

Approval of Full Construction (CD-3b)
for the
Run IIb CDF Detector Project
at Fermi National Accelerator Laboratory

Office of High Energy Physics
Office of Science

A. Purpose

The purpose of this paper is to document the review by the Office of Science Energy Systems Acquisition Advisory Board-equivalent for the critical decision "Approval of Full Construction (CD-3b)" in order to commence full construction activities scheduled for the Run IIb CDF Detector Project at Fermi National Accelerator Laboratory (FNAL).

Critical Decisions 1, 2, and 3a were approved on February 6, 2003. Critical Decision 3 was split into two parts due to concerns with the accelerator performance that would influence the need for the silicon tracker upgrades. The decision associated with this CD-3b decision point was announced on September 3, 2003. As a result, a Baseline Change Proposal (BCP) has been submitted with scope reduction and a decrease in project cost. Approval of this BCP is a prerequisite for CD-3b approval.

The Acquisition Executive (AE), upon signature of this document, will grant approval of CD-3b and thereby allow the project to proceed with construction.

B. Justification and Definition of CD-3b

The Tevatron Collider at FNAL provides the highest energy particle beams in the world, enabling unique opportunities for scientific discovery. FNAL will continue to operate at the "energy frontier" until the Large Hadron Collider (LHC) at the European Organization for Nuclear Research (CERN) begins operation with higher beam energy. Thus, the Tevatron Collider has a window of opportunity for making major scientific discovery before handing off the baton to CERN.

Run II of the Tevatron began in March 2001, but the Tevatron accelerator has faced difficulties meeting its luminosity goals. Based on the knowledge gained from the operation of the Tevatron and R&D, a new plan was developed and the luminosity goals were revised. The Run II plan for the Tevatron was submitted on June 15, 2003 to the DOE, and evaluated in July 2003 by a DOE review committee. The new accelerator plan significantly lowered the expected integrated luminosity of Run II.

Instead of granting full Critical Decision 3, Critical Decision 3 was split into two parts due to concerns with the accelerator performance that would influence the need for the silicon tracker upgrades. CD-3a allowed construction to begin while the latest

accelerator plan was being evaluated, and CD-3b was set as a decision point on whether to make any scope changes based on the latest plan and its evaluation. The decision associated with this CD-3b decision point was announced by the FNAL Director on September 3, 2003. The scope and cost portions of the project have been adjusted to reflect this decision, and a BCP has been submitted for an approval. Thus, the reason for splitting CD-3 into two parts has been met and the project is now ready for CD-3b approval to move forward with remaining construction.

C. Project Execution Plan

The Project Execution Plan and Project Management Plan have been revised to incorporate the rebaseline changes.

D. Project Scope Baseline

The project consists of: upgrade of the central calorimetry, to provide improved time measurement of electromagnetic energy deposition and a replacement for the obsolete central preradiator chambers; replacement of obsolete portions of the data acquisition system that prevent the experiment from collecting data at the rates needed in Run IIb; and closeout of prior silicon detector effort. The detector components provided by the Run IIb upgrades will allow the detectors to operate at high luminosity and meet the laboratory's goal of optimizing integrated luminosity accumulation.

E. Project Cost, Funding and Schedule Baseline

The revised Total Estimated Cost for the Run IIb CDF Detector Project is \$10.4 million. The current (as of 11/30/03) Estimate to Complete (TEC minus silicon closeout and contingency) is \$6.0 million. The contingency of \$2.7 million is 45 percent of this ETC.

The planned funding for the Run IIb CDF Detector Project is shown in the following table. This profile is consistent with the request of changes in the project funding profile submitted by the Office of High Energy Physics in November 2003.

Planned funding (AY in millions)					
	FY02	FY03	FY04	FY05	Total
DOE MIE	3.5	3.5	1.7	1.7	10.4

The table below presents the schedule for the Run IIb CDF Detector Project. The schedule has eleven months of float (milestone "Data Acquisition and Trigger Upgrades Ready for Installation" to CD-4).

Run IIb CDF Detector Project

CD-3b

Milestone	Description	Date*
0.0	CD-0: Approve Mission Need	May 2001 (A)
0.1	CD-1: Approve Preliminary Baseline	February 2002 (A)
0.2	CD-2: Approve Performance Baseline	February 2002 (A)
0.3	CD-3a: Approve Limited Construction	February 2002 (A)
0.4	CD-3b: Approve Full Construction	December 2003 (F)
0.5	CD-4: Approve Project Completion	November 2006 (F)

*(A) Actual, (F) Forecast

F. Risk Analysis

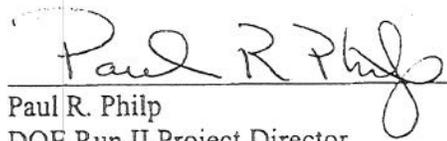
The BCP is simply a subtraction of the elements that were needed for the construction and installation of the replacement silicon detector. Consequently, the contingency and risk assessments on the remaining elements of the project, done at that time, are still appropriate.

G. Safety Documentation

The safety requirements have not changed since the project was baselined. FNAL subscribes to the philosophy of Integrated Safety Management (ISM) for all work conducted on the FNAL site and requires its subcontractor and sub-tier contractors to do the same.

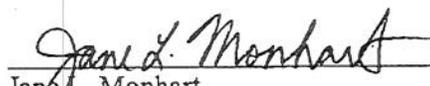
**Run IIb CDF Detector Project
CD-3b – Approval of Full Construction**

Submitted by:



Paul R. Philp
DOE Run II Project Director
Fermi Area Office

Date: 11-26-03



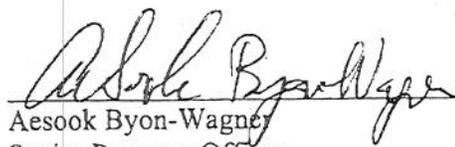
Jane L. Monhart
Fermi Area Office Manager

Date: 11-26-03



Michael P. Procario
Program Manager for Run IIb Detector Projects
Office of High Energy Physics

Date: 12/1/03



Aesook Byon-Wagner
Senior Program Officer
Office of High Energy Physics

Date: 12/1/03

Run Iib CDF Detector Project
CD-3b - Approval of Full Construction

Recommendations

The undersigned "Do Recommend" (Yes) or "Do Not Recommend" (No) Approval of CD-3b, Approval of Full Construction for the Run Iib CDF Detector Project at FNAL as noted below

[Signature] 12/8/03 Yes No
ESAAB Secretariat, Construction Management and Support Division/ Date

[Signature] 12/8/03 Yes No
Representative, Non-Proponent SC Program Office/ Date

[Signature] 12-8-03 Yes No
Representative, Environmental Safety and Health Division/ Date

[Signature] Yes No
Representative, Financial Management Division / Date

Representative, Security Management Team / Date

Representative, Grants & Contracts Division / Date

[Signature] Yes No
Representative, Laboratory Infrastructure Division/ Date

Approval

Based on the material presented above and this review, Critical Decision 3b, Approval of Full Construction, for the Run Iib CDF Detector Project at FNAL is approved. Therefore, the Chicago Operations Office/Fermi Area Office is authorized to proceed with expenditures of the remainder of Major Item of Equipment funds for the Run Iib CDF Detector Project.

[Signature] Date: _____
Robin Staffin
Associate Director, Office of High Energy Physics
Office of Science