National Synchrotron Light Source II

Project Progress Report

July 2009

August 20, 2009

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OVERALL ASSESSMENT

The project continues to be on schedule and on budget, overall, with satisfactory cost and schedule performances. Excellent technical progress continues on all fronts, and cost/schedule performance for the Accelerator Systems Division (ASD) improved significantly in July.

At the ring building construction site, the utility tunnel is completely excavated and foundation concrete is being poured. Column footings are being constructed in Pentants 1 and 5, the RF building, and the lobby of the main building. The vehicle access tunnel has been excavated. In the western section of the site, stormwater drains and the domestic water main loop are in place. Underground electrical ductbanks have been constructed for the RF building and Pentant 1. The ratchet wall mockup was built and reviewed.

With technical progress continuing, ASD greatly improved overall cumulative performance. Procurement work for the magnets, linac, booster, and damping wiggler (DW) received high priority in July. Proposals for the magnet production are being evaluated and procurement documents—including statements of work (SOWs), technical specs, and evaluation criteria for the linac, booster, and DW—are being finalized.

The Experimental Facilities Division (XFD) continued to make progress on designs for the six project beamlines, with Conceptual Design Reports scheduled for delivery in September. Collaborative R&D effort with the Advanced Photon Source (APS) at Argonne National Laboratory (ANL) produced the first-ever 2D x-ray focus using two crossed Multilayer Laue (MLL) lenses.

Recent approval of the more detailed contractor schedule baseline, and its subsequent incorporation in the project baseline, necessitated a one-time adjustment in the current period, yielding a low-current-period schedule variance. The cumulative schedule variance remains in green status.

SCHEDULED EVENTS 2009

X-ray Powder Diffraction (PWD) BAT meeting	August 6
Coherent Soft X-Ray (CSX) BAT meeting	August 10
Coherent Hard X-Ray (CHX) BAT meeting	August 11
XFD Conceptual Design Review meeting	Oct. 13-14
Conventional Facilities Advisory Committee (CFAC) meeting	Oct. 20-21
Accelerator Systems Advisory Committee (ASAC) meeting	Oct. 22-23
Project Advisory Committee (PAC) meeting	Fall 2009
DOE Review of the NSLS-II Project	Nov. 17

ACCELERATOR SYSTEMS DIVISION (ASD)

Design, prototyping, and procurement activities progressed well in July, taking important steps closer to start the industrial fabrication of major components. With substantial progress in the storage ring vacuum and RF systems, the cost/schedule performance for ASD improved significantly in July.

Evaluation of the proposals for production magnets required considerable effort, as initial submissions lacked sufficient information. The Proposal Evaluation P (PEP) therefore entered into protracted discussions to obtain clarifications and additional detailed information needed to complete its analysis. Additional calculations to check vendor-supplied designs and manufacturing tolerances were performed.

After potential vendors were visited to assess their capabilities, the booster procurement strategy was finalized to be a semi turn-key option, where most hardware will be produced by the vendor while BNL will supply the RF, some controls, BPM electronics, electronics racks, and installation labor. With the installation and commissioning, the vendor will be responsible for delivering a functioning accelerator performing to specifications (3GeV beam energy, 30mA of beam current, limited losses, and 1Hz maximum cycle frequency). Procurement documents for the booster have been finalized based on this plan.

SOW, technical specifications, and evaluation criteria for the linac and damping wiggler procurement were finalized. The engineering group from ANL-APS provided a conceptual design for the NSLS-II damping wiggler (DW), a schedule, and preliminary cost estimates. A memorandum purchase order to procure the DW from APS is being prepared, and technical details of the insertion device (ID) design are being iterated with APS engineers and scientists.

The pulsed magnet laboratory has been set up, and tests of pulsed components are being prepared. Designs for magnets and diagnostics of the beam transfer lines are underway.

Successful test extrusions of a vacuum chamber with the new multipole cross-section have been completed, but only one of two vendors provided satisfactory results. RFP packages for an ultrasonic cleaning facility and for bi-metallic flanges were released to potential vendors; proposals are due in mid August. The pumping speed dome is assembled and ready to measure prototype ion pumps.

Electrical engineering tests continued for the series pass filter and controls of the main dipole power supply. Demonstrations of the required stability are progressing quite successfully. Work with outside vendors progresses well on regulators and controls for the multipole and corrector power supplies. The First Article printed circuit board for the power supply interface has been delivered and debugged and the design has been refined. There is also progress on the power supply controller design. The design of the new two-channel corrector power supply is progressing, and associated cost savings have been clarified. The First Article large-aperture RF beam position monitor (BPM) buttons (Fig.1) have been received and are undergoing acceptance tests.

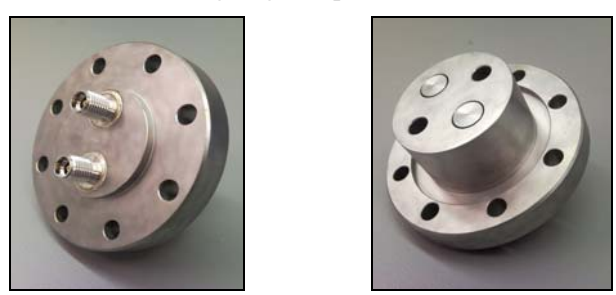


Figure 1. SR large-aperture RF BPM buttons

The instrumentation group discussed various approaches for improved BPM electronics and some preparatory tests were performed. Decisions regarding further moves in this direction and discussions on whether to drop the plan to procure the commercially available LIBERA electronics are scheduled for the end of August 2009. Work on the transverse feedback multi-bunch damper system began with a calculation of the strip-line kicker performance.

Activities for the mechanical engineering (ME) group included analysis of the temperature changes in the ring building floor, which could misalign the magnet girders. Tests with visco-elastic pads placed under the girders were quite encouraging, showing that the floor and girder can expand and contract independently. A series of tests confirmed that girder profiling can be successfully accomplished with laser trackers (tolerance: ±10 μm). The injector process water system has been also designed and modeled in great detail in 3D, and the piping distribution has been included in the ring building assembly plans.

Procurement work to equip the magnetic measurement lab is progressing well, and work on ID controls has begun.

EXPERIMENTAL FACILITIES DIVISION (XFD)

The Experimental Facilities Division made good progress in the conceptual designs of the six project beamlines and completed the finite element analyses for mirrors, beamline monochromators, compound refractive lenses, windows, and graphite filters.

The beamline advisory teams (BATs) for the Hard X-ray Nanoprobe (HXN), Inelastic X-ray Scattering (IXS), and Submicron Resolution X-ray Spectroscopy (SRX) beamlines met to review their conceptual designs. Considerable discussions were focused on the optical layouts and user science instruments that should be available for beamline commissioning at the end of the project. For the HXN and the IXS beamlines, the BATs discussed the options for user instruments that may be coupled with the 1nm and 0.1meV optics R&D activities, and suggested setting up appropriate decision timelines to ensure the completion of the HXN and IXS beamlines and to allow user science experiments during commissioning and early operations.

In the area of 1nm optics, the R&D group, in close collaborations with APS and the Center for Nanoscale Materials at Argonne, made significant progress in the experimental test of MLLs. For the first time ever, a 2D x-ray focus has been achieved using two crossed MLLs (Fig. 2). Even though the focus spot size (~90 nm) has not been optimized, it represents a significant step toward nm-scale focusing of hard x-rays based on the MLL concept.

In the area of 0.1meV optics R&D, the IXS group started aligning test meV optics and further characterized the existing beamline optics for mechanical and temporal beam stability, using the NSLS X16A beamline. They concluded that the stability, even though not perfect, may be sufficient for the experiment being planned. Additional improvements needed for precision alignment of the high-resolution optics in monochromator controls are ongoing.

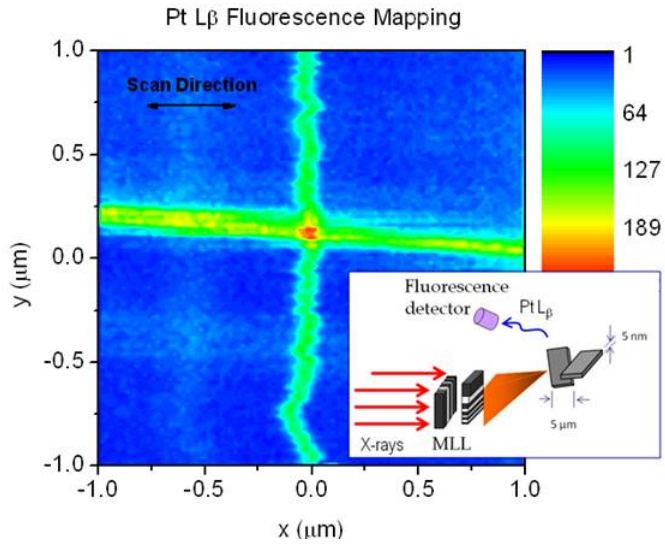


Figure 2: First experimental results at APS/CNM 26-ID on 2D focusing by two crossed Multilayer Laue lenses.

CONVENTIONAL FACILITIES DIVISION (CFD)

Construction field operations through July continued on or slightly ahead of baseline projections. June's heavy rainfall was mitigated by good weather in July and persistent effort by Torcon and their subcontractors. However, the cumulative schedule variance for the ring building contract was greater than anticipated because actual engineering and procurement efforts occurred later than the baseline schedule dates in the final approved construction schedule from Torcon, which was incorporated into the project baseline this month. With this schedule incorporation, the ring building construction critical path runs through Pentant 1 foundations; Pentant 1 and 2 form, rebar, and pour tunnel walls; erect, bolt, and deck steel; install metal wall panels, roof, building enclosures; rough-in systems; start-up; and commissioning.

Major activities accomplished during July include:

- Completed excavating the utility tunnel and placing concrete for its foundation (Fig. 3)
- Constructing column footings in Pentants 1 and 5
- Constructing lobby and RF building column footings
- Placing / compacting engineered fill for the ring building
- Excavating the vehicle access tunnel
- Installing western and northwestern stormwater mains
- Installing the western section of domestic water main
- Constructing underground electrical ductbanks in the RF building and Pentant 1
- Constructing and reviewing the ratchet wall mock-up

Submittals for the ring building continue to be made for the major components of the structure. Of 600-plus structural steel shop drawings received in June, more than 60% have

been reviewed and returned to the contractor. Fabrication and stockpiling of certain structural steel shapes is in progress.

Figure 3. Utility tunnel concrete work

Bids for the Electrical Substation Expansion Project were received and a contract was awarded. The Chilled Water Plant Expansion contract was awarded on July 1. The bids for the Chilled Water Piping Contract came in higher than anticipated and are being reviewed for compliance with the required scope of work. A decision on whether to award this contract or rebid it later is expected in August. Note that this activity has 270 days of slack and can be deferred until spring without delaying the project.

RECENT HIRES

Jinhyuk Choi – Physicist – Lattice Design, Accelerator Physics, ASD
Charles Hetzel – Mechanical Engineer - Vacuum Systems, ASD
Kunal Shroff – Controls Engineer – Controls, ASD

PROCUREMENT ACTIVITIES

All magnet proposals are being evaluated by the Proposal Evaluation Panel, with emphasis on first completing the evaluations for the multipole magnets (quadrupole, sextupole, and large aperture). The Chilled Water Plant Expansion construction procurement was awarded July 1, and the Electrical Substation Expansion Project procurement was awarded July 21.

COST/SCHEDULE BASELINE STATUS

The cumulative Cost Performance Index (CPI) is 1.04 and the cumulative Schedule Performance Index (SPI) is 0.92. Both have green status and are well within the DOE acceptable range. The project's monthly CPI is 1.15 (green status) but the monthly SPI is 0.57 (red). The negative current-period schedule variance is due primarily to the approval and incorporation of Torcon's cost-loaded baseline schedule into the project schedule, which resulted in modifications to the time-phased budget by WBS. Integration of the Torcon schedule and the revised time-phased budget necessitated one-time adjustments in the current period. As a result, the BCWS (planned work through July) and BCWP (Earned Value) for the contract reflect these one-time adjustments in the project performance measurement baseline, yielding a low current-period schedule variance.

The analysis of the critical path for the project will be updated with the completion of near-term planning and review of the ASD schedule, which is expected to be finalized in August.

ARRA activities: During July, Pentant 1 foundation excavations began and completed on schedule. The form, rebar, and pour of those foundations also began. Excavating foundations and footings for the Pentant 2 utility tunnel was started, as well as excavation of foundations for Pentant 5. Excavation of the vehicle tunnel for Pentant 5 was completed. Also, the Chilled Water Plant and the Electrical Substation and Feeder contracts were awarded.

ENVIRONMENT, SAFETY, AND HEALTH (ESH)

NSLS-II staff continues to work closely with Torcon and the subcontractors to develop Phase Hazards Analyses (PHAs), which record the work steps, hazards, and controls to reduce the risk of incident. The PHAs also provide a mechanism for feedback from the workers to improve future work. PHAs for concrete pouring and crushing were completed in July.

A subcontractor received a minor injury on July 16, 2009 while unloading conduit elbows from a truck to a pallet on the ground. As he was about to lower the conduit to the pallet he lost his footing in the sand. The conduit slipped off his shoulder onto the pallet and the end flipped up, hitting him in the mouth. He sustained a bloody lip and a chipped tooth. He was treated at the on-site medical station and sent to his dentist to repair the tooth. This is an OSHA-recordable event, due to the chipped tooth.

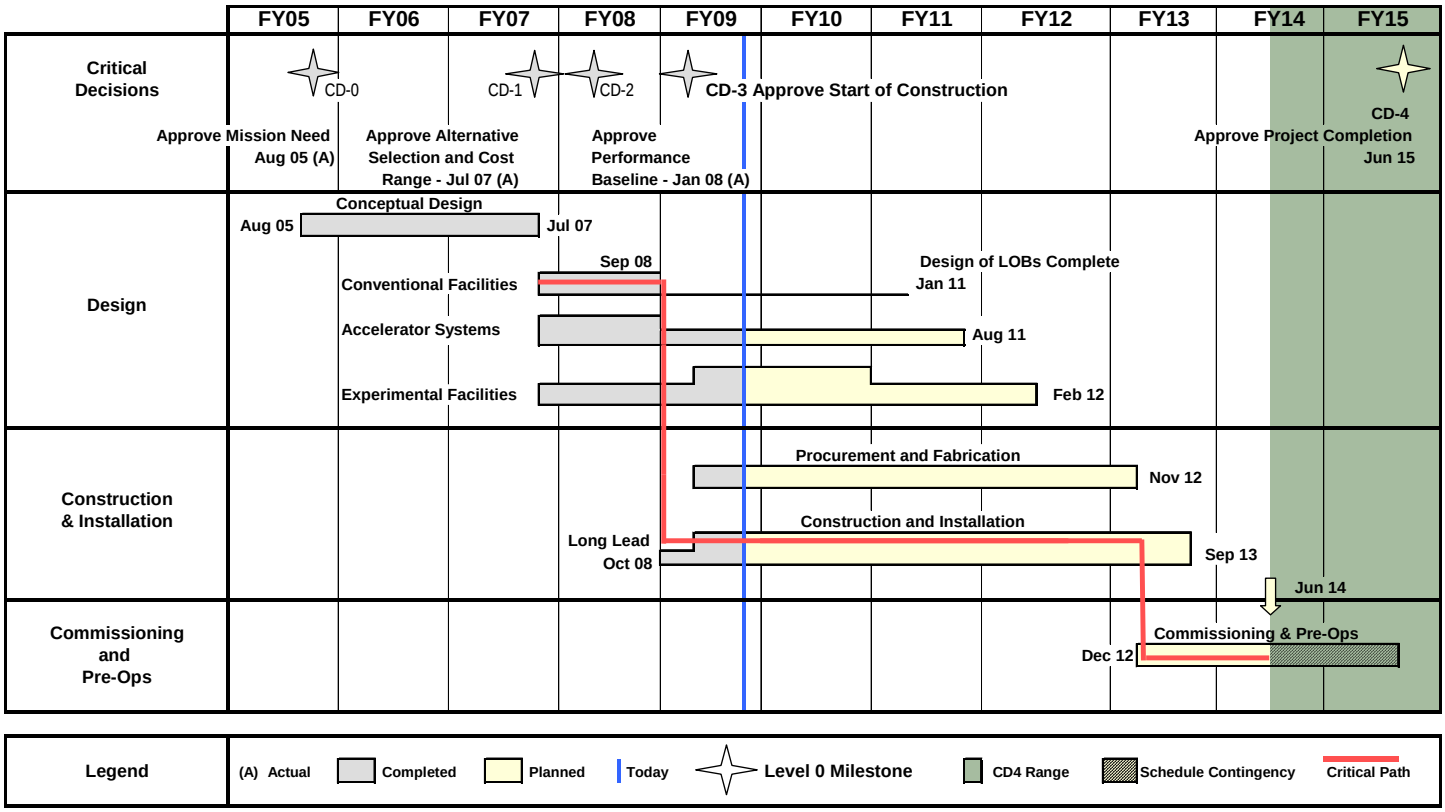
The BNL Independent Assessment and Oversight Group, in conjunction with Liberty Mutual Insurance Co., completed Phase One of a documentation review in July as part of an independent Construction Safety Assessment for NSLS-II. Recommendations from the review are being incorporated into construction safety documentation. Reviews of training and operations are expected to end in October.

Planning continues for a NSLS-II Authorization Basis Workshop, to be held on August 21. The focus will be to gain consensus on the NSLS-II authorization basis strategy, including defining schedules, responsibilities, documentation development, and lessons learned from other accelerator projects.

PROJECT DESCRIPTION

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.

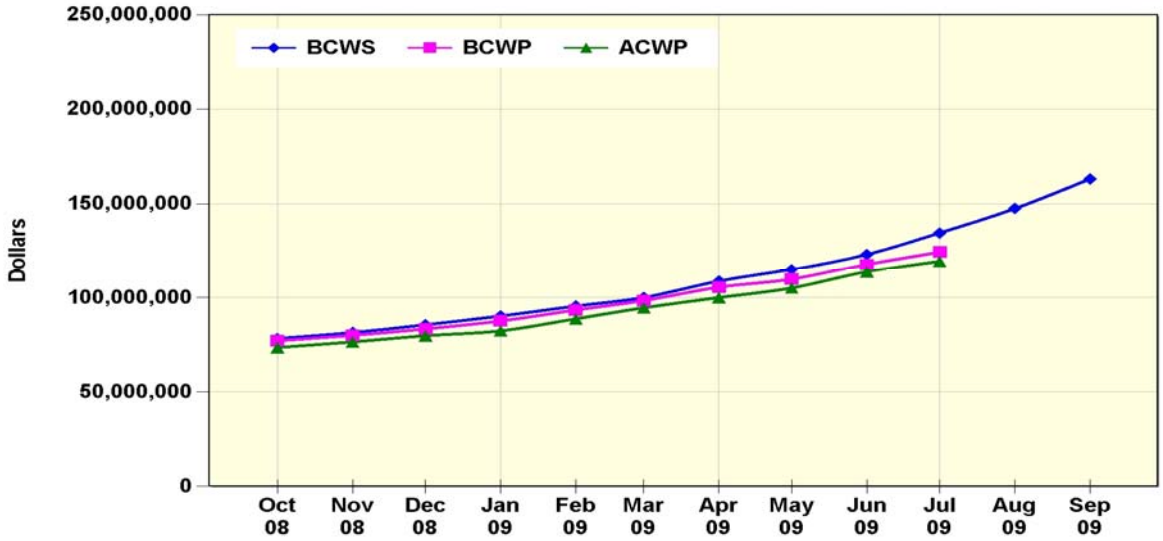
DOE Project Milestone Schedule



RECENT PROJECT ACCOMPLISHMENTS

- The cost/schedule performance for Accelerator Systems improved significantly.
- A series of tests confirmed that girder profiling can be successfully accomplished with laser trackers (tolerance: ±10 μm).
- All magnet proposals are being evaluated by the Proposal Evaluation Panel.
- The APS engineering group provided a conceptual design for the DW, a schedule, and preliminary cost estimates.
- Procurement work to equip the magnetic measurement lab is progressing well, and work on ID controls has begun.
- The ASD ME group completed the finite element analyses for beamline monochromators, mirrors, compound refractive lenses, windows, and graphite filters.
- In close collaborations with APS and the Center for Nanoscale Materials at Argonne, the XFD R&D group achieved the first-ever 2D x-ray focus using two crossed MLLs.
- Construction schedule from Torcon was approved and incorporated into the project baseline.
- Completed excavating the utility tunnel and placing concrete for its foundation.
- Contracts for the Electrical Substation Expansion Project and the Chilled Water Plant Expansion were awarded.
- The BNL Independent Assessment and Oversight Group, in conjunction with Liberty Mutual Insurance Co., completed Phase One of a documentation review in July as part of an independent Construction Safety Assessment for NSLS-II.

EV for WBS 1 (NSLS-II Project) as of July 31, 2009



Cumulative to Date (K$)	Oct 08	Nov 08	Dec 08	Jan 09	Feb 09	Mar 09	Apr 09	May 09	Jun 09	Jul 09	Aug 09	Sep 09
BCWS	78,248	81,437	85,551	90,181	95,480	100,025	108,753	115,036	123,163	134,682	147,567	163,305
BCWP	77,088	79,974	83,373	87,572	93,407	98,407	105,508	110,000	117,841	124,463		
ACWP	73,505	76,479	79,754	82,330	88,714	94,556	100,000	105,100	113,794	119,538		

Project as of 7/31/09	Current Period	Cum-to-date
Plan (BCWS) $K	11,519	134,682
Earned (BCWP) $K	6,622	124,463
Actual (ACWP) $K	5,743	119,538
SV $K	-4,897	-10,218
CV $K	879	4,926
SPI	0.57	0.92
CPI	1.15	1.04
Budget at Completion $K (PMB)		741,907
Planned % Complete		18.2%
Earned % Complete		16.8%
Mgmt Rsrv/Cont. as % of BAC remaining		27.5%
Mgmt Rsrv/Cont. as % of EAC remaining		25.6%

Levels 1, 2, 3 Milestones – Near Term

Level	Description	Baseline Date
L1 00040	CD-3 Approve Start of Construction	Feb09 Actual=Jan09✓
L2 00100	100% Conventional Facility Title II Design Complete	Aug 2008✓
L2 00220	Begin Site Preparation	Nov 2008✓
L2 00240	Issue Ring Building NTP	Jun09 Actual=Mar09✓
L2 00260	Contract Award for Booster System	Mar 2010
L3 05732	40% Accelerator Design Complete	Feb 2008✓
L3 05735	60% Conventional Facility Title II Design Complete	May 08✓
L3 05765	Conventional Facility Site Prep Complete	Jan09 Actual=Feb09✓
L3 05770	Accelerator SR Magnet Design Complete	Feb 2009✓
L3 05780	Exp. Facilities – Prelim. Design End Stations 1 Complete	June 2010

✓ = Completed; on schedule, unless otherwise noted

Schedule Performance Index, Project to Date:

SPI **0.92**

Cause & Impact: No reportable variance.
Corrective Action: None Required.

Cost Performance Index, Project to Date:

CPI **1.04**

Cause & Impact: No reportable variance.
Corrective Action: None Required.

ACWP = Actual Cost of Work Performed
BAC = Budget at Completion
BCWP = Budgeted Cost of Work Performed
BCWS = Budgeted Cost of Work Scheduled
CPI = Cost Performance Index (BCWP/ACWP)
EV = Earned Value
IPT = Integrated Project Team
PMB = Performance Measurement Baseline
SPI = Schedule Performance Index
WBS = Work Breakdown Structure

SPI or CPI in the range of:	
	0.9 – 1.15 is green
	0.85 – 0.89 or 1.16 – 1.25 is yellow
	<0.85 or >1.25 is red

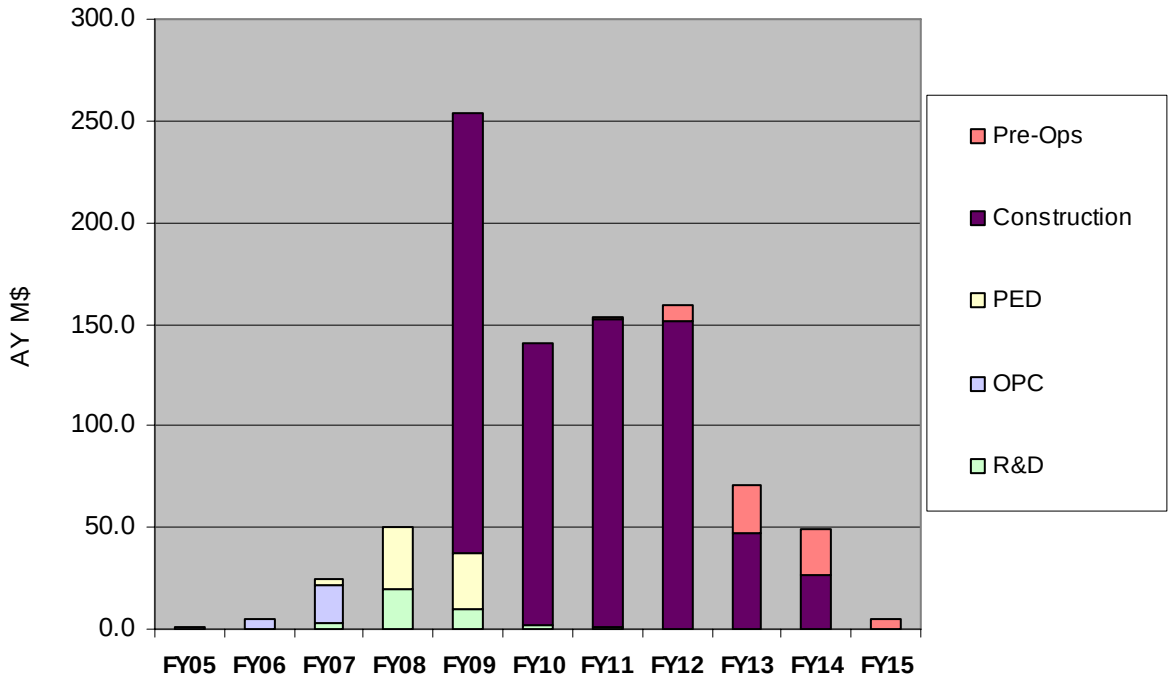
The July BAC remains the same as June, with the exception of these two approved PCRs:

Conventional Facilities	PCR_09_081 approved to combine Control Accounts in WBS 1.04.04 and 1.05.06.
Conventional Facilities	PCR_09_082 approved to incorporate the Torcon baseline cost/schedule plan into the project baseline.

The IPT can find further details on NSLS-II cost and schedule data at http://www.bnl.gov/nsls2/project/IPT/default.asp.

Funding Profile (revised to reflect ARRA funding)

	NSLS-II Funding Profile ($M)												
Fiscal Year	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	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	151.6	151.4	46.9	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	153.1	159.1	71.3	48.7	5.0		912.0



Key Personnel

Title	Name	Email	Phone
Federal Project Director	Frank Crescenzo	crescenzo@bnl.gov	631-344-3433
NSLS-II Project Director	Steve Dierker	dierker@bnl.gov	631-344-4966
NSLS-II Deputy Project Director	Aesook Byon	byon@bnl.gov	631-344-3601
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NSLS-II Experimental Facilities Division Director	Qun Shen	qshen@bnl.gov	631-344-3465
NSLS-II Conventional Facilities Division Director	Martin Fallier	fallier@bnl.gov	631-344-3475
NSLS-II Project Support Division Director	Diane Hatton	dhatton@bnl.gov	631-344-5073

CONTRACT PERFORMANCE REPORT
FORMAT 1 - WORK BREAKDOWN STRUCTURE

FORM APPROVED
OMB No. 0704-0188

1. CONTRACTOR	2. CONTRACT	3. PROGRAM	4. REPORT PERIOD
a. NAME Brookhaven Science Associates	a. NAME	a. NAME NSLS_EV8 - NSLS II Project	a. FROM (YYYYMMDD) 2009 / 07 / 01
b. LOCATION (Address and ZIP Code) Brookhaven National Laboratory, Upton,NY	b. NUMBER	b. PHASE	b. TO (YYYYMMDD) 2009 / 07 / 31
	c. TYPE / d. SHARE RATIO	c. EVMS ACCEPTANCE NO YES X (YYYYMMDD)	

5. CONTRACT DATA

a. QUANTITY	b. NEGOTIAT COST	c. ESTIMATED COST OF THORIZED UNPRICED WOR	d. TARGET PROFIT/ FEE	e. TARGET PRICE	f. ESTIMATED PRICE	g. CONTRACT CEILING	i. DATE OF OTB/OTS (YYYYMMDD)
1	912,000,000	0	0	912,000,000	0	0	

8. PERFORMANCE DATA

WBS[2] WBS[3] Control Acct ITEM (1)	CURRENT PERIOD BUDGETED COST WORK SCHEDULED (2)	BUDGETED COST WORK PERFORMED (3)	ACTUAL COST WORK PERFORMED (4)	VARIANCE SCHEDULE (5)	VARIANCE COST (6)	CUMULATIVE TO DATE BUDGETED COST WORK SCHEDULED (7)	BUDGETED COST WORK PERFORMED (8)	ACTUAL COST WORK PERFORMED (9)	VARIANCE SCHEDULE (10)	VARIANCE COST (11)	AT COMPLETION BUDGETED (14)	ESTIMATED (15)	VARIANCE (16)
1.01 Project Management													
1.01.01 Project Management													
WBS[3]Totals:	107,206	107,206	84,349	0	22,857	1,995,066	1,995,066	2,281,739	0	-286,673	6,692,091	7,445,091	-753,000
1.01.02 Environmental, Safety & Health													
WBS[3]Totals:	85,045	85,045	93,323	0	-8,278	1,533,163	1,533,163	1,782,862	0	-249,699	6,154,591	6,154,591	-0
1.01.03 Project Support													
WBS[3]Totals:	840,386	840,386	803,528	0	36,858	11,755,082	11,755,082	11,959,804	-0	-204,722	36,375,557	39,010,557	-2,635,000
1.01.04 Quality Assurance													
WBS[3]Totals:	54,625	54,625	32,928	0	21,697	909,572	909,572	613,334	0	296,238	3,073,212	3,073,212	0
1.01.05 Configuration Management & Document Contro													
WBS[3]Totals:	28,798	28,798	18,018	0	10,780	585,043	585,043	446,676	0	138,367	1,972,567	1,972,567	-0
WBS[2]Totals:	**1,116,060**	**1,116,060**	**1,032,146**	**0**	**83,914**	**16,777,925**	**16,777,925**	**17,084,415**	**-0**	**-306,490**	**54,268,017**	**57,656,018**	**-3,388,000**
1.02 R&D and Conceptual Design													
1.02.01 Accelerator Systems R&D													
WBS[3]Totals:	45,934	100,705	165,261	54,772	-64,556	8,936,257	8,485,499	8,742,655	-450,757	-257,156	11,460,076	11,460,076	0
1.02.02 Experimental Systems R&D													
WBS[3]Totals:	169,017	165,203	203,358	-3,814	-38,154	10,347,701	9,923,194	8,492,255	-424,507	1,430,939	19,166,553	19,163,549	3,005
1.02.03 Conceptual Design - Accelerator Systems													
WBS[3]Totals:	0	0	0	0	0	12,998,214	12,998,214	12,953,527	0	44,686	12,998,214	12,998,214	0
1.02.04 Conceptual Design - Experimental Facilities													
WBS[3]Totals:	0	0	0	0	0	709,445	709,445	712,450	0	-3,005	709,445	712,450	-3,005
1.02.05 Conceptual Design - Conventional Facilities													
WBS[3]Totals:	0	0	0	0	0	3,886,952	3,886,952	3,872,878	0	14,074	3,886,952	3,886,952	0
1.02.06 Conceptual Design - Project Management & Support													
WBS[3]Totals:	0	0	0	0	0	7,086,188	7,086,188	7,325,314	0	-239,126	7,086,188	7,325,314	-239,126
1.02.07 Project Management - R&D													
WBS[3]Totals:	54,143	54,143	19,148	0	34,995	4,569,863	4,569,863	4,676,840	0	-106,977	5,305,339	5,066,213	239,125
WBS[2]Totals:	**269,094**	**320,052**	**387,767**	**50,958**	**-67,715**	**48,534,620**	**47,659,355**	**46,775,919**	**-875,265**	**883,436**	**60,612,767**	**60,612,767**	**0**
1.03 Accelerator Systems													
1.03.01 Accelerator Systems Management													
WBS[3]Totals:	118,940	118,940	110,149	0	8,791	1,958,984	1,958,984	1,672,251	0	286,733	6,019,099	14,319,099	-8,300,000
1.03.02 Accelerator Physics													
WBS[3]Totals:	214,873	214,873	151,459	0	63,414	2,329,898	2,329,898	1,958,219	0	371,679	10,071,767	10,071,767	-0
1.03.03 Injection System													
WBS[3]Totals:	272,333	141,224	127,772	-131,109	13,452	2,099,803	1,345,635	875,681	-754,168	469,954	39,905,613	40,936,613	-1,031,000
1.03.04 Storage Ring													
WBS[3]Totals:	533,190	946,020	736,362	412,830	209,658	12,717,555	11,083,869	9,909,078	-1,633,686	1,174,790	140,726,562	145,518,562	-4,792,000
1.03.05 Controls Systems													
WBS[3]Totals:	269,303	316,743	252,993	47,440	63,750	3,186,438	2,284,446	2,385,033	-901,992	-100,587	20,121,954	20,121,953	0
1.03.06 Accelerator Safety Systems													
WBS[3]Totals:	47,176	13,186	41,638	-33,990	-28,452	576,363	536,975	405,832	-39,388	131,143	4,297,433	4,506,433	-209,000
1.03.07 Insertion Devices													
WBS[3]Totals:	18,452	21,942	17,717	3,490	4,225	1,038,240	497,843	378,025	-540,398	119,818	25,237,478	27,487,479	-2,250,000
1.03.08 Accelerator Fabrication Facilities													
WBS[3]Totals:	378,013	428,648	207,056	50,635	221,592	4,336,613	3,138,292	3,089,730	-1,198,321	48,562	5,722,387	6,176,695	-454,308
WBS[2]Totals:	**1,852,279**	**2,201,576**	**1,645,147**	**349,297**	**556,429**	**28,243,893**	**23,175,941**	**20,673,850**	**-5,067,953**	**2,502,091**	**252,102,293**	**269,138,601**	**-17,036,308**
1.04 Experimental Facilities													
1.04.01 Experimental Facilities Management													
WBS[3]Totals:	91,914	91,914	115,515	0	-23,601	1,331,210	1,331,210	1,640,268	0	-309,058	4,568,673	7,193,673	-2,625,000
1.04.02 Standard Local Controls & Data Acquisition Systems													
WBS[3]Totals:	3,294	3,151	0	-143	3,151	19,297	11,656	0	-7,641	11,656	69,585	69,585	-0
1.04.05 User Instruments													
WBS[3]Totals:	188,524	135,315	130,396	-53,209	4,919	2,648,309	2,382,260	1,433,968	-266,049	948,292	63,573,084	67,523,084	-3,950,000
1.04.06 Front End User Requirements Development													
WBS[3]Totals:	0	0	0	0	0	456	456	1,205	-0	-749	456	1,205	-749
1.04.07 Optics Labs													
WBS[3]Totals:	4,543	0	100,175	-4,543	-100,175	822,882	633,098	546,294	-189,785	86,803	2,072,162	2,072,162	0
WBS[2]Totals:	**288,275**	**230,380**	**346,086**	**-57,896**	**-115,706**	**4,822,155**	**4,358,680**	**3,621,736**	**-463,475**	**736,944**	**70,283,960**	**76,859,709**	**-6,575,749**
1.05 Conventional Facilities													
1.05.01 Conventional Facilities Management													
WBS[3]Totals:	228,762	228,762	204,737	0	24,025	3,620,937	3,620,937	3,466,104	0	154,832	14,187,003	14,223,590	-36,588
1.05.02 Conventional Facilities Engineering and Desigr													
WBS[3]Totals:	209,602	141,822	2,381	-67,779	139,441	14,278,022	14,261,232	14,017,510	-16,791	243,721	20,673,299	23,342,952	-2,669,653
1.05.03 Conventional Facilities Construction													
WBS[3]Totals:	7,542,398	2,383,351	2,119,003	-5,159,047	264,348	18,274,243	14,572,079	13,863,356	-3,702,164	708,722	217,414,846	235,514,846	-18,100,000
1.05.04 Integrated Controls & Communications													
WBS[3]Totals:	10,000	0	0	-10,000	0	115,000	0	0	-115,000	0	561,273	961,273	-400,000
1.05.05 Standard Equipment													
WBS[3]Totals:	0	0	0	0	0	0	0	0	0	0	1,025,586	1,025,586	0
1.05.06 Conventional Facilities Commissioning													
WBS[3]Totals:	2,500	0	5,970	-2,500	-5,970	15,000	37,233	34,825	22,233	2,407	578,000	578,000	0
WBS[2]Totals:	**7,993,262**	**2,753,935**	**2,332,091**	**-5,239,327**	**421,845**	**36,303,202**	**32,491,480**	**31,381,796**	**-3,811,722**	**1,109,683**	**254,440,008**	**275,646,248**	**-21,206,239**
1.06 Pre-Operations													
1.06.01 Management - Pre Ops													
WBS[3]Totals:	0	0	0	0	0	0	0	0	0	0	20,170,700	20,170,700	0
1.06.02 Accelerator Systems - Pre Ops													
WBS[3]Totals:	0	0	0	0	0	0	0	0	0	0	17,071,591	17,071,591	-0
1.06.03 Experimental Facilities - Pre Ops													
WBS[3]Totals:	0	0	0	0	0	0	0	0	0	0	3,823,660	3,823,660	0
1.06.04 Spares													
WBS[3]Totals:	0	0	0	0	0	0	0	0	0	0	9,134,454	9,134,454	-0
WBS[2]Totals:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**50,200,405**	**50,200,405**	**0**
b. Cost of Money	0	0	0	0	0	0	0	0	0	0	0	0	0
c. Gen. and Admin.	0	0	0	0	0	0	0	0	0	0	0	0	0
d. Undist. Budget											0	0	0
e. Sub Total	11,518,971	6,622,003	5,743,237	-4,896,968	878,766	134,681,795	124,463,380	119,537,715	-10,218,414	4,925,665	741,907,451	790,113,747	-48,206,296
f. Contingency/Management Resrv.											170,092,549		
g. Total	11,518,971	6,622,003	5,743,237	-4,896,968	878,766	134,681,795	124,463,380	119,537,715	-10,218,414	4,925,665	912,000,000		
9. Reconciliation to CBB													
a. Variance Adjustment													
b. Total Contract Variance													

CONTRACT PERFORMANCE REPORT FORMAT 1 - WORK BREAKDOWN STRUCTURE				FORM APPROVED OMB No. 0704-0188
1. CONTRACTOR	2. CONTRACT		3. PROGRAM	4. REPORT PERIOD
a. NAME Brookhaven Science Associates	a. NAME		a. NAME NSLS_EV8 - NSLS II Project	a. FROM (YYYYMMDD) 2009 / 07 / 01
b. LOCATION (Address and ZIP Code) Brookhaven National Laboratory, Upton,NY	b. NUMBER		b. PHASE	b. TO (YYYYMMDD) 2009 / 07 / 31
	c. TYPE	d. SHARE RATIO	c. EVMS ACCEPTANCE NO YES X (YYYYMMDD)	

5. CONTRACT DATA

a. QUANTITY	b. NEGOTIAT COST	c. ESTIMATED COST OF THORIZED UNPRICED WOR	d. TARGET PROFIT/ FEE	e. TARGET PRICE	f. ESTIMATED PRICE	g. CONTRACT CEILING	l. DATE OF OTB/OTS (YYYYMMDD)
1	912,000,000	0	0	912,000,000	0	0	

8. PERFORMANCE DATA

WBS[2] WBS[3] Control Acct ITEM (1)	CURRENT PERIOD BUDGETED COST WORK SCHEDULED (2)	BUDGETED COST WORK PERFORMED (3)	ACTUAL COST WORK PERFORMED (4)	VARIANCE SCHEDULE (5)	VARIANCE COST (6)	CUMULATIVE TO DATE BUDGETED COST WORK SCHEDULED (7)	BUDGETED COST WORK PERFORMED (8)	ACTUAL COST WORK PERFORMED (9)	VARIANCE SCHEDULE (10)	VARIANCE COST (11)	AT COMPLETION BUDGETED (14)	ESTIMATED (15)	VARIANCE (16)