

QUARTERLY REPORT

Report Date: **12/31/2008**
 Project Number: **07-SC-02**
 Report Period: **Oct-Dec 2008**

U. S. DOE Federal Project Director's Progress Report
 Title: **EBIS Project**
 Location: **Brookhaven National Laboratory**

Office of Science
 Program: **NP**
 Project Office: **BHSO**

SUMMARY ASSESSMENT

	<u>Current Quarter</u>	<u>Previous Quarter</u>
Cost:	Satisfactory	Satisfactory
Schedule:	Satisfactory	Satisfactory
Technical:	Satisfactory	Satisfactory
Overall:	Satisfactory	Satisfactory

PROJECT MANAGEMENT

DOE Office of Nuclear Physics Program Manager: **J. Simon-Gillo**
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 DOE Federal Project Director: **N. Narain**
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 Contractor Project Manager: **J. Alessi**
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PROJECT COST/FUNDING (\$K)

	<u>Baseline</u>	<u>Current Estimate</u>	<u>Funding Received</u>
DOE TEC	13,700	13,700	12,650
DOE TPC	14,800	14,800	13,750
Non DOE	4,500	4,500	4,500

CRITICAL DECISIONS

	<u>Number</u>	<u>Title</u>	<u>Baseline</u>	<u>Actual/Forecast</u>
	0	Mission Need	08/04	08/04 (A)
	1	Preliminary Baseline Range	Q4 FY05	09/05 (A)
	2	Performance Baseline	Q4 FY06	09/06 (A)
	3	Construction	Q1 FY07	09/06 (A)
	4	Start of Operations	Q4 FY10	Q3 FY10 (F)

FUNDING PROFILE

Latest DOE Budget Profile (FY09 Appropriation) (\$K)

DOE info: cumulative through: **Dec 31, 2008**

	<u>FY05</u>	<u>FY06</u>	<u>FY07</u>	<u>FY08</u>	<u>FY09</u>	<u>Total</u>
TEC		1,980	5,120	4,162	2,438	13,700
OPC	700	100			300	1,100
TPC	700	2,080	5,120	4,162	2,738	14,800

	<u>TEC</u>	<u>OPC</u>	<u>TPC (\$)</u>
Remaining Contingency:	1583	0	1583
Costs Accrued:	9539	728	10267
Uncosted Commitments:	391	71	462

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SCHEDULE SUMMARY

Subsystem	Start Date		Completion Date		Percent Complete ¹	
	Baseline	Forecast/Actual	Baseline	Forecast/Actual	Baseline	Actual
Design	Q1FY06	Q1FY06 (A)	Q1FY07	Q4FY07 (A)	100	100
Procurement	Q1FY07	Q3FY07 (A)	Q1FY10	Q1FY10 (F)	94	90
Construction	Q1FY07	Q3FY07 (A)	Q4FY10	Q3FY10 (F)	84	75 ²

1. Percent complete is calculated using data from the Microsoft Project Schedule and Cost Reports. Procurement is calculated based on planned and actual obligations (burdened commitments). Construction includes Procurement.
2. Late delivery of the solenoid has allowed some EBIS tasks to be delayed with no impact to the CD-4 date, so that extra resources could be allocated to other Collider Accelerator Department shutdown work. A PCR will be processed in 2QFY09 to reschedule the delayed tasks.

<u>Milestones Accomplished Since Last Report</u>	<u>Baseline Date</u>	<u>Actual Date</u>
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<u>Upcoming Milestones</u>	<u>Baseline Date</u>	<u>Planned Date</u>
L1 – SC Solenoid Factory / Acceptance Test	1QFY09	2QFY09
L2 – Drift Tube Structure complete	1QFY09	2QFY09
L2 – EBIS Preassembly complete	2QFY09	2QFY09
L2 – RFQ tested to full power	3QFY09	2QFY09

NARRATIVE HIGHLIGHTS

Following delivery of the RFQ to BNL at the end of the last quarter, low level rf measurements were made confirming the measurements made at Frankfurt. Vacuum pumps were installed, the cavity pumped down to 10^{-8} T, and found to be leak tight. A 200' run of 3-1/8" coax was installed from an existing 100 MHz RF amplifier to the RFQ location. Power was then applied to the RFQ, and the RFQ conditioned up to 150 kW (50% above nominal operating value) with no signs of sparking. It is now ready for installation on Test EBIS for beam tests.

Good progress continues to be made on the manufacturing of the linac by Institute of Applied Physics (IAP), Frankfurt, through a subcontract with PINK GmbH. All drift tubes were completed and copper plated at GSI. The three cavity sections are back at PINK following annealing, and are being finish machined in preparation for initial rf measurements. The subcontract for the manufacturing of the internal quadrupole triplet was awarded to Bruker, and they are preparing detailed design drawings. The MEBT buncher cavity and internal structure, also from IAP, are nearly complete. Weekly conference calls with IAP to discuss progress and technical issues continued.

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At the end of the last quarter, the ACCEL superconducting solenoid magnet had been successfully operated at the desired field of 5.5 T, and passed the forced quench test (which it had failed the previous year), but the helium boiloff rate was higher than specified, due to contact between the internal radiation shield and the warm bore, and also the magnetic axis was misaligned relative to the warm bore by ~2mm. During this quarter, ACCEL opened the magnet system, found the cause of the misalignment, and made the necessary repairs. During the repair, the magnet was converted to a flanged system, rather than welding it shut again. This is a benefit to BNL, since it will now be much easier to open should problems arise in the future. During the week of December 15, two BNL staff went to ACCEL for another acceptance test, but the tests could not be performed due to a suspected blockage in the helium fill line during cooldown. The magnet will be warmed up to clear the blockage, and factory testing is now scheduled for the first week of January. Therefore, level 1 milestone for completion of acceptance testing in this quarter was missed, but is expected to be completed early in the next quarter.

The BNL-made electron collector was installed on the Test EBIS for testing prior to installation on the RHIC EBIS. The source was then operated successfully with this collector. In addition, the RHIC EBIS 100 kV HV break and 16-plate deflector were installed, as well as the pulsed solenoid for matching beam in to the RFQ. The optics from the Test EBIS collector through the LEBT chamber now matches the RHIC EBIS optics, so we will soon begin measurements of the emittance of the extracted ion beam at the RFQ entrance location. Brush-Wellman prepared a schedule to remanufacture the Be-Cu electron collector using the spare cylinder, showing delivery to BNL in March, 2009. BNL approved the plan, and fabrication of the new collector is rapidly progressing. They have already successfully made the difficult welds that were the source of the problems during their first attempt at manufacturing the unit.

Good progress was made on the assembly of the EBIS drift tube structure, and we are preparing for final alignment in January. The heating rods and cooling jacket were installed on the center bore vacuum pipe. The level 2 milestone for completion of this drift tube structure during this quarter was missed, since it was given a lower priority relative to competing tasks once the solenoid delivery was delayed.

Hookup of output power combiners and circulators for the 350 kW rf systems for the RFQ and linac continued during this quarter. Manufacturing of the rf amplifiers for the three bunchers continued during this quarter, and by the end of this period all amplifiers had been operated at the factory. Acceptance testing is scheduled for January, 2009.

The order for the HEBT dipole power supply was placed, and a final design review was held at the vendor's factory in December. We are preparing to go out for bids on the pulsed power supplies for the Linac and MEBT quadrupole magnets.

The high voltage platform for the electron collector power supply was installed. The cage which goes around this platform was received, and installation is in progress. Steady progress continues on installation of power supply components and auxiliary equipment for the other EBIS HV platforms.

The high level bi-weekly project status meetings and the monthly telecon meetings between the DOE-HQ Program Office and the site continue. EBIS status meetings with all sub-project leads continue.

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A no-cost administrative Project Change Request was approved by the Contractor Project Manager. The PCR expanded the number of Power Supply purchasing tasks to enable better cost vs. plan comparisons, removed links from Safety milestones due to a better understanding of the Safety requirements for the EBIS operation at CD-4, and incorporated new columns into the Microsoft Project Schedule file which enable different data sorts.

BACKUP INFORMATION

Baseline Document

Document Title: **EBIS Project Execution Plan, Rev.1**

Date of Document: **May 2008**

Approving Official: **Jehanne Simon-Gillo, Associate Director (Acting), Office of Nuclear Physics, Office of Science**