

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

Office of High Energy and Nuclear 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 Limited Construction (CD-3A)" in order to commence limited construction activities scheduled through September 30, 2003 for the Run IIb CDF Detector Project at Fermi National Accelerator Laboratory.

A baseline readiness review was conducted by the Office of Science, Construction Management Support Division on September 24-26, 2002. The goal of this review was to assess the readiness of the projects on establishment of technical, cost, schedule, and management baselines, which are needed for Critical Decision 2 (CD-2), Approve Performance Baseline and Critical Decision 3 (CD-3), Approve Start of Construction. The review committee evaluated that the Run IIb CDF Detector Project had a good management team in place and was technically advanced. The committee concluded that with a minor cost and schedule adjustment, the project is ready to be baselined.

Due to the advanced state of the planning for the projects, Approvals of CD-1 and CD-2 are being requested at the ESAAB equivalent board meeting on December 17, 2002.

The Acquisition Executive (AE), upon signature of this document, will also grant approval of CD-3A and therefore allows the project to proceed to the next phase and commit resources for construction activities planned in FY03.

B. Justification and Definition of CD-3A

The Fermilab Tevatron provides the highest energy particle beams in the world, enabling unique opportunities for scientific discovery. Fermilab 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 much higher beam energy at the earliest in late FY 2007. Thus Fermilab Tevatron Collider has a window of opportunity for making a major scientific discovery before handing off the baton to CERN.

Portions of the detector will be damaged by radiation from the colliding beams over the next several years. Small sections of the electronics will not be able to function at the higher data rates planned for the later part of Run II of the Tevatron. The replacement of

these portions is required to continue optimal operation until the end of the Tevatron program. Estimates indicate that, due to radiation damage, the current silicon detectors will only be useful up to 4 inverse femtobarns, which is expected to occur by 2006. 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 acquiring an integrated luminosity of 15 inverse femtobarns.

At the baseline readiness review, the committee strongly recommended that DOE should move forward expeditiously with the approval of CD-1, CD-2 and CD-3 because of the tight schedule to complete this project significantly before the LHC experiments begin data taking and publishing their analyses.

Run II of the Tevatron began in March 2001 but the Tevatron accelerator has faced difficulties meeting its luminosity goals. These difficulties are now being analyzed while Tevatron continues to operate with roughly half of its original luminosity goal. Based on the experience gained from actual operation of Tevatron, a new plan is being developed to meet the revised luminosity goals. The Run II plan for Tevatron is expected to be completed by June of 2003 and evaluated in July 2003.

In order for project activities to be performed without causing delay in the project schedule while the new plan for the Tevatron accelerator is being developed and evaluated, the initial construction activities have to start promptly. CD-3A will grant for the project to proceed with the initial phase of activities scheduled in FY03. These activities will include all procurements and labor purchases planned through September 30, 2003.

C. Budget Profile

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 project funding profile submitted by the Division of High Energy Physics on December 11, 2002.

Planned funding (AY in millions)						
	FY02	FY03	FY04	FY05	FY06	Total
DOE MIE	3.5	3.5	8.4	8.5	1.1	25.0

D. Schedule

The table below presents the schedule for the Run IIB CDF Detector Project.

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

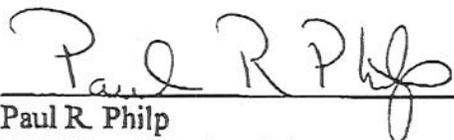
December 17, 2002

Run IIb CDF Detector Project

CD-3A

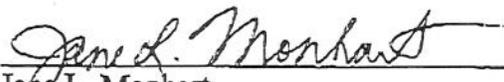
**Run IIb CDF Detector Project
CD-3A Review**

Submitted by:



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

Date: 12-12-02



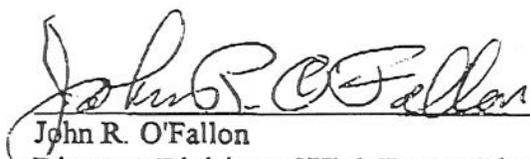
Jane L. Monhart
Fermi Area Office Manager

Date: 12-13-02



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

Date: 12-13-02



John R. O'Fallon
Director, Division of High Energy Physics

Date: 12/16/02

December 17, 2002

Run IIb CDF Detector Project

CD-3A

Run IIb CDF Detector Project CD-3A Review

Recommendations

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

[Signature] 12/17/02 Yes No
ESAAB Secretariat, Construction Management and Support Division/ Date

[Signature] 17 Dec 02 Yes No
Representative, Non-Proponent SC Program Office/ Date

[Signature] 12-17-02 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] 12/17/02 Yes No
Representative, Laboratory Infrastructure Division/ Date

Approval

Based on the material presented above and this review, Critical Decision 3A, Approval of Limited 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 Major Item of Equipment funds of \$7.0 million through FY03 for the Run IIb CDF Detector Project.

S. Peter Rosen
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Associate Director
Office of High Energy and Nuclear Physics
Office of Science

FEB 6 2003
Date