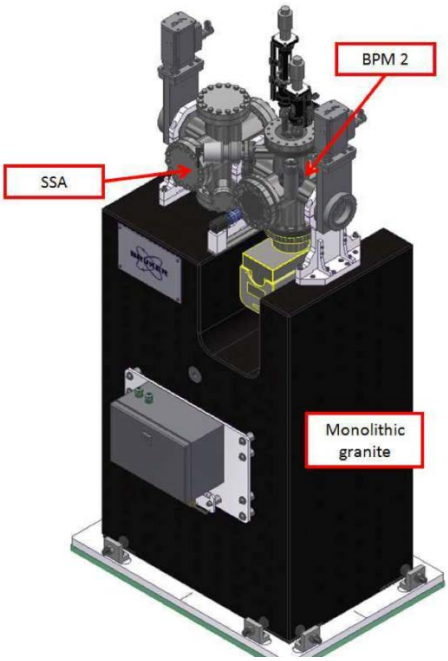


Figure 9: Final design of theSRX secondary source aperture (SSA), mounted on a monolithic granite block for stability.

CHX. The CHX group held the FDR for the Bruker GmbH optics package, scheduled for an October 2013 delivery. Following the optics package FDR, the CHX team traveled to the 34-ID beamline at APS to test an online and on-axis sample visualization microscope (OAV) which will eventually be installed at the CHX beamline after modifications for in-vacuum operation. The tests were done by carrying out an experiment to measure diffuse coherent diffraction from protein crystals. The ultimate goal of such measurements is to measure protein dynamics, but in order to do so, the unprecedented coherent flux available only at NSLS-II will be required. For these tests, some of the protein samples were frozen (hence quasi-static).

Figure 10 shows an example of the very interesting capabilities offered by the OAV. The detector used here is the Timepix (using the Medipix chip) purchased for the HXN beamline and also tested at 34ID.

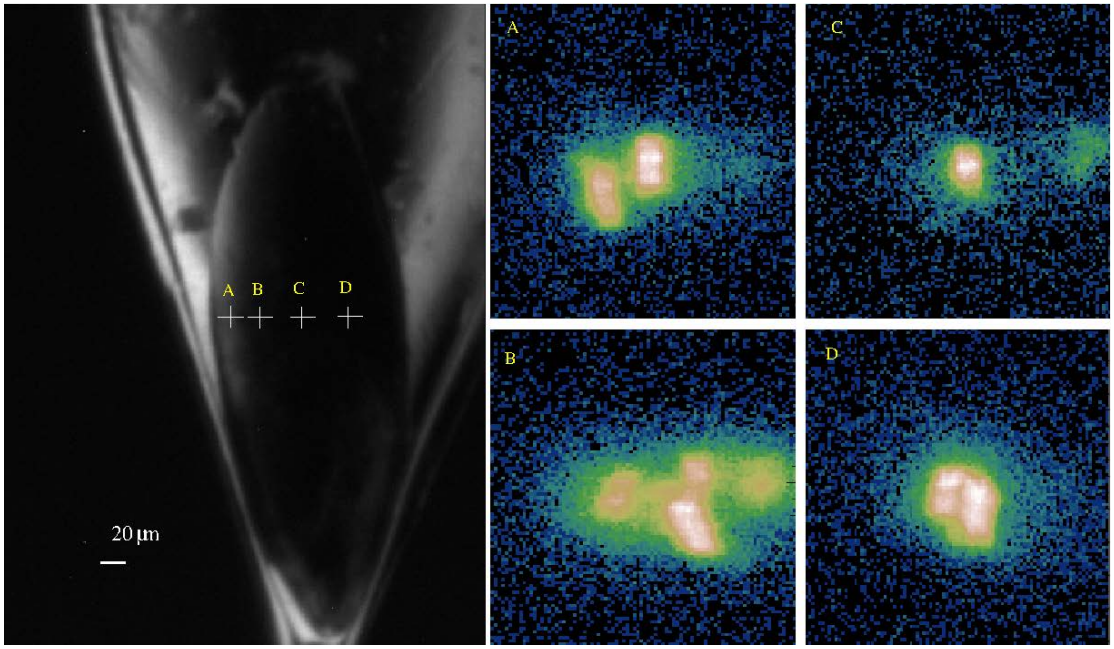


Figure 10: Image of a Haemoglobin (Hb) crystal in the OAV. The crosses show different locations where a ~1 µm highly coherent beam was incident on the sample. A-D: Splitting of a Bragg spot from the Hb crystal is highly dependent on the exact location on the sample and shows the presence of several domains. This method can be used as a micro-diffraction topography tool. Team: Luxi Li, Lutz Wiegart, Daron Chabot, Vivian Stojanoff, Joe Sullivan, Ross Harder, Andrei Fluerasu

XPD. Beamline components. Materials and subcontracted components have been ordered and FMB-Oxford (FMBO) awaits delivery starting in mid-January. Manufacturing will start with a number of vacuum-brazed assemblies around January 17. The beam transport tube design was reviewed and a number of requested changes have been discussed with the subcontractor.

Laue-Laue monochromator (DLM). FMBO is aiming to get Part 1 available for testing at the Diamond Light Source (DLS) in March 2013. There is no time contingency and it is not likely that DLS will be able to accommodate later testing. Presently FMBO does not have sufficient parts from vendors and subcontractors to start manufacture of Part 1. It is expected that the flexure sub-assemblies can be started by January 10 and the crystal cage by January 15. The PDR of the DLM Part 2 took place on December 3. The draft FDR report of Part 2 is due by end of January. Material for Part 2 will not be procured until the Part 1 tests have been done. This mitigates the risk of any additional material costs that might result from the Part 1 testing.

Vertical focusing mirror. The granite is ordered and should be received by the end of January. Mechanical parts of the bender are ordered and should be received by Winlight-X early in February. The ion pump was delivered to Winlight-X. The vacuum vessel is ordered and should be shipped on February 15. Software development is in progress and on schedule.

Controls and data. The scope of work, schedule, and work plan regarding XPD Beamline controls, data acquisition, and data analysis were presented on December 12.

Diffractometer. The PDR took place on December 7. The RPI design office is currently working on the horizontal linear translation stage and implementing updates to the 3-axis spindle assembly. The components released for manufacture during November have been completed; additional drawings for components released by the RPI drawing office in December are 75% complete.

X-ray photon counting pixel area detector. The solicitation was published on FedBizOpps.gov on December 11. The proposal return date is January 16, 2013.

Lead/steel enclosures 28-ID A, B, and C. Assembly work continued on the roof frame, platform and stairs, and guard rails and attachments.

CONVENTIONAL FACILITIES

Conventional construction continued its excellent progress; three of the five Lab–Office Buildings are complete and have beneficial occupancy, while the core and shell for LOBs 4 and 5 were completed in December. The ring building contractor has completed basic contract work and continues to work through the 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 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.

Base scope construction activities in LOBs 1 through 3, including the HXN area, are now completed (Fig. 11).

Figure 11. Completed LOB 3 and HXN addition (windowless block at right).

Beneficial occupancy was received for LOBs 1 through 3 in October. Office furniture in LOB 3 (Figures 12, 13) was completed in December, enabling the move-in of new occupants in early January

Figure 12. Completed Open Plan Office area, LOB 3.

Figure 13. Kitchen area, LOB 3.

The final element of conventional facilities project scope, LOBs 4 and 5 core and shell, was completed in December. Interior fit-out of parts of LOB 4 and 5 is now underway as part of a separate project (Fig. 14).

Figure 14. LOB 5 interior ready for fit-out under a separate project.

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.

ENVIRONMENT, SAFETY, AND HEALTH

A corrective action plan has been finalized and approved by BHSO in response to the report of the external, independent reviewers of a beam mis-steering excursion that occurred at the linac on May 29. Work is underway to implement the improvements identified. 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.

Beneficial occupancy readiness evaluations (BOREs) for LOBs 4 and 5 will be completed in the late-Jan/Feb time frame. 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 10 laboratories in LOB 3. The occupants and processes to be used in these labs are being identified. 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, 2, and 3 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 focus of remaining conventional construction is now on LOBs 4 and 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 50 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 0.95, both well within the acceptable range. The Project is approximately 85% complete, with approximately 45% of contingency and management reserve, based on EAC work remaining. The Project's current-month SPI is 1.08, +$738K, and current-month CPI is yellow at 1.17, +$1.39M.

Conventional Facilities' SPI for December is red, at 2.23, +$1.06M; this is due to current-month positive performance taken in WBS 1.5.5, Standard Equipment, and 1.5.3.2.1, CF Construction Phase A/E Support. The cumulative Conventional Construction SPI is 1.00, +$906K, and CPI is 1.02, +$4.5M, both green.

In Accelerator Systems (WBS 1.3), schedule performance for December is red, with a SPI of 1.40, +$1.2M, due to largely complete Storage Ring Girder Integration and Vacuum Chambers, Storage Ring Mechanical, and Electrical Utilities. Cost performance for the month is green with a CPI of 0.96 (-$176K). The cumulative schedule performance is green with a SPI of 0.91 (-$24.2M), and the cost performance is also green with a CPI of 0.95 (-$13.4M).

The Experimental Facilities cumulative SPI, 0.83, is a decline from the previous month, moving to "red" status. The decreased performance is due primarily to delays in hutch fabrication and installation work. There were also delays in FDR approvals for the CHX optics and CSX monochromator. These contributed to an overall WBS 1.4 negative SV for the current month (-$1.4M) and SPI of 0.55.

The critical path for the project has changed from prior months. The new critical path 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 40% schedule contingency.

NEWLY HIRED

Andrew DeSantis – Mechanical Designer – Accelerator Division

John Fabijanic – Mechanical Designer – Accelerator Division

Michael Johanson – Mechanical Designer – Accelerator Division

Sterling Prince – Student Assistant – Photon Division

Paul Schneider – Mechanical Designer – Accelerator Division

Richard Skelaney – Technician – Accelerator Division

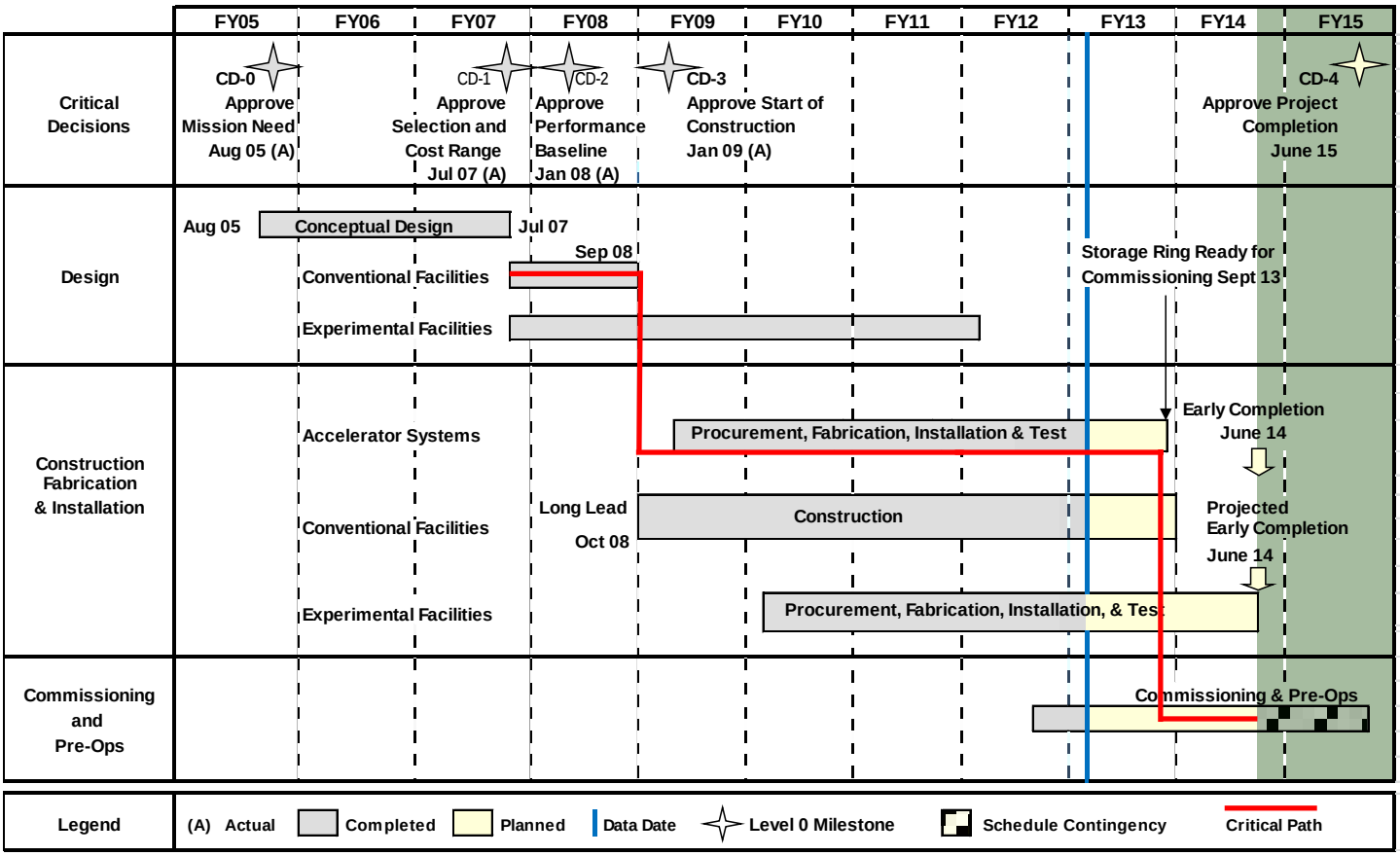
John Tuozzolo – Mechanical Designer – Accelerator Division

ACRONYMS

3PW	Three Pole Wiggler (magnet)
APS	Advanced Photon Source at Argonne Nat. Lab
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
DCCT	DC Current Transformer
DI	Deionized
DCM	Double Crystal Monochromator
DLM	Double Laue Monochromator
DLS	Diamond Light Source
EAC	Estimate at Completion
EPU	Elliptically Polarizing Undulator
FAT	Factory Acceptance Test
FDR	Final Design Review
FE	Front End
HVAC	Heating, Ventilation and Air Conditioning
HXN	Hard X-ray Nanoprobe beamline
IRR	Instrumentation Readiness Review
ISA	Injector Service Area
ISR	In-Situ Resonant X-ray Studies beamline
IVMMS	In-Vacuum Magnetic Measurement System
IXS	Inelastic X-ray Scattering beamline
LOB	Lab–Office Building
LN2	Liquid Nitrogen
LtB	Linac-to-Booster
MLL	Multilayer Laue Lens
NEXT	NSLS-II Experimental Tools
OAV	On-Axis Visualization
ORE	Occupancy Readiness Evaluation
P1, P2…	Pentant 1, Pentant 2, etc.
PCW	Process Chilled Water
PDR	Preliminary Design Review
PLC	Programmable Logic Controller
PPS	Personnel Protection System
PS	Power Supply
PSC	Power Supply Controller
PSI	Power Supply Interface
RF	Radio Frequency
SIX	Soft Inelastic X-ray Scattering beamline
SLM	Synchrotron Light Monitor
SPI	Schedule Performance Index
SR	Storage Ring
SRX	Submicron Resolution X-ray Spectroscopy beamline
SSA	Single Source Aperture
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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