

24 February 2003

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 Monthly Report**

Attached is the monthly report summarizing the January 2003 activities and progress for the Fermilab Run IIb CDF Detector Project.

cc: J. Appel MS 105  
E. Arroyo 208  
N. Bacchetta 318  
D. Benjamin 318  
J. Cooper 208  
B. Flaugher 318  
A. Goshaw 318  
D. Knapp 318  
J. Kotcher 357  
S. Kuhlmann 318  
N. Lockyer 318  
J. Monhart 118  
H. Montgomery 105  
K. Pitts 318  
TJ Sarlina 318  
K. Stanfield 105  
E. Temple 200  
C. Trimby 200  
V. White 370  
M. Witherell 105

**RunIIb CDF Detector Project**  
**Progress Report No. 2**  
**1 - 31 January 2003**

**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 main focus of the experiment in Run IIb will be the continuation of the search for the Higgs boson. The increased size of the data sample will also 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:

- Replace the silicon micro-vertex detector with a device capable of withstanding the expected radiation dose for Run IIb and with fast  $r$ - $\phi$  (axial) and small angle stereo readout.
- 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 did not receive approval during January 2003. CD-1 is still contingent on the Undersecretary of Energy signing the Acquisition Execution Plan. We believe there are no obstacles to this approval, although it did not occur during this reporting period.

No milestones were missed this month. The project is staying on the baseline schedule presented to the External Independent Review in November. The final engineering work on the SVX4 chip has stayed on track, with a schedule that provides for submission on 26 Feb 2003. This misses our milestone by a week.

Memoranda of Understanding are being developed, and drafts exist for ten universities as well as for the Particle Physics Division. We expect that several should be signed within the next month.

### III. PROJECT MILESTONE SUMMARY

#### CDF Level 2 Schedule Milestones from the resource loaded schedules

WBS	Title	Scheduled Completion Date	Forecast/Actual Completion Date	Complete
1.1.5.4.1.13	Prototype stave #1 complete	5-Dec-02	5 Nov 02	Yes
1.1.2.1.2.4	2nd chip submission	20-Feb-03	27-Feb-03	
1.1.2.10.2.4	Testing #1 complete- go ahead for #2	3-Apr-03		
1.2.2.2.7.4	ASD->TDC Cables ready for install	4-Apr-03		
1.3.3.2.3.4	Begin fabrication of Prototype Finder 1/3 board	9-Apr-03		
1.2.2.2.7.2	CEM Splitters ready for installation	11-Apr-03		
1.2.1.10.1	First phototube order placed	9-May-03		
1.2.2.2.7.1	Prototype Testing Complete	15-May-03		
1.1.3.1.2.4	Production Sensor submission	16-May-03		
1.3.3.8.1.9	Prototype Linker Module avail for test	9-Jun-03		
1.2.2.2.7.3	PEM Harnesses ready for installation	2-Sep-03		
1.2.2.2.7.5	All cables done and ready to install	2-Sep-03		
1.1.2.1.3.5	Production chip submission	9-Sep-03		
1.3.5.2.5	Arrival of 0/10 PCs from the vendor	10-Sep-03		
1.2.1.10.2	1st WLS fiber holder finished	7-Oct-03		
1.2.2.2.7.8	VME Crate ready for installation	7-Oct-03		
1.1.2.10.3.4	Go ahead for Preproduction	11-Nov-03		
1.3.1.6.7	First Prototype TDC available for testing	19-Nov-03		
1.1.6.3.1.1.5	Stave & screen mounting tests complete	5-Dec-03		
1.2.1.10.4	1st CPR module finished and tested	11-Dec-03		
1.2.2.2.7.10	Upstairs components ready to install	7-Jan-04		
1.2.2.2.7.11	All EM Timing components ready to install	7-Jan-04		
1.2.2.2.7.6	ASD/TB ready for installation	7-Jan-04		
1.2.2.2.7.7	Downstairs components ready to install	7-Jan-04		
1.2.2.2.7.9	TDC boards ready for installation	7-Jan-04		
1.2.1.10.3	First set of phototubes tested	30-Jan-04		
1.2.1.10.6	1st CCR module finished and tested	12-Feb-04		
1.1.2.3.1.3.12	Preproduction hybrid available	25-Mar-04		
1.2.1.10.5	Second set of phototubes tested	21-May-04		
1.1.5.2.2.8	L0 prototype modules complete	26-May-04		
1.3.4.4.1.4	Arrival of the hardware	3-Jun-04		
1.2.1.10.7	50% CPR Detectors Tested	4-Jun-04		
1.3.3.10.3.3	Preproduction of Stereo Assoc Modules	21-Jun-04		
1.3.4.5.3	Production Readiness Rev - Event Builder	24-Jun-04		
1.1.2.10.4.6	Go ahead for DAQ production	19-Jul-04		
1.2.1.10.8	50% CCR Detectors tested	30-Aug-04		
<b>Milestone list continues on following page</b>				

<b>WBS</b>	<b>Title</b>	<b>Scheduled Completion Date</b>	<b>Forecast/Actual Completion Date</b>	<b>Complete</b>
1.3.2.6.3	Begin production of Level 2 Pulsar system	16-Sep-04		
1.3.3.2.6.9	Begin Production Finder SL7 boards	12-Oct-04		
1.1.2.3.1.4.9	Production hybrid available	9-Nov-04		
1.3.3.8.3.3	Begin Production Linker Modules	13-Dec-04		
1.3.6.5	SVT ready for installation	13-Dec-04		
1.1.5.3.4.8	Production module available	5-Jan-05		
1.3.1.12	Beginning of TDC Production	10-Jan-05		
1.3.4.5.4.4	Arrival of the hardware	3-Feb-05		
1.2.1.10.10	Final CCR Detector Tested	24-Mar-05		
1.2.1.10.9	Final CPR Detector Tested	24-Mar-05		
1.3.5.5.5	Arrival of 70 L3 & 15 DAQ PCs from the vendor	24-Mar-05		
1.3.5.6.5	Arrival of 140/20 PCs from the vendor	24-Mar-05		
1.3.5.8	Finish Purchase of Computers for L3/DAQ	14-Apr-05		
1.1.6.1.11.3.5	L0 Supports Complete	5-May-05		
1.3.4.8	Finish Event-Builder Upgrade	5-May-05		
1.2.1.10.11	Final set of phototubes tested	6-May-05		
1.2.1.10.12	End of Central Preshower Project	6-May-05		
1.2.3.5	End of Calorimetry Project: Level 2	6-May-05		
1.1.5.4.4.11	100 Production staves complete	26-May-05		
1.3.1.14.16	Data Concentrator Production Completed	2-Jun-05		
1.3.2.9	Pulsar Level 2 subproject ready for installation	8-Jun-05		
1.1.6.3.1.3.3	Stave Installation Begins	24-Jun-05		
1.3.3.10.4.6	Production Stereo Association Modules complete	6-Jul-05		
1.3.3.23	XFT Ready for Installation at CDF	6-Jul-05		
1.3.1.13.10	Production Board testing complete	30-Sep-05		
1.3.1.16	Run 2b TDC Ready for Installation	30-Sep-05		
1.3.8	Finish Run 2b Trigger DAQ project	30-Sep-05		
1.1.5.4.4.14	Production staves complete	18-Oct-05		
1.1.6.3.1.3.8	Stave Installation Complete	8-Dec-05		
1.1.6.3.2.3.6	Inner detector complete	4-Jan-06		
1.1.6.3.1.3.16	Outer detector complete	23-Feb-06		
1.1.6.4.8	SVX2b Ready for Installation into ISL	31-May-06		

### CDF Run2b Silicon Level 2 Milestones

ID	Task Name	2002		2003		2004		2005		2006		2
		Q4Q1	Q Q4Q1									
117	L2MS Prototype stave #1 complete			12/5	◆	100%						
219	L2MS 2nd chip submission			2/20	◆	0%						
293	L2MS Testing #1 complete- go ahead for #2			4/3	◆	0%						
43	Production Sensor submission			5/16	◆	0%						
231	L2MS Production chip submission			9/9	◆	0%						
298	L2MS Go ahead for Preproduction			11/11	◆	0%						
704	Milestone: stave installation & screen mounting tests complete			12/5	◆	0%						
380	L2MS preProduction hybrid available					3/25	◆	0%				
66	L2MS L0 prototype modules complete					5/26	◆	0%				
305	L2MS Go ahead for DAQ production					7/19	◆	0%				
390	L2MS Production hybrid available							11/9	◆	0%		
102	L2MS Production module available							1/5	◆	0%		
626	L0 Supports Complete							5/5	◆	0%		
150	L2MS 100 Production staves complete							5/26	◆	0%		
714	L2MS Stave Installation Begins							6/24	◆	0%		
155	L2MS Production staves complete							10/18	◆	0%		
719	L2MS Stave Installation Complete							12/8	◆	0%		
697	L2MS Inner detector complete							1/4	◆	0%		
727	Outer detector complete							2/23	◆	0%		
736	L2MS SVX2b Ready for Installation into ISL									5/31	◆	0%

## CDF Run2b Calorimeter Level 2 Milestones

ID	Name	2003				2004				2005				2006			
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
39	ASD->TDC Cables ready for installation			4/4	◆	0%											
40	CEM Splitters ready for installation			4/4	◆	0%											
106	First phototube order placed			5/9	◆	0%											
41	Prototype Testing Complete			5/15	◆	0%											
42	PEM Harnesses ready for installation					9/2	◆	0%									
43	All cables done and ready for installation					9/2	◆	0%									
107	Ist WLS fiber holder finished					10/7	◆	0%									
44	VME Crate ready for installation					10/7	◆	0%									
108	Ist CPR module finished and tested					12/11	◆	0%									
45	ASD/TB ready for installation					1/7	◆	0%									
46	Downstairs components ready for installation					1/7	◆	0%									
47	TDC boards ready for installation					1/7	◆	0%									
48	Upstairs components ready for installation					1/7	◆	0%									
49	All EMTiming components ready for installation					1/7	◆	0%									
109	First set of phototubes tested					1/30	◆	0%									
110	Ist CCR module finished and tested					2/12	◆	0%									
111	Second set of phototubes tested							5/21	◆	0%							
112	50% CPR Detectors Tested							6/4	◆	0%							
113	50% CCR Detectors Tested									8/30	◆	0%					
114	Final CPR Detector Tested												3/24	◆	0%		
115	Final CCR Detector Tested												3/24	◆	0%		
116	Final set of phototubes tested													5/6	◆	0%	
117	End of Central Preshower Project													5/6	◆	0%	
123	End of Calorimetry Project: Level 2													5/6	◆	0%	



## **IV. PROCUREMENT**

No major procurements were made in January 2003. The project was still not approved to spend Equipment funds during this period.

## **V. PROJECT HIGHLIGHTS**

### **1.1 – Silicon Detector Project**

#### **1.1.2 DAQ (Data Acquisition) – Brenna Flaughner, Nicola Bacchetta**

Design of the SVX4 chip is finished. Top level simulation and verification have begun and all indications are that the chip submission will be February 27th. This is one week later than the Level 2 milestone but this should not have any significant impact on the planned schedule. A considerable amount of effort is focused on trying to beat the February 27th projection. Due to the large amount of testing, study, simulation and verification, there is a high level of confidence that this submission will result in production chips. If this is realized it will be possible to advance the schedule.

We had a workshop in January to review all of the prototype testing with staves and modules. In general, the results look very good although a few additional tests were identified. These will be performed in the next few weeks. We decided that the testing results were sufficiently understood to proceed with the order of the next round of hybrids, bus cables, and mini-portcards. The goal is to have these parts in hand for testing with the next SVX4 chip this summer.

Development of the PCI test stands by University of Illinois - Urbana is going very well. They are able to run and readout a single chip and will soon be testing with a hybrid.

A review of the BeO and Polyamide Mini-portcard identified a few changes. The detailed pin-outs for the cables and the location of grounding pads will be resolved before they are ordered.

#### **1.1.3 Sensors – Brenna Flaughner, Nicola Bacchetta**

The internal review of the sensor test results on Jan. 22nd went very well and we went ahead with the external review on February 3rd. We await the report of the committee. Overall, their comments seemed positive and we do not expect to encounter any problems or concerns as a result of the review. We are still on track to order the sensors at the beginning of March.

#### **1.1.5 Construction of Modules, Staves, and L0 – Brenna Flaughner, Nicola Bacchetta**

The 2nd stave was fully bonded on one side and sent to LBL for testing. Construction of the 3rd stave is in progress. This stave has an Aluminum grounding strip that was successfully laminated to the CF of the stave.

Work on the design of the module alignment fixture neared completion. The current prototypes are not precisely aligned.

### **1.1.6 Support Mechanics – Brenna Flaughner, Nicola Bacchetta**

Work this month focused on the inner and outer screens. Another inner screen was fabricated and the design of the prototype outer screen was finalized. Work also continued on the design and modeling of the support tube which will carry the barrels. Two full-scale prototypes of the L0 CF structure were built and will arrive at Fermilab in February.

## **1.2 – Calorimeter Upgrades**

### **1.2.1 Central Preshower and Crack Detector – Steve Kuhlmann**

The Central Preshower/Crack Upgrade continued to make progress in January on many fronts. Phototube tests in a B field were performed at Tsukuba. Tests of the mu-metal shield were conducted at MSU. The shield was deemed too short to do the job; therefore a 2nd prototype box is being designed. The redesign of the prototype box should not delay any portion of the work or negatively impact our construction schedule.

Fibers were delivered to FNAL Village Labs 5 and 7 for mirroring and splicing. Argonne continued work to complete the documentation of the CPR mechanical designs and prototype tests. Pisa resumed prototype tests and these are progressing smoothly. Extensive discussions of the plans for full-scale prototypes were conducted via phone conferences involving INFN, Argonne National Lab, and Michigan State University. We expect these prototypes to be built in April with the fibers that are currently at FNAL.

### **1.2.2 Electromagnetic Timing – Dave Toback**

During January, we saw the arrival of the prototype ASD and were able to conduct the final, multi-channel, on-the-detector testing. This includes 3 wedges of the PEM and encompasses the transition board, ASD, long cable, and the TDC being read out. We have also concurrently installed 2 channels of CEM splitters.

All of the parts for the TDC crate have arrived and the crate has been installed. The connections to the rest of the TDC system will be done during the month of February. We have begun cable production according to schedule since there are no known problems. Our test stand room is fully functional with production quality components.

## **1.3 –Data Acquisition and Trigger Project**

### **1.3.1 TDC (Time to Digital Converter) Project – Kevin Pitts**

Specifications of the XFT interface have been completed. Work is ongoing to include the timing information for the XFT, which is sent out on a path that is parallel to the primary data path. Flexibility is being incorporated into the XFT interface to allow for programmable time delays. This is necessary for optimal XFT operation.

Now that we have successfully shown that 1.2 nanosecond timing can be maintained using

LVDS signals over real cables, work is continuing on the edge detector, which will turn these signals into measured times. This is being developed in firmware for the Altera design and also undergoing testing using the twelve channel test board. Implementation of the TDC design in the Altera chip is very far along and undergoing extensive simulation at every stage.

### **1.3.3 XFT (eXtremely Fast Tracker) II Project – Kevin Pitts**

Ohio State University has focused its efforts over the past 4 months on firmware design using the target Field Programmable Gate Array (FPGA) chips from ALTERA (Stratix EP1S25). This effort has been in three major areas:

1) Implementing the previous design:

We have successfully implemented the current Run IIa Linker chip design using these chips.

2) Implementing the new algorithm:

An important feature of XFT2b is the use of much more detailed information at each stage of the device. We have started the design work on a Linker chip that uses approximately 3 times the granularity of slope information currently used.

3) Simplifying the Linker board design:

The current design uses 12 Altera 10k50 chips on each of 24 Linker boards. We are investigating the possibility of merging the functionality of these 12 chips into a much smaller number of the EPXXX chips (possibly just 1). This would greatly simplify the layout of the Linker boards for XFT2b. We have successfully implemented a design that would compress the 12 chips into 1 chip, using the current RunIIa design. We are working on doing the same using the new algorithm.

## **VI. EARNED VALUE**

The accompanying tables and charts are the Cost Performance Reports generated from COBRA detailing Earned Value (EV), Schedule Variance (SV), Cost Variance (CV), Schedule Performance Index (SPI), and Cost Performance Index (CPI). This is the second month earned value calculations have been obtained, and they have not been thoroughly checked for errors. The history of the project, and the fact that these earned value calculations have been performed on R&D funds, complicates the calculation. However, the reports obtained to date are included as a demonstration of the format we intend to distribute in future monthly reports. We anticipate that the first procurement on equipment funds will occur during March 2003. These R&D prototype earned value reports will be replaced by equipment funded ones at that time.

Cost Performance Report - Work Breakdown Structure													
Contractor: Location:				Contract Type/No:				Project Name/No: Silicon Jan EV (R&D)		Report Period: 12/31/2002                      1/31/2003			
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling		
1	15,576,910		0		0		15,576,910	0		0	0		
Funding Type-CA	Current Period					Cumulative to Date					At Completion		
	Budgeted Cost		Actual Cost Work	Variance		Budgeted Cost		Actual Cost Work	Variance		Budgeted	Latest Revised Estimate	Variance
	Work Scheduled	Work Performed		Schedule	Cost	Work Scheduled	Work Performed		Schedule	Cost			
Item	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
R&D	138,681	74,901	309,896	-63,780	-234,995	1,901,216	1,664,866	931,953	-236,350	732,913	2,259,747	1,331,414	928,334
Gen. and Admin.	0	0	0	0	0	0	0	0	0	0	0	0	0
Undist. Budget											-5,466,850	0	-5,466,850
Sub Total	138,681	74,901	309,896	-63,780	-234,995	1,901,216	1,664,866	931,953	-236,350	732,913	-3,207,103	1,331,414	-4,538,516
Management Resrv.											5,466,850	0	5,466,850
Total	138,681	74,901	309,896	-63,780	-234,995	1,901,216	1,664,866	931,953	-236,350	732,913	2,259,747	1,331,414	928,334

Variance Analysis Worksheet

Funding Type-CA  
R&D

Reporting Period: 12/31/2002 1/31/2003

	BCWS	BCWP	ACWP	SV in \$	SV in %	CV in \$	CV %	SPI	CPI
Current:	138,681	74,901	309,896	-63,780	-46%	-234,995	-314%	0.54	0.24
Cumulative:	1,901,216	1,664,866	931,953	-236,350	-12%	732,913	44%	0.88	1.79
	BAC	EAC	VAC in \$	VAC in %	CPI to BAC	CPI to EAC			
At Complete:	2,259,747	1,331,414	928,334	41%	0.45	1.49			

Explanation of Variance/Description of Problem:

Impact:

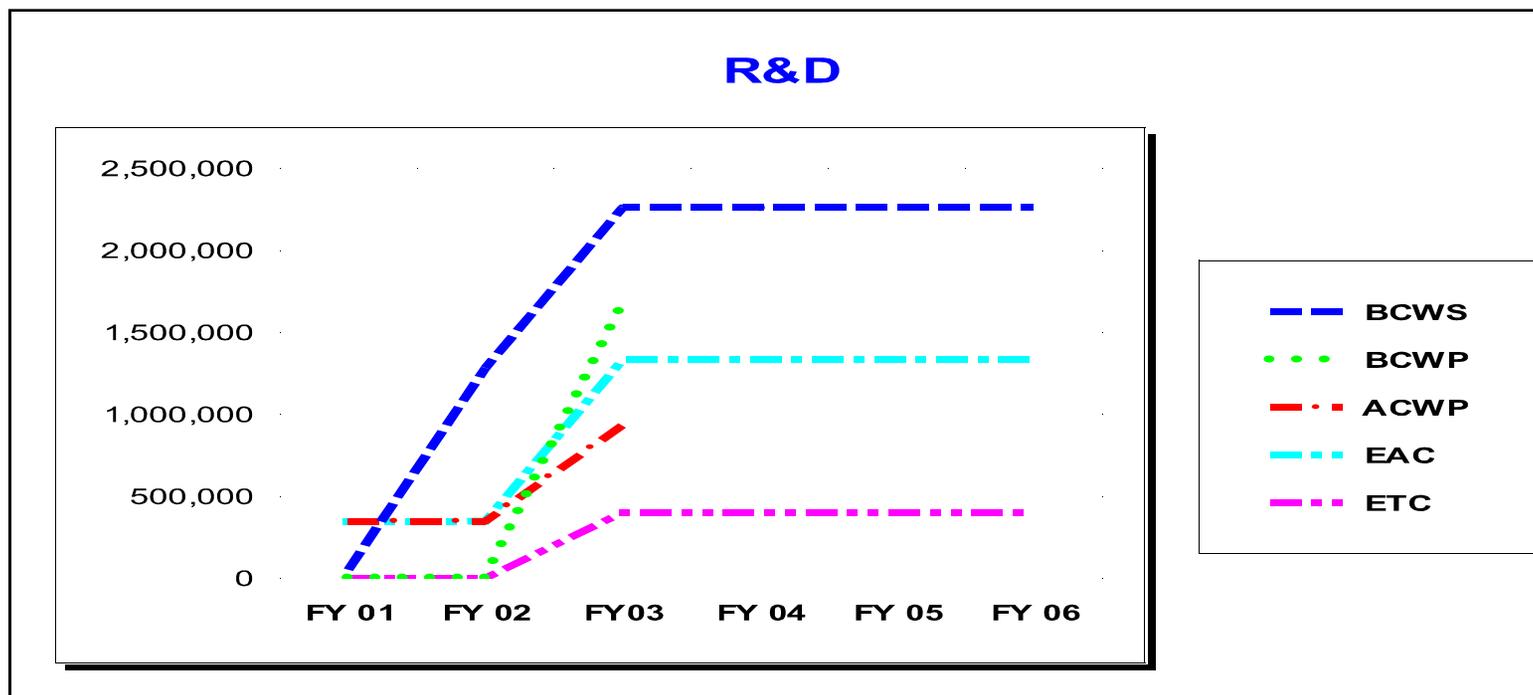
Corrective Action:

Monthly Summary (to include technical causes of VARs, Impacts) and Corrective Action(s):

Prepared by: \_\_\_\_\_ Date: \_\_\_\_\_ Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

Report: CURVE	Silicon Jan EV (R&D)
Program: CDFSILI	

Funding Type-CA



	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
BCWS	51,536	1,282,621	2,259,747	2,259,747	2,259,747	2,259,747
BCWP	0	0	1,664,866			
ACWP	346,957	346,957	931,953			
EAC	346,957	346,957	1,331,414	1,331,414	1,331,414	1,331,414
ETC	0	0	399,461	399,461	399,461	399,461

Cost Performance Report - Work Breakdown Structure														
Contractor:				Contract Type/No:				Project Name/No:		Report Period:				
Location:								CDF Calorimeter (R&D)		12/31/2002		1/31/2003		
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling			
1	1,026,775		0		0		1,026,775	0		0	0			
Funding Type-CA	Current Period						Cumulative to Date					At Completion		
	Budgeted Cost		Actual Cost Work	Variance		Budgeted Cost		Actual Cost Work	Variance		Budgeted	Latest Revised Estimate	Variance	
	Work Scheduled	Work Performed		Schedule	Cost	Work Scheduled	Work Performed		Schedule	Cost				
Item	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
R&D	6,118	12,159	9,339	6,041	2,820	46,384	32,273	25,835	-14,111	6,438	57,760	54,991	2,769	
Gen. and Admin.	0	0	0	0	0	0	0	0	0	0	0	0	0	
Undist. Budget											-343,638	0	-343,638	
Sub Total	6,118	12,159	9,339	6,041	2,820	46,384	32,273	25,835	-14,111	6,438	-285,878	54,991	-340,869	
Management Resrv.											343,638	0	343,638	
Total	6,118	12,159	9,339	6,041	2,820	46,384	32,273	25,835	-14,111	6,438	57,760	54,991	2,769	

Variance Analysis Worksheet

Funding Type-CA  
R&D

Reporting Period: 12/31/2002 1/31/2003

	BCWS	BCWP	ACWP	SV in \$	SV in %	CV in \$	CV %	SPI	CPI
Current:	6,118	12,159	9,339	6,041	99%	2,820	23%	1.99	1.30
Cumulative:	46,384	32,273	25,835	-14,111	-30%	6,438	20%	0.70	1.25
	BAC	EAC	VAC in \$	VAC in %	CPI to BAC	CPI to EAC			
At Complete:	57,760	54,991	2,769	5%	0.80	0.87			

Explanation of Variance/Description of Problem:

Impact:

Corrective Action:

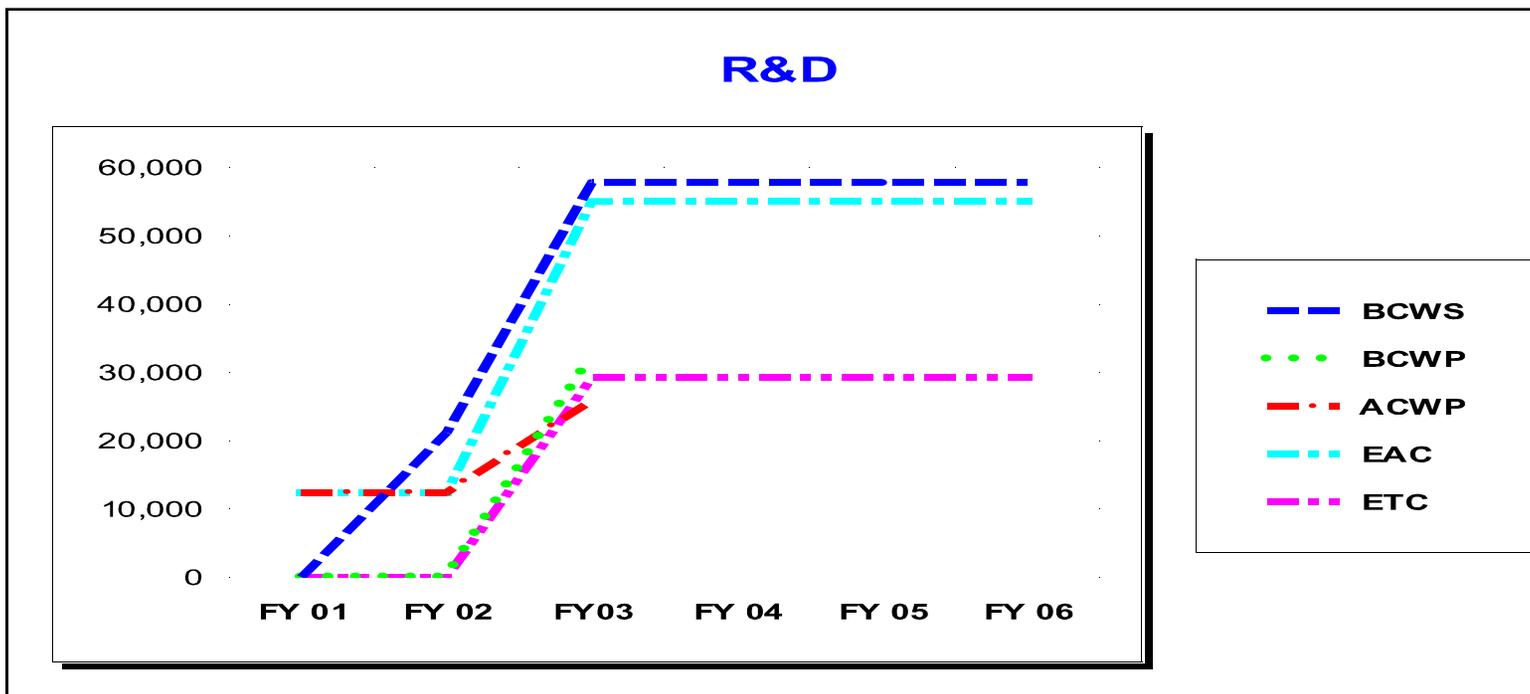
Monthly Summary (to include technical causes of VARs, Impacts) and Corrective Action(s):

Prepared by: \_\_\_\_\_ Date: \_\_\_\_\_ Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

Report: CURVE  
 Program: CDFCALO

CDF Calorimeter (R&D)

Funding Type-CA



	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
BCWS	0	21,148	57,760	57,760	57,760	57,760
BCWP	0	0	32,273	32,273	32,273	32,273
ACWP	12,396	12,396	25,835	25,835	25,835	25,835
EAC	12,396	12,396	54,991	54,991	54,991	54,991
ETC	0	0	29,156	29,156	29,156	29,156

Cost Performance Report - Work Breakdown Structure													
Contractor: Location:				Contract Type/No:				Project Name/No: CDF DAQ (R&D)		Report Period: 12/31/2002                      1/31/2003			
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling		
1	4,662,773		0		0		4,662,773	0		0	0		
Funding Type-CA	Current Period					Cumulative to Date					At Completion		
	Budgeted Cost		Actual Cost Work Performed	Variance		Budgeted Cost		Actual Cost Work Performed	Variance		Budgeted	Latest Revised Estimate	Variance
	Work Scheduled	Work Performed		Schedule	Cost	Work Scheduled	Work Performed		Schedule	Cost			
Item	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
R&D	24,372	9,420	0	-14,952	9,420	101,562	66,775	0	-34,786	66,775	626,349	538,480	87,869
Gen. and Admin.	0	0	0	0	0	0	0	0	0	0	0	0	0
Undist. Budget											-1,854,581	0	-1,854,581
Sub Total	24,372	9,420	0	-14,952	9,420	101,562	66,775	0	-34,786	66,775	-1,228,232	538,480	-1,766,712
Management Resrv.											1,854,581	0	1,854,581
Total	24,372	9,420	0	-14,952	9,420	101,562	66,775	0	-34,786	66,775	626,349	538,480	87,869

Variance Analysis Worksheet

Funding Type-CA  
R&D

Reporting Period: 12/31/2002 1/31/2003

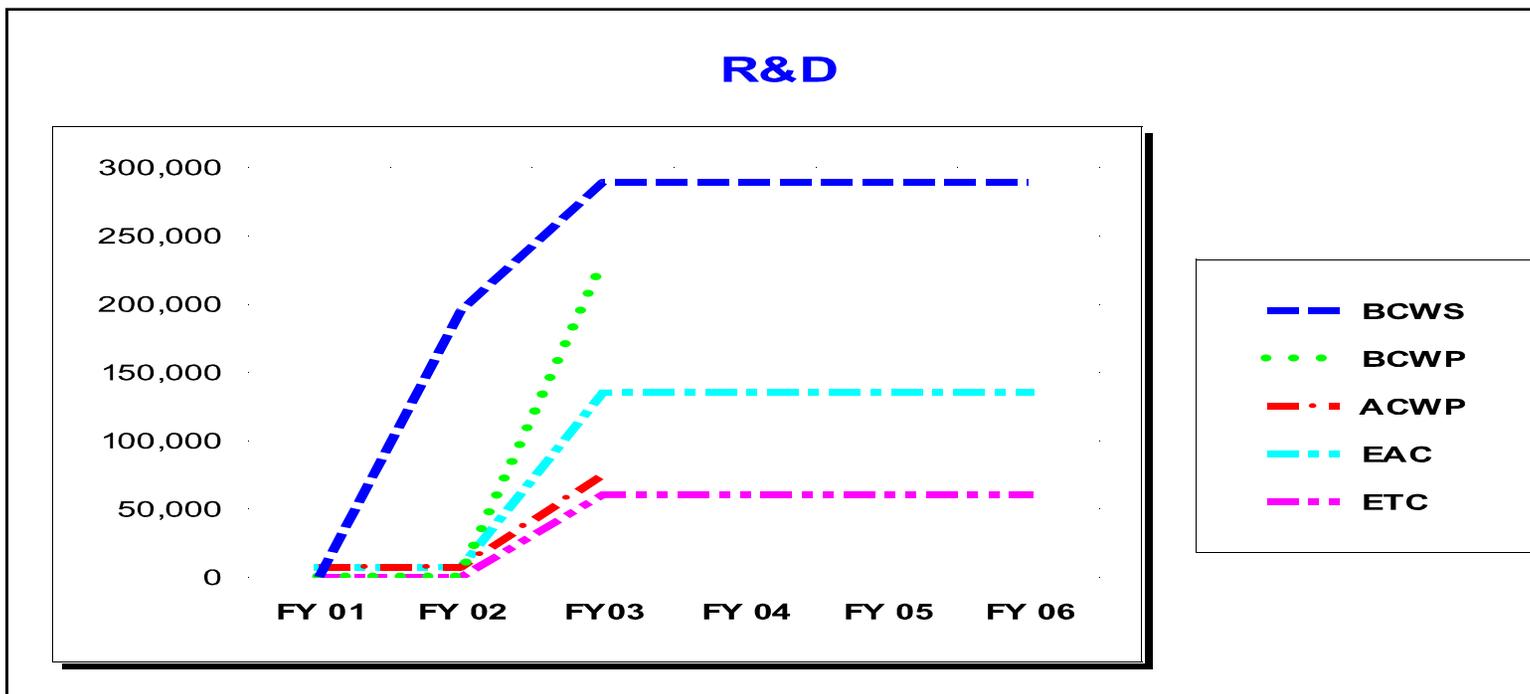
	BCWS	BCWP	ACWP	SV in \$	SV in %	CV in \$	CV %	SPI	CPI
Current:	24,372	9,420	0	-14,952	-61%	9,420	100%	0.39	N/A
Cumulative:	101,562	66,775	0	-34,786	-34%	66,775	100%	0.66	N/A
	BAC	EAC	VAC in \$	VAC in %	CPI to BAC	CPI to EAC			
At Complete:	626,349	538,480	87,869	14%	0.89	1.04			
Explanation of Variance/Description of Problem:									
Impact:									
Corrective Action:									
Monthly Summary (to include technical causes of VARs, Impacts) and Corrective Action(s):									
Prepared by:				Date:		Approved by:		Date:	



Report: CURVE  
 Program: CDF\_ADMI

CDF Jan 03 Admin (R&D)

Funding Type-CA



	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
BCWS	0	195,144	289,002	289,002	289,002	289,002
BCWP	0	0	228,671			
ACWP	7,200	7,200	74,639			
EAC	7,200	7,200	134,970	134,970	134,970	134,970
ETC	0	0	60,331	60,331	60,331	60,331

## **VII. VARIANCE ANALYSIS**

Cost variances in excess of \$50K at level 3 in the WBS will be discussed in this section. To date, no earned value calculation has been performed on equipment funds, so there is no variance discussion needed this month.

## **VIII. FUNDING PROFILES**

The following table contains the funding plan for the project. Specific information relating to spending profiles for the current fiscal year is available above in Section VI, Earned Value.

	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Totals</b>
US - M&S	\$ 2,750,000	\$ 1,580,000	\$ 5,292,456	\$ 7,073,262	\$ 242,418	\$ 16,938,135
US - Labor	\$ 250,000	\$ 1,250,000	\$ 1,989,300	\$ 2,607,789	\$ 651,352	\$ 6,748,441
US - G&A	\$ 500,000	\$ 639,000	\$ 1,114,182	\$ 1,616,354	\$ 219,344	\$ 4,088,880
US - Equip. Total	\$ 3,500,000	\$ 3,469,000	\$ 8,395,938	\$ 8,508,623	\$ 1,113,114	\$ 24,986,676
US - R&D	\$ 1,670,000	\$ 480,000				\$ 2,150,000
Japan	\$ 235,465	\$ 867,229	\$ 1,080,700	\$ 9,600	\$ -	\$ 2,192,994
Italy	\$ 64,506	\$ 350,838	\$ 260,946	\$ -	\$ -	\$ 676,290
University	\$ 23,557	\$ 224,780	\$ 103,030	\$ 26,040	\$ -	\$ 377,407
Total Funding	\$ 5,493,528	\$ 5,391,847	\$ 9,840,614	\$ 8,544,263	\$ 1,113,114	\$ 30,383,366

This is the funding profile submitted to the DOE Office of Science in the Project Execution Plan, and dates from the External Independent Review (November, 2002).