

**Memorandum of Understanding
Between
<Institution>

and the

Run IIb CDF Detector Project
at Fermilab**

1. Introduction

This Memorandum of Understanding (MOU) describes the collaboration by members of <Institution> in the Collider Detector at Fermilab (CDF) Run IIb Project. The purpose of this collaboration is the design, fabrication, operation and scientific exploitation of the CDF Detector in the era of Tevatron operation from 2005 - 2010. The detector is described in the CDF Run IIb Technical Design Report, September, 2002.

The CDF Run IIb project management infrastructure (CDF Run IIb Project Office) resides at Fermilab. The responsibility for CDF Run IIb project management resides with the CDF Run IIb Project Manager (PM) who reports to the Run IIb Fermilab Project Management Group (PMG) and the Fermilab Deputy Director. The CDF Run IIb Project Manager has appointed level two (L2) managers who are responsible to them for subsystems of the CDF Run IIb project.

This Memorandum of Understanding describes the long-term contributions of <Institution> to the design and construction of the CDF Detector. It is understood that these contributions of <Institution> may later be modified or that additional responsibilities may be added. The CDF Run IIb project finishes at the end of FY2006 and covers design and construction of the Run IIb detector only. This MOU will not cover any activities beyond the end of the project. Installation, commissioning, and other activities related to operation of the experiment will be covered by another MOU, that will be written explicitly for that purpose.

An annual Statement of Work (SOW) will detail the contributions of <Institution> as the detector construction proceeds and will contain the specific activities, deliverables,

and funding required. The normal period of performance will be the US fiscal year (October 1 - September 30). A separate SOW will be written for each L2 subsystem, while the MOU will be a single document for each CDF Run IIB Institution.

This Memorandum of Understanding is made between <Institution> and the CDF Run IIB Project. Fermilab is a signatory as part of its role in management oversight. It does not constitute a legal, contractual obligation on the part of any of the parties. It reflects an arrangement that is currently satisfactory to the parties involved. The parties agree to negotiate amendments to this memorandum as required.

2. Personnel

2.1. List of Scientific Personnel

Participating scientists committed to CDF over the full project period are listed below. No support for these individuals comes from project funds. The CDF Run IIB Fraction refers to the fraction of total time committed to CDF Run IIB activities.

Name or Position	CDF Run IIB Fraction	Other Commitments	
		Research	Other (teaching, admin., etc.)
	50%	Atlas(1%), CDF (49%)	.001%
	50%	Atlas(1%), CDF (49%)	.001%
	50%	Atlas(1%), CDF (49%)	.001%

2.2. Executive Board Representative

<Name> is the present representative of <Institution> to the CDF Executive Board.

2.3. List of Technical Personnel

Participating technical personnel with the anticipated fraction of their time (time fractions are estimates and are not cost shares) committed to CDF Run IIB during this period of performance and their source(s) of support are indicated in each SOW.

2.4. Other Key Personnel

The Environment, Safety and Health (ES&H) for work performed at <Institution> is the responsibility of that institution. All work performed at Fermilab will be performed in accordance with Fermilab ES&H policies. The ES&H officer currently responsible for compliance with applicable ES&H policies associated with CDF participation by this institution is listed in the SOW. The Quality Assurance officer for the CDF Run IIB

group at <Institution> currently responsible for QA compliance of tasks performed by this institution is also listed in the SOW.

3. Design, Fabrication and Installation Responsibilities

3.1. Design and Fabrication Responsibilities - Construction Period

3.1.1 WBS Items at L2, Estimated Cost and Deliverable:

The CDF RUN I Ib Work Breakdown Structure (WBS) contains a detailed cost estimate of the items needed to complete the CDF RUN I Ib project. By this MOU <Institution> agrees to make a best effort to provide the items listed in the SOW at a cost not to exceed the WBS base cost estimate. Procedures to be followed in the event of a necessary variation of cost from the base cost are described in section 3.3 below.

3.1.2 Transportation

Unless specifically indicated otherwise here, items produced by <Institution> for use in the CDF detector or subsystems shall be transported by the providing institution to the agreed upon point of delivery. <Institution> shall be responsible for safe transport of all items to these delivery points. The method of transport and packaging are to be authorized by the CDF Run I Ib Project Office in consultation with the appropriate L2 lead engineer and L2 Manager.

3.2. Coordination and Reporting

The CDF Run I Ib L2 managers are signatories to this MOU. The institution contact person for activities at <Institution> is <name>. The task managers for CDF Run I Ib activities carried out at <Institution> are as follows

WBS (L2)	Task - Deliverable	Task Manager
1.1	Silicon Detector	
1.2	Calorimeter	
1.3	Data Acquisition and Trigger	
1.4	Administration	

Any changes to the Task Manager assignment will be listed in the SOW. The progress of the design, fabrication, and testing of these components will be reported by the above-named task managers on a monthly basis, by WBS element in detail, to the CDF Run I Ib L2 Manager, who in turn will report subsystem progress to the CDF Run I Ib PM. The PM will, in turn, report to the Fermilab PMG.

3.3. Procurement Authorization

The authorized financial officer at <Institution> is listed in the SOW. The CDF Run Iib PM delegates obligation authority regarding the designated WBS items in the SOW to the authorized financial officer subject to the following requirements. The base cost of the WBS items is given in the SOW without contingency. The officer agrees that these cost ceilings cannot be exceeded without the authorization the PM and the relevant L2 manager. In addition, the officer agrees that purchases exceeding the delegated limit (currently \$25K) must be authorized by the CDF Run Iib L2 manager. Larger procurements (greater than \$100K) must in addition have the written authorization of the CDF Run Iib PM. Approval by the Run Iib Project managers and Level 2 managers will be indicated by signature on purchase requisitions, or other authorization documents as appropriate.

3.4. Reporting to CDF RUN Iib Project Management

<Institution> will report all CDF related expenditures and labor charges together with associated technical progress in each item of work by Work Breakdown Structure (WBS) category on a monthly basis through the appropriate L2 Manager(s) to the CDF Run Iib PM. Cost reporting will apply to CDF Run Iib Project funds related to detector fabrication. Other, non-DOE costs will be reported in a manner that is agreed to by the L2 Manager(s), the PM and <Institution>. Any request for variance from the base cost must be immediately reported to the appropriate L2 manager.

Technical progress will be reported by WBS element to the L2 Manager and the PM on a monthly basis and will describe all items covered in this Statement of Work regardless of the specific nature of the funding support.

<Institution> agrees to furnish complete documentation of the quality control and performance checks which are carried out for CDF Run Iib. Further, the institution agrees to furnish full documentation of all equipment and services which it provides for the CDF Run Iib project. This will include engineering drawings of equipment, full schematics of electronics, and documentation of all software. Where relevant, an acceptable level of spares (as specified in the base cost estimate) will be provided and maintained by <Institution>.

Each CDF Run Iib group at <Institution> agrees, with this document, to set up and maintain a ledger for all DOE-funded costs, of a form specified by CDF Run Iib Project Management. This ledger will contain information on cost items at the lowest level of the CDF Run Iib WBS. Each Institution agrees to provide and maintain this ledger so as to provide timely information to the L2 Manager and the CDF Run Iib Project Office.

4. Contribution of Effort, Services and Equipment

4.1. Effort

Subject to funding of its base program, <Institution> will provide support for the scientific and technical personnel as indicated in section 2. This contribution refers only to support provided outside the CDF Run IIB Project.

4.2. Services

The services of the <Institution> Purchasing, Expediting, and Receiving Departments and the Administrative Staff will be available to the CDF project to the degree required to carry out the fabrication responsibilities of <Institution>. By this MOU, <Institution> agrees to provide the services of the responsible financial officer. Standard <Institution> cost accounting practices will be applied to the CDF Run IIB Project activities at <Institution>.

4.3. Facilities and Equipment

The following <Institution> facilities and equipment will be made available to the CDF project to the degree necessary to carry out the design and fabrication responsibilities of the group:

Facilities and Equipment:

4.4. Operating Costs

<Institution>, subject to the availability of funds, will support the normal research operating expenses (such as physicists' salaries, travel expenses, miscellaneous supplies, administrative support, etc.) of the <Institution> group working on the Run IIB CDF Detector Project. These normal operating expenses are not considered as part of the CDF detector cost estimate nor will they be borne by the CDF Run IIB Detector Project.

5. Fermilab (as host institution) Effort, Services and Facilities

Tracking of Fermilab CDF support, whether provided by Fermilab or paid by the CDF Run IIB Project, will be done using appropriate effort reporting codes. The costs incurred will be reported to the Fermilab Director.

Subject to the agreement to be negotiated with the Fermilab Director, <Institution> expects the following Fermilab resources to be available in support of the design, fabrication, and installation responsibilities of <Institution>:

5.1. Administrative and Technical Personnel

Administrative and technical staff salary support may be paid by the CDF Run IIB Project, or may be provided by Fermilab as project host laboratory. The salary support of Fermilab staff contributing to the responsibilities of <Institution> must be negotiated

annually with the Fermilab Director as part of the SOW. Support provided by Fermilab will be tracked and reported to the Fermilab Director and the PMG.

5.2. Services

The services of the Fermilab Purchasing, Expediting, and Receiving Departments are expected to be available to <Institution> for procurement.

5.3. Facilities and Equipment

<Institution> expects that the following Fermilab facilities, equipment, and laboratory space will be available during the course of the project:

6. **Costs and Funding**

6.1. Expected Sources of Funding

The cost of the detector elements covered under the CDF Run IIb WBS are taken in detail from the current CDF Run IIb Cost Estimate (September 1, 2002). DOE Funds indicate the project funds expected to be provided over the lifetime of the project. <Institute> agrees to not exceed the costs shown in the SOW, subject to the procedures given in section 3.3.

6.2. Management Reserve

Each year, a SOW will be written with each CDF Run IIb Institution for each L2 subsystem which is relevant. The allocation of funds for the fiscal year will occur in accordance with the project schedule, and will be subject to a review of progress made. Management control requires the review and concurrence of the L2 Manager and the Project Office, as needed, for major expenditures, as defined above. The release of funds above the given thresholds by the responsible financial officer as named above will be contingent upon this concurrence.

7. **Method of Funding Transfers**

Any portion of the expenditures by <Institution> that are to be covered by funds provided by the Run IIb CDF Detector Project require an allocation decision of the CDF Run IIb PM and the concurrence of the Fermilab Deputy Director. Details will be contained in the Statement of Work, and no funds will be distributed from the project to <Institution> until the appropriate SOW is in place.

All equipment items bought or fabricated will be properly marked as the property of the appropriate funding agency. The equipment will remain part of the CDF detector until it is dismantled or the detector element in question is replaced.

8. General Considerations

8.1. Safety and Engineering Practices

The experimenters from <Institution> agree to familiarize themselves with Fermilab safety policies and to adhere to them. All detector components must be designed, fabricated, installed and operated in conformity with Fermilab safety policies and practices as well as Fermilab engineering standards. All engineering, design, quality assurance, safety, and other activities shall be in compliance with ISO standards. All major components will undergo appropriate design, safety, and engineering reviews.

8.2. Operations

<Institution> agrees to maintain, to the best of their ability, equipment provided for the CDF detector as long as <Institution> is a member of the CDF collaboration.

9. Schedules and Milestones

<Institution> will make every effort to carry out their institutional responsibilities consistent with the schedule for the fabrication of the CDF detector. These schedules may have to be changed as the project progresses. Changes that affect <Institution> will be noted in the annual SOW. The program milestones over the life of the project relevant to <institution> will appear in the annual SOW.

