U.S. Large Hadron Collider Construction Program
(U.S. LHC Project)

1. PROJECT IDENTIFIERS

Reporting Period[1]:	Through September 30, 1998
Program Sponsors:	DOE Division of High Energy Physics/NSF Physics Division
Program Managers:	DOE - D. Sutter, (301) 903-5228/NSF - M. Goldberg, (703) 306-1894
DOE Operations Office:	Chicago Operations Office/Fermi Group
Project Manager:	J. Yeck, (630) 840-2530

2. PROJECT DESCRIPTION

The U.S. Department of Energy (DOE) and the National Science Foundation (NSF) have signed agreements committing to collaboration in the construction of the Large Hadron Collider (LHC) at CERN (European Laboratory for Particle Physics) and two of its associated detectors. The U.S. fabrication effort will be carried out at, or under the supervision of, U.S. universities and national laboratories under the terms and conditions described in the International Collaboration Agreement (Agreement) and its Accelerator and Experiments Protocols. The U.S. LHC Construction Program (U.S. LHC Project) is defined by the goods and services to be provided to CERN under the terms of the Agreement between CERN, DOE and NSF. These goods and services include DOE contributions to the LHC accelerator, and DOE and NSF contributions to the ATLAS (A Toroidal LHC Apparatus) and CMS (Compact Muon Solenoid) experiments.

The DOE contribution to the LHC accelerator consists of items provided by DOE National Laboratories and CERN direct purchases from U.S. industrial firms. The scope of these contributions is addressed in the Accelerator Protocol and described in detail in an Implementing Arrangement between the collaborating DOE National Laboratories and CERN. The DOE and NSF contributions to the ATLAS and CMS detectors consists of items supplied by the collaborating U.S. universities and DOE National Laboratories. The scope of these contributions is addressed in the Experiments Protocol and described in detail in Memoranda of Understanding for collaboration on construction of each experiment.

The U.S. LHC Project includes three sub-projects: U.S. ATLAS, U.S. CMS, and U.S. LHC Accelerator projects. This report summarizes the overall status of the U.S. LHC Project effort and includes status specific to each sub-project.

[1] Cost data is provided through the end of the reporting period. Narrative and schedule status can be through the date the report is issued.

3. PROJECT MANAGER'S NARRATIVE HIGHLIGHTS

The DOE/NSF Memorandum of Understanding (MOU) on U.S. Participation in the LHC Project at CERN was formally approved in August 1998. The MOU describes the responsibilities of the DOE/NSF Joint Oversight Group (JOG) and related joint coordination activities. The JOG held its third meeting on December 1, 1998. The U.S. LHC Program Manager presented the status of several action items assigned at the previous JOG meeting held on June 15. These action items and the corresponding completion dates are summarized below:

Action Item	Date Complete
DOE and NSF approve the DOE-NSF MOU on Joint Oversight	Aug. 1998
JOG approve the U.S. LHC Construction Project Execution Plan	Dec. 1998
JOG approve the U.S. CMS Project Management Plan	Dec. 1998
JOG approve the U.S. CMS Baseline Document	Oct. 1998
JOG approve the U.S. LHC Accelerator Project Management Plan	Oct. 1998
DOE appoint Fermilab as lead laboratory for the U.S. LHC Accelerator project	July 1998
U.S. CMS provide list of U.S. CMS deliverables to CERN	Aug. 1998
JOG send letter to CERN endorsing U.S. CMS and U.S. ATLAS deliverables	Oct. 1998
DOE revise funding profiles to address new profile for CERN purchases	Ongoing

The U.S. LHC Project Execution Plan (U.S. LHC PEP), as approved by the JOG on December 1, is a complete description of the organization and management systems for the U.S. LHC project.

The U.S. LHC Project Manager continues to participate in various internal reviews conducted by the contractor project management teams. The projects have progressed beyond the baseline development phase and the project offices are using the management systems defined in the project management plans. There is good communication among project participants.

The work carried out at the collaborating universities and laboratories can be generally described as pre-production work including the design and fabrication of prototype components. The detector projects are in advanced stages of design and procurement for components that are supported by the entire international collaboration. These items are referred to as “common projects” given the responsibility to produce these items, e.g., cryostats and solenoid magnets, is shared among the entire international detector collaborations. There is an extensive amount of information available through the internet. Principal web sites include:

LHC Project	http://wwwlhc.cern.ch/
U.S. LHC Project	http://www.hep.net/doe-hep/lhc.html
ATLAS Experiment	http://atlasinfo.cern.ch/Atlas/Welcome.html
U.S. ATLAS Project	http://www.usatlas.bnl.gov/
CMS Experiment	http://cmsinfo.cern.ch/Welcome.html
U.S. CMS Project	http://uscms.fnal.gov/
U.S. LHC Accelerator	http://www-td.fnal.gov/

4. PROJECT MANAGER'S ASSESSMENT

Project Manager's Summary Assessment – Satisfactory. The project technical, cost, and schedule baselines are approved. All baselines are subject to formal change control procedures and performance reporting has begun. Summary cost and schedule data is included in this report.

Cost Assessment – Satisfactory. U.S. LHC project total cost is fixed at $531 million. The U.S. ATLAS and U.S. CMS detector projects and the U.S. LHC Accelerator project have developed cost baselines within this overall funding constraint. DOE and NSF sponsored reviews of the projects concluded that each project has appropriate cost and contingency estimates. Cost performance is in accordance with plans with very limited use of contingency this fiscal year.

Schedule Assessment – Satisfactory. The LHC is scheduled to complete construction and commence initial operations in 2005. The schedules for the U.S. ATLAS, U.S. CMS, and U.S. LHC Accelerator projects are consistent with the overall LHC schedule. Numerous DOE/NSF control milestones have been developed to track progress and are included in this report. Near term progress is satisfactory.

Technical Assessment – Satisfactory. Considerable effort has been devoted to define a set of deliverables to CERN that the U.S. collaborators are confident can be realized given present funding expectations. The U.S. ATLAS, U.S. CMS, and U.S. LHC Accelerator projects have each developed a separate list of deliverables that has been accepted by DOE and NSF. The projects expect to deliver the entire list of their deliverables and hope that additional deliverables can be provided to CERN should cost performance be favorable.

SIGNIFICANT PROBLEMS/VARIANCE ANALYSIS

There are no significant problems to address. Since the U.S. is only a part of the total LHC program there is a strong interdependence with other international collaborators. Progress on the U.S. responsibilities is typically dependent on progress made by institutions outside the U.S. There are instances where delays in the international ATLAS and CMS experiments have caused adverse schedule impacts to the U.S. activities. This issue continues to be worked by the project management team.

Russian collaborators continue to face severe difficulties due to the financial crisis in Russia. CERN is actively monitoring this issue in order to mitigate impacts on the LHC program.

ITEMS REQUIRING HEADQUARTERS ACTION

NSF Cooperative Agreements - NSF will fund the U.S. ATLAS and U.S. CMS projects through Cooperative Agreements with Columbia University and Northeastern University, respectively. These Cooperative Agreements must be awarded to permit the use of NSF funding in FY 1999.

5. NARRATIVE SUMMARY

5.1 DETECTORS

U.S. ATLAS

The U.S. ATLAS Project Manager and the U.S. ATLAS Project Advisory Panel (PAP) conducted a review of the entire project in early August at Brookhaven National Laboratory (BNL). The PAP reports to the BNL Associate Laboratory Director assigned oversight responsibility by DOE and NSF. The review focused on the resource-loaded schedules and provided a number of constructive recommendations to the project team. A DOE/NSF review was conducted in early October. A final report from this review should be available in December. Status of selected U.S. ATLAS subsystems in summarized below:

Silicon System – Important results continue to come out of the test beam run of the Pixel System. Excellent efficiency is observed even for detectors irradiated to the full LHC fluence.

Liquid Argon Calorimeter - The large barrel cryostat for the Liquid Argon system was ordered at a very favorable price. The management team has been working with ATLAS to try to ensure urgent review of the problems in the readout electrodes. The electrodes are not a U.S. responsibility but are vital for the detector. Good results have been obtained for the feedthroughs based on glass-insulated pins, rather that the ceramic-insulated pins ordered earlier. The design review for this item was held in October.

Transition Radiation Tracker – The vendors of the carbon fiber shells that held up the start of production have solved their problems. Straw tube wiring and testing started at Hampton University.

Tile Calorimeter – The gain drift observed in the previous test beam results of the Tile Calorimeter has now been understood as an effect in the photomultiplier. The manufacturer knows the origin of the effect, and ATLAS has decided to use a modified phototube with slightly different processing.

Muon Spectrometer – The tooling for the muon system is in preparation.

U.S. CMS

The U.S. CMS project office submitted its first monthly report addressing technical, cost, and schedule performance through the end of September. Progress in selected subsystems is described below:

Hadron Calorimeter (HCAL) - The HCAL barrel passed the first CMS Engineering Design Review. All of the HCAL scintillator was purchased in FY 1998. In addition, the first pre-production prototype passed a CERN safety review.

Common Projects - Agreement was reached with CMS that the U.S. CMS contribution to

Common Projects will be fixed in U.S. dollars, thus removing concerns about currency fluctuations. The University of Wisconsin awarded a contract to Kawasaki Heavy Industries for fabrication on the endcap yoke at a price well below the estimate given in the CMS cost book.

5.2 LHC MACHINE

U.S LHC ACCELERATOR

The Implementing Arrangement (IA) between CERN and the U.S. LHC Accelerator Collaboration was signed in July. The document was signed by the CERN LHC Project Leader, L. Evans; the three DOE laboratory directors, J. Peoples, J. Marburger, and C. Shank; and the U.S. LHC Accelerator Project Manager, J. Strait.

A review of Fermilab's model magnet program for the Inner Triplet Quadrupoles was conducted in July. The review committee included members from outside Fermilab including one member from CERN. The quadrupole magnet R&D program was modified based on the recommendations of the review committee.

A conceptual design review of BNL's Interaction Region and RF Region Beam Separation Dipole magnet designs was conducted in July. The review committee recommended that BNL proceed with detailed designs.

CERN DIRECT PURCHASES[2]

The U.S. has begun to receive invoices from CERN for their payments to U.S. vendors as described in the U.S.-CERN Agreement and Accelerator Protocol. The first invoices for approximately $4 million and $1.15 million have been paid for down payments for materials from Wah Chang and IGC, respectively. CERN and Cabot Corporation have terminated negotiations regarding contracts for niobium-titanium rods and niobium sheet. As a result, CERN has elected to increase the orders to Wah Chang to cover these materials.

CERN is working with Wah Chang to accelerate deliveries on its contracts. This may affect the U.S. LHC spending profiles for industrial procurements.

[2] The status presented on CERN direct purchases is through December 15, 1998.

6. FINANCIAL/COST STATUS AND PLANS

TOTAL PROJECT FUNDING PLAN (then year millions of dollars)[3]

Fiscal Year	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	Total
Machine Funding Profiles (DOE)[4]											
LHC Accelerator	2.00	6.67	14.00	11.80	17.00	17.00	17.00	14.70	9.83	0.00	110.00
CERN Direct	0.00	0.00	0.00	18.80	14.20	14.20	14.20	14.30	14.30	0.00	90.00
Total	2.00	6.67	14.00	30.60	31.20	31.20	31.20	29.00	24.13	0.00	200.00
Detector Funding Profiles (DOE and NSF)											
US ATLAS	1.70	3.70	10.05	27.83	27.44	27.59	27.85	22.89	14.70	0.00	163.75
DOE	1.70	3.70	10.05	11.20	15.50	15.30	15.20	15.60	14.70	0.00	102.95
NSF	0.00	0.00	0.00	16.63	11.94	12.29	12.65	7.29	0.00	0.00	60.80
US CMS	2.30	4.63	10.95	28.72	27.26	27.58	27.81	22.83	15.17	0.00	167.25
DOE	2.30	4.63	10.95	23.20	23.30	23.50	23.60	20.40	15.17	0.00	147.05
NSF	0.00	0.00	0.00	5.52	3.96	4.08	4.21	2.43	0.00	0.00	20.20
Detector Totals	4.00	8.33	21.00	56.55	54.70	55.17	55.66	45.72	29.87	0.00	331.00

FUNDS, COSTS, & COMMITMENTS (thousands of dollars)[5]

Project Element	A = Funds Allocated	B = Actual Costs	C = Open Commit.	D= B+C Total	A –D= Funds Available
Detectors					
U.S. ATLAS	15,460	9,778	2,628	12,406	3,054
U.S. CMS	17,870	14,341	2,140	16,481	1,389
Machine					
U.S. LHC Accelerator	22,670	16,413	1,060	17,473	5,197
CERN Direct Purchases	0	0	0	0	0
U.S. LHC TOTAL	56,000	40,532	5,828	46,360	9,640

The Funds, Costs, & Commitments table addresses DOE funding only. NSF funding for the U.S. LHC Construction Program begins in FY 1999. The figures presented exclude NSF r&d funding. The total U.S. LHC funds available at the end of the fiscal year is higher than planned. This is primarily due to the fact that CERN did not invoice DOE for their Direct Purchases in FY 1998 as originally planned. Funding originally allocated to CERN Direct Purchases was reallocated to the other U.S. LHC activities late in the fiscal year.

[3] The actual annual funding distribution among the U.S. LHC projects is subject to change. The total funding for these projects is fixed.

[4] During the reporting period there was a change to the planned funding profiles for the machine (DOE funding only). FY 1998 funding for reimbursements to CERN for their direct purchases from U.S. vendors was reduced and reallocated to U.S. LHC Accelerator project. Further revisions to the profiles will addressed next quarter.

[5] The figures presented in this table are estimates only. The estimates are based on financial reports from the U.S. ATLAS, U.S. CMS, and U.S. LHC Accelerator project offices.

DOE/NSF COST BASELINE (in thousands of dollars)

U.S. ATLAS Cost Baseline

WBS No.	Description	Original	Change	Current
1.1	Silicon System	15,677	0	15,677
1.2	Transition Radiation Tracker	6,563	0	6,563
1.3	Liquid Argon Calorimeter	34,922	0	34,922
1.4	Tile Calorimeter	6,576	0	6,576
1.5	Muon Spectrometer	17,928	0	17,928
1.6	Trigger/Data Acquisition System	13,245	0	13,245
1.7	Common Projects	8,089	0	8,089
1.8	Education	270	0	270
1.9	Project Management	6,863	0	6,863
	Contingency	37,068	0	37,068
	Total in FY 1997 dollars	147,201	0	147,201
	Escalation (FY 1997 to as spent $)	16,549	0	16,549
	U.S. ATLAS Total Cost Baseline	163,750	0	163,750

U.S. CMS Cost Baseline

WBS No.	Description	Original	Change	Current
1.1	Endcap Muon	26,551	0	26,551
1.2	Hadron Calorimeter	30,255	0	30,255
1.3	Trigger and Data Acquisition	12,393	0	12,393
1.4	Electromagnetic Calorimeter	7,728	0	7,728
1.5	Forward Pixels	5,208	0	5,208
1.6	Common Projects	23,714	0	23,714
1.7	Project Office	5,738	0	5,738
	Contingency	48,743	0	48,743
	FY 1996 & FY 1997 Expenditures	6,920	0	6,920
	U.S. CMS Total Cost Baseline	167,250	0	167,250

U.S. LHC Accelerator Cost Baseline

WBS No.	Description	Original	Change	Current
1.1	Interaction Region Components	42,147	0	42,147
1.2	Radio Frequency Straight Section	12,636	0	12,636
1.3	Superconducting Wire and Cable	10,608	0	10,608
1.4	Accelerator Physics	4,508	0	4,508
1.5	Project Management	14,175	0	14,175
	Escalation (FY 1997 to as spent $)	7,117	0	7,117
	Total in as spent $	91,195	0	91,195
	Contingency	18,809	0	18,809
	U.S. LHC Accelerator Total Cost Baseline	110,000	0	110,000

7. SCHEDULE STATUS AND PLANS[6]

U.S. ATLAS Schedule Baseline

WBS Identifiers	Milestone Description	Baseline Date	Forecast (F)/ Actual (A)
1	Project Start	10/01/95	10/01/95 (A)
	Project Completion	09/30/05	09/30/05 (F)
1.1 Silicon	Start Full Silicon Strip Electronics Production	05/03/99	05/03/99 (F)
	Start Full Strip Module Production	10/15/99	10/15/99 (F)
	ROD Design Complete	04/14/00	04/14/00 (F)
	Complete Silicon Strip Module Production	05/01/02	05/01/02 (F)
	ROD Installation Complete	09/30/04	09/30/04 (F)
1.2 TRT	Mechanical Design Frozen	12/31/98	**12/07/98 (F)**
	Select Final Electrical Design	07/31/00	**08/06/98 (A)**
	Start Production (Electrical)	07/31/00	07/31/00 (F)
	Module Production Complete	03/29/02	03/29/02 (F)
	Barrel Construction Complete	12/31/02	12/31/02 (F)
	Installation Complete (Electrical)	09/30/04	09/30/04 (F)
1.3 LArCal	Cryostat Contract Award	07/24/98	**08/05/98 (A)**
	Barrel Feedthroughs Final Design Review	09/30/98	**01/31/99 (F)**
	Start Electronics Production	06/01/99	06/01/99 (F)
	FCAL Mechanical Design Review	12/14/98	12/14/98 (F)
	FE Board SCA Production Chip Submission	11/01/99	**07/01/00 (F)**
	Level 1 Trigger Final Design Complete	03/01/00	03/01/00 (F)
	ROD Final Design Complete	06/01/00	06/01/00 (F)
	Motherboard System Production Complete	01/01/01	01/01/01 (F)
	Cryostat Arrives at CERN	03/30/01	03/30/01 (F)
	Barrel Feedthroughs Production Complete	07/18/01	07/18/01 (F)
	FCAL-C Delivered to EC	09/03/01	09/03/01 (F)
	FCAL-A Delivered to EC	11/01/02	11/01/02 (F)
1.4 Tile Cal	Start Submodule Procurement	09/01/97	**09/01/97 (A)**
	Technology Choice for F/E Electronics	11/15/97	**11/15/97 (A)**
	Start Module Construction	05/01/99	05/01/99 (F)
	Start Production Motherboards & Digitizer boards	07/02/99	07/02/99 (F)
	Start Installation at CERN	06/01/02	06/01/02 (F)
	Module Construction Complete	10/01/02	10/01/02 (F)
	Installation at CERN Complete	05/01/04	05/01/04 (F)
1.5 Muon	Start MDT Chambers Lines 1 and 2	01/04/99	01/04/99 (F)
	Start CSC Chamber Production	07/01/99	07/01/99 (F)
	ASD Chip Design Complete	10/29/99	10/29/99 (F)
	Final Design Global Alignment Devices Complete	04/28/00	04/28/00 (F)
	CSC IC Production Complete	06/30/00	06/30/00 (F)

[6] Actual (A) dates are shown in bold print. Forecast (F) dates are also shown in bold when the forecast date differs from the baseline date.

	MDT Supports,Mounts,Connect. Design Complete	01/30/01	01/30/01 (F)
	MDT Chambers Production Complete	09/30/03	09/30/03 (F)
	MDT Supports,Mounts,Connectors Fab. Complete	12/31/03	12/31/03 (F)
	ROD Production Complete	01/30/04	01/30/04 (F)
	MDT Off-Chamber Electronics Product. Complete	05/28/04	05/28/04 (F)
	CSC Assembly/Testing at CERN Complete	12/31/04	12/31/04 (F)
	Global Alignment Final Assembly Complete	12/31/04	12/31/04 (F)
1.6 Trigger	Select Final LVL2 Architecture	12/31/99	12/31/99 (F)
DAQ	LVL2 Trigger Design Complete	12/31/01	12/31/01 (F)
	LVL2 Trigger Development/Prototype Complete	12/31/01	12/31/01 (F)
	Start Production	01/08/02	01/08/02 (F)
	Start Installation and Commissioning	03/05/02	03/05/02 (F)
	Production Complete	12/31/04	12/31/04 (F)
	LVL2 Installation and Commissioning	12/31/04	12/31/04 (F)

U.S. CMS Schedule Baseline (Proposed)

WBS Identifiers	Milestone Description	Baseline Date	Forecast (F)/ Actual (A)
1	DOE/NSF CERN Agreement	12/97	**12/08/98 (A)**
	Approve Baseline	07/98	**10/19/98 (A)**
	Approve Project Management Plan	09/98	**12/01/98 (A)**
	US CMS Project Complete	10/05	10/05 (F)
CP	Move 2nd Year Funding for Common Package A	10/98	10/98 (F)
EMU	Muon CSC Factory Start	01/99	01/99 (F)
HCAL	HCAL Optics Factory Start	01/99	01/99 (F)
HCAL	1st 18 Wedges Optics @ CERN	06/00	06/00 (F)
HCAL	1st 18 Wedges HCAL Brass @ CERN	11/00	11/00 (F)
FPIX	FPIX Cooling Distribution Design Complete	01/01	01/01 (F)
CP	4th Year CP Package A Payment Complete	06/01	06/01 (F)
EMU	1st 17 EMU CSC Chambers Complete	06/01	06/01 (F)
HCAL	Finish Production Brass Wedges @ CERN	12/01	12/01 (F)
HCAL	Finish Production Optical System @ CERN	12/01	12/01 (F)
HCAL	HCAL Electronics Complete	01/02	01/02 (F)
ECAL	Final Production ECAL Serializer Wafer	02/02	02/02 (F)
TriDAS	Trigger MPC Board Assembly Complete	01/03	01/03 (F)
Inst	Start CMS Installation in Pit	01/03	01/03 (F)
CP	HE + YE + Connect	01/03	01/03 (F)
CP	HB in Vacuum Tank Test	03/03	03/03 (F)
CP	HE - YE – Connect	05/03	05/03 (F)
EMU	1st Half CSC Assembly at CERN Complete	07/03	07/03 (F)
TriDAS	DAQ Event Manager Boards Complete	08/03	08/03 (F)
CP	Magnet Full Field Test Completed @ CERN	09/03	09/03 (F)
Inst	BO Underground Counting House	09/03	09/03 (F)
ECAL	Complete Production of APDs	09/03	09/03 (F)

Inst	Install Magnet in Collision Hall	10/03	10/03 (F)
EMU	All ME234/2 Assembled & Tested	10/03	10/03 (F)
EMU	EMU Electronics Complete	12/03	12/03 (F)
ECAL	Forward Pixels Shipped to CERN	09/04	09/04 (F)
All	US CMS Construction Complete	09/04	09/04 (F)

U.S. LHC Accelerator Schedule Baseline

WBS Identifiers	Milestone Description	Baseline Date	Forecast (F)/ Actual (A)
1	Project Start	10/01/95	10/01/95 (A)
	Decision on RF Region Quadrupoles	07/01/01	07/01/01 (F)
	Project Completion	09/30/05	09/30/05 (F)
1.1 IR Region	Begin 1st Inner Triplet Quadrupole Model Magnet	07/01/97	**07/01/97 (A)**
	Complete Inner Triplet Quad Model Phase 1	06/01/99	06/01/99 (F)
	Complete Inner Triplet Quad Model Phase 2	01/01/00	01/01/00 (F)
	Complete Tests of Prototype HTS Power Leads	01/01/00	01/01/00 (F)
	Begin Absorber Fabrication	11/01/00	11/01/00 (F)
	Complete Inner Triplet Quad Prototype Program	12/01/00	12/01/00 (F)
	Begin Interaction Region Dipole Prod. Assembly	03/01/01	03/01/01 (F)
	Begin Inner Triplet Feedbox Fabrication	03/01/01	03/01/01 (F)
	Begin Inner Triplet Quad Production Assembly	04/15/01	04/15/01 (F)
	Complete 1st Inner Triplet Quadrupole Magnet	11/01/01	11/01/01 (F)
	Delivery of D2 for IR8 Left	04/01/02	04/01/02 (F)
	Complete Inner Triplet Feedbox Fabrication	05/01/02	05/01/02 (F)
	Delivery of All Inner Triplet System Components for IR8 Left (MQX, DFBX, D1)	10/01/02	10/01/02 (F)
	Delivery of D2 for IR5 Left	11/01/02	11/01/02 (F)
	Complete Absorber Fabrication	12/01/02	12/01/02 (F)
	Delivery of All Inner Triplet System Components for IR8 Right (MQX, DFBX, D1)	01/01/03	01/01/03 (F)
	Delivery of D2 for IR8 Right	02/01/03	02/01/03 (F)
	Complete IR Dipole Production Assembly	03/01/03	03/01/03 (F)
	Delivery of All Inner Triplet System Components for IR1 Left (MQX, DFBX, TAS, TAN)	07/01/03	07/01/03 (F)
	Delivery of D2 for IR2 Right	09/01/03	09/01/03 (F)
	Begin Ionization Chamber Fabrication	11/01/03	11/01/03 (F)
	Delivery of D2 for IR1 Left	12/01/03	12/01/03 (F)

	Delivery of All Inner Triplet System Components for IR5 Left (MQX, DFBX, TAS, TAN)	01/01/04	01/01/04 (F)
	Delivery of D2 for IR5 Right	03/01/04	03/01/04 (F)
	Delivery of All Inner Triplet System Components for IR5 Right (MQX, DFBX, TAS, TAN)	04/01/04	04/01/04 (F)
	Delivery of All Inner Triplet System Components for IR2 Right (MQX, DFBX, D1)	04/01/04	04/01/04 (F)
	Delivery of All Inner Triplet System Components for IR1 Right (MQX, DFBX, TAS, TAN)	07/01/04	07/01/04 (F)
	Delivery of D2 for IR1 Right	08/01/04	08/01/04 (F)
	Delivery of D2 for IR2 Left	09/01/04	09/01/04 (F)
	Complete Inner Triplet Quadrupole Production	09/01/04	09/01/04 (F)
	Complete Ionization Chamber Fabrication	09/15/04	09/15/04 (F)
	Delivery of All Inner Triplet System Components for IR2 Left (MQX, DFBX, D1)	10/01/04	10/01/04 (F)
	Interaction Region Task Complete	09/30/05	09/30/05 (F)
1.2 RF Region	Begin Assembly of 1st Dipole Model Magnet	09/01/99	09/01/99 (F)
	Complete Dipole Model Magnet Program	08/01/00	08/01/00 (F)
	Begin RF Region Dipole Production Assembly	09/01/00	09/01/00 (F)
	Delivery of D3, D4 for IR4 right	01/01/02	01/01/02 (F)
	Complete RF Region Dipole Production Assembly	10/01/02	10/01/02 (F)
	Delivery of D3, D4 for IR4 left	11/01/02	11/01/02 (F)
	RF Region Task Complete	09/30/05	09/30/05 (F)
1.3 SC	Deliver All Cable Production Support Equipment	03/01/99	03/01/99 (F)
	Complete Superconductor Test Facility Upgrades	06/01/99	06/01/99 (F)
	Series Wire and Cable Testing Complete	10/01/04	10/01/04 (F)
	Superconducting Wire and Cable Testing Complete	09/30/05	09/30/05 (F)

8. TECHNICAL BASELINE STATUS

Project Element	Reference Document	Forecast
US ATLAS	US ATLAS PMP Appendix 3	No change. Approved 3/18/98
US CMS	US CMS PMP Appendix 2	No change. Approved 10/19/98
US LHC Accelerator	US LHC Accelerator PMP Annex II	No change. Approved 6/15/98

U.S. ATLAS

The U.S. ATLAS collaboration defined a list of initial deliverables representing the U.S. contribution to ATLAS. This list was approved by the DOE/NSF Joint Oversight Group in March 1998 and transmitted to the CERN Director of Research in April 1998. Additional deliverables have already been identified as potential future contributions should cost performance permit.

U.S. CMS

The U.S. CMS collaboration defined a list of deliverables representing the U.S. contribution to CMS. This list was sent to the CERN Director of Research in August 1998 and approved by the DOE/NSF Joint Oversight Group in October 1998.

U.S. LHC Machine

U.S. LHC Accelerator Project - The U.S. deliverables to CERN are defined in the Implementing Arrangement to the Accelerator Protocol. The Implementing Arrangement was signed by the CERN and U.S. signatories in July 1998.

CERN Direct Purchases - CERN will procure from U.S. industrial firms supplies required to construct the LHC accelerator. These supplies will include superconducting alloy, cable, insulation, and other materials. CERN is currently negotiating contracts with U.S. suppliers for Niobium-Titanium bars, Niobium sheets, and superconducting cable.

9. BASELINE CHANGE ACTIVITY

Baseline Control Level	Baseline Change Description
Level 1, DOE/NSF Joint Oversight Group	No changes this quarter
Level 2, DOE/NSF Project Office	No changes this quarter
Level 3, US ATLAS	No changes this quarter
US CMS	No changes this quarter
US LHC Accelerator Project	No changes this quarter

There were no baseline changes during the reporting period.