

21 December 2004

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 November 2004 Report

Attached is the monthly report summarizing the November 2004 activities and progress for the Fermilab RunIIb CDF Detector Project. This report is available electronically at:

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

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RunIIb CDF Detector Project
Progress Report No. 24
1 - 30 November 2004

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

Although not strictly within the scope of the Project, the installation of the Calorimeter upgrades is now complete. This installation was completed on 8 November. No shutdown time was needed beyond the schedule set by the Accelerator Division for their work. The upgraded preshower system and electromagnetic timing systems will be included in the data for all future operation.

Other subprojects have slipped somewhat, but are making steady progress. 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 4 August 2005.

Reviews of the Track Trigger (XFT) and Event Builder subprojects are scheduled for December. These are internal to CDF, but will have review committees of experts who are not currently involved with these subprojects. These reviews are intended to provide an objective assessment on the status and technical directions of these activities.

III. PROJECT MILESTONE SUMMARY (as of 30 November 2004)

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	
1.3.11.6.3.6	All TDC to Finder cables Received	18-Mar-05	2-Feb-05	
1.3.5.3.7	Arrival of 15 PCs from the vendor	23-Mar-05	20-May-05	
1.3.2.9	Pulsar Level 2 subproject ready for installation	1-Apr-05	28-Feb-05	
1.3.11.8.8	Begin Joint Testing with Finder Board	4-Apr-05	29-Mar-05	
1.3.11.7.5.8	Begin Production of SLAM Boards	18-Apr-05	4-Apr-05	
1.3.11.4.4.8	Begin Production TDC Fiber Transition Boards	21-Apr-05	12-Apr-05	
1.3.11.5.3.9	Checkout of TDC Mezzanine Cards Complete	6-Jun-05	20-Apr-05	
1.3.11.2.5.1	Begin Production XFT Finder Boards	8-Jun-05	9-May-05	
1.3.6.1.2.5	Hit Buffer Firmware Complete	23-Jun-05	27-Jun-05	
1.3.6.1.3.5	Track Fitter Firmware Complete	28-Jun-05	2-Mar-05	
1.3.4.8	Finish Event-Builder Upgrade	28-July-05	29-Jun-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	19-Aug-05	2-Feb-05	
1.3.6.3	SVT ready for installation	25-Aug-05	15-July-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	24-Aug-05	
1.3.11.7.5.9	Checkout of SLAM Boards Complete	28-Sept-05	30-Aug-05	
1.3.11.2.5.10	Finder Board Checkout Complete	29-Sept-05	22-Sept-05	
1.3.11.10	XFT Ready for Installation at CDF	29-Sep-05	22-Sep-05	
1.3.8	Finish Run 2b Trigger DAQ project	30-Sep-05	22-Sept-05	
1.3.9	DAQ and Trigger Upgrades Ready for Installation	17-Jan-06	22-Sept-05	

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

Name	Baseline	Forecast	Variance	2004				2005				2006		
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	
Begin production of Level2 Pulsar system	11/12/03	11/12/03	0 wks	◆										
First Prototype TDC available for testing	11/19/03	2/16/04	11.35 wks	◆	★									
Arrival of the prototype Event Builder hardware	6/3/04	3/31/04	-9 wks		★	◆								
Event Builder Production Readiness Review	10/4/04	6/2/04	-17.2 wks			★	◆							
Begin AMS Design Work	9/1/04	8/2/04	-4.4 wks				★	◆						
Begin Track Fitter Design	9/1/04	8/2/04	-4.4 wks				★	◆						
Pulsar Hardware Ready for Installation	8/31/04	8/20/04	-1.4 wks				★	◆						
Arrival of the Event Builder hardware	10/15/04	10/15/04	0 wks					◆						
Begin Production TDC Mezzanine Card	10/28/04	11/3/04	0.8 wks					◆						
Begin Purchase of Pulsar Board components	10/20/04	11/4/04	2 wks					◆						
Begin AMS Mezzanine Card Production	1/14/05	11/11/04	-8.2 wks					★	◆					
Begin Ampchip Production	1/10/05	11/22/04	-5.8 wks					★	◆					
TDC Readout System Complete	1/21/05	12/10/04	-5 wks					◆						
AMS Firmware Complete	8/19/05	2/2/05	-28 wks						◇					
Pulsar Level 2 subproject ready for installation	4/1/05	2/28/05	-4.6 wks						◇					
Receipt of TDC to Finder cables Complete	3/18/05	2/28/05	-2.8 wks						◆					
Track Fitter Firmware Complete	6/28/05	3/2/05	-16.6 wks						◇					
Begin Joint Testing with Finder Board	4/4/05	3/29/05	-1 wk						◆					
Begin Production of SLAM Boards	4/18/05	4/4/05	-2 wks						◆					
Begin Production TDC Fiber Transition Boards	4/21/05	4/12/05	-1.4 wks						◆					
Checkout of TDC Mezzanine Cards Complete	6/6/05	4/20/05	-6.5 wks						◇					
Begin Production XFT Finder Boards	6/8/05	5/9/05	-4.2 wks						◆					
Arrival of 15 PCs from the vendor	3/23/05	5/20/05	8.4 wks						◆					
Hit Buffer Firmware Complete	6/23/05	6/27/05	0.4 wks						◆					
Finish Event-Builder Upgrade	7/28/05	6/29/05	-4 wks						◆					
SVT ready for installation	8/25/05	7/15/05	-5.8 wks						◆					
Arrival of 70 Level3 and 15 DAQ PCs from the vendor	8/15/05	8/15/05	0 wks						◆					
Arrival of 140/20 PCs from the vendor	8/15/05	8/15/05	0 wks						◆					
Checkout of TDC Transition Boards Complete	9/16/05	8/24/05	-3.2 wks						◇					
Checkout of SLAM Boards Complete	9/28/05	8/30/05	-4 wks						◇					
Finish Purchase of Computers for Level3/DAQ system	9/6/05	9/6/05	0 wks						◆					
Finder Board Checkout Complete	9/29/05	9/22/05	-1 wk						◆					
XFT Ready for Installation at CDF	9/29/05	9/22/05	-1 wk						◆					
Finish Run 2b Trigger DAQ project	9/30/05	9/22/05	-1 wk						◆					
Data Acquisition and Trigger Upgrades Ready To Instal	1/17/06	9/22/05	-15 wks						◇					◆

Project: CDF RunIIb DAQ
 Status Date: 11/30/04
 Print Date: 12/16/04

Completed Milestone ★
 Current Forecast ◇

Baseline Milestone ◆

**CDF Calorimeter Level 1 and Level 2 Milestones
Sorted by Baseline Completion Date**

WBS	Milestone	Baseline Completion Date	Forecast/Actual Completion Date	Complete
1.2.1.10.1	First phototube order placed	9-May-03	1-Apr-03	Yes
1.2.2.2.7.1	Prototype testing complete	16-May-03	28-Mar-03	Yes
1.2.2.2.7.4	ASD->TDC Cables ready for installation	16-May-03	26-Aug-03	Yes
1.2.2.2.7.2	CEM Splitters ready for installation	19-May-03	29-Jul-03	Yes
1.2.2.2.7.3	PEM Harnesses ready for installation	2-Sep-03	28-Apr-03	Yes
1.2.2.2.7.5	All EMT cables done and ready to install	2-Sep-03	26-Aug-03	Yes
1.2.2.2.7.8	VME Crate ready for installation	7-Oct-03	30-Apr-03	Yes
1.2.1.10.3	First set of Calorimeter phototubes tested	20-Oct-03	20-Oct-03	Yes
1.2.2.2.7.10	Upstairs components ready to install	7-Jan-04	16-Oct-03	Yes
1.2.2.2.7.11	All EM Timing components ready to install	7-Jan-04	16-Oct-03	Yes
1.2.2.2.7.6	ASD/TB ready for installation	7-Jan-04	16-Oct-03	Yes
1.2.2.2.7.7	Downstairs components ready to install	7-Jan-04	16-Oct-03	Yes
1.2.2.2.7.9	TDC boards ready for installation	7-Jan-04	16-Oct-03	Yes
1.2.1.10.2	1 st Calorimeter WLS fiber holder finished	1-Apr-04	17-Feb-04	Yes
1.2.1.10.4	1 st CPR module finished and tested	4-Jun-04	15-Mar-04	Yes
1.2.1.10.6	1 st CCR module finished and tested	19-Jul-04	2-Mar-04	Yes
1.2.1.10.5	2 nd set of Calorimeter phototubes tested	6-Aug-04	26-Mar-04	Yes
1.2.1.10.7	50% Calorimeter CPR Detectors Tested	14-Jan-05	30 June 04	Yes
1.2.1.10.8	50% Calorimeter CCR Detectors tested	14-Feb-05	25 Aug 04	Yes
1.2.1.10.9	Final Calorimeter CPR Detector Tested	15-Apr-05	25 Aug 04	Yes
1.2.1.10.10	Final Calorimeter CCR Detector Tested	15-Apr-05	15-Oct-04	Yes
1.2.1.10.11	Final set of Calorimeter phototubes tested	6-May-05	6-June-04	Yes
1.2.1.10.12	End of Central Pre-shower Project	6-May-05	28-Jan-05	
1.2.3.5	End of Calorimeter Project: Level 2	6-May-05	28-Jan-05	
1.2.3.6	End of Calorimeter Project: Level 1	23-Jan-06	28-Jan-05	

IV. PROCUREMENT – P. Lukens

No significant procurements were placed during November 2004.

V. PROJECT HIGHLIGHTS

1.2 – Calorimeter

1.2.1 Central Preshower and Crack Detector – Steve Kuhlmann

Installation of the CPR upgrade was completed during November. All production parts have been delivered, while some extra spare parts are being produced at ANL and MSU. Performance of the detector with cosmic rays continues to be very good.

1.2.2 Electromagnetic Timing – Dave Toback

All EM Timing work has been completed. Installation of this system was completed in November, 2004.

1.3 – Data Acquisition and Trigger

1.3.1 TDC (Time to Digital Converter) – Henry Frisch, Ting Miao

A TDC Review was held on Sept 28 to evaluate the viability of IIA design for the remainder of Run II. The report was received in October and we are acting on the recommendations.

1.3.2 Level 2 – Ted Liu

All Level 2 components required for operations have been produced and fully tested. We are in the process of acquiring some necessary spares. We expect this to go forward smoothly over the next few months as the components are commercially available.

Much of the work during November has involved Firmware improvements and software development. Things are going well with the online systems interface and the algorithm for all trigger paths. The initial system integration was successful with tests in the non-beam environment. We are ready and waiting for beam to return.

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

All of the components have been purchased for the preproduction of the SLAM Boards. The boards and components will be sent out to be assembled by the vendor next month (December 2004). We have developed the preliminary version of the firmware for the SLAM Chip. The firmware efforts will continue into December as well. And finally, the Ohio State University Test stand has been set and is functional.

1.3.4 Event Builder – Bruce Knuteson

The Level 3 Builder code, the last major piece to be written, is roughly halfway completed at this point. Minor tasks left to complete include fleshing out EVB Error Logging and ACE controls. Rate tests with the CDF DAQ indicate our code is at present CPU bound in the SCPUs; this can be handled by removing known inefficiencies from our code, as previous tests we have conducted have demonstrated rates up to 1.2 kHz. The number of VRB crates we add to the system affects the number of additional VMIC 7805 boards that need to be purchased; we hope to reach a decision on this soon.

1.3.6 SVT (Silicon Vertex Tracker) – Mel Shochet

AM++:

An unexpected low yield of standard cell AM chips is being studied. Of the 63% of chips that were not perfect, approximately $\frac{1}{3}$ have only a few bad patterns. A LAMB board has been assembled with 16 of these chips for thorough testing in the VME test stand. A LAMB assembled with 8 good chips has been tested with random patterns and hits at 33 MHz in the test stand. Its performance is excellent. To ensure an adequate number of chips, even if the yield continues to be lower than anticipated, the INFN has provided funds for a pilot run for this chip, which should occur in January. The new AM++ and LAMB boards passed their Fermilab board review, and second prototypes have now been ordered.

AMS/RW:

Intensive random tests of the AMS firmware have been carried out using a Merger to provide hits and an AM++ to provide roads. During these tests in the VME test stand, a few firmware bugs were found and corrected.

Hit Buffer:

Writing the detailed firmware specifications continues. An initial study of FIFO and SpyBuffer memory allocation was carried out. Results show that the planned new auxiliary card containing a memory mezzanine board will likely not be needed.

Track Fitter:

It was decided to use the existing Pulsar VME libraries rather than modifying the VME functions from the old Track Fitters. The other Track Fitter firmware moved closer to completion, specifically the communication and inter-FPGA data transfer functions. Pin assignments on the Pulsar and mezzanines were largely completed, with the remaining pins awaiting resolution of a few VME issues. They should be finished early in December, after which simulation can begin.

Mezzanine Memory Cards:

Bids were received for constructing the prototype PC boards and a vendor was selected. All parts are in hand and the boards are scheduled to be delivered in early December.

Pulsar Boards:

Bids were received for constructing all of the SVT and XFT upgrade Pulsar boards. A vendor was selected and the order was sent to the university's purchasing department.

VI. FINANCIAL STATUS (as of 30 November 2004)

The baseline cost of the Project is \$10,375K, and consists of the costs for the scope of the Run IIb Project (\$8,702K) plus the closeout costs of the silicon detector upgrade (\$1,673K), which will no longer be constructed.

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 – The total of the obligations made against the project for the reporting month.
- Year to Date (YTD) Total Cost – The total cost charged to the project in this fiscal year.
- YTD Obligations w/Indirect – Total obligations 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 30 November 2004**

CDF RIIb EQU - November FY05 IN \$K								
Task Number	Expenditure Category		Current Month Total Cost	Current Month Obligation	YTD Total Cost	YTD Obligations w/Indirect	Current PO Open Commitment	Prior Yr Total Cost
Silicon	M&S		16.1	6.2	16.1	6.2	93.5	539.0
	SWF		0.0	0.0	0.0	0.0	0.0	571.1
	OH		0.2	0.0	0.2	0.2	0.0	230.9
		Total 1.1		16.4	6.2	16.4	6.5	93.5
Calorimeter	M&S		12.7	0.1	11.0	0.7	33.2	211.8
	SWF		0.0	0.0	0.0	0.0	0.0	139.1
	OH		0.2	0.0	0.3	0.3	0.0	51.5
		Total 1.2		12.9	0.1	11.2	1.0	33.2
Trigger/DAQ	M&S		59.8	82.8	114.1	104.1	47.6	708.2
	SWF		21.5	21.5	49.3	49.3	0.0	220.7
	OH		15.2	0.0	32.3	32.3	0.0	129.2
		Total 1.3		96.5	104.3	195.7	185.7	47.6
Administration	M&S		0.0	0.0	0.0	0.0	0.0	29.1
	SWF		12.2	12.2	24.6	24.6	0.0	268.2
	OH		3.7	0.0	7.5	7.5	0.0	84.4
		Total 1.4		15.9	12.2	32.1	32.1	0.0
Total Project	M&S		88.6	89.1	141.2	111.0	174.3	1,488.2
	SWF		33.7	33.7	73.9	73.9	0.0	1,199.0
	OH		19.3	0.0	40.3	40.3	0.0	495.9
Grand Total			141.6	122.7	255.4	225.2	174.3	3,183.1

Total Project Cost (Inception To Date): 3,438.5

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 \$1673K 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	Nonsil.	Silicon	Nonsil.	Silicon	Nonsil.				
August	1321	1357	1321	1893	1673	5734	2967	6871	7160	43%
September	1342	1842	1342	2002	1673	5734	2967	7247	7030	45%
October	1342	1957	1342	2125	1673	5254	3448	6759	6908	50%
November	1357	2081	1357	2366	1673	5254	3448	6642	6652	54%

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. The closeout for the silicon detector subproject does not have its performance 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
at WBS Level 3
Through 30 November 2004**

Cost Performance Report - Work Breakdown Structure														
Contractor: Location:				Contract Type/No:			Project Name/No: CDF RIIB Mstr Equ - 0		Report Period: 10/31/2004 11/30/2004					
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		Baseline BAC	Latest Revised BAC	BAC Delta
		Scheduled	Performed	Performed	Schedule	Cost	Scheduled	Performed	Performed	Schedule	Cost			
EQU Equipment														
1.2 Calorimeter Upgrades														
1.2.1 Central Preshower and Crack Detectors		2,166	0	12,886	-2,166	-12,886	376,841	375,045	389,850	-1,796	-14,806	377,440	377,590	150
1.2.2 Electromagnetic timing		0	0	0	0	0	35,630	35,630	23,403	0	12,227	35,630	35,630	0
WBS[2]Totals:		2,166	0	12,886	-2,166	-12,886	412,471	410,675	413,253	-1,796	-2,578	413,070	413,220	150
1.3 Run 2b DAQ and Trigger Project														
1.3.1 Run 2b TDC Project		125,142	99,895	60,364	-25,247	39,531	495,550	405,258	439,100	-90,291	-33,842	546,541	546,541	0
1.3.2 Run 2b Level 2 Project		13,829	0	22,184	-13,829	-22,184	277,092	356,413	335,737	79,321	20,676	437,236	437,249	13
1.3.4 Event-Builder Upgrade		23,371	3,559	0	-19,812	3,559	286,941	228,039	113,774	-58,902	114,266	518,179	518,179	0
1.3.5 Computer for Level3 PC Farm / DAQ		55,979	46,060	0	-9,919	46,060	55,979	131,601	210,333	75,621	-78,733	479,403	475,942	-3,461
1.3.6 SVT upgrade		38,649	7,323	0	-31,327	7,323	84,218	39,667	0	-44,551	39,667	280,920	281,432	512
1.3.11 Revised XFTII Project		131,720	64,062	13,972	-67,659	50,089	335,207	251,055	154,600	-84,152	96,455	1,620,128	1,627,725	7,597
WBS[2]Totals:		388,691	220,898	96,521	-167,793	124,377	1,534,987	1,412,034	1,253,544	-122,953	158,490	3,882,406	3,887,067	4,661
1.4 Administration														
1.4.3 Construction Phase		24,877	21,135	15,853	-3,742	5,282	547,193	543,915	413,823	-3,278	130,091	958,867	958,851	-16
WBS[2]Totals:		24,877	21,135	15,853	-3,742	5,282	547,193	543,915	413,823	-3,278	130,091	958,867	958,851	-16
Funding Type-CA Totals:		415,734	242,032	125,260	-173,702	116,773	2,494,651	2,366,623	2,080,620	-128,028	286,003	5,254,343	5,259,139	4,795
Sub Total		415,734	242,032	125,260	-173,702	116,773	2,494,651	2,366,623	2,080,620	-128,028	286,003	5,254,343	5,259,139	4,795
Management Resrv.												3,447,656	3,442,860	-4,795
Total		415,734	242,032	125,260	-173,702	116,773	2,494,651	2,366,623	2,080,620	-128,028	286,003	8,701,999	8,701,999	0

VII. VARIANCE ANALYSIS – P. Lukens

Subproject	Schedule Variance	Cost Variance
Calorimeter Schedule	Not Significant	Not significant
Run 2b TDC	This is slipping as effort winds down on this project. No significant impact on the overall project, since this is closing out.	Labor charges are higher than planned. This is an artifact of closing this project.
Run 2b Level 2	Ahead of schedule	Not Significant
Run 2b XFTII	Finder submission is behind by a month	Not Significant
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.
Computers for Level 3 and DAQ	Ahead of schedule	This is an artifact of the way Earned Value is calculated. We have purchased computers earlier than scheduled.
SVT Upgrade	None	None
Administration	None	Costs for support and travel have been below estimates.

VIII. BASELINE CHANGES

Change control #16 was approved in November 2004. This change control drops the production of the TDCs and increases engineering labor on the Level 2 trigger. The CPR shown above reflects this new baseline.

IX. FUNDING PROFILES

The funding profile for the RunIIb CDF Detector Project is shown below:

	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	\$ 342	\$ 252	\$ 10	\$ 643
U.S. Universities	\$ 24	\$ 225	\$ 103	\$ 26	\$ 378
Total	\$ 5,193	\$ 4,556	\$ 2,028	\$ 1,768	\$ 13,545