

21 April 2005

To: Paul Philp
DOE Project Manager, Run IIb CDF Detector Project

From: Pat Lukens
Project Manager for the Run IIb CDF Detector Project

Subject: Run IIb CDF Detector Project March 2005 Report

Attached is the monthly report summarizing the March 2005 activities and progress for the Fermilab RunIIb CDF Detector Project. This report is available electronically at:

<http://www-cdf.fnal.gov/run2b.html>

electronic cc: A. Annovi
J. Appel
E. Arroyo
D. Benjamin
H. Frisch
D. Hoffer
J. Huston
R. Hughes
E. James
YK Kim
D. Knapp
B. Knuteson
S. Kuhlmann
T. Liu
J. Livengood
R. Lipton
P. Lukens
T. Miao
H. Montgomery
V. O'Dell
V. Pavlicek
K. Pitts
L. Ristori
R. Roser
TJ Sarlina
T. Shaw
M. Shochet
K. Stanfield
J. Strait
E. Temple
D. Toback
C. Trimby
V. White
P. Wilson
B. Winer
M. Witherell

RunIIb CDF Detector Project
Progress Report No. 28
1 - 31 March 2005

I. PROJECT DESCRIPTION

The primary goal of the CDF Run IIb Detector Project is to enable the detector to exploit the physics opportunities available during Tevatron operation through 2008. The data from Run II will represent a set of detailed measurements that can be compared with the predictions of the Standard Model at the highest available collision energy. The increased size of the data sample will allow us to study the top quark by measuring the details of its production and decay mechanism. In addition, we plan precision electroweak and QCD measurements, continued searches for a variety of phenomena that are predicted to exist beyond the Standard Model framework, and to explore CP violation in the b quark sector. The detailed physics goals of the upgrade are described in the Technical Design Report (TDR).

The major tasks of this upgrade are:

- Upgrade the calorimeter by replacing the Central Preradiator Chamber with a device with shorter response time to allow operation in a high-luminosity environment, and adding timing information to the electromagnetic calorimeters.
- Upgrade the data acquisition and trigger systems to increase throughput needed for higher luminosity operation and efficiently trigger on the higher multiplicity events of Run IIb.

II. OVERVIEW OF PROJECT STATUS – P. Lukens

The project made steady progress during March, 2005. The final procurement to close out the Calorimeter subproject was placed, and all cost codes for the calorimeter activities will be closed by the end of April. Installation of modified TDC's continues. The upgraded Level 2 trigger system was placed into operation. All remaining subprojects are on track for installation during the summer.

Our current projection is that portions of the Project that require a shutdown of the experiment and access to the collision hall will be complete by 29 August 2005. Our current estimate is that no more than five weeks of shutdown are required for installation of the Run IIb upgrades.

III. PROJECT MILESTONE SUMMARY (as of 31 March 2005)

CDF Data Acquisition & Trigger (L1 and L2) Milestones Sorted by Baseline Completion Date

WBS	Title	Baseline Comp. Date	Forecast/Actual Completion Date	Complete
1.3.2.6.3	Begin production of Level 2 Pulsar system	12 Nov 03	12 Nov 03	Yes
1.3.1.6.6	First Prototype TDC available for testing	19-Nov-03	16-Feb-04	Yes
1.3.4.4.1.4	Prototype Event Builder hardware arrives	3-Jun-04	31 Mar 04	Yes
1.3.2.10	Pulsar Hardware Ready for Installation	31-Aug-04	20-Aug-04	Yes
1.3.6.1.1.7	Begin AMS Design Work	1-Sept-04	2-Aug-04	Yes
1.3.6.1.3.7	Begin Track Fitter Design	1-Sept-04	2-Aug-04	Yes
1.3.4.5.3	Production Readiness Review - Event Builder	4-Oct-04	2-Jun-04	Yes
1.3.4.5.4.4	Arrival of the Event Builder hardware	15-Oct-04	15-Oct-04	Yes
1.3.11.8.5.5	Begin Purchase of Pulsar Board components	20-Oct-04	4-Nov-04	Yes
1.3.11.5.3.8	Begin Production TDC Mezzanine Card	28-Oct-04	3-Nov-04	Yes
1.3.6.2.6.4	Begin Ampchip Production	10-Jan-05	22-Nov-04	Yes
1.3.6.2.1.1.5	Begin AMS Mezzanine Card Production	14-Jan-05	11-Nov-04	Yes
1.3.1.17.4	TDC Readout System Complete	21-Jan-05	10-Dec-04	Yes
1.3.11.6.3.6	Receipt of TDC to Finder cables complete	18-Mar-05	3-May-05	
1.3.5.3.7	Arrival of 15 PCs from the vendor	23-Mar-05	18-Mar-05	Yes
1.3.2.9	Pulsar Level 2 subproject ready for installation	1-Apr-05	11-Mar-05	Yes
1.3.11.8.8	Begin Joint Testing with Finder Board	4-Apr-05	2-May-05	
1.3.11.7.5.8	Begin Production of SLAM Boards	18-Apr-05	3-May-05	
1.3.11.4.4.8	Begin Production TDC Fiber Transition Boards	21-Apr-05	18-Apr-05	
1.3.11.5.3.9	Checkout of TDC Mezzanine Cards Complete	6-Jun-05	15-Jun-05	
1.3.11.2.5.1	Begin Production XFT Finder Boards	8-Jun-05	16-May-05	
1.3.6.1.2.5	Hit Buffer Firmware Complete for Board Test	23-Jun-05	14-Jun-05	
1.3.6.1.3.5	Track Fitter Firmware Complete for Board Test	28-Jun-05	31-Mar-05	
1.3.1.12.6	Installation of Modified TDC's Complete	27-July-05	29-Aug-05	
1.3.4.8	Finish Event-Builder Upgrade	28-July-05	29-Jun-05	
1.3.10.2	Ready for Accelerator Shutdown 2005	8-Aug-05	29-Aug-05	
1.3.1.12.8	TDC Modification Complete	10-Aug-05	13-Sept-05	
1.3.5.5.5	Arrival of 70 Level3 and 15 DAQ PCs	15-Aug-05	15-Aug-05	
1.3.5.6.5	Arrival of 140/20 PCs from the vendor	15-Aug-05	15-Aug-05	
1.3.6.1.1.5	AMS Firmware Complete for Board Test	19-Aug-05	14-Apr-05	
1.3.6.3	SVT ready for installation	25-Aug-05	9-Aug-05	
1.3.5.8	Finish Purchase of Computers for L3 DAQ system	6-Sept-05	6-Sept-05	
1.3.11.4.4.9	Checkout of TDC Transition Boards Complete	16-Sept-05	3-Aug-05	
1.3.11.7.5.9	Checkout of SLAM Boards Complete	28-Sept-05	1-Sept-05	
1.3.11.2.5.10	Finder Board Checkout Complete	29-Sept-05	27-Oct-05	
1.3.11.10	XFT Ready for Installation at CDF	29-Sep-05	27-Oct-05	
1.3.8	Finish Run 2b Trigger DAQ project	30-Sep-05	27-Oct-05	
1.3.9	DAQ and Trigger Upgrades Ready for Installation	17-Jan-06	27-Oct-05	

Run IIb Data Acquisition & Trigger Milestones (Level 1 and 2)

ID	Name	Forecast	Baseline	Variance	2004				2005				2006					
					Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3		
174	Begin production of Level2 Pulsar system	11/12/03	11/12/03	0 wks	◆													
67	First Prototype TDC available for testing	2/16/04	11/19/03	11.35 wks	◆	★												
344	Arrival of the prototype Event Builder hardware	3/31/04	6/3/04	-9 wks		★	◆											
184	Pulsar Hardware Ready for Installation	8/20/04	8/31/04	-1.4 wks					◆									
411	Begin AMS Design Work	8/2/04	9/1/04	-4.4 wks					★	◆								
425	Begin Track Fitter Design	8/2/04	9/1/04	-4.4 wks					★	◆								
353	Event Builder Production Readiness Review	6/2/04	10/4/04	-17 wks						★	◆							
358	Arrival of the Event Builder hardware	10/15/04	10/15/04	0 wks							◆							
321	Begin Purchase of Pulsar Board components	11/4/04	10/20/04	2 wks							◆							
269	Begin Production TDC Mezzanine Card	11/3/04	10/28/04	0.8 wks							◆							
471	Begin Ampchip Production	11/22/04	1/10/05	-5.8 wks							★	◆						
436	Begin AMS Mezzanine Card Production	11/11/04	1/14/05	-8.2 wks							★	◆						
108	TDC Readout System Complete	12/10/04	1/21/05	-4.8 wks							★	◆						
280	Receipt of TDC to Finder cables Complete	5/3/05	3/18/05	6.4 wks								◆	◇					
376	Arrival of 15 PCs from the vendor	3/18/05	3/23/05	-0.6 wks								◆						
188	Pulsar Level 2 subproject ready for installation	3/11/05	4/1/05	-3 wks								★	◆					
324	Begin Joint Testing with Finder Board	5/2/05	4/4/05	3.8 wks									◆	◇				
307	Begin Production of SLAM Boards	5/3/05	4/18/05	2.2 wks									◆					
252	Begin Production TDC Fiber Transition Boards	4/18/05	4/21/05	-0.6 wks									◆					
270	Checkout of TDC Mezzanine Cards Complete	6/15/05	6/6/05	1.4 wks									◆					
212	Begin Production XFT Finder Boards	5/16/05	6/8/05	-3.2 wks										◆				
417	Hit Buffer Firmware Complete for Board Test	6/14/05	6/23/05	-1.6 wks										◆				
423	Track Fitter Firmware Complete for Board Test	3/31/05	6/28/05	-12.6 wks											◆			
146	Installation of Modified TDC's Complete	8/29/05	7/27/05	4.6 wks												◆		
367	Finish Event-Builder Upgrade	6/29/05	7/28/05	-4 wks												◆		
480	Ready for Accelerator Shutdown 2005	8/29/05	8/8/05	3.2 wks												◆		
152	TDC Modification Complete	9/13/05	8/10/05	4.6 wks												◆		
391	Arrival of 70 Level3 and 15 DAQ PCs from the vendor	8/15/05	8/15/05	0 wks												◆		
398	Arrival of 140/20 PCs from the vendor	8/15/05	8/15/05	0 wks												◆		
409	AMS Firmware Complete for Board Test	4/14/05	8/19/05	-18 wks													◆	
473	SVT ready for installation	8/9/05	8/25/05	-2.4 wks													◆	
401	Finish Purchase of Computers for Level3/DAQ system	9/6/05	9/6/05	0 wks													◆	
253	Checkout of TDC Transition Boards Complete	8/3/05	9/16/05	-6.2 wks													◆	
308	Checkout of SLAM Boards Complete	9/1/05	9/28/05	-3.6 wks													◆	
224	Finder Board Checkout Complete	10/27/05	9/29/05	4 wks													◆	
326	XFT Ready for Installation at CDF	10/27/05	9/29/05	4 wks													◆	
475	Finish Run 2b Trigger DAQ project	10/27/05	9/30/05	4 wks													◆	
476	Data Acquisition and Trigger Upgrades Ready to Install	10/27/05	1/17/06	-10 wks													◆	◆

Project: CDF RunIIb DAQ
 Status Date: 3/31/05
 Print Date: 4/15/05

Completed Milestone ★
 Current Forecast ◇

Baseline Milestone ◆

IV. PROCUREMENT – P. Lukens

The procurement to finish the calorimeter project was placed with Michigan State. Also, a large procurement was placed with Ohio State University for production of the Stereo Linker module of the track trigger project.

V. PROJECT HIGHLIGHTS

1.3 – Data Acquisition and Trigger

1.3.1 TDC (Time to Digital Converter) – Eric James

TDC modification continues at a rate of about 10 boards per week when boards are available. A total of 98 boards out of 300 to be modified were completed by the end of the month. The success rate for the modifications remains well above ninety percent. We have continued to install modified boards on the detector as they become available. As of the end of the month, modified boards have been installed in four of the twenty COT TDC crates in the CDF collision hall. The newly installed boards have performed well and have not had a negative impact on normal detector operations.

Month	Board Modification		Testing at Michigan		Detector Installation	
	Complete	Remaining	Complete	Remaining	Complete	Remaining
January	39	261	9	291	0	233
February	61	239	43	257	21	212
March	98 - (33%)	202	65 - (22%)	235	42 - (18%)	191

1.3.2 Level 2 – Ted Liu

The upgrade Level 2 Pulsar system has been driving the CDF data-taking since mid-March without significant problems. In their presentation at the April 1 meeting of the Trigger and Dataset Working Group, the Pulsar group indicated they are ready to be declared operational. There are still things to learn but that will come with operating time. The Pulsar group will still be working actively to improve things in the future. The L2 Pulsar Readiness Review Committee agreed that the Pulsar is operational and ready for running alone. The Committee considers the original L2 Pulsar Upgrade project to be complete and congratulated the L2 Pulsar group for a job well done (and for getting the Pulsar its full "driver's license").

1.3.11 XFT (eXtremely Fast Tracker) II – Richard Hughes, Brian Winer, Kevin Pitts

Stereo Linker Association Module (SLAM) Boards: SLAM testing continued. Two boards are completely loaded with parts. Firmware was developed to use one of the boards as a source (driver) for optical signals and the other board as a receiver. We drove data on all nine fibers between the two boards. The data was driven at speed. We are in the process of debugging the connections between the two boards. We have tested the loading of the flash RAM on the boards that hold the firmware designs and it works well. Software for testing has continued to become more developed. We now have block transfers of data to the board working. This speeds up the testing and communication to the board considerably. Development of the firmware for the full algorithm is continuing and we expect to download the firmware next month.

XTC: The first five machine assembled boards were received from the vendor during the week of March 7th. These boards were inspected and went through the full checkout

procedure. One board showed a low level problem that was not assembly-related, so the remainder of the production assembly order was released. Production checkout testing code is fully ready to receive the production quantity of XTC boards. In addition to full scale checkout, the production teststand is being utilized to run "burn in" tests on a selected sub-sample of the boards. The remaining boards will undergo burn in the Fermilab TDC test crate before installation on the detector. We are logging XTC production board information in the CDF module database.

We're now using the first production XTC boards to test modified TDCs at Fermilab. When sufficient production boards are available, they will be incorporated into the TDC installation cycle and installed onto the detector. This will minimize the access time needed for XTC boards during the shutdown.

Testing of the prototype fiber optic transmission boards continues. We have successfully captured fiber optic data from the XTC->TDC TM->Finder in the Wilson Hall test stand. We also have a standalone Tx test setup available using a Pulsar board.

Due to design changes in other parts of the system, it is no longer advantageous to have distinct TDC TM and fiber optic Tx mezzanine boards. In the next version of the TDC TM board, we will incorporate Tx functionality directly onto this board, alleviating the need for a mezzanine board. We anticipate the first copy of this board to be available by May 1.

Cabling: The purchase order for the TDC to Finder fiber optics was placed in early March. Delivery of pre-production evaluation units is expected in mid-April with full production complete by the first week of May. All patch panel components were received. Specification of the Finder to SLAM fibers and the Finder to L2 fibers are awaiting the final layout of the production Finder and SLAM boards and final location of the L2 hardware.

Stereo Finder: The Stereo XFT Finder board is being brought up in segments. The VME slave Interface downloads from a flash memory configuration device and works. VME transfers to and from the board and various FPGA's work without problems.

The other FPGAs must be downloaded via a JTAG interface due to a design flaw in dealing with the Altera Flash Configuration devices. We know how to fix this and it is being addressed on the next version of the board. Data has been transferred into the Finder FPGA via optical cables which go through the RX Mezzanine board. This has been tested with counter data driven via the Finder Transition module and has been tested with the TDC as well (some bit problems at TDC end!).

Data has also been sent from the Finder FPGAs to the Pixel FPGA. These tests validate a significant fraction of the board functionality. Most of the remaining work will involve proving the Finder/Pixel Firmware is functioning. Tests sending data to the SLAM board should also occur by the end of April.

1.3.4 Event Builder – Bruce Knuteson

This month we completed the last major piece of the Event Builder software: the interface of the data to the Level 3 filter. We have begun testing the full upgrade system in the CDF control room during Tevatron downtime.

1.3.6 SVT (Silicon Vertex Tracker) – Alberto Annovi

Software: We are on schedule. The training period for the new people can be considered completed. The simulation can reproduce the current SVT configuration and people started working on the modification for the upgrade. We are able to generate patterns for the upgraded SVT and we have optimized the parameters for 128k and 512k pattern sets.

AM++ and AMS/RW: The AM++ and the AMS have been inserted in the vertical slice and used at Fermilab for the tests "fake hits" and "parasitic test". The tests have been executed on a single AM++ equipped with a single LAMB. The software for these tests has been produced. The test of the AMS with 2 AM++ has been executed in Pisa. The Road Warrior has been implemented and successfully tested in Pisa and the backward compatibility option "Bitmap yes/No" has been implemented so that the new AMSRW can be used both with the new and old Hit Buffer.

Hit Buffer: Firmware is in the process of being written, both the logic and low-level sides. A first version of the state machine is completed, as well as most of the logical components used in the "read" mode of the hit buffer. All completed components pass functional simulation individually, and currently the effort is focused on understanding glitches and deformations which are observed in full timing simulation. On the low level side, pin-outs for both the control and I/O chips are being finalized. Currently, the effort is focused on interfacing to the mezzanine cards. Both the VME read/write as well as the real run-time read/write interfaces are being assembled.

Track Fitter: Considerable time was spent to load the TF netlist files into Quicksim for simulation. Force files are almost ready to go, except that there seem to be issues reading/writing to VME in simulation (even though this works OK on the real board). We hope to resolve this soon. In addition, the TF VME register list has been documented, and the svtvme and coldstart routines for the new TF are almost complete.

Mezzanines and Pulsars: The first two Pulsar boards were received and passed all tests. We then gave approval for the remaining boards to be built. They will arrive in Chicago in mid-April. The production order of large memory mezzanine cards arrived. All but 10 passed the preliminary tests. Those that did are undergoing long-term testing. Those with testing complete have all passed. The 10 that were rejected were sent back to the vendor for repair. (As of April 4, they were received back in Chicago and passed the preliminary tests) Bids were received for stuffing the small memory mezzanine cards. The first 5 pieces should be available for testing during April.

VI. FINANCIAL STATUS (as of 31 March 2005)

The baseline cost of the Project is \$10,375K, consisting of Run IIb Project costs (\$9,034K) plus the closeout costs of the silicon detector upgrade (\$1,341K), which will no longer be constructed.

Current Financial Tracking Report - The table below contains current values for selected financial tracking quantities that do not appear in the standard Obligations or Cost Performance Reports. For the Silicon Detector portion of the project, we assume a BAC of \$1,341K and obtain the ACWP from the Obligations report. Remaining portions of the project have their costs listed in the Cost Performance Report.

	ACWP		BCWP		BAC		Cont.	EAC	ETC	Complete
	Silicon	Non-Sil	Silicon	Non-Sil	Silicon	Non-Sil				
CY 2004										
October	1342	1957	1342	2125	1673	5254	3448	6759	6908	50%
November	1357	2081	1357	2366	1673	5254	3448	6642	6652	54%
December	1341	2199	1341	2673	1673	5254	3448	6453	6361	58%
CY 2005										
January	1341	2277	1341	2909	1673	5254	3448	6295	6125	61%
February	1341	2396	1341	3095	1341	5531	3503	6173	5939	65%
March	1341	2866	1341	3361	1341	5531	3503	6377	5673	68%

CDF RunIIb Obligations Report - This report provides a Level 2 summary of outstanding Purchase Orders (PO) where money has been committed but for which the Project has not been invoiced. This does not include requisitions in the system where a Fermilab PO number has not yet been assigned. A brief description of the columns included in this report is given below:

- Current Month Total Cost – The cost charged to the project for the reporting month.
- Current Month Obligation – This is the total of the obligations made against the project for the reporting month.
- Year to Date Total Cost – This is the total cost charged to the project in this fiscal year.
- Year to Date Obligations with Indirect – This is the total of the obligations made against the project for this fiscal year.
- Current Purchase Orders Open Commitment – This is the total of the open commitments against the project. It includes open commitments from the current and all prior years.
- Prior Year Total Cost - This is the total cost charged to the project in all prior fiscal years.

The total project cost is simply the sum of the Year-to-Date costs and the Prior Year costs. The total committed and spent is the Total Project Cost plus the Open Commitment value.

**CDF Project Obligations Report
Through 31 March 2005**

CDF RIIb EQU - March FY05 IN \$K							
Schedule	Expenditure Category	Current Month Total Cost	Current Month Obligation	YTD Total Cost	YTD Obligations w/Indirect	Current PO Open Comm	Prior Yr Total Cost
Silicon	M&S	(3.6)	(3.6)	(0.3)	(103.7)	0.0	539.0
	SWF	0.0	0.0	(1.1)	(1.1)	0.0	571.1
	OH	(0.6)	0.0	(2.7)	(2.7)	0.0	230.9
	Total 1.1	(4.2)	(3.6)	(4.1)	(107.5)	0.0	1,341.0
Calorimeter	M&S	1.5	17.1	43.5	21.2	21.3	211.8
	SWF	0.0	0.0	0.0	0.0	0.0	139.1
	OH	0.1	0.0	0.9	0.9	0.0	51.5
	Total 1.2	1.6	17.1	44.3	22.1	21.3	402.3
Trigger/DAQ	M&S	397.2	259.7	604.6	1,123.0	576.0	708.2
	SWF	37.2	37.2	183.5	183.5	0.0	220.7
	OH	18.9	0.0	94.2	94.2	0.0	129.2
	Total 1.3	453.3	297.0	882.3	1,400.7	576.0	1,058.1
Administration	M&S	0.2	0.2	0.3	0.3	0.0	29.1
	SWF	11.7	11.7	74.7	74.7	0.0	268.2
	OH	3.6	0.0	22.7	22.7	0.0	84.4
	Total 1.4	15.5	11.9	97.7	97.7	0.0	381.7
Total Project	M&S	395.2	273.4	648.1	1,040.8	597.2	1,488.2
	SWF	48.9	48.9	257.1	257.1	0.0	1,199.0
	OH	22.0	0.0	115.0	115.0	0.0	495.9
Grand Total		466.2	322.4	1,020.2	1,412.9	597.2	3,183.1

Total Project Cost (Inception To Date): \$4,203.3

CDF Project Cost Performance Report (CPR) – This report is generated from COBRA and provides a summary of the WBS 1.2-1.4 costs of the Project down to Level 3 of the Work Breakdown Structure. Silicon detector subproject closeout costs are not tracked here. Input data originates with the status (% Complete) of the Project schedules as reported by the Level 2 managers and actual costs extracted from the Fermilab accounting system. Where possible, costs are accrued for items that have been delivered, but not yet invoiced. This is only possible for a small fraction of our cost. Financial summaries are shown for this reporting period (columns 2-6) as well as the project to date (columns 7-11). Column 12 contains our baseline BAC, and will only be changed after the formal implementation of the Change Control process. Column 13 is the projected BAC, based on the current month's schedule. A number of specialized financial terms and abbreviations used in the CPR are defined here for convenience:

ACWP – Actual Cost of Work Performed. This is the actual cost of tasks that have been completed.

BAC – Budget at Completion. The BAC is the estimated total cost of the project when completed. It is equivalent to the BCWS at completion. The baseline value of the BCWS is contained in column 12 of the Cost Performance Report.

BCWP – Budgeted Cost of Work Performed. This is the scheduled cost profile of tasks that have been completed.

BCWS – Budgeted Cost of Work Scheduled. This is the sum of the budgets for all planned work to be accomplished within a given time period.

CV – Cost Variance. $CV = BCWP - ACWP$

EAC – Estimate At Completion. This is the ACWP to date, plus the BCWS (current scheduled estimate) of remaining tasks. $EAC = (BAC (current) - BCWP) + ACWP$

ETC – Estimate to Completion. $ETC = EAC - ACWP + Contingency$

Percent Complete - %Com = $\frac{BCWP}{BAC}$

SV – Schedule Variance. $SV = BCWP - BCWS$

**CDF Project
Cost Performance Report
Through 31 March 2005**

Cost Performance Report - Work Breakdown Structure														
Contractor: Location:					Contract Type/No:			Project Name/No: CDF RIIB Mstr Equ - D		Report Period: 2/28/2005 3/31/2005				
Quantity		Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price		Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling	
1		8,701,999		0		0.00		8,701,999		0		0	0	
Funding Type-CA WBS[2] WBS[3]		Current Period					Cumulative to Date					At Completion		
Item		Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance		Budgeted	Latest Revised Estimate	Variance
		Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost			
EQU Equipment														
1.2 Calorimeter Upgrades														
1.2.1 Central Preshower and Crack Detectors		0	0	1,613	0	-1,613	377,440	377,440	422,928	0	-45,488	377,440	447,113	69,673
1.2.2 Electromagnetic timing		0	0	0	0	0	35,630	35,630	23,403	0	12,227	35,630	23,403	-12,227
WBS[2]Totals:		0	0	1,613	0	-1,613	413,070	413,070	446,331	0	-33,261	413,070	470,516	57,446
1.3 Run 2b DAQ and Trigger Project														
1.3.1 Run 2b TDC Project		42,496	34,818	11,588	-7,678	23,230	537,278	510,224	507,550	-27,054	2,675	741,434	760,465	19,032
1.3.2 Run 2b Level 2 Project		11,152	8,778	8,968	-2,374	-190	387,585	388,226	370,170	641	18,055	437,236	438,964	1,729
1.3.4 Event-Builder Upgrade		29,831	41,467	78,031	11,636	-36,564	446,782	447,871	208,268	1,089	239,603	518,180	435,363	-82,817
1.3.5 Computer for Level3 PC Farm / DAQ		18,017	12,220	0	-5,797	12,220	162,151	178,601	220,806	16,450	-42,205	479,403	479,403	0
1.3.6 SVT upgrade		54,220	28,847	171,477	-25,373	-142,629	220,841	213,664	188,422	-7,177	25,241	362,407	362,407	0
1.3.11 Revised XFII Project		302,772	115,134	183,210	-187,638	-68,077	849,808	565,855	445,512	-283,954	120,342	1,620,128	1,654,504	34,376
WBS[2]Totals:		458,487	241,264	453,274	-217,223	-212,010	2,604,445	2,304,440	1,940,729	-300,005	363,711	4,158,787	4,131,106	-27,681
1.4 Administration														
1.4.3 Construction Phase		26,008	24,226	15,465	-1,782	8,761	645,570	643,448	479,401	-2,122	164,047	958,867	958,859	-8
WBS[2]Totals:		26,008	24,226	15,465	-1,782	8,761	645,570	643,448	479,401	-2,122	164,047	958,867	958,859	-8
Funding Type-CATotals:		484,495	265,490	470,352	-219,005	-204,862	3,663,086	3,360,958	2,866,461	-302,127	494,498	5,530,724	5,560,481	29,758
Sub Total		484,495	265,490	470,352	-219,005	-204,862	3,663,086	3,360,958	2,866,461	-302,127	494,498	5,530,724	5,560,481	29,758
Management Resrv.												3,171,276	3,141,518	-29,758
Total		484,495	265,490	470,352	-219,005	-204,862	3,663,086	3,360,958	2,866,461	-302,127	494,498	8,701,999	8,701,999	0

VII. VARIANCE ANALYSIS – P. Lukens

Subproject	Schedule Variance	Cost Variance
Run 2b TDC	Not significant. Limited by operations, and the availability of the detector.	None.
Run 2b Level 2	Ahead of schedule.	Not Significant.
Run 2b XFTII	Finder submission is behind by a month, then there were vendor problems (since resolved).	Actual costs have lagged the progress. Costs will be accrued next month.
Event Builder	An element of this related to TDC readout is behind schedule.	Costs are low. Some engineering has been done with physicist (no cost) labor. These will be revaluated soon.
Computers for Level 3 and DAQ	Ahead of schedule	The price of Level 3 computers purchased in September, 2004 was higher than budgeted.
SVT Upgrade	None	Actual costs have lagged the progress. Costs will be accrued next month.
Administration	None	Costs for support and travel have been below estimates.

VIII. BASELINE CHANGES

There were no baseline changes made during March, 2005

IX. FUNDING PROFILES

The funding profile for the RunIIb CDF Detector Project is shown below. This profile has been updated to include additional Italian contributions to the Silicon Vertex Trigger subproject. These contributions are a result of the scope established in August, 2004.

	Funding Plan in Current Year \$K				
	FY02	FY03	FY04	FY05	Total
DOE MIE	\$ 3,460	\$ 3,509	\$ 1,673	\$ 1,732	\$ 10,375
DOE R&D	\$ 1,670	\$ 480	\$ -	\$ -	\$ 2,150
Foreign Contributions	\$ 39	\$ 518	\$ 234	\$ 404	\$ 1,195
U.S. Universities	\$ 24	\$ 225	\$ 103	\$ 26	\$ 378
Total	\$ 5,193	\$ 4,732	\$ 2,010	\$ 2,162	\$ 14,097