National Synchrotron Light Source II

Project Progress Report

August 2010

August 31: Progress on conventional facilities continues, with siding and roofing installation most visible in this shot.

report due date:
September 20, 2010

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BROOKHAVEN NATIONAL LABORATORY

OVERALL ASSESSMENT

The National Synchrotron Light Source II project maintained excellent technical progress and satisfactory cost and schedule performance. The cumulative cost and schedule performance indices are 1.02 and 0.98, respectively. The DOE Independent Project Review (IPR) was conducted by the Office of Science on August 25 and the committee concluded, "*The overall technical and cost performance is excellent and the safety performance has improved substantially. Schedule performance needs attention and is being addressed.*"

Construction of the ring building continues to make excellent progress without any safety incident and is on track for beneficial occupancy of the first section of the building in February 2011. With much of the concrete and steel work nearly complete, the work emphasis has shifted to the building envelope and interior. The contract for the Lab–Office Building (LOB) was awarded in late August.

Accelerator Systems progress continued with successful procurement and delivery of major production components. A number of production and final design reviews were completed in August. Schedule delay in the delivery of acceptable first article production magnets, however, continues to be a concern and is being watched closely.

Preliminary design of the six project beamlines is more than 60% complete and engineering designs are on track to issue RFPs for major long-lead procurement items late this year.

February 2014 remains the projected early completion date, but the critical path for the project has changed slightly, now tracking through the delivery of acceptable magnet first article production. Schedule floats for key elements in the accelerator systems are being closely monitored, and potential mitigation plans for schedule risks are being actively discussed.

Activities funded by the American Recovery and Reinvestment Act (ARRA) continue to be on schedule and on budget.

UPCOMING EVENTS 2010 – 2011

ASD Secondary Cooling System Design Review	Sept. 1–2
RF Bellows and Absorbers Review	Sept. 8–9
Earned Value Management System (EVMS) Training	Sept. 9–10
Coherent Hard X-Ray (CHX) Beamline Adv Team (BAT) meeting	Sept. 14
Insertion Devices Review	Sept. 14–15
Inelastic X-ray Spectroscopy (IXS) BAT meeting	Sept. 16
Injection Straight Review	Sept. 16–17
X-ray Powder Diffraction (XPD) BATmeeting	Oct. 6
NSLS-II Conventional Facilities Advisory Cttee (CFAC) meeting	Oct. 5–6
EPICS Collaboration Meeting	Oct. 11–14
NSLS-II Accelerator Systems Advisory Cttee (ASAC) meeting	Oct. 14–15
Experimental Facilities Div (XFD) Prelim Design Rev (PDR)	Oct. 19–20
DOE Review of NSLS-II Project	Nov. 15–18
Project Advisory Committee (PAC) meeting	Feb. 9–11, 2011

ACCELERATOR SYSTEMS DIVISION (ASD)

Three additional first article magnets (two quadrupoles, one produced by BINP and one by Tesla, as well as one sextupole) were completed in early August. The BINP quadrupole finally achieved desired field quality after special shimming, and the TESLA quadrupole is being tested. IHEP sextupole magnets have acceptable field quality and a few more units are planned to be built before series production starts, in order to get the assembly procedure better under control. Danfysik production was fully authorized after partial production started in July and final reproducibility tests on the first article magnets were demonstrated. So far, Buckley Industries has produced two quadrupoles and two sextupoles but testing has not been completed. Delivery of fully acceptable first article magnets in order to commence the start of full production continues to be delayed. Although it has not impacted the overall project schedule yet, the magnet production schedule is being carefully monitored.

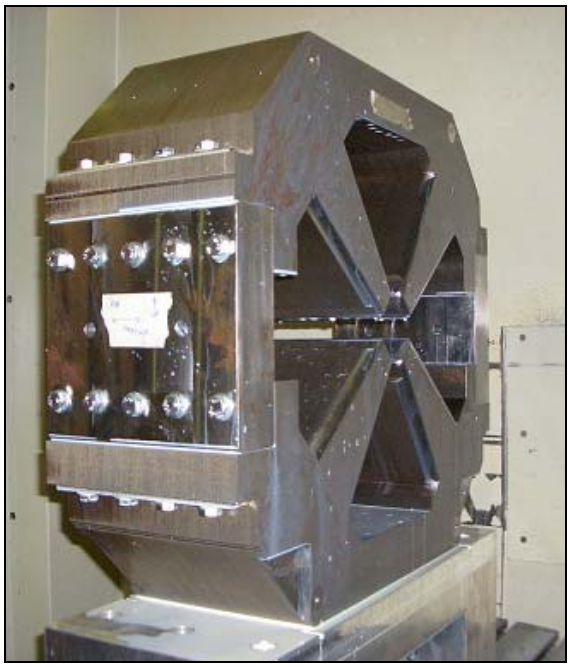


Figure 1. Magnet production at Tesla, Ltd.

The production readiness review for the storage ring girders was carried out and the full production of girders was approved. All twelve first article units have been accepted with only minor issues.

Vacuum chamber production progressed well. Fourteen dipole extrusions which had been received earlier were bent, measured, and sent to a vendor for machining. More dipole extrusions produced at an Arkansas vendor were about to be shipped at the end of the month. Six S2E multipole chambers were received after welding at APS. Six S4 multipole chambers have been welded at APS and are under vacuum testing. In addition, nine dipole chambers were received after welding. They have been surveyed and NEG pump assembly

has begun. One prototype S4A inconel chamber magnet was received but returned to the vendor for a weld repair.

Chamber mounting tests were successfully carried out on production girders using prototype stands. Orders for carbon fiber stands for multipole chamber mounting were placed with two vendors.

The delivery of 100 l/s ion pumps continues, while the vendor works to improve the heaters for 200 l/s ion pumps. The ion pump mounting holes on the girders were updated. The first shipment of fifteen ion pump controllers arrived; they are being tested with dummy loads.

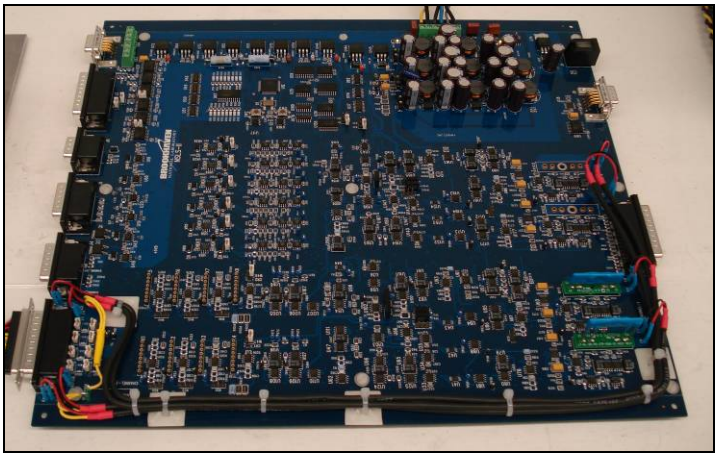


Figure 2. Preproduction prototype current regulator board.

Preproduction units of the corrector magnet regulator (dual-channel architecture, Fig. 2) were received, and testing of these units started. The production versions of the single- and dual-channel current regulator designs are completed. All drawings were released and purchase orders (POs) have been submitted for approval.

The designs for power supply components (PSC) and the regulator have been completed, and procurement of the various hardware systems is proceeding as planned. In particular, the PSC hardware tests have been completed and the main and transition boards are ready for production. All changes needed for production have been completed, drawings were released, and the corresponding POs are in the approval stage.

The production of the equipment enclosures by Crenlo/ Emcor in Rochester, Minnesota proceeds well. The final design report is expected the first week in September and the new schedule calls for first articles by mid October. The PO for the uninterruptible power supplies has been submitted, with expected first deliveries in February of 2011.

A successful RF Systems Preliminary Design Review (PDR) was carried out, and as a result some significant changes have been made in the linac beamline: adding 20 cm to the low-energy beam transport to allow future development of a chopper for bunch train cleaning, reducing the 2m spacing for a future second linac injection dog-leg, reducing triplet lengths, and adding a third triplet.

The contract for the storage ring 500MHz 310kW RF transmitters was awarded to Thomson in July and is now fully active. A kickoff meeting was held and discussions on the safety system, physical layout, and controls interface have been clarified so that production can start.

Phase glitch problems during frequency jumps occurred with the Agilent master oscillator. This has now been resolved. The design of the master oscillator distribution system has started and parts have been ordered and will be assembled and tested in the laboratory.

The proposals for the damping wiggler design and manufacturing have been received and are under evaluation. The insertion device clean room in Bldg. 832 is now under construction by American Clean-Room. The RFP for the cryogenic plant has been released and the proposals are due on October 15. Release of the RFP for the In-Vacuum Magnetic Measurement System is expected on September 10.

The NSLS 3rd Harmonic Cavity (NSLS-3HC) has been successfully e-beam welded (Fig. 3). The cavity will next be pre-tuned to the operating frequency and the pi-zero mode separation will be set and tuning investigated. An independent weld inspector will visit the Niowave site and x-ray the welds for compliance with ASME code. All weld and braze samples have been prepared and have been tested by the independent laboratory. Results will be written into the weld qualification reports for review by the laboratory safety committee.

Figure 3. Two finished NSLS-3HC SRF cavities.

The model is now mature for the SRX in-vacuum undulator (1.5m long with a 21mm period length and an option for a second cryogenically cooled unit). The design includes subassemblies for the magnet core, the cooling platen, cross-over/manifold, coolant/cryogen transfer lines, gap drive assembly and feed-through, vacuum chamber and penetrations/transitions, kinematic differential adjusters, thermal shielding, drive train and bearing system, structural frame, and bucking system.

The booster procurement continues to make good progress. The vendor visited BNL to clarify technical boundary conditions with NSLS-II staff. The preliminary design is advancing as expected, and so far the activities are compatible with the schedule for the PDR at the end of September. The design of the power system for the injection kicker is iterated to take into account improvements suggested in technical discussion with external reviewers.

The design concept for the injection septum is completed and the detailed design of components is underway. The concept of a local DC bump has been integrated into the layout of the injection straight and the needed components have been specified. This will reduce demands on the kicker system.

EXPERIMENTAL FACILITIES DIVISION (XFD)

The Experimental Facilities Division continued to advance the preliminary design for the six project beamlines. Ray-trace drawings for the six beamlines were being completed following completion of the preliminary design layout of the front-end components upstream of the shield wall. Draft beamline preliminary design reports (PDRs) were started for the beamlines. Two Beamline Advisory Team (BAT) meetings were held in August to review and discuss the preliminary designs, one for the Coherent Soft X-ray Scattering (CSX) beamline and the other for the Submicron Resolution X-ray Spectroscopy (SRX) beamline. Preliminary designs of the experimental hutches (radiation enclosures) further advanced in August, with additional details specified. Beamline design and safety reviews are being planned to review major safety parts of the beamline designs in the September timeframe. Preliminary designs for beamline controls and standard utilities layouts are also being finalized.

The Scientific Advisory Committee (SAC) met in August to review the status of the Experimental Facilities, including scope addition priorities for the six project beamlines. The SAC also reviewed 54 beamline development proposals from the scientific community for additional future beamlines at NSLS-II, and provided useful recommendations on the priority rankings of these proposals.

In nanofocusing optics R&D, the plan was finalized in August for the first multilayer Laue lens (MLL) to be grown in the newly commissioned sputter deposition system. This MLL will consist of 6,510 layers of WSi2/Si with a total thickness of 43 microns, and 5nm outmost zones. This MLL will set a new record for thickness and number of layers. It is also the first test using 4-cathodes (only 2-cathodes were used in past growths).

Figure 4 shows the layout of the Hard X-ray Nanoprobe (HXN) beamline, designed to take full advantage of the MLL nano-focusing capabilities.

Figure 4. Preliminary design of the Hard X-ray Nanoprobe Beamline, a 115m-long beamline with its endstation in a satellite building.

CONVENTIONAL FACILITIES DIVISION (CFD)

Construction of conventional facilities continued to make excellent progress in August, as the ring building workforce is nearing its projected peak. Sitewide, the workforce will continue to grow, with the recent award of the LOB contract and mobilization of the LOB contractor. Overall progress continues to be ahead of schedule and on track for beneficial occupancy of the first building section in early 2011.

The structural steel for the ring building is nearly complete. The only portions remaining are erection of the injection building equipment area and the section of the ring building at pentant 5 that has been kept open for access. These last sections of steel, which will complete the circle of the ring building, are planned to be erected in early October.

Concrete work for the ring building is now more than 85% complete. The only concrete work remaining includes some bypass corridor slabs, exterior retaining walls, and the pentant 5 tunnel and booster ring sections that are being kept open for construction access.

Figure 5. Vehicle tunnel being readied for use during construction.

Excellent progress continues to be made in the installation of utility systems. The inner courtyard mechanical utility installation has progressed sufficiently to allow work to begin on the final sections of electrical ductbank near the service building 1 and the RF area.

Much of the work emphasis now shifts to the building envelope (cover shot). After initial work to confirm all fit-up details for the siding and roofing systems, the building envelope is now making rapid progress and the installation teams are fully mobilized. The roof decking is now complete to pentant 4, including insulation and membrane, and the standing seam finished roof panels are being installed on pentant 1. Waterproofing of the booster tunnel began (Fig. 6).

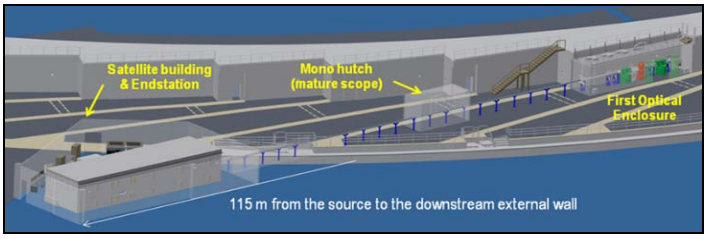


Figure 6. Waterproofing of the booster tunnel roof begins. Note also that backfill operations at the booster tunnel are in progress.

The interior liner system is now extended into pentant 3, and finished exterior siding is progressing rapidly on pentant 1. Interior mechanical, electrical, and plumbing (MEP) work continues to make rapid progress. Major HVAC equipment items, including air handlers for the experimental floor and storage ring, have been installed in pentant 1. Fire protection headers and return air ductwork are now installed from pentant 1 through pentant 3. Supply and exhaust air ductwork is nearly complete in pentant 1. Electrical conduit and lighting in the storage ring tunnel are now complete from pentant 1 through pentant 2. Work continues on all piping, HVAC, and electrical systems throughout the ring building.

Additional progress continues to be made on various architectural finishes, including masonry block and the installation of shield doors in pentant 1. Painting of the storage ring tunnel is now complete up to pentant 4, and mezzanine railings and stairs have been installed. The RF area (Fig. 7) and RF compressor buildings have also seen significant progress during the period and are nearly ready for enclosure to begin.

Figure 7. RF area masonry wall seen the from electrical mezzanine. Installation of the railing and stairs is complete, and masonry wall block finishing is in progress.

The Chilled Water Plant Expansion is ahead of schedule and will likely be ready to deliver chilled water several months earlier than required. The chilled water piping is now installed adjacent to the NSLS-II site and will be connected by late September. The electrical substation main transformer tie-in began a week earlier than planned and is on schedule to be completed in October, enabling permanent power to be available to the site in November.

The LOB contract has been awarded and the contractor is making good progress toward mobilization. It is anticipated that notice to proceed will be issued in late September, with physical work getting underway in October, more than a year earlier than the original baseline plan.

ENVIRONMENT, SAFETY, AND HEALTH (ESH)

Excellent progress has been made on the development of the Linac Commissioning Safety Assessment Document (SAD). The draft SAD is scheduled to be complete in January 2011, when it will undergo extensive internal and external review. This document is part of the commissioning package that must be approved prior to the start of the accelerator readiness review for the linac, scheduled for September 2011. Procurement of the area radiation monitors to support the linac commissioning is also underway. Three units have been ordered and will be accepted, installed, and pre-commissioned in FY11 to support commissioning activities in October 2011.

An overall Transition to Operations Plan is in development that will provide a comprehensive process to manage the transition from the NSLS-II construction project to the full operations of the NSLS-II facility. This includes identification of key staff responsibilities, essential program requirements, facility acceptance criteria, technical equipment installation and acceptance criteria, authorization basis and approvals, and operational controls.

Interviews are ongoing for a QA/ESH assessment position to develop, implement, and administer an effective and comprehensive construction assessment/oversight program. Working with subject matter experts from construction management, QA, and ES&H, this person will take the lead in evaluating the construction contractors' compliance with established contractual and regulatory requirements, codes and standards, and plans and procedures as these relate to the contractors' processes, systems, and products. This position is expected to be filled by the end of September.

PROCUREMENT ACTIVITIES

The Laboratory–Office Building (LOB) contract was awarded on August 27, 2010. Construction is anticipated to begin by the end of September or early October, 14 months ahead of schedule. The Transport Line Magnets and SR Cryogenic System requests for proposals (RFPs) were issued and posted on FedBizOps in August. Closing dates are September 27 and October 14, respectively.

RECENT HIRES

Charles Amarito – Mechanical Designer, Mechanical Engineering, ASD

Kenneth Decker – Mechanical Technician, Vacuum, ASD

Jeffrey Duff – Mechanical Technician, Mechanical Engring, ASD

Yong Hu – Controls Engineer, Controls, ASD

Paul Palecek – Mechanical Technician, Vacuum, ASD

Huijuan Xu – Controls Engineer, Controls, ASD

COST/SCHEDULE BASELINE STATUS

The cumulative Cost Performance Index (CPI) is 1.02 and the cumulative Schedule Performance Index (SPI) is 0.98, both well within the acceptable range.

Progress during August in most areas of the project was on schedule and on budget. The current-month CPI is 1.03, green status, and the current-month SPI is 0.96, also green status. The cumulative accelerator schedule continues to run behind the baseline, due primarily to a delay in the delivery of storage ring first article magnets and to late deliveries in vacuum chamber production.

The critical path for the project changed slightly in August, now passing through accelerator magnet first article production; girder assembly and installation, survey, and alignment; then accelerator installation, testing, and commissioning. Ring building construction, magnet production, and vacuum chambers/components are within 3 months of the critical path, and the projected early completion date continues to be February 2014.

RECENT PROJECT ACCOMPLISHMENTS

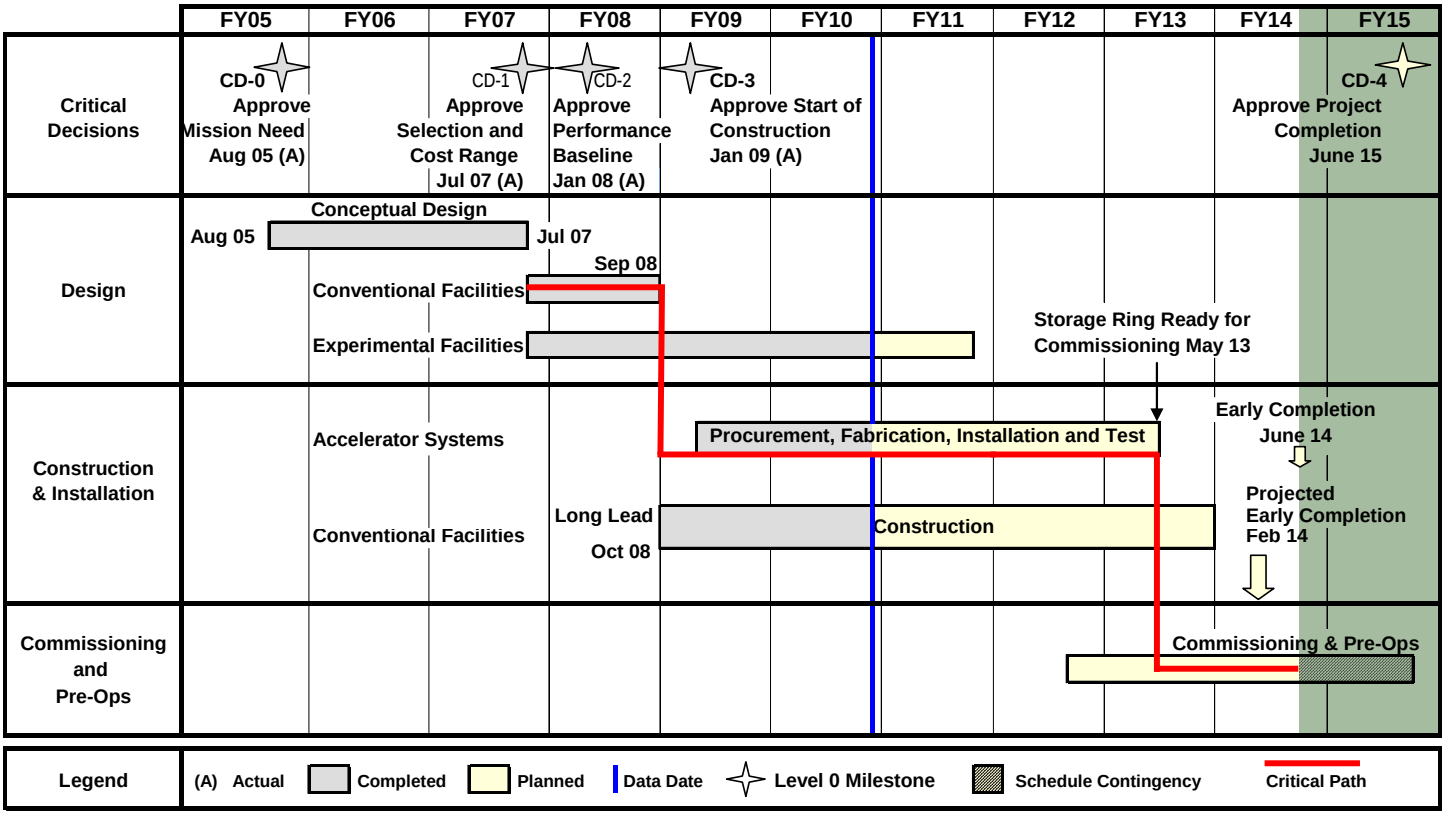
- Conventional facilities progress on the ring building continued, with siding and roofing being installed (see Fig. 8 and cover).
- The BINP quadrupole achieved desired field quality. IHEP sextupoles have acceptable field quality. Danfysik production was fully authorized after successful final reproducibility tests on the first articles.
- All first article storage ring girders have been accepted with only minor issues, and full production was commenced.
- Production of the vacuum chambers is proceeding well.

Figure 8. Pentant 1 standing seam metal roof being installed.

- The RF Systems Preliminary Design Review was successful, with some significant design changes as a result.
- The proposals for the damping wiggler design and manufacturing have been received and are under evaluation.
- Beamline advisory teams met in August to review PDRs for the CSX and SRX beamlines. All six project beamlines are deeply into preliminary design work.
- The LOB contract has been awarded and the contractor is making good progress toward mobilization.
- Excellent progress has been made on the development of the Linac Commissioning Safety Assessment Document.

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

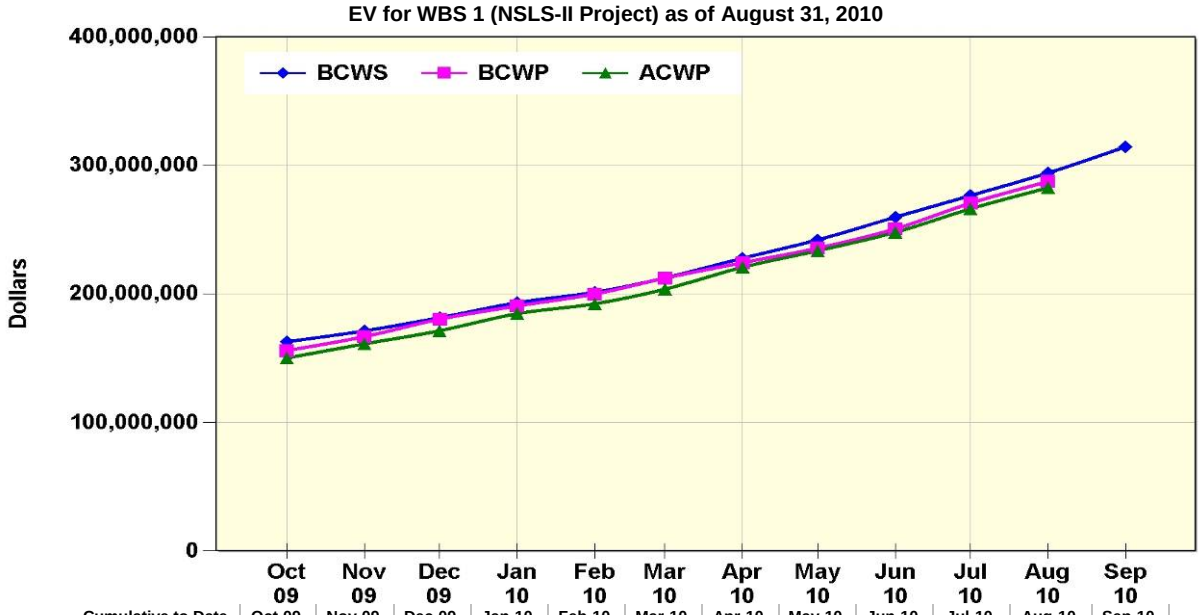


Funding Profile

	NSLS-II Funding Profile ($M)											
Fiscal Year	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	151.6	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



Cumulative to Date	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10
BCWS	162,854	171,323	181,553	193,298	201,337	212,530	227,854	242,113	259,796	276,586	294,163	314,533
BCWP	155,908	166,818	180,426	190,699	199,953	212,325	224,378	235,636	250,654	270,668	287,518	
ACWP	150,173	161,209	171,370	184,693	192,382	203,749	220,833	233,646	247,959	266,302	282,695	

Project as of 8/31/10	Current Period	Cum-to-date
Plan (BCWS) $K	17,577	294,163
Earned (BCWP) $K	16,850	287,518
Actual (ACWP) $K	16,393	262,695
SV $K	-727	-6,644
CV $K	457	4,823
SPI	0.96	0.98
CPI	1.03	1.02
Budget at Completion $K (PMB (UB))		780,643
Planned % Complete		37.7
Earned % Complete		36.8
Mgmt Reserve/Cont as % of BAC remaining		26.6
Mgmt Reserve/Cont as % of EAC remaining		26.0

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

Milestones – Near Term	Baseline	Done
L3-Begin Ring Building Steel Erection	09/14/09	✓
L3-External Tech. review of concept. design for project BLs done	11/16/09	✓
L3-Clean Room contract awarded	12/30/09	✓
L3-Linac contract awarded	2/05/10	✓
L3-APS Welding S2 ODD – first chamber ready for assembly	3/17/10	✓
L3-Pentant 1 structural steel erected	3/31/10	✓
L3-Initial test of new MLL deposition system completed	6/30/10	✓
L3-LOB construction contract awarded	7/01/10	✓
L3-LOB construction Notice to Proceed (NTP) issued	7/01/10	
L3-SR Magnet – Quads First Article ready for integration	7/19/10	
L2-Pentant 2 structural steel erected	8/05/10	✓
L3-Safety review of preliminary designs for project BLs completed	8/30/10	
L2-BAT Reviews of 100% prelim. designs for project BLs completed	9/15/10	

L3 = Level 3 Milestone, L2 = Level 2

Schedule Performance Index, Project to Date:

SPI: **0.98**

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

Cost Performance Index, Project to Date:

CPI: **1.02**

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

Nine PCRs that affect the baseline were approved in July:

PCR #	Area	Δcost	Title or Description	PCR #	Area	Δcost	Title or Description
10_176	CF	0	Safety Incentive Cost Award	10_146	ASD	0	Controls Cost/Schedule Revision
10_120	CF	$9.1M	LOB Increased size and Contract Award	10_167	ASD	$1.5M	RF Transmitter Vendor Schedule Implementation
10_114	CF	$695K	Add Data Communication	10_158	ASD	0	Fast Corrector Magnet Contract Award
10_149	CF	$178K	Add HDR Engineering Costs, Geotech. Re-phase	10_124	ASD	$819K	Design Evolution IXS Undulator
10_178	ASD	$118K	SR Equipment Racks, Enclosures, Re-phase				

ARRA DETAILS

This Recovery Act project will provide advanced funding for NSLS-II construction, create jobs, and substantially reduce the cost and schedule risks for the project. The overall schedule for the ring building completion will not be accelerated; however, Recovery Act funds allow for re-ordering of the work sequence with a six-month acceleration of the injection building completion. Acceleration of the injection building allows for earlier installation and commissioning of the injector, which had been close to critical path. This addition of schedule float will significantly reduce the schedule risk for the accelerator. In addition, Recovery Act funds will accelerate completion of the Laboratory–Office Buildings by approximately 15 months, which will enable the project to maximize the cost advantage of the depressed construction market.

ARRA$ as of 7/31/10	Current Period	Cum-to-date
Plan (BCWS) $K	6,212	72,868
Earned (BCWP) $K	6,309	75,594
Actual (ACWP) $K	6,859	72,699
SV $K	98	2,726
CV $K	-550	2,895

ARRA Milestones		
Description	Baseline Date	Status
Install sanitary UG piping SB3 footings.	12/08/09	Completed 12/10/09.
Pour tunnel slab CL 018-024.	12/14/09	Completed 11/02/09.
Excavate booster svc bldg. foundations.	12/24/09	Completed 10/7/09.
Pour tunnel slab CL 024-030.	12/30/09	Completed 11/25/09.
Begin concrete tunnel roof pentant 1.	12/10/09	Completed 11/12/09.
Complete tunnel slab pentant 2.	1/15/10	Completed 1/15/10.
Pentant 2 tunnel walls complete.	3/16/10	Completed 3/11/10.
Begin steel erection pentant 1.	4/14/10	Completed 3/16/10.
Start metal decking for pentant 1 Service Building.	5/12/10	Completed 4/14/10.
Pentant 5 tunnel slab complete.	5/25/10	In progress. Area left open for construction access to interior of ring building will be closed in September.
Begin experimental floor concrete, pentant 1.	6/2010	Completed 6/7/10.
Begin experimental floor concrete, pentant 2.	7/2010	Completed 6/21/10.
Complete structural for steel pentant 3.	9/2010	Completed 8/13/10.
Complete chilled Water Plant enclosure.	9/2010	Completed 8/20/10.

Blue text represents an addition.

CLASSIFICATION (When Filled In)

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 National Synchrotron Light Source II (NSLS-II)	a. NAME NSLS-II August 2010	a. FROM (YYYYMMDD) 2010 / 08 / 01
b. LOCATION (Address and ZIP Code) Brookhaven National Laboratory, Upton,NY	b. NUMBER	b. PHASE	b. TO (YYYYMMDD) 2010 / 08 / 31
	c. TYPE / d. SHARE RATIO	c. EVMS ACCEPTANCE NO YES X (YYYYMMDD)	

5. CONTRACT DATA

a. QUANTITY	b. NEGOTIATED COST	c. ESTIMATED COST OF AUTHORIZED UNPRICED WORK	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:	162,621	162,621	134,643	0	27,977	4,097,181	4,097,181	4,048,557	0	48,624	7,503,242	7,503,242	0
1.01.02 Environmental, Safety & Health													
WBS[3]Totals:	72,991	72,991	101,982	0	-28,991	2,648,464	2,648,464	3,066,262	0	-417,798	6,478,032	6,478,032	0
1.01.03 Project Support													
WBS[3]Totals:	1,355,347	1,355,347	1,036,827	0	318,521	23,423,546	23,423,546	23,363,235	-0	60,311	40,447,041	42,123,066	-1,676,025
1.01.04 Quality Assurance													
WBS[3]Totals:	67,140	67,140	55,334	0	11,806	1,626,096	1,626,096	1,248,034	0	378,062	3,397,133	3,397,133	0
1.01.05 Configuration Management & Document Control													
WBS[3]Totals:	28,223	28,223	24,996	0	3,227	945,496	945,496	753,350	0	192,146	1,972,567	1,972,567	0
WBS[2]Totals:	**1,686,322**	**1,686,322**	**1,353,782**	**0**	**332,540**	**32,740,784**	**32,740,784**	**32,479,439**	**-0**	**261,345**	**59,798,015**	**61,474,040**	**-1,676,025**
1.02 R&D and Conceptual Design													
1.02.01 Accelerator Systems R&D													
WBS[3]Totals:	440,693	194,525	5,192	-246,167	189,333	10,965,374	10,269,833	10,031,324	-695,541	238,509	11,460,076	11,460,076	-0
1.02.02 Experimental Systems R&D													
WBS[3]Totals:	223,428	244,223	248,922	20,795	-4,699	14,051,727	13,896,263	13,281,147	-155,464	615,116	19,166,550	19,163,545	3,005
1.02.03 Conceptual Design - Accelerator Systems													
WBS[3]Totals:	0	0	0	0	0	12,998,214	12,998,214	12,960,504	0	37,709	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	7,326,180	0	-239,992	7,086,188	7,325,314	-239,126
1.02.07 Project Management - R&D													
WBS[3]Totals:	35,352	35,352	15,095	0	20,258	5,055,138	5,055,138	5,034,342	0	20,796	5,305,339	5,066,213	239,126
WBS[2]Totals:	**699,473**	**474,101**	**269,208**	**-225,372**	**204,892**	**54,753,038**	**53,902,033**	**53,218,826**	**-851,005**	**683,207**	**60,612,763**	**60,612,763**	**1**
1.03 Accelerator Systems													
1.03.01 Accelerator Systems Management													
WBS[3]Totals:	94,418	94,418	121,072	0	-26,654	3,174,157	3,174,157	3,403,517	0	-229,359	6,019,099	6,019,099	0
1.03.02 Accelerator Physics													
WBS[3]Totals:	230,007	230,007	247,226	0	-17,219	5,164,728	5,164,728	4,869,389	0	295,339	10,071,767	10,071,767	0
1.03.03 Injection System													
WBS[3]Totals:	1,665,430	1,365,686	992,038	-299,744	373,648	8,736,836	7,055,749	4,330,644	-1,681,086	2,725,105	41,184,668	41,095,545	89,123
1.03.04 Storage Ring													
WBS[3]Totals:	3,849,558	3,206,157	3,053,017	-643,401	153,140	38,705,884	32,222,803	33,394,409	-6,483,080	-1,171,606	152,856,242	158,302,669	-5,446,427
1.03.05 Controls Systems													
WBS[3]Totals:	291,202	784,042	280,327	492,841	503,715	7,241,274	6,433,513	5,776,683	-807,761	656,829	20,364,972	20,364,972	0
1.03.06 Accelerator Safety Systems													
WBS[3]Totals:	55,830	71,899	411,889	16,069	-339,990	1,410,031	1,047,533	1,758,444	-362,498	-710,911	4,471,232	4,915,544	-444,312
1.03.07 Insertion Devices													
WBS[3]Totals:	90,498	23,874	144,329	-66,623	-120,454	1,847,481	1,370,004	1,178,258	-477,477	191,746	25,432,532	25,432,532	0
1.03.08 Accelerator Fabrication Facilities													
WBS[3]Totals:	85,290	68,962	246,694	-16,328	-177,732	6,345,653	4,982,109	5,132,218	-1,363,543	-150,108	6,961,411	7,211,411	-250,000
WBS[2]Totals:	**6,362,233**	**5,845,047**	**5,496,592**	**-517,186**	**348,455**	**72,626,043**	**61,450,597**	**59,843,563**	**-11,175,446**	**1,607,034**	**267,361,923**	**273,413,539**	**-6,051,616**
1.04 Experimental Facilities													
1.04.01 Experimental Facilities Management													
WBS[3]Totals:	108,829	108,829	124,885	0	-16,056	2,715,875	2,715,875	3,190,888	0	-475,013	4,828,335	6,586,298	-1,757,962
1.04.02 Standard Local Controls & Data Acquisition Systems													
WBS[3]Totals:	3,676	0	0	-3,676	0	37,454	44,941	3,457	7,487	41,485	69,585	69,585	0
1.04.05 User Instruments													
WBS[3]Totals:	257,019	266,876	401,521	9,857	-134,645	5,807,701	5,490,864	5,122,725	-316,837	368,139	63,112,765	63,112,765	0
1.04.06 Front End User Requirements Development													
WBS[3]Totals:	0	0	1,012	0	-1,012	456	456	2,111	-0	-1,655	456	1,099	-643
1.04.07 Optics Labs													
WBS[3]Totals:	12,146	12,146	8,758	0	3,388	868,209	669,535	624,714	-198,674	44,820	1,117,071	1,750,249	-633,179
WBS[2]Totals:	**381,669**	**387,850**	**536,176**	**6,181**	**-148,325**	**9,429,695**	**8,921,671**	**8,943,895**	**-508,024**	**-22,224**	**69,128,213**	**71,519,997**	**-2,391,784**
1.05 Conventional Facilities													
1.05.01 Conventional Facilities Management													
WBS[3]Totals:	322,810	322,810	313,597	0	9,213	7,149,635	7,149,635	7,214,994	0	-65,359	16,099,717	16,136,305	-36,588
1.05.02 Conventional Facilities Engineering and Design													
WBS[3]Totals:	290,049	-93,174	26,636	-383,224	-119,810	19,631,007	19,246,167	18,359,161	-384,840	887,007	22,741,410	22,741,410	0
1.05.03 Conventional Facilities Construction													
WBS[3]Totals:	7,770,830	8,234,715	8,540,904	463,885	-306,189	97,466,826	104,056,221	102,700,062	6,589,395	1,356,159	230,705,270	233,658,052	-2,952,782
1.05.04 Integrated Controls & Communications													
WBS[3]Totals:	50,000	-7,250	0	-57,250	-7,250	240,057	6,289	13,594	-233,767	-7,305	1,256,000	1,256,000	0
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:	13,574	0	-143,829	-13,574	143,829	125,741	45,000	-78,387	-80,741	123,387	578,000	578,000	-0
WBS[2]Totals:	**8,447,264**	**8,457,101**	**8,737,308**	**9,837**	**-280,207**	**124,613,266**	**130,503,314**	**128,209,425**	**5,890,048**	**2,293,889**	**272,405,984**	**275,395,354**	**-2,989,370**
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	4,313,427	-489,767
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**	**50,690,172**	**-489,767**
Performance Measurement Baseline - PMB	17,576,961	16,850,420	16,393,066	-726,540	457,355	294,162,825	287,518,398	282,695,147	-6,644,427	4,823,251	779,507,304	793,105,865	-13,598,562
Undistributed Budget											1,135,635	0	1,135,635
Sub Total	17,576,961	16,850,420	16,393,066	-726,540	457,355	294,162,825	287,518,398	282,695,147	-6,644,427	4,823,251	780,642,939	793,105,865	-12,462,927
Contingency/Mangement Reserve											131,357,061		
Total Project Cost -TPC	17,576,961	16,850,420	16,393,066	-726,540	457,355	294,162,825	287,518,398	282,695,147	-6,644,427	4,823,251	912,000,000		

CLASSIFICATION (When Filled In)

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 National Synchrotron Light Source II (NSLS-II) ARRA		a. NAME NSLS-II August 2010	a. FROM (YYYYMMDD) 2010 / 08 / 01
b. LOCATION (Address and ZIP Code) Brookhaven National Laboratory, Upton,NY	b. NUMBER		b. PHASE	b. TO (YYYYMMDD) 2010 / 08 / 31
	c. TYPE	d. SHARE RATIO	c. EVMS ACCEPTANCE NO YES X (YYYYMMDD)	

5. CONTRACT DATA

a. QUANTITY	b. NEGOTIATED COST	c. ESTIMATED COST OF AUTHORIZED UNPRICED WORK	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	#REF!	0	

8. PERFORMANCE DATA

ARRA Cost Account 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)
A ARRA													
1.05.03.02.01 General Requirements	44,173	44,173	83,605	0	-39,432	4,933,652	4,970,185	3,008,813	36,533	1,961,372	5,299,456		
1.05.03.02.02 Site Work	0	3,967	3,967	3,967	0	3,153,705	3,185,995	3,012,961	32,290	173,034	3,611,419		
1.05.03.02.03 Pentant 1 and Service Building	896,121	1,737,202	1,782,516	841,081	-45,314	12,398,854	13,342,067	13,428,232	943,213	-86,165	18,965,496		
1.05.03.02.04 Pentant 2 and Service Building	613,622	1,331,915	1,331,918	718,293	-3	7,599,184	9,685,012	9,792,821	2,085,828	-107,809	15,430,487		
1.05.03.02.05 Pentant 3 and Service Building	296,106	343,589	343,589	47,483	0	5,809,711	7,123,457	7,261,502	1,313,746	-138,045	10,280,472		
1.05.03.02.06 Pentant 4 and Service Building	374,615	77,807	77,807	-296,808	0	1,404,889	1,804,300	1,976,662	399,411	-172,362	2,594,850		
1.05.03.02.07 Pentant 5 and Service Building	744,900	979,899	979,896	234,999	3	5,925,398	5,200,115	5,132,369	-725,283	67,747	7,246,240		
1.05.03.02.08 Injection Building	405,580	382,745	382,745	-22,835	0	2,784,896	2,047,049	1,943,645	-737,847	103,404	5,589,306		
1.05.03.02.09 RF and Compressor Building	560,673	96,804	96,804	-463,868	0	2,327,706	2,256,698	2,333,382	-71,009	-76,684	4,959,461		
1.05.03.02.10 Lobby	946,942	144,219	144,219	-802,723	0	1,070,867	872,371	869,993	-198,496	2,378	3,005,358		
1.05.03.02.11 Cooling Tower and Process Water	270,036	166,690	145,865	-103,346	20,825	1,562,875	1,854,887	1,827,302	292,011	27,584	4,458,617		
1.05.03.02.12 Underground Mechanical Utilities	692,768	260,055	260,057	-432,713	-2	6,426,870	6,176,032	6,119,196	-250,838	56,836	8,573,121		
1.05.03.02.13 Site Electrical Utilities	-144,947	-269,660	16,785	-124,713	-286,445	7,008,866	6,656,632	6,546,779	-352,234	109,852	8,411,720		
1.05.03.02.14 LN2 and GN2 Systems	0	0	0	0	0	0	0	0	0	0	0		
1.05.03.03 Electrical Substation and Feeder (Contract)	109,653	272,689	73,053	163,036	199,636	2,617,796	2,558,017	2,098,118	-59,779	459,899	2,943,143		
1.05.03.04 Chilled Water Plant (Contract)	401,564	707,329	1,136,207	305,765	-428,878	7,543,140	7,561,548	7,347,457	18,408	214,091	9,200,000		
1.05.03.06.01 LOB 1	0	0	0	0	0	0	0	0	0	0	13,293,500		
1.05.03.06.02 LOB 2	0	0	0	0	0	0	0	0	0	0	7,700,000		
1.05.03.06.03 LOB 3	0	0	0	0	0	0	0	0	0	0	12,993,500		
1.05.03.07.01 HXN Sattelite Building Design	0	30,000	0	30,000	30,000	300,000	300,000	0	0	300,000	300,000		
1.05.03.07.02 HXN Satellite Building Construction	0	0	0	0	0	0	0	0	0	0	1,264,573		
1.05.04 Integrated Controls & Communications	0	0	0	0	0	0	0	0	0	0	0		
AARA Sub Total	**6,211,806**	**6,309,423**	**6,859,033**	**97,617**	**-549,610**	**72,868,409**	**75,594,363**	**72,699,231**	**2,725,954**	**2,895,132**	**146,120,719**		
d. Undist. Budget											**1,083,969**		
ARRA Total	**6,211,806**	**6,309,423**	**6,859,033**	**97,617**	**-549,610**	**72,868,409**	**75,594,363**	**72,699,231**	**2,725,954**	**2,895,132**	**147,204,688**		