Neutrinos at the Main Injector (NuMI) Project

Project No. 98-G-304
Progress Report No. 64
March 1-31, 2004
(G. Bock, A.L. Read - Editors)
(NuMI-1021)

I. PROJECT DESCRIPTION

The NuMI Project provides for the construction of an intense, variable energy, beam of neutrinos using the Fermilab Main Injector, as well as large underground neutrino detectors located at Fermilab and Soudan, Minnesota. The purpose of the project is to enable a new generation of long baseline neutrino experiments that can decisively detect and accurately measure neutrino oscillations. Detection of such oscillations would firmly establish a non-zero value of neutrino mass. The neutrino beam will be of sufficient energy that experiments capable of identifying muon neutrino to tau neutrino oscillations are feasible. The scope of the NuMI Project includes the excavation of large underground laboratories to house the neutrino beam system and the MINOS detectors.

II. OVERVIEW OF PROJECT STATUS – G. Bock

At the close of the first half of FY04 the project continues to be progressing well. This month the project accepted beneficial occupancy of the MINOS area from the outfitting subcontractor. This completes the large conventional construction effort to produce the NuMI Facilities. Installation work in support of the Near Detector installation began immediately and on March 31, the first Near Detector plane was delivered to the MINOS underground experimental hall.. Progress on the technical components continued on schedule. Overall the project is now 97% complete.

Installation of technical components in the target hall and pre-target areas is proceeding on schedule.

There were no injuries on the NuMI project this month.

The MINOS Far Detector took atmospheric neutrino data.

More detailed information on the project's progress and status this month follows in the rest of this report.

III. MASTER SCHEDULE AND FUNDING SUMMARY

The NuMI DOE Project Master Schedule is shown in Figure 1.

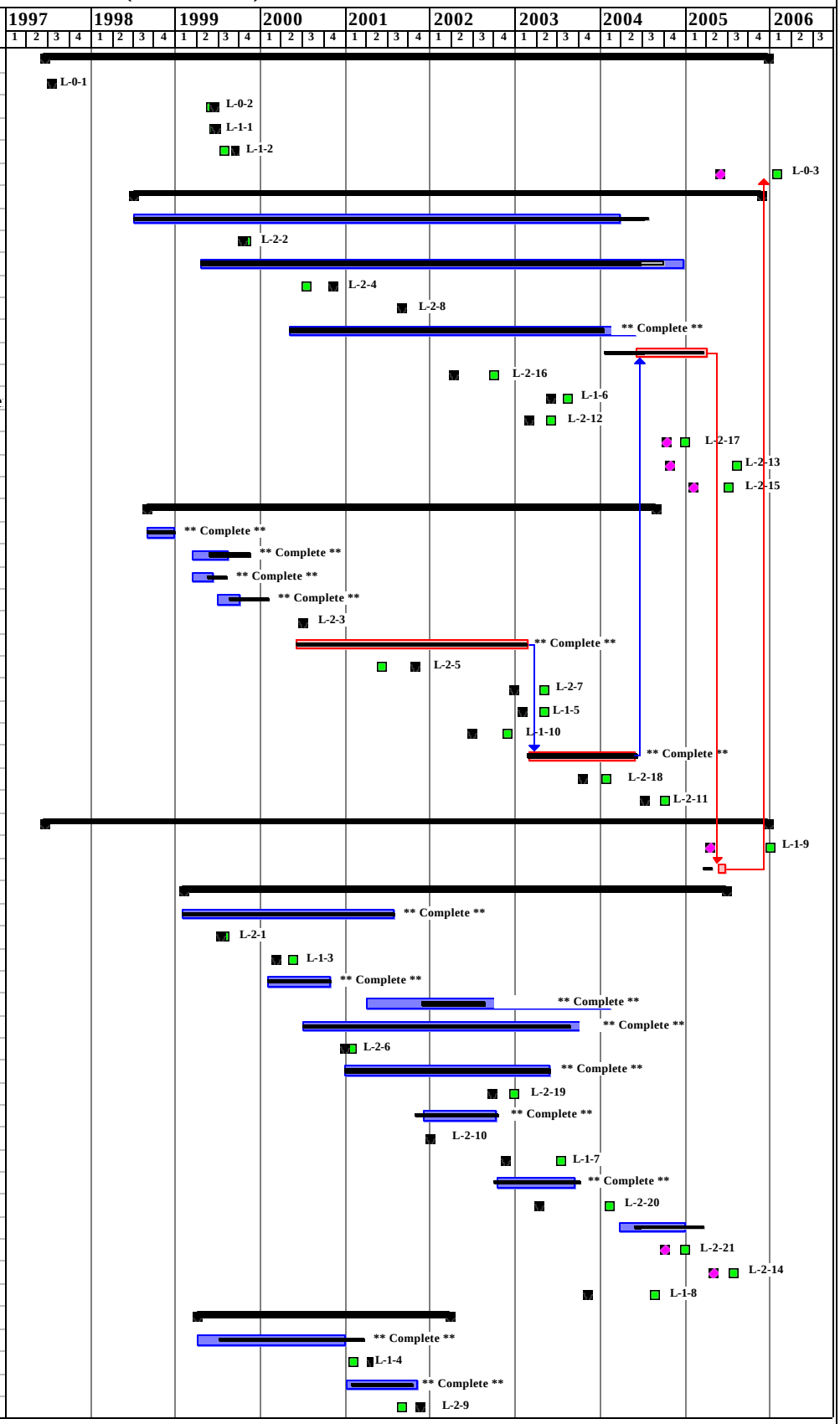
The DOE baseline milestones are shown in the figure as solid squares. These fixed milestones are defined in the DOE Project Execution Plan and the Baseline Change Proposal approved in December 2001. Shown as diamonds on the same line are the project's baseline projected dates for achieving the milestones. Actual dates of achieving milestones are shown as inverted black triangles.

Our actual progress is indicated by black 'thermometer' lines within the horizontal (baseline schedule) bars.

A Table titled "DOE Milestones vs. Current Forecast" follows immediately after the Project Master Schedule. That table lists all the approved Level 0-1-2 DOE milestone dates along with the project's current (and previous month's) forecast for achieving them. The list is sorted by DOE Milestone date. Milestones with forecast dates that have changed significantly in the last month are discussed in Section VIII of this report.

As always the TEC and OPC profiles are presented in the Funding Summary.

NuMI Project
(Fiscal Years)



Project: NuMI_Master_Sched
Date: 4/15/04

Baseline Task
Critical Task
Summary Task
DOE Baseline Milestone
FNAL Current Projection
Milestone Complete
FNAL Forecast
Task Status

DOE Milestone vs Current Forecast
(Sorted by DOE Milestone Date)

5/4/2004

Milestone Description	PEP Milestone #	DOE Milestones (As of 12/2001)	Last Month's Forecast Milestone (2/2004)	Current Month's Forecast Milestone (3/2004)	DOE Milestone Variance (Cal Days)	Monthly Variance (Cal Days)	Notes
CD-1 Approve Mission Need	L-0-1	3/17/1997	3/17/1997	3/17/1997	0	0	Complete
CD-3a Start Limited Construction	L-1-1	2/15/1999	2/23/1999	2/23/1999	(8)	0	Complete
CD-2 Approve Baselines	L-0-2	2/17/1999	2/17/1999	2/17/1999	0	0	Complete
CD-3b Continue Construction	L-1-2	3/31/1999	5/21/1999	5/21/1999	(51)	0	Complete
MINOS Steel Purchase Subcontract Awarded	L-2-1	4/1/1999	3/15/1999	3/15/1999	17	0	Complete
Top of Soudan #8 Mineshaft Located with GPS	L-2-2	6/28/1999	6/16/1999	6/16/1999	12	0	Complete
Far Detector Prototype Erected	L-1-3	1/17/2000	11/10/1999	11/10/1999	68	0	Complete
NTP Issued for Fermilab Underground Subcontract	L-2-3	3/6/2000	3/6/2000	3/6/2000	0	0	Complete
High Current Pulse into Prototype Horn	L-2-4	3/14/2000	7/14/2000	7/14/2000	(122)	0	Complete
CalTech Factory Commissioned	L-2-6	9/29/2000	9/1/2000	9/1/2000	28	0	Complete
Far Detector Excavation Complete	L-1-4	10/2/2000	12/22/2000	12/22/2000	(81)	0	Complete
Fermilab Underground Construction 50% Complete	L-2-5	2/6/2001	6/29/2001	6/29/2001	(143)	0	Complete
Magnets for MI Stub Refurbished	L-2-8	4/30/2001	4/30/2001	4/30/2001	0	0	Complete
Outfitting of Far Detector Enclosure Complete	L-2-9	4/30/2001	7/19/2001	7/19/2001	(80)	0	Complete
Cosmic Rays Observed in Far Detector	L-2-10	3/22/2002	8/31/2001	8/31/2001	203	0	Complete
Technology Choice Made for Muon Monitors	L-2-16	5/30/2002	12/10/2001	12/10/2001	171	0	Complete
Service Building & Outfitting Bid Package Out	L-1-10	7/30/2002	2/25/2002	2/25/2002	155	0	Complete
75% Scintillator Produced	L-2-19	8/30/2002	5/24/2002	5/24/2002	98	0	Complete
Near Detector Hall Excavation Complete	L-2-7	12/30/2002	8/30/2002	8/30/2002	122	0	Complete
Target Hall Excavation Complete	L-1-5	12/30/2002	10/4/2002	10/4/2002	87	0	Complete
Lambertson & C-Magnets Assembled & Tested	L-2-12	2/1/2003	10/31/2002	10/31/2002	93	0	Complete
First Far Detector Super Mod Complete & Tested	L-1-7	3/15/2003	7/24/2002	7/24/2002	234	0	Complete
Inner & Outer Conductors for First Production Horn Assembled	L-1-6	4/14/2003	2/5/2003	2/5/2003	68	0	Complete
Target Service Building Shell Complete	L-2-18	9/30/2003	6/17/2003	6/17/2003	105	0	Complete
Near Plane Pre-assembly Complete	L-2-20	10/10/2003	12/17/2002	12/17/2002	297	0	Complete
Far Detector Complete & Tested	L-1-8	4/25/2004	7/9/2003	7/9/2003	291	0	Complete
Beneficial Occupancy of Service Buildings at Fermilab	L-2-11	5/31/2004	3/10/2004	3/10/2004	82	0	Complete
Start Commissioning with Both Near and Far DAQ	L-2-21	8/30/2004	6/9/2004	6/9/2004	82	0	
Complete Installation of Horn Power Supply	L-2-17	9/1/2004	6/11/2004	6/11/2004	82	0	
MI Stub Installation Complete	L-2-15	3/11/2005	10/7/2004	10/7/2004	155	0	
Near Detector Complete & Tested	L-2-14	3/31/2005	12/27/2004	12/27/2004	94	0	
First Horn Installed	L-2-13	4/7/2005	6/24/2004	6/24/2004	287	0	
Start Commissioning	L-1-9	9/1/2005	12/22/2004	12/22/2004	253	0	
CD-4 Start Operations	L-0-3	9/30/2005	2/1/2005	2/1/2005	241	0	End of Commissioning

IV. FUNDING SUMMARY (K$)

Funding Summary (as of 3/31/2004), amounts in thousands

YEAR	TEC (NuMI Facility) Appropriations	OPC (MINOS, Soudan) Obligations
		Actual costs through FY03. Plan from Baseline Change Proposal
Prior FY's	0	1,417 actual
FY98	5,500	2,348 actual
FY99	14,300	4,114 actual
FY00	22,000	11,324 actual
FY01	22,949[1]	13,598 actual
FY02	11,400	17,227 actual
FY03	19,842[1,2,3]	7,067 actual
FY04	12,426[2,4]	4,605 balance
		Future Funding Plan
FY05	825[2,3,4]	500
TOTALS	**109,242**	**62,200**

Note [1]: FY01 Rescission removed $51K from plant line and $26K from OPC. We planned the restoration of these funds in FY03.

Note [2]: FY03, FY04, and FYY05 plant line funds as recommended for inclusion in the Baseline Change Proposal by the September DOE Review and approved in December 2001. This is the $33.042M in additional funding in the rebaseline proposal from Project Management.

Note [3]: FY03 Rescission removed $251K from plant line. We show the restoration of these funds in FY05.

Note [4]: FY04 Rescission removed $73.750K from plant line. We show the restoration of these funds in FY05.

TEC Funding Appropriated, Not yet authorized
6,426

Total TEC funding authorized
101,991

TEC Obligations to date, (Not including requisitions in progress)
98,353 58,136 **OPC Obligations to date**

TEC Funding authorized but not obligated
3,638

V. NARRATIVE HIGHLIGHTS

MANAGEMENT HIGHLIGHTS – G. Bock

DOE Milestone L-2-11, Beneficial Occupancy of Service Buildings at Fermilab, was completed on March 10, 82 days ahead of the Project Execution Plan schedule.

Two change requests (CRs) are included this month. CR #278 adds some cooling fins to a few NuMI primary beam focusing magnets. CR #279 transfers $250K of excess budget from WBS 1.3 to WBS 1.1.2 to clear some variances associated with installation effort costs. No significant changes to the total estimated cost resulted from either of these changes.

Five WBS 1.1 Level 3 Milestones were achieved.

A MINOS collaboration meeting was held at Fermilab March 25-28.

The Project continues to report its progress against its own plan, which has a more aggressive schedule than that required by DOE milestones. The Project Support staff has developed a chart that provides the DOE NuMI Project Manager with a progress report against the DOE milestones.

Procurement Highlights – R. Huite

NuMI Tunnels and Halls (T&H) -- (NuMI Closeout Team)

The closeout team continues to responsible for the timely and effective closeout of the S. A. Healy contract. This team is organized with several sub-groups bringing together a variety of as-needed expert help, i.e., a negotiating group, claims and legal strategy expertise, geotechnical experts, cost estimators, auditors, procurement, etc.

The NuMI T&H Closeout Team consists of W. D. Wightman & Company (T. Wightman – Lead Negotiator), R. Helmuth (Claims professional); and Montgomery Watson Harza (J. Kovacich – Technical Support). Fermilab support continues to be provided by C. Laughton – BD/NuMI, R. Huite – BSS/Procurement, and G. Leonard, BSS/Legal. The NuMI T&H Closeout Team continued to evaluate Disputes Review Board (DRB) recommendations/issues, S. A. Healy potential change orders/claims, Fermilab's Counter Claim, and other correspondence. Additional outside consultants/professionals are retained as the NuMI Closeout Team may require.

On September 29, 2003, the Fermilab Director authorized Mr. W. D. Wightman to negotiate on behalf of Universities Research Association, Inc. with S. A. Healy representative(s) for the settlement of their claims engendered by their work under the NuMI T&H Contract. Mr. Wightman is authorized to represent URA in all matters relating to the settlement of these claims involving the Disputes Review Board, outside consultants and other interested parties.

BSS/Procurement continues to provide oversight of the subcontract terms and conditions, tracking of invoice/payment, and ensuring compliance with the Fermilab Procurement Policy and Procedures manual, and continues to be provided by the NuMI Procurement Administrator. The NuMI Senior Procurement Coordinator (R. Huite) attends the NuMI Project Manager's weekly staff meeting (each Monday); a weekly closeout status meeting (each Monday) with the NuMI Manager (G. Bock); a weekly status meeting with the BSS/Procurement Manager (J. Collins); a weekly meeting (each Tuesday) with the BSS/Procurement Manager, DOE-FAO Procurement Specialist (J. Chapman), and others as necessary. In addition, meetings with Head, BSS as may be necessary.

Six disputes have been presented to the Disputes Review Board. DRB recommendations have now been received on all six of the issues:

(1) DRB Recommendation No. 1, August 21, 2002 – Enhanced Water Treatment Facilities (FNAL No. 14) (Hearing Date – April 4, 2002), for entitlement.

(2) DRB Recommendation No. 2, November 12, 2002 -- Carrier Tunnel Clay Seam DSC at Station 4+20 (SAH No. 17/FNAL No. 53 (Hearing Date – April 4 & 5, 2002), for quantum.

(3) DRB Recommendation No. 3, August 2, 2002 – Geocompostie Drainage Strips/Shotcrete (FNAL No. 40) (Hearing Date – May 9, 2002), for quantum.

(4) DRB Recommendation No. 4, November 12, 2002 -- MINOS Shaft Excavation Vertical DSC (SAH No. 32/FNAL No. 20) (Hearing Date – May 9 & 10, 2002 and rebuttal July 9, 2002), for quantum.

(5) DRB Recommendation No. 5, April 29, 2003 -- Safety Stoppages & Constraints (SAH No. 68/FNAL No. 62) (Hearing Date -- November 12 and 13, 2002), for entitlement.

(6) DRB Recommendation No. 6, October 24, 2003 -- Decay Tunnel – Clay Seams and Groundwater/TBM (SAH NO. 69/FNAL No. 63) (Hearing Date -- September 17 and 18, 2002), for entitlement and quantum.

On December 1, 2003, Fermilab requested that the DRB panel members resign from their positions immediately. On December 18, 2003, S. A. Healy was encouraged to join with Fermilab to reconstitute a new DRB panel and move forward in a joint effort to reconcile the outstanding matters between the parties. On January 7, 2004, Fermilab sent a letter to S. A. Healy with Fermilab's nomination of replacement DRB Member. S. A. Healy has not advised of their acceptance or rejection of Fermilab's nominee.

The S. A. Healy's subcontract No. 527522 totals $34,629,667 through Supplemental Agreement No. 16. Total amount invoiced from S. A. Healy to date is $34,480,116 through and including Invoice No. 68 Rev. 1. Payment has been made in the amount of $31,621,265.36 and $2,858,850.64 retained.

There are a total of 60 pending open claims/change orders. Of this number, 4 have been denied and 19 are pending execution of Supplemental Agreement No. 17. The parties have exchanged

all outstanding claims except for about eight that S. A. Healy has "reserved their rights" for later presentation.

The following is a summary total of the numbered correspondence (i.e., letters and field communications/memorandums) that have been entered into the NCMO tracking database:

SAH to NuMI Numbered letters – 1319 (February 5, 2004)
NuMI to SAH Numbered Letters – 887 (February 12, 2004)

Fermilab entered into a purchase order with Holland & Knight LLP, Oakbrook Terrace, Illinois to provide professional legal services as may be required to provide advice and counsel on legal matters related to the NuMI T&H contract negotiation closeout team.

NuMI Service Buildings and Outfitting

The subcontract was awarded to Ragnar Benson, Inc. (RBI), of Park Ridge, Illinois in the amount of $17,880,000 million. The NuMI SB&O Construction Manager for this subcontract is Elaine McCluskey. The Business Services Section/Senior Procurement Administrator is R. Cibic.

The following Supplemental agreements have been issued:

Supplemental Agreement No. 1 – EC-001, Temporary Water Treatment at Minos -- $207,508.92
Supplemental Agreement No. 2 – EC-003, Power Clarifications and back-up Generator -- $19,057.50
Supplemental Agreement No. 3 – EC-002, EC-005, EC-006, & EC-007 -- $99,033.00
Supplemental Agreement No. 4 -- EC-009, EC-010, EC-011, EC-012, EC-013, EC-014, & EC-015 -- $28,813.39
Supplemental Agreement No. 5 – EC-004, EC-008, EC-021, EC-022, EC-025, EC-027, & EC-034 -- $159,477.99
Supplemental Agreement No. 6 – EC-017, EC-018, EC-023, EC-031, & EC-032 -- $122,390.74
Supplemental Agreement No. 7 – EC-019, EC-020, EC-028, EC-033, EC-037, EC-038, EC-040, EC-042, EC-043, EC-044, EC-046, EC-048, EC-049, EC-051, EC-053, EC-054, EC-056 -- $138,837.97
Supplemental Agreement No. 8 – EC-026, EC-020b, EC-065, EC-050, EC-061 -- $380,547.53
Supplemental Agreement No. 9 – EC-030, EC-035, EC-052A, EC-058, EC-059, EC-060, EC-62, EC-63, EC-064, EC-066 EC-067, EC-072, EC-076 -- $56,962.56
Supplemental Agreement No. 10 – EC-036, EC-069A, EC-075, EC-078, EC-079, EC-080, EC-081, EC084 -- $144,211.83
Supplemental Agreement No. 11 – EC-088, EC-090, EC-091, EC-094, EC-52B -- $546,129.48
Supplemental Agreement No. 12 – EC-074, EC-087, EC-092, EC-093, EC-098, EC-100, EC-101, EC-102, EC-103, EC-104, EC-105, EC-106, EC-109 -- $122,406.48
Supplemental Agreement No. 13 – EC-073, EC-087a, EC-89, EC-110, EC-111, EC-115, EC-117, EC-119, EC-123 -- $515,431.74
Supplemental Agreement No. 14 -- Pending

The RBI's subcontract No. 546631 totals $20,420,809.14 through Supplemental Agreement No. 13. Total amount invoiced from RBI to date is $20,267,918.18 through and including Invoice No. 9618, dated 22-Mar-2004, in the amount of $2,196,756.26. Payment has been made in the amount of $19,456,876.44 and $811,041.74 retained. The amount retained was reduced from six (6) percent to four (4) percent based on the subcontract Incentive Program for fieldwork completed satisfactorily.

On June 19, 2003, RBI submitted their formal claim for the victaulic pipe run up the Decay Pipe Walkway pursuant to Exhibit D of the subcontract. Fermilab is in the process of reviewing and developing its strategy.

NTP1 (October 1, 2002) provided for procurement and planning activities to include:

(1) Submission of technical and Subcontract submittals including but not limited to: required schedules, safety and quality control submittals, long-lead item shop drawings, and critical item shop drawing submittals.

(2) Procurement of initial critical and long lead items after coordinate submittals have been approved.

NTP2 (November 22, 2002) authorized commencement of work as required by the terms and conditions of the subcontract. Construction activities continue at both the MINOS and Target sites.

The subcontract incorporates two incentive programs:

(1) Percentage of fieldwork completed satisfactorily: if Fermilab finds that satisfactory progress is being achieved in the field, Fermilab may reduce the percentage retained based on the scheduled contain in the subcontract. This retention rate is adjusted by increments of 2 percent based on fieldwork percentage completed satisfactorily.

(2) Safety performance record: in rewarding the subcontractor for accomplishing the work described within the subcontract without injuries, lost workdays, and/or fatalities within the contractual requirements of the subcontract, Fermilab will reward the subcontractor for fieldwork accomplished over four periods established with the subcontract. The first safety performance period was not achieved due to missed milestone date and one recordable lost-time accident. RBI and their workforce successfully completed the second safety performance incentive period.

The following is a summary total of the numbered correspondence (i.e., letters and field communications/memorandums) that have been entered into the SB&O tracking database:

SBO to RBI – 408
RBI to SBO – 138
Field Memos (FM) – 0
Field Communications (FC) – 2
NCMO General – 93

The Target Area, including the MI-65 Service building and the below grade Pre-Target area, the Support Rooms, Target Hall, and the Target Shaft, was accepted from RBI, for Beneficial Occupancy by Fermilab on October 20, 2003. RBI has completed 170 of 179 punch list items at Target (MI-65). The carrier tunnel is complete. The fire alarm system is the biggest item.

Beneficial occupancy for the MINOS site occurred on March 10, 2004. RBI has completed 158 of 194 punch list items at the MINOS site. On March 31, 2004, RBI was notified which punch list items are outstanding and what RBI must do in order to meet MS-10 by April 2, 2004.

NuMI Technical Components

The Procurement Coordinator continues to be available to assist the NuMI Project relating to NuMI Technical components issues.

NuMI FACILITY AT FERMILAB
TECHNICAL COMPONENTS (WBS 1.1) – B. Baller, N. Grossman

Overview

Magnetic shielding was installed on two NuMI dipoles during a ten day shutdown in mid March. The shielding efficiency will be tested during the next available shutdown. Testing of the kicker magnet and power supply will start in April after minor changes are made to improve cooling of the load resistor.

Installation of technical components in the target hall continues on schedule. The target pile lower shielding is complete (L-3-310) and the target pile carriage pads were installed and aligned (L-3-315). The final assembly of horn 1 and the module was completed (L-3-212). The target/baffle module was assembled. Final assembly of the target/baffle carrier on the module is expected in July.

Two additional Level 3 milestones were met in March. Fiber optic cable was installed to all NuMI areas (L-3-234). FIRUS cabling to the Fermilab fire sensor and alarm system was completed (L-3-214).

We are planning to conduct a commissioning workshop in April to refine the beam commissioning steps required to reach the CD-4 and physics goals.

Integration and Installation – R. Andrews

General Remarks

Accelerator Operations has done a good job of incorporating the needs of NuMI Installation into daily planning of the activities for the accelerator complex. We have been able to make significant progress in completing the installation of the extraction channel.

The MI-65 installation continues to run smoothly. The nature of the installation is changing from the Target Chase work of installing the blocks, to a wider variety of tasks, and we remain focused on keeping all team members informed on the details of t he installation activities.

We have taken beneficial occupancy of the MINOS area, and we have begun the outfitting of the area to ensure its security and safety. In addition, some phases of the installation have begun.

Main Injector

The MI-60 activities for the month of March were mainly preparing for and executing the 10-day shutdown, which began on March 15. NuMI was able to use profitably six of the ten days. The last four days were TEV access only. During this shutdown we accomplished the following tasks: installation of recycler shielding on two of the six EPB magnets; filling and commissioning of the LCW system; hosing of the magnets; pulling, termination, and connection of klixon cables; pulling of field and temp probe cables; modifications of two EPB magnet stands to allow for increased weight of shielding; and, installation and welding of vacuum fittings to connect upper hobbit vacuum to lower hobbit and stub vacuum.

MI-65

Installation continued with activities in all areas of the MI-65 facility. This included the service building support rooms, the underground support rooms, the Target Pit, and the Pre-Target and Carrier tunnels. Power supplies for the beam line magnets were placed in the SB electrical support room. Power supplies and the large capacitor bank for the horns were placed in the underground electrical support room. Work on electrical service distribution in both the service building and underground continued.

Assembly of the target pile shielding was completed along with the fabrication and installation of the stainless steel membrane (air block) making up the conduit that routes conditioned air through the target pile chase to cool the target, horn 1, and horn 2. The pads for the target and horn carriages were also placed, aligned, and fixed in position.

18 of the 72 "R" blocks making up the roof of the target pile were placed at the downstream end of the target pile to form the base for assembly of the Work Cell. 60% of the blocks making up the east and west walls of the Work Cell enclosure were placed and grouted.

LCW manifolds, running the length of the Carrier and Pre-Target enclosures and continuing in to the RAW processing support room, were flushed and cleaned. Following this, LCW was circulated through the Carrier and Pre-target magnets. Corrector magnet stands were placed and cable tray for magnet power cables was installed. Also, the 500 MCM cables that power the V118 magnet string were terminated.

MINOS

Beneficial Occupancy of the MINOS area was given on March 10th. The general subcontractor (RBI) still has over one hundred punch-list items to complete. As a result, RBI had 6–10 workers present for most of March. They have been working on elevators, cranes, fire protection system, sprinkler systems, ventilation systems and sumps. At BO, the systems are virtually complete, but

need completion of such things as labeling, touch up paint, operational system bugs, etc. RBI is scheduled to complete all work by April 2nd.

However, work on the AC distribution system that supplies AC power to the Detector electronics racks was started on March 8th, a couple of days ahead of BO. Since BO was moved back from March 4th to March 10th, we did not want to delay the start of electrical work. We expect to complete AC distribution to the Detector racks before mid April. So the advance start was very beneficial. At the end of March, the AC distribution for the electronics is about 95% complete.

After BO, our MINOS organization implemented a tunnel access control procedure, which consisted of training, a badge system, key controlled doors and monitoring of daily activities to limit the number of people to 24 at any one time in the MINOS tunnel. Additionally, procedures and hazard analyses are written and signed by particular workers prior to starting a given task.

In addition to electrical work during March, the following jobs were also begun:
install decay pipe vacuum cover – complete
install vacuum pipes from the decay pipe to pump skid – complete
install vacuum exhaust pipe – in progress
install vacuum and water skids at absorber – complete
install water pipes at absorber – in progress
water mitigation along access tunnel and into absorber – complete
480v power connected to vacuum pump skid and water skids at absorber - complete
water mitigation in area of shaft – in progress
The first detector plane (#281) was installed, 280 more to go.

Our most outstanding issue at present is the electric fork truck that was purchased to carry absorber material up the ramp to the absorber. Upon a test run carrying a "blue block," the drive motor on the fork truck overheated. The fork truck was returned to the vendor for an evaluation. As of the end of March, there is no resolution of the problem. At this point, the installation schedule has not been impacted.

Primary Beam (WBS 1.1.1) – S. Childress

Overview

Priority efforts for the primary beam system have included installation and preparation for tunnel testing of EPB dipole fringe field shields to control fringe fields from NuMI magnets near the Recycler Ring, fabrication of remaining components for the kicker load assemblies, and beam instrumentation efforts.

Magnets and Stands

EPB dipole fringe field shields have been fabricated and installed for two of the six dipoles in the HV101 magnet string, in close proximity to the Recycler ring. Power feeds have been completed to these two magnets only, to enable initial power tests of the shield effectiveness. Initial testing is projected for early April.

Adjuster assemblies for the Pre-target corrector dipoles have been delivered, and are being checked out, in preparation for corrector magnet installation in the Pre-target enclosure.

Prototyping tests have been completed, and procurement initiated for external water-cooled plates to be added to the six 3Q120 quads operating at the highest currents. This should enable conservative operation of these magnets at the currents needed.

Kicker Magnet System – C. Jensen

Fabrication of final components for the kicker load assemblies is nearing completion. After silver-plating of the modified Cu load cooling washers is completed in early April, assembly of the production load units will be done. Also, the prototype load has been disassembled as the final part of its extensive test program. No potential flaws or signs of electrical problems have been observed. The kicker load cooling skid is now being moved from the F17 location used for prototype testing to MI-60 South, where it will be located for NuMI beam operation.

Beam Instrumentation – D. Harris

BPMs:

Specifications have been established for a NuMI BPM electronics station, reading four Main Injector detectors in the extraction region. This is needed as the current Main Injector BPM system cannot provide multi-batch position information, and a MI system upgrade is later than first year NuMI beam operation. Only the positions for the last pass before extraction are required. Processing electronics is in hand for this.

Virgil Bocean of the Survey and Alignment group has worked with AD Instrumentation Dept. staff to finalize needs for laser tracker alignment of the NuMI BPM detectors.

Profile Monitors:

All the linear drive motion actuators were delivered to Austin, TX in March, and the machining for all parts was completed. Assembly of the SEMs can now begin. One complete SEM will be delivered in mid April along with an assembly to do wind tunnel tests for integrity of SEM foils in event of a vacuum system failure. Continued improvements have been made with the vacuum test setup for the SEMs. The first production unit successfully holds better than 1.5E-8 torr, when isolated on an ion pump.

The MiniBooNE beamline data from the Fall 2003 SEM beam test were extracted to enable more detailed processing, thanks to Tom Kobilarcik. There was an additional short beam test conducted during the startup after the mid-March down period. These later data provide higher beam intensity, and will be used for study of space charge effects.

Backup Multiwires (FNAL units):

All parts to build 6 multiwires have been ordered, with vacuum cans to arrive in early April. Studies continued on determining optimal wire tension for the 1 mil multiwires. Most of the costing for these units was provided in the early part of the NuMI project.

Loss Monitor Calibration:

Gianni Tassotto has measured calibration constants for the sealed loss monitors and also for a 3 foot length of the Total Loss Monitor (TLM). At 800V, using a Cs 137 source at Fermilab, the total loss monitor registered 108 micro-amps per (rad/sec), while the sealed units produce 14.3 micro-amps per (rad/sec). This calibration is within expectations, and indicates that the TLM's should have the required operating range.

Beam Loss Monitors:

A problem has developed with vendor production of new sealed loss monitor units. An improvement based on BNL testing, and newly incorporated for the current Accelerator Division production run of 250 units, was not appropriately quality controlled in the vendor production based on initial deliveries, with subsequent HV breakdown problems. The problem is understood, and sealed loss monitor production will now be done according to the old design.

We have 30 good monitors on hand for NuMI installation, of the total of 50 slated for NuMI. All remaining units should be available as needed.

Instrumentation Stands:

Procurements are in progress for BPM precision adjusters and support stands. Procurements for the profile monitor stands will be done in April.

Beam Permit System – R. Ducar

New Beam Permit System hardware continues to successfully support MiniBooNE operations. As more Controls hardware comes on-line, testing of the new Beam Permit System is expected to commence shortly.

Neutrino Beam Devices (WBS 1.1.2) – J. Hylen, D. Ayres, K. Anderson, A. Stefanik

I. Magnetic Focusing Horns

Production Horns.

Horn 1 and Horn 2. Some minor work on electrical insulation of instrumentation lines remains.

Horn integration. The water vent line has to be installed between the horn drain water tank and the horn hanger. We plan to do the test of sucking water from the tank with the RAW skid soon after the horn is lowered into the target hall. The electrical standoff in the horn hangers will be re-stacked with new mica sheets in April.

II. Target

The target was mounted in its brackets on the target/baffle carrier. Vibration measurements were done with cooling water flow and airflow set to operational values. Vibration was small, and it was determined that a target support spider to reduce vibrations is not needed.

We plan to re-use the vacuum pump and related equipment from the prototype target test for the final target vacuum/helium system, but integration work remains to be done on this system.

III. Modules

Horn 1 Module. Modifications of the horn positioning system drive were completed. Horn 1 module is ready for installation. Installation is planned for May.

Horn 2 Module. This module is ready for installation.

Target/Baffle Module. Modification to the main shaft was completed, achieving milestone L-3-235 "Assembly of Target/Baffle Module Complete" on 3/20/04. (The baseline date was 2/25/04). While the motor drive positioning system has been run, precise calibration of module motion remains to be done. Installation is planned for July.

Remote Clamp/Stripline block. The remote clamp / stripline blocks for both horn 1 and horn 2 are ready for installation in the target hall.

Component-module tests. After modification of the horn 1 module positioning mechanism, horn 1 was remounted and the remote drive was run through its paces. This achieved milestone L-3-212 "Assembly of Horn 1 on Module Complete" on 3/22/04. (The baseline date was 2/13/04). The motion of the horn as a function of motor drive steps and LVDT position read-back was also calibrated.

The milestone date for L-3-309 "Assembly of Target Baffle on Module Complete" is 5/27/04, which we are on track to achieve on time.

IV. Target Carrier and Baffle

A preliminary survey of the carrier rails was done, and the target and baffle were mounted on the carrier. Assembly and testing of the carrier will continue through May.

V. Target Hall Shielding/Cooling

Air Cooling System. The RFQ for the blower is ready; the RFQs for chiller and coil are nearly ready.

Concrete Covers. 78% of the "R"-block concrete shielding blocks were delivered. Production of the remainder was supposed to be completed in March, but is dragging out. However, the rest are not needed until September.

VI. Radioactive component handling

Work cell. The door support rework was finished, and all work cell parts are in hand.

Cameras. Work on the camera system resumed. The wireless transmission of TV signals in the target hall during crane operations was tested, and progress was made in identifying camera and laser positions for remote handling of the modules.

Lifting/Transportation fixtures. The installation transport support for the work cell door has had its required safety review. A modification of the shielding block basket is being done so it can also transport T-blocks; this is needed in April. A block lifting fixture for remote handling needs to be built by July.

VII. Instrumentation/Electronics

Specifications for the instrumentation cabling are being written up. The ionization chamber mount/feed-through for the horn cross-hair system is under construction in Brazil. The front-end cards for target hall instrumentation are under construction.

VIII. Installation

The installation of target pile shielding is almost as far done as it can be until after horn module installation. All bottom shielding blocks are now installed. We achieved milestone L-3-310 "Install Bottom Shielding Complete" on 4/2/04, well before the 5/12/04 milestone date. A few days of top air block installation remains, after which a few top blocks of removable steel will be put in place.

The concrete R-block cover over the beam chase that forms the floor for the work cell was laid in place and air-sealed. Installation of the component-module work cell began, with the first few layers of the concrete shielding block walls being grouted in place. The work cell will be required to mount horns on modules in the target hall before they can be placed in the target pile chase.

The baseline date for milestone L-3-315 "Target Pile Carriage Pads on Concrete Install Complete" is 6/13/04. This requires survey to complete the analysis of the precision network, as the pads set the module installation locations. We will (did) achieve this milestone on 4/1/04.

About half the rails with v-blocks that set the position of the removable T-block shielding were installed in March.

Other remaining installation items are: horn module carriages, removable shielding steel T-blocks and concrete R-block covers, pre-target shielding block wall, target module, horn modules, re-circulating air system, camera system, target vacuum/helium system, cross-hair ionization chambers, and instrumentation cabling.

The date for milestone L-3-254 "Complete Placement of Horn 1 into Target Station" is 7/12/04. The date for milestone L-3-314 "Complete Placement of Horn 2 Assembly into Target Station" is 8/18/04. Both the progress with target hall shielding installation and the component/module integration are on track to achieve these on schedule. The other remaining milestones are L-3-270 "Target & Horn Installation Complete" (10/5/04), L-3-290 "Shielding Installation Complete (Pre-Hot Handling)" (11/11/04) and L-3-295 "Pulse & Checkout Horn System Complete" (11/26/04).

IX. Administrative/Project Management

Milestones for the next six months are called out in the above text. With regard to the critical path tasks, we have finished the installation of the fixed (bottom) radiation shielding and are starting work cell installation on schedule. The major components (horns, target/baffle carrier, modules) are on track to be ready by the scheduled installation-early dates, although the remaining free slack is not large.

Physicist, engineering, drafting, technician and installation team resources are at reasonable levels. We managed to work around the drain on Survey resources of the March accelerator shut-down, and Survey support is now good.

Power Supply Systems (WBS 1.1.3) – G. Krafczyk

Overview - G. Krafczyk

The Horn pulser and power supplies were moved to the power supply room at the lower level in the target hall.

Horn Power Supply - K. Bourkland

The capacitor bank and both refurbished PEI supplies were transported into the Target Hall Support Room by the rigging crew. All equipment was moved without incident and arrived in excellent condition.

About 80% of the control electronic chassis, as well as some of the spare chassis, are now in place in the equipment racks, and approximately 50% of the cabling has been re-installed between them and the capacitor bank.

Transmission Lines - D. Tinsley

Support columns were ordered and delivered. The roller assembly for the capacitor bank/pulser was completed and assembled. Most of the penetration strip line parts are ordered and all are out for bids.

Work continued on the blower system to cool the penetration stripline.

Extraction Kicker Power Supply - C. Jensen

Low level tests on the PFN were conducted during the first two weeks of the month. The tests determined that there is an excess of mutual coupling between coils. A final decision as to the remedy if in fact one is needed will be made early in April.

Conventional Power Supplies - S. Hays

The power supply work at MI-60 continued with the commissioning of the HV101 power supply loop for the power-on access field measurements. The three supplies of the HV101 loop were

tested into a resistive load and all three supplies were run on the load and all three were run in series in current mode. After the field measurements are complete and the magnet string is connected work will continue with filter testing and the high precision current regulator setup.

The filter racks for the LAM60 and LAM61 supplies were moved to MI-60 and will be connected next month.

Test of the 20KW PEI supplies for ramping was worked on using the external current loop equipment. This will continue next month.

Decay Region & Hadron Absorber (WBS 1.1.4) – C. James

Fabrication of the core lifting fixture proceeds. Materials and fabrication are also proceeding on the door which covers a 6" gap in the concrete shielding just downstream of the decay pipe end-cap. This gap allows installation access for the Hadron Monitor.

Beneficial Occupancy of the MINOS Service Building and downstream underground areas occurred on March 10. Steel plate to bridge over the sump covers at the base of the shaft was put into place the previous Friday, with permission from RBI. The downstream decay end-cap was installed by the 16th. The pipe-fitters started work on the vacuum and water piping on the 17th and continued through the month. All four Absorber utility skids were in place by the 17th.

The large electric fork truck was used to install the decay pipe end-cap, and during its use some problems were observed. The following week, a mechanic and manufacturer's representative were present during a test of the fork truck, as it carried one of the 10-ton blue blocks up the slope of the Absorber Access Tunnel. While the fork truck did carry the load up the hill, the motor overheated; the manufacturer's representative arranged to have the fork truck taken back for a more thorough overhaul. This places the entire Absorber installation on hold until the issues with the fork truck are resolved.

Neutrino Beam Monitoring (WBS 1.1.5) – D. Harris, S. Kopp

During the past month the muon monitor support stands were shipped from Wisconsin to Fermilab, and then moved into Alcove 4 for temporary storage underground. The three stands will eventually be assembled in alcoves 1, 2, and 3.

Preparations continue at University of Wisconsin-Madison to test one muon monitor tube at the health facility that has a very large gamma source. A transportation stand was built for the test, and the details of the testing procedure have been developed.

The machining for the hadron monitor parts has been completed at University of Texas at Austin over the past month, and the final ceramic planes are now ready to be installed in the device itself. The parts for the support structure for the hadron monitor were also all machined (or received from vendors) and these parts will be shipped up to Fermilab in April.

Survey, Alignment & Geodesy (WBS 1.1.6) – W. Smart

The calculations were finished for the precise target hall network, completing level 3 milestone L-3-236. Measurements, drops, and calculations were completed for the MINOS near detector hall as well as other required alignment tasks needed to prepare for near detector plane installation.

Survey for the NuMI target pile installation continued with measurements of the installed positions of some steel shielding blocks, and installation alignment of T-block Rails and Carriage Pads. Survey was also provided for horn and carriage assembly and referencing in MI-8.

The Fermilab Alignment Group provided excellent support for NuMI during the ~10 day accelerator shutdown, both for vital parts of the above tasks and for re-alignment of 2 Main Injector and one Recycler magnet and rough alignment of 10 NuMI magnets in the Main Injector.

The survey engineer effort for NuMI in March was 4.6 mw, with 0.8 mw used for calculations to complete the precise target hall network; 2.0 mw used for calculations to complete the precise MINOS hall network; 0.6 for alignment preparations for MINOS near detector installation; 0.5 mw for target pile installation support; 0.2 mw for horn and target module referencing and assembly support; and 0.5 mw used for the alignment of magnets in the Main Injector during the accelerator shutdown.

Beamline Utilities (WBS 1.1.7) –D. Pushka

General

Activities presently underway for WBS 1.1.7 include: Commissioning the MI-62 system with water, installing piping for the absorber Raw and intermediate systems, installing piping for the decay pipe cooling and vacuum systems, and preparing for vacuum installation in the primary beam vacuum system.

Engineering notes for the RAW systems have been signed off.

Instrumentation has been installed in MI-62 and is reading into the ACNET front end. However, these instruments are not yet on a traditional ACNET parameter page.

Additionally, code has been written for the PLC's in the Target Hall Mechanical Support Room (THSR) and in the absorber access tunnel (AAT). Meanwhile, writing the PLC code for the PLC to be in MINOS has also been started.

A recent addition to the scope of this system is the pond water pumps for PV-9 that will provide pond water to the heat exchanger in MI-62. The existing pond water pumps are not suitable for the NuMI loads and require replacement. A specification for new pond water pumps has been drafted, circulated to the FESS operations and engineering groups for comment. Little constructive information was received. Be that as it may, the RFQ for new PV-9 pond water

pumps has been issued in February and then re-issued in March. A CR to add this scope to 1.1.7 has not yet been initiated.

Upstream LCW System

The system is being operated. Half of the magnets are valved in. Conductivity is good enough to allow powered testing of the magnets.

Final Horn Raw System

The horn skids will likely be placed in the MI-65 below ground mechanical support room on April 1st. Installation did not occur in February or March as previously hoped because of other more pressing installation activities.

Piping layout at the top of the modules has been started. Glenn Waver was charged with performing this work, but because he is unable, Felix Yoffee has been assigned this job and started in late January. Work is progressing, slowly.

Upstream RAW System.

The target skid will likely be placed in the MI-65 below-ground mechanical support room on April 1st. Installation did not occur in February or March as previously hoped because of other more pressing installation activities.

Downstream (Absorber) RAW System.

Piping for the absorber RAW and absorber intermediate systems is in the process of being installed under a fixed price contract. A relatively large amount of field re-routing has proven necessary due to the difficulty of measuring the existing field conditions while the SB&O contract was underway. This will not cause the total value of the work to exceed the initial estimate, however.

Field wiring for the absorber RAW and absorber intermediate systems has been installed. Motors have not been bumped to check phase rotation.

Vacuum Decay Pipe Cooling

The work to tie between the existing copper lines and to the skid has been started, but not completed.

Field wiring for the decay pipe cooling systems has been installed. Motors have not been bumped to check phase rotation.

Extraction and Primary Beam Vacuum System

Layout drawings of the vacuum system for the pre-target area (complete with the material take-off lists) have been completed by Vic Madjanski and Gary Trotter (both of PPD/MD) with guidance from Mayling Wong (PPD/MD) and Jim Klen.

The long lead-time ion vacuum pumps have been ordered and all 56 have been received. Vacuum valves have been received and tested. Nearly all items have been received except for the metal EVAC seals. Parts were stored at MI-60 but have been moved to PAB. Technicians from PAB, led by Ron Davis, are taking the responsibility for installing this NuMI primary beam vacuum system.

During March, the transition sections from 12 inch pipe to 6 inch tube were installed in the carrier tunnel during the short 5 day MI shutdown. Work on the vacuum in the pre-target area will continue over the next few months. Vacuum work in the portion of the NuMI beamline in the Main Injector will require a shutdown to proceed. This will likely happen in the summer shutdown.

Decay Pipe Vacuum System

The vacuum pump-out line has been installed between the downstream decay pipe end and the vacuum pump.

Field wiring for the decay pipe vacuum pump has been installed. Motors have not been bumped to check phase rotation.

The HA for the initial decay pipe evacuation has been written and sent to Mike Andrews for review.

Equipment (filters, desiccant) for letting the vacuum vessel back up to atmosphere after the initial pump-down test is completed has been specified and purchased.

Gas Systems

T&M work to run gas lines in the Main Injector tunnel and in MI-62 has been completed. Running the same lines into the target hall mechanical support areas remains to be completed.

Controls, Interlocks and Cable Installation (WBS 1.1.8) – R. Ducar

March activities again included work at the MI-62, MI-65 and MINOS Service Buildings as well as Main Injector enclosure work during a one-week shutdown that began March 15th. During the MI shutdown, routing and marking of conductors to MI enclosure magnets were verified. This installation was found to be 100% accurate. Klixon (magnet over-temperature) cables were installed between each of the beamline magnets and already pulled trunk cables. Instrumentation cables were installed in the vicinity of the HV101 EPB dipole string to measure temperature and stray B fields. Cables for the Radiation Safety and vacuum systems were installed between MI-60 and MI-62. Routing these cables in the enclosure served to mitigate safety issues that would otherwise be encountered had these cables been pulled in the road communication duct system. During the shutdown, various final connections were made for Controls hardware. Such connections are generally discouraged during operations for fear of program disruption.

At the MI-62 Service Building, wiring for LCW motors was completed to pond pump vault PV-9. A new six-blade disconnect was installed for the two-speed pump that is yet to be installed. FIRUS cables were also installed to PV-9 and await final termination. Conduit networks were

installed for LCW System instrumentation and all associated cabling was installed and connected. The PLC system for the LCW system is now connected to ACNET and being commissioned. The excellent efforts of Mark Averett, Loren Anderson and Ryan Hagler under the able leadership of Paul Kasley, all of the Accelerator Controls Department, are acknowledged as instrumental in bringing this NuMI LCW control system into operation. A technical representative of the Motor Control Center manufacturer was present to assist in the commissioning of the MCC. Controllers for each of the main 125 HP pumps were exercised successfully.

At MI-65 cable tray was installed behind the V118 B2 dipole magnets in the Pre-Target enclosure for routing of the interconnection cabling. Installation of these interconnections, three sets of seven 500 MCM conductors each, has now commenced.

Shortly before beneficial occupancy of the MINOS area, the new sump pumps became operational. Conduit and various conductors were installed between the sump pump controllers and FIRUS equipment. This facilitated generation of FIRUS utility alarms for sump system malfunctions. These alarms were well tested as the motor for sump pump #2 encountered an early failure soon thereafter.

Six salvaged equipment racks for installation at the upstream end of the Absorber Access Tunnel underground of the MINOS Service Building were re-conditioned and outfitted with plug-strips. These racks will be installed in April. Two new equipment racks for the Near Detector Hall were installed and powered. Ragnar-Benson completed installation of technical cables in the MINOS shaft. A few of the cables came up short at the service building level. Additional cables were pulled to a shaft junction box that allowed splicing to achieve desired points of terminus. The single and multi mode fiber optic cables installed from the service building to the Near Detector Hall were terminated and tested. Fiber trunk cable and several telephone cables were installed between the Near Detector Hall and the Absorber area.

Two milestones were achieved in March. The FIRUS Cable System (L-3-214) was completed on March 8. The Fiber Optic Cable Installation (L-3-234) was completed on March 12. Other milestones for 1.1.8 continue to be reviewed with a resulting assessment that completion dates are reasonable.

CIVIL CONSTRUCTION AT FERMILAB (WBS 1.2) – D. Bogert

Overview

During March, Ragnar Benson finished the construction work for the Service Buildings and Outfitting contract in the MINOS area. Beneficial Occupancy for the MINOS Area, which included the MINOS Service Building on the surface, the underground area from the downstream end of the Target Hall to the downstream end of MINOS Hall, and the MINOS Shaft, was achieved on March 10th. That was the date projected at the end of February. Ragnar Benson was completely demobilized from the site by April 2, 2004. April 2nd was the contractual date for completion and demobilization; thus the work was completed on time. There were no recordable safety incidents during March.

During March Ragnar Benson maintained the workforce necessary for the completion of the MINOS Area and to complete the punch list work. The check valve modification to the sump

discharge system was completed prior to the March 10th Beneficial Occupancy date. During the remainder of March almost all of the punch list items were completed; only a handful remained at the end of the month.

Laboratory staff and Ragnar Benson have worked to close any outstanding contractual issues. Approximately $100K remains under discussion awaiting final resolution

With the agreement of Ragnar Benson, Fermilab-managed T&M electrical contractors began work in the MINOS Area on March 8th, prior to beneficial occupancy. Thus, the impact of the few days delay in the Beneficial Occupancy was minimized.

The overall quality of the completed Ragnar Benson work is excellent.

The claims and contract closeout issues for the S. A. Healy contract again are discussed at length in the procurement portion of this monthly report. Additional discussions held during March between Fermilab and S. A. Healy did not lead to a global resolution of the outstanding issues.

Surface Buildings and Outfitting – E. McCluskey

At the Target Site, punch list work completion continued, including the fire alarm tie to MINOS and site work.

At the MINOS Site on the surface: Temporary power and lighting were removed. The natural gas generator was load tested. Fire alarm programming and system testing continued. Final acceptance of the system, which spans from MI-62 to MI-65 to MSB, occurred. Final terminations were made at the sanitary lift station. The holding tank and pumps were commissioned. Piping insulation was completed. Final painting occurred. The last doors and hardware were installed and all exterior caulking completed. Hardstands were final graded, as was the rest of the site. Final work was done on the elevators by RBI's elevator maintenance contractor.

Below-grade at MINOS: Incorrect sump pump check valves were replaced and the pumps started up satisfactorily. CHW piping and insulation at the bottom of the shaft were completed. Temporary power and lighting were removed. Lab-furnished control and signal cables were installed in the tunnel. Additional lights were installed around the bottom of the shaft to improve light levels. Final sump covers were installed. Temporary sump pump installation was demolished and removed. Sprinklers and smoke detectors were installed in the elevator lobby. Firestopping occurred throughout the tunnel. The Beneficial Occupancy was delayed from March 4 to March 10 due to issues related to sump pump system commissioning. Fermilab installation phase work began in the interim, with electricians working in MINOS Hall and lab survey in the shaft and tunnel.

Two major milestones were completed in March. MS8 MSB Complete was delayed from November 8, 2003, due to the inter-related nature of the building and tunnel. This was recognized by the CMO and RBI as unavoidable. MS9 Beneficial Occupancy of MINOS Site including building and tunnel was delayed from March 4 to March 10 due to the sump pump check valve replacement. MS8 and MS9 were completed March 10, 2003, when Fermilab took beneficial occupancy of the MINOS Site.

The CMO and its consultant engineers finalized the incomplete items list for the MINOS beneficial occupancy form.

No supplemental agreements were issued during March, though some change requests were evaluated and processed.

The CMO requested proposals from RBI for the following:
Additional lights at bottom of MINOS shaft
Purchase of extra cable pieces from Divane Electric for installation purposes.

Site tours for NuMI project installation and FESS services and operations personnel, as well as various special visitors, continued as required.

MINOS DETECTORS (WBS 2.0) – R. Rameika

Overview

In March we completed final preparations for the beginning of Near Detector installation in the MINOS underground experimental hall. We took beneficial occupancy on March 10. On March 24 the Plane Transport Cart was moved underground. On March 31 the first plane (#281) was brought underground and hung in position. Plane installation is scheduled to start in early April. We anticipate closeout of WBS 2.3 during April, with any remaining electronics or DAQ installation tasks being moved to WBS 2.5.

Some examples of statistics for the production status at the end of the month are given below. (Production items that have been listed as 100% complete in prior months are not shown here.)

WBS	Near Detector Production Items	%Complete
2.5	Near Detector Electronics Rack assembly	95%
2.5	Near Detector Planes installed	0.3%
2.5	Near Detector Planes commissioned	0%

Electronics and Data Acquisition (WBS 2.3) – G. Pearce, P. Shanahan

Overview

Near Detector Electronics components that have been returned from the Calibration Detector at CERN (CalDet) are being put through the checkout procedure again.

A procedure has been developed by the assembly manufacturer to remove the solder flux residue from the Front End Daughter cards (MENUs). About 2% of the boards appear to have the most harmful residue, but about 15% of the cards will be cleaned in order to remove all visible residues. As batches of sorted and cleaned cards are returned, they will be re-loaded on Front End Mother boards (MINDERs), and put through the checkout procedure again. We expect that

this process will provide re-tested MENUs at a rate that will stay ahead of need for new channels as the Near Detector is commissioned.

With the support of the DAQ group, data taking continued at the New Muon Lab with a setup of the first 9 detector planes to go underground in April.

During data taking with the 9-plane setup, it was discovered that the switcher power supplies in the Rack Protection System (RPS) controllers were generating unacceptable noise in the Front End Electronics. A relatively inexpensive external linear power supply has been tested and found to eliminate the problem. All RPS controllers will have their internal power supplies replaced.

WBS 2.3.6 (Clock and GPS) work is complete for the Far Detector. Work remains for the Near Detector, but it will be mostly conducted by physicists. The small amount of technician effort required will be managed directly under WBS 2.5.

Near Detector Front End Electronics (WBS 2.3.1) - G. Drake

A remaining issue for finalizing the firmware for the MINDERs, the number of time slices to record in a dynode trigger, was discussed at the March collaboration meeting. It was decided to keep the number at 8, as was originally specified in the design documents. A semi-final version of the firmware has been created, and tests are in progress at the New Muon Lab. We expect to begin burning the final firmware for all the MINDERs in early April.

The assembly of the production VTM boards continues at IIT. The assembly is approximately half complete, and should be completed in April.

Checkout of electronics from CALDET continues at Argonne. All of the MASTERs have been checked out, and approximately 2/3 of the MINDERs are finished. The work will be completed in April.

The remaining 20 MINDER Crates were returned to Pentair in March for modification. They are due back in early April.

Progress was made concerning the problem with residual solder flux on the MENU modules. The assembly vendor has studied the residues, and has proposed a chemical cleaning process to clean the boards. We sent a preliminary batch of 100 MENUs for a test. The boards have been received back, and we are currently evaluating the cleanliness and rechecking the performance. Assuming that cleaning is satisfactory, we plan to send all the MENUs to the vendor. The vendor will then visually inspect all MENUs, and clean only those that have residues, which is estimated to be approximately 15%. At Argonne, we have to date pulled 7,000 of the ~10,000 MENUs from MINDER Modules, in preparation for this work. When the MENUs are returned, they will be re-inserted onto MINDERs, and re-checked through a test stand at Argonne. Work is in progress to streamline this process, making it as efficient as possible while ensuring that the boards meet performance standards before being installed in the experiment. Currently, this is not expected to have a serious impact on the installation and commissioning schedule.

Progress was made on the rack protection noise problem. We have procured a cheap, external, linear power supply, and designed a wiring harness to bypass the switching power supplies that are resident in the unit. Performance tests at the New Muon Lab showed that this solves the noise problem. Work is in progress to purchase 55 supplies, and to retrofit the RPS units, in both the near and far detectors.

Data Acquisition Systems (WBS 2.3.4) – G. Pearce

Support was provided for commissioning of the 9 plane Near Detector system in the New Muon Lab at Fermilab. Preparations continued for the Near Detector installation.

Clock and GPS (WBS 2.3.6) – A. Weber

The last months saw a wealth of activity concerning the far detector timing system. C. Perry prepared the final upgrade of the firmware for the TRC and TCU. This update was required to improve the monitoring of the system as well as the locking procedure to the GPS clock. N. Tagg smoothly installed the new firmware at Soudan. The system was stress tested during far detector operations and the minor faults present in an earlier version of the firmware had all been eliminated. WBS 2.3.6 for the Far Detector is now finished.

Detector Control and Monitoring (WBS 2.3.8) – A. Habig

Rack Monitoring. The noise from the RPS units which was being picked up in the Near Detector front end electronics is coming from the switching power supplies in the RPS. Replacing the switchers with external "wall wart" style linear supplies cures the noise problem. This retrofit is being applied. Although only one electronics channel at the Far Detector has problems with this noise, the retrofit will be applied at the Far Detector as well.

Near Detector Installation (WBS 2.5) – C. James, J. Thron

The highlight this month was taking Beneficial Occupancy of the MINOS Near Hall and Surface Building. This precipitated the planned flurry of work to prepare the Hall for plane installation. The electricians were allowed underground a few days before B.O. to get a start on running the electrical wiring. They ran power to the readout racks, the controls and LAN rack and started on the LCW skids. The surveyors established an underground network down from the surface and used it to position the shims on the plane bookend, to align the stainless steel plane support rail, and to set up the laser plane collar alignment system. The LAN wiring (both copper and optical) to the readout rack locations was installed. The Beams control and LAN racks were installed and the LCW skids were put in place. Work began on terminating the optical fibers coming down the shaft and installing telephones.

In preparation for plane installation, tools, the detector cart, and the plane transfer fixture were brought underground. The first plane to be installed (#281) was moved underground, and mounted in position on the last day of the month using this equipment. This allowed the plane installation crew to refine their procedures. A measurement of background radiation was made in the empty hall that will be useful in understanding noise rates in the detector.

In the New Muon Lab the readout racks received their final preparation. The Alner boxes were

insulated from their shelves to reduce noise, the power supply current and voltage limits were set, and the RPS sensors were tested. Tests were done to reduce the magnetic noise from the RPS power supplies - an external linear supply will be used. Several fixes were applied to the fan trays, which were then installed in the racks.

After fixing a few light leaks the 9-plane test stand was able to read out all its planes and collect cosmic ray data. It was also used to check out several electronics configurations.

MINOS Survey and Alignment – D. Boehnlein

The Fermilab metrology group has installed a network of monuments that can be used in the calibration of the Vulcan system. Virgil Bocean is developing a set of local coordinates from these. The metrology group will also assist with the collar surveys, making precision measurements at the start of each shift. The Vulcan system has been sent to the manufacturer for refurbishment prior to starting the near detector surveys. The system has been returned and is now ready to be set up in the near detector hall. Survey procedures for the installation crew are being developed.

March 2004 MINOS Collaboration meeting – D. Ayres

This meeting was held at Fermilab on Thursday through Sunday, March 25-28, 2004. More than 100 physicists, engineers and students from 27 institutions attended. The main meeting plenary sessions on Friday, Saturday and Sunday were preceded by working group meetings on Thursday. The Collaboration held a reception on Friday evening to celebrate the full beneficial occupancy of the NuMI beamline and MINOS near detector tunnels and halls and to thank the many people at Fermilab whose work contributed to the completion of this milestone.

The following working groups and committees met on Thursday: Core software, Detector data and operation, Near detector installation, Proton intensity, and Reconstruction. The MINOS Executive Committee and Institutional Board both met in conjunction with this meeting. Topics considered by the ExCom included planning for future meetings, removal of the Soudan 2 detector, use of the MINOS near detector hall by other experiments, and proton intensity. The Institutional Board admitted the College of William and Mary to the Collaboration, bringing the number of MINOS institutions to 31. Other topics considered by the IB included the protocol for approval of analysis procedures, results of the 2004 Collaboration survey, institutional shift quotas and responsibilities, and the use of the MINOS near detector hall by other experiments.

The most important topics discussed at this meeting were:

Preparation for NuMI beam turnon

NuMI beamline and MINOS near detector installations are proceeding on schedule. Studies and tests of modifications to the Booster and Main Injector to implement multi-batch operation for NuMI are under way. The first protons could be extracted into the NuMI beamline at the end of the accelerator shutdown in November 2004. This summer MINOS collaborators will be actively involved in the installation and commissioning of the near detector and of NuMI beamline components. MINOS collaborators are heavily involved in Main Injector and Booster

modifications for multibatch operation, and also in efforts to achieve substantial increases in proton intensity for MINOS in the longer term. Much of this meeting focused on detailed planning for upcoming work in these areas and on integrating new collaboration workers into these activities.

Experiment installation, commissioning and operation shifts

Preparations for turnon of the NuMI beamline and the MINOS near detector during the next nine months will require increased levels of collaboration manpower and careful coordination of several critical activities. Installation of the first near detector planes and readout system began shortly after the meeting. The far detector is already in routine operation and is recording cosmic ray and atmospheric neutrino data with a duty cycle in excess of 90%. The Collaboration plans to increase this to nearly 100% by providing trained physicist shift workers 24 hours/day, 7 days/week when the beam is on. Training and development of shift tools and protocols have already started at both Soudan and Fermilab. Evening and weekend shifts in the Fermilab control room will begin in April. Shift workers are also needed for the installation and commissioning of the near detector during the next few months. At this meeting the collaboration finalized an institutional quota system that will ensure the availability of trained workers for these tasks.

Preparations for analysis of MINOS neutrino beam data

In parallel with the beamline and detector hardware tasks described above, the collaboration is devoting much effort to the development of analysis software. Five neutrino-beam physics analysis groups are now well advanced in the development of software to analyze the first MINOS data. A major topic of discussion at this meeting was the preparation for the mock data challenge, with the first results from the analysis working groups to be presented at the week-long June meeting. Another major topic of discussion was the analysis of data from the 2003 Calibration Detector test beam run at CERN. This work is now nearly complete and results are being incorporated into Monte Carlo simulations and data analysis software. Analysis framework software and tools continue to improve and are being utilized by the analysis working groups. Much of the discussion at this meeting centered on the use of blind analysis techniques for each physics topic, and how to implement them in a coordinated fashion.

Atmospheric neutrino analysis

The MINOS far detector continues to record good quality atmospheric neutrino data. Routine offline reconstruction of far detector data provides information on detector response and performance from muon tracks as well as a growing sample of atmospheric neutrino events. The entire data set is reprocessed every few months with the latest reconstruction software. Good progress continues to be made on event reconstruction and background rejection. The Collaboration plans to present the first results from this work at the 2004 summer conferences, followed by the first physics publication within a few months. Atmospheric neutrino results are also the subjects of several Ph.D. theses that will be completed during the next few years.

Planning for the Ely week-in-the-woods meeting

Initial planning began for the week-long June meeting in Ely, Minnesota, which will focus on software and analysis work. A highlight of this meeting should be the working group reports on

first results from the mock data challenge. The meeting will also include training and tutorials for physicists getting involved in analysis and experiment operations work in preparation for the first neutrino beam data.

VI. ES&H HIGHLIGHTS – M. Andrews

Management Overview – M. Andrews

Mike Andrews continued to provide ES&H support to the Service Building & Outfitting Construction Management Offices (NCMO) to augment the civil construction oversight effort. His efforts include oversight of the implementation of the subcontractor's safety program, concurring with the subcontractor on where improvements are needed and the priority for those improvements, attending pre-shift subcontractor safety meetings to verify continuing improvement, and participating in weekly ES&H Inspections with the sub-contractor and representatives from the DOE Fermi Area Office.

The NuMI Project and Ragner Benson project management teams meet on a weekly basis to discuss work planning issues, hazard analysis review, training issues, general ES&H program issues, and day-to-day scheduling issues through a series of regularly scheduled meetings.

Mike Andrews is also providing ES&H support for the Installation phase of the project. At present, he chairs a weekly ES&H meeting with NuMI/MINOS Project Management to discuss issues relating to the upcoming installation and operational phases. John Cassidy, the Field Safety Coordinator, continues to supplement the ES&H support effort.

NuMI Beam Safety Issues – M. Andrews

The NuMI Project ESH Coordinator (Mike Andrews) and the NuMI ES&H/QA Committee Chair (Keith Schuh) meet on a weekly basis to discuss and coordinate the process for completing upcoming equipment reviews by the committee. They also discuss the status of reviews which are in progress.

The committee has completed reviews on Engineering Notes for the NuMI Horn Raw System, the MINOS Shielding Block Lifting Basket, the MINOS Near Coil Lifting Fixture, the NuMI Water Skid Lifting Fixture, the Penetration Strip Line Lifting Fixture, Target Hall T-Block Transporting Lifting Fixture, the Work Cell Door Transportation Cart, the MINOS Near Detector Scintillator Plane Transport Cart, and the NuMI Horn Power Supply Capacitor Bank. The committee has also completed a supplemental review of the NuMI Extraction Magnet Stands Support Refurbishment, the NuMI Extraction Magnet Stands Cradles, and the NuMI Extraction Magnet Stands Aisle Side Supports due to the need to install shielding for the recycler.

Regular weekly meetings continue to occur between the NuMI Project ES&H personnel and the MI-65 and MINOS Floor Managers to coordinate upcoming ES&H requirements including daily work planning meetings and Hazard Analyses for installation tasks.

Weekly Installation Meetings continue to occur between NuMI Project ES&H personnel, Floor Managers and L2/L3 Managers. The topics discussed include installation procedures, hazard analyses, equipment ES&H/QA reviews and upcoming schedule issues.

The NuMI Project ES&H Coordinator and the Deputy for Installation have scheduled and completed multiple site tours of the MI-65 and MINOS sites, which were attended by numerous Accelerator and Particle Physics Division Department Heads. These tours were initiated to orient these individuals with regard to both above and below ground facilities.

Installation Safety – M. Andrews

A daily meeting is held between the MI-65 and MINOS Floor Managers, the NuMI Project ES&H Coordinator, and the Field Safety Coordinator to discuss installation activities for the day, upcoming activities, Hazard Analyses, installation procedures and ES&H/QA review status.

NuMI Project Management, FNAL ES&H Section, and DOE Area Office performed multiple ES&H reviews and audits during the month of March 2004. NuMI Project Management conducted ES&H Inspections on March 4th, 11th, 18th, and 25th, 2004. Results of an inspection were communicated to the MI-65 and MINOS Floor Managers at the close out meeting held immediately following the inspection.

MI-65 and MINOS Floor Managers are holding daily work planning meetings with all site workers, which includes a review of task hazards. T&M subcontractor personnel are holding weekly toolbox meetings. NuMI Project Management is monitoring these meetings on a regular basis. Additional meetings are being held between the MINOS Installation Management and Project ES&H support personnel in preparation for installation activities at the MINOS site including the development of the necessary hazard analysis documentation.

Task Managers are developing task related HAs and submitting Hazard Analysis documentation for review and acceptance to the NuMI Field Safety Coordinator for all new tasks. ES&H personnel and Floor Managers also met with members of the Fermilab support groups to review tasks and explain the requirements to complete those tasks, as they relate to schedule and ES&H.

There were no OSHA-recordable injuries during the month of March 2004.

Construction Safety – M. Andrews

NuMI Project Management, FNAL ES&H Section, and DOE performed multiple ES&H reviews and audits during the month of March. NuMI Project Management developed and distributed a report for ES&H Inspections conducted on March 4th, 11th, 18th, and 25th, 2004. Safety Findings/Deficiencies were transmitted to the Subcontractor through the NuMI Construction Management Office. A follow-up on each finding was conducted during the Weekly ES&H Inspections and in the Weekly Construction Management Meetings with Ragnar Benson Management in order to track and/or close each item.

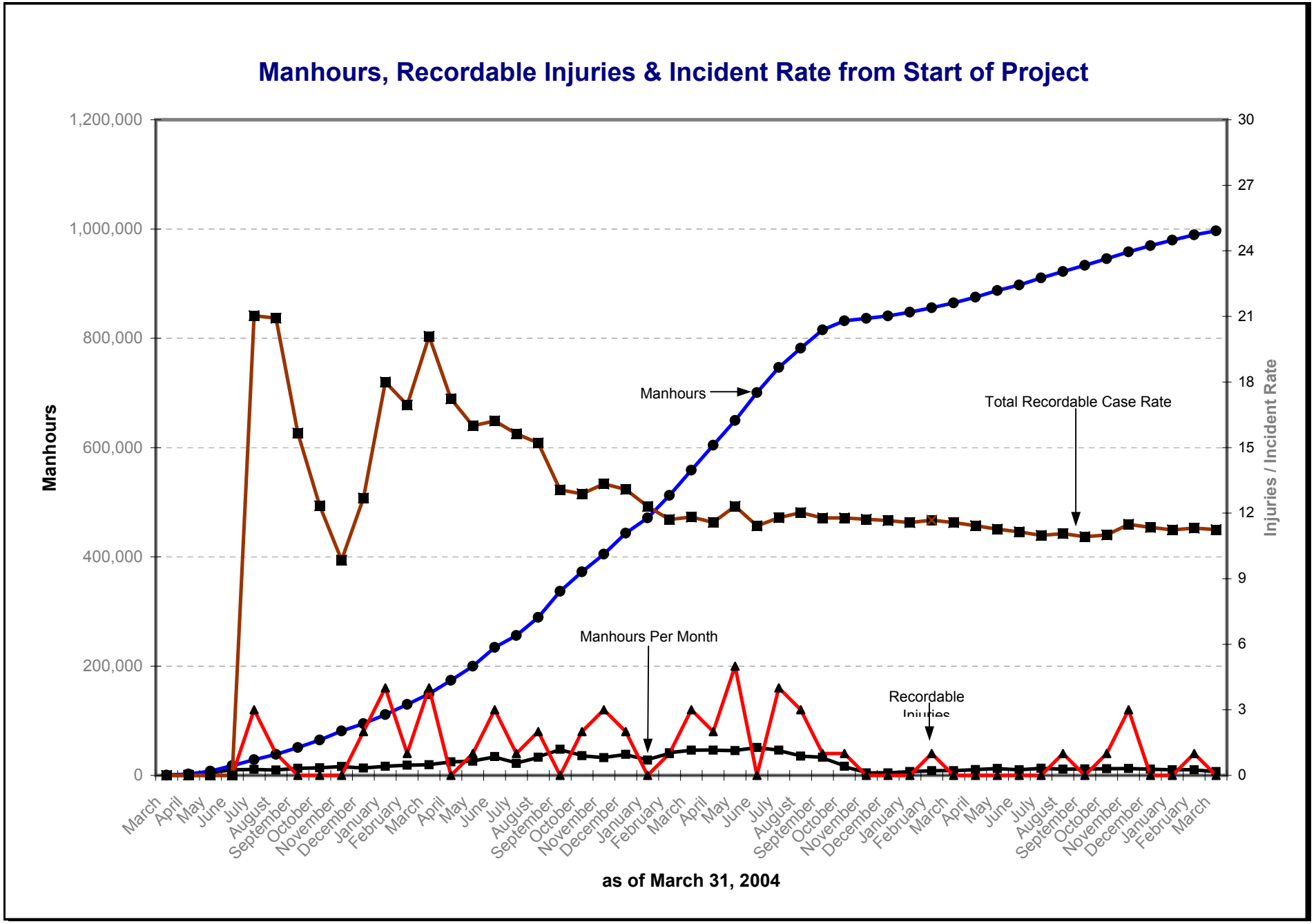
RBI continued to hold their daily huddles, which include a review of task hazards, and their weekly toolbox meetings. RBI also held their monthly safety meeting for all site personnel. NuMI Project personnel continue to monitor these meetings on a regular basis.

RBI continued to submit Hazard Analyses for review and acceptance to the SBO-CMO for all new tasks. RBI has generated in excess on one hundred and forty hazard analysis for tasks being completed by subcontractor personnel.

There were no OSHA-recordable injuries during the month of March 2004.

Safety Performance for the NuMI Construction/Installation Project for 2004 Calendar Year to Date includes a Recordable Incident Rate of 7.4**,** a Lost Time Incident Rate of 0.0, and a Lost Workday Incident Rate of 0.0. The Project to Date Safety Performance includes a Recordable Incident Rate of 11.2, a Lost Time Incident Rate of 2.6, and a Lost Workday Incident Rate of 7.2. Figure 2 shows man-hours worked, and recordable injury and incident rates from the start of the NuMI construction subcontracts through March 2004.

NuMI TUNNEL and HALLS PROJECT
CONTRACTOR'S INJURY DATA



Environmental Issues – M. Andrews

Discharge results to be reported to the IEPA for March 2004 are as follows:

MINOS Outfall 004
TSS Ave. <1 mg/l
pH 7.33

MINOS ground water pumping systems were installed and have operated without incident. RBI completed construction of Pond 1 and all site grading.

Ongoing erosion control findings: RBI continued to make a good effort in resolving environmental findings throughout the month.

MINOS Safety – D. Boehnlein

Existing safety documentation on near detector systems was used to prepare a request for a partial Operational Readiness Clearance to operate the 9-plane test stand for the near detector at the New Muon Lab. The pORC was granted and the test stand has run in attended mode only, as the rack protection system is not yet fully operational.

The master aux cards underwent an internal review for ES&H/QA. The review found no concerns and the cards were installed and operated in the test stand.

Radiation Safety – N. Grossman

The recent update of the NuMI QA Plan has been completed and signed. NuMI Radiation Drawings and the Longitudinal & Transverse shielding spreadsheets are also complete. All Shielding Assessment MARS calculations have been completed and documented. The air and groundwater calculations are now being completed since the MARS source terms have been finalized. A relatively complete first draft shielding assessment was given to Mike Gerardi and Kamran Vaziri for first pass comments. Initial comments were received and no major issues were found. These comments will be incorporated, along with the final air and groundwater estimates. Discussions on what is needed for the NuMI readiness review have started.

VII. LEVEL 3 MILESTONES

The current NuMI/MINOS Level 3 Milestones are shown in Figure 3. Milestones for the period 1/04 to 9/05 are shown. The triangles are the fixed Fermilab milestones. Note that we show L3 milestones along with the new "L-3-n" identifiers. Actual dates of achieving milestones are shown as black diamonds. Currently projected dates for achieving milestones are shown as hollow diamonds. Projected milestone dates which differ from the fixed Fermilab milestone dates by more than two weeks are flagged as **<Late>** or **<Early>**.

VIII. VARIANCE ANALYSIS – G. Bock

Variances are reported in the cost and schedule reports against the NuMI Project's plan, which is considerably more aggressive than that required by the DOE milestones. In all cases the project remains comfortably ahead of schedule with respect to the DOE milestones and within baseline cost.

We include the Variance Summary Table. Cost and schedule variances against the project's plan are extracted from the Cost Tables in Section IX and shown here at Level 2.

DOE MILESTONES

Planning for installation and commissioning continues to be a focus for the final stages of the NuMI project. DOE Milestone L-2-11, Beneficial Occupancy of Service Buildings at Fermilab, was completed on March 10, 82 days ahead of the Project Execution Plan schedule. There were no changes in the forecast dates for any of the remaining DOE milestones. The forecast dates for all remaining DOE milestones continue to include comfortable amounts of float.

NuMI (WBS 1.1)

The schedule variance is large and positive reflecting the continuing good progress on this effort. There is a negative cost variance reported of ($345K). The majority of that amount is due to components for spares purchased in bulk along with project materials. The spares costs will be transferred later. Some positive variances developing elsewhere within WBS 1.1 may offset the remaining negative variances in the Technical Components. Project management is paying careful attention to this, but remains pleased at the overall cost performance here.

NuMI (WBS 1.2)

Schedule variance: The work is complete. There is no schedule variance.

Cost variance: A negative variance arises principally from an accrual against potential future claim settlements from work on the tunneling project.

NuMI (WBS 1.3)

Cost variance: There is a favorable cost variance reported at $479K.

MINOS (WBS 2)

Cost and Schedule variances: Closeouts of WBS 2 elements continue. As expected, no major negative or positive variances resulted from the Near Detector Installation re-planning activity completed this month.

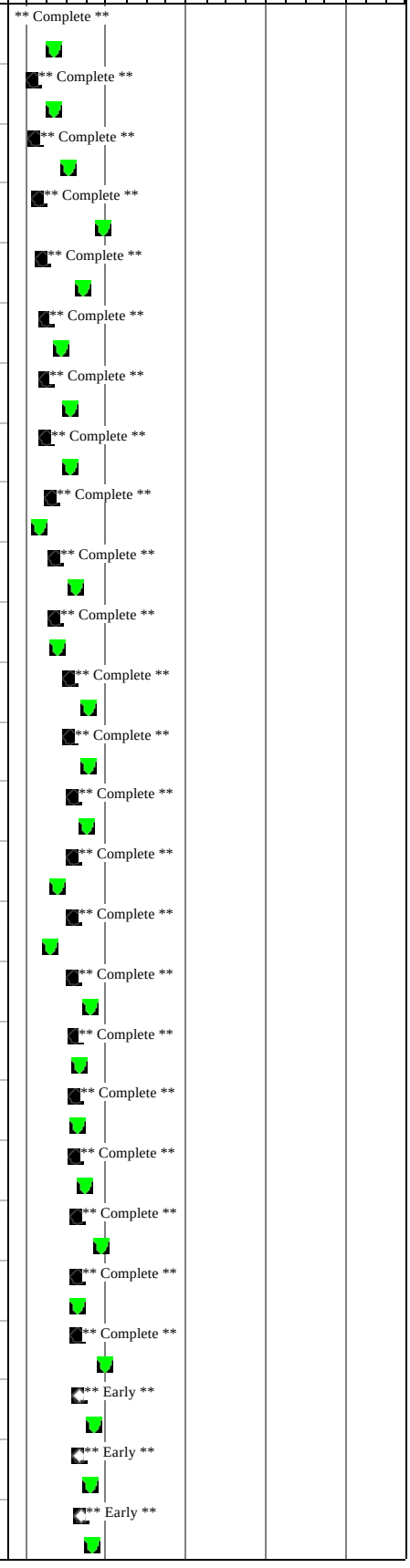
MINOS Cavern and Project Support (WBS 3)

The MINOS Cavern outfitting is complete.. There are no significant variances in WBS 3.

NuMI WBS Level 3 Milestones
(12/2003 - 9/2005)

4/15/04

Mlstn#	WBS Lev	Name	FNAL Cur Forecast	FNAL Base Date	Float
L-3-196	112	Production Target Fabrication Complete	3/17/03	12/19/03	0 d
L-3-197	112	Complete Horn 1 Operational Testing in Test Stand	9/15/03	12/5/03	0 d
L-3-335	111	Complete Beam Permit System Input Parameters	9/22/03	2/20/04	0 d
L-3-215	111	Lambertson Magnet Installation Complete	10/10/03	7/23/04	0 d
L-3-219	111	Extraction Devices Ready for Installation	10/23/03	4/30/04	0 d
L-3-329	111	MI & Stub Magnets Installed & Ready for Low Power Testing	11/3/03	1/15/04	0 d
L-3-216	112	Assembly of Horn 2 Module Complete	11/4/03	2/26/04	0 d
L-3-210	114	Start of U.S. VacuumEndcap Installation	11/10/03	2/27/04	0 d
L-3-153	117	RAW Systems Engineering Notes Sent for Review	12/1/03	9/30/03	0 d
L-3-213	115	Muon Monitors Ready for Installation	12/23/03	3/19/04	0 d
L-3-331	111	Kicker Magnet Construction Complete	12/23/03	12/26/03	0 d
L-3-308	112	Assy of Horn 2 & Module Complete	2/27/04	5/20/04	0 d
L-3-195	113	Kicker Power Supply Construction Complete	2/27/04	5/20/04	0 d
L-3-234	118	Fiber Optic Cable Installation Complete	3/10/04	5/12/04	0 d
L-3-218	120	B.O. of MINOS Shaft, Absorber, MINOS Tunnel & MINOS Hall	3/10/04	12/26/03	0 d
L-3-211	120	MINOS Service Bldg Complete	3/10/04	11/26/03	0 d
L-3-238	114	All Hadron Absorber Core Material Delivered	3/11/04	5/31/04	0 d
L-3-235	112	Assy of Target/Baffle Module Complete	3/19/04	4/8/04	0 d
L-3-212	112	Assy of Horn 1 & Module Complete	3/22/04	3/29/04	0 d
L-3-315	112	Targ Pile Carriage Pads on Concrete Install Compl	3/26/04	5/3/04	0 d
L-3-214	118	FIRUS Cable System Installation Complete	3/29/04	7/14/04	0 d
L-3-310	112	Install Bottom Shielding Complete	3/31/04	4/2/04	0 d
L-3-236	116	Network in Target Hall	3/31/04	8/6/04	0 d
L-3-231	117	All Water System Skids Installed in Enclosures	4/5/04	6/14/04	156 d
L-3-320	113	Receipt of Major Transmission Line Materials & Parts	4/9/04	6/1/04	145 d
L-3-330	111	Low Power Test of MI Magnets Started	4/15/04	6/7/04	132 d

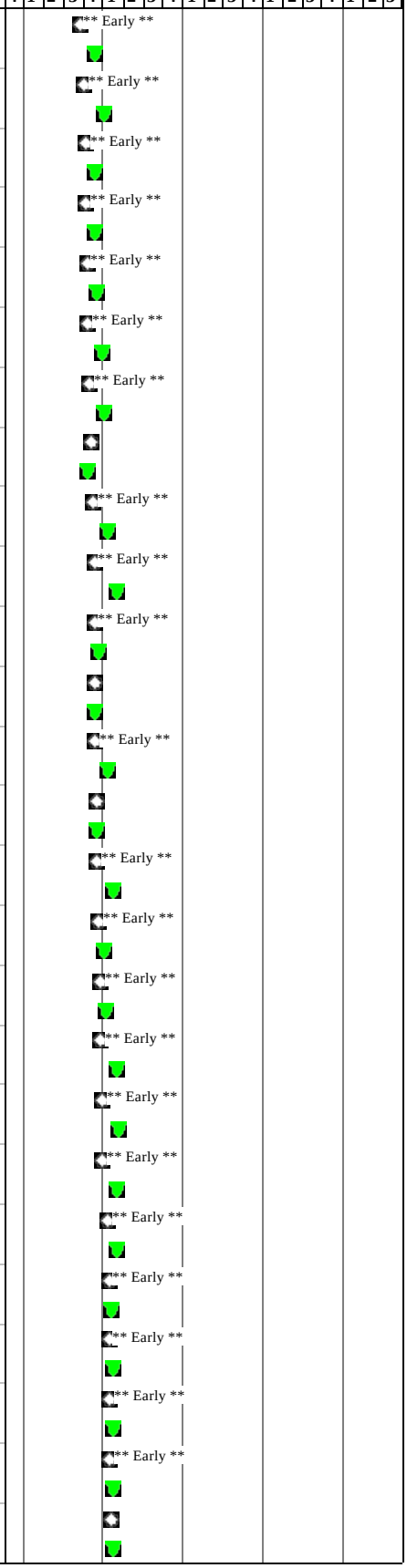


FNAL Current Forecast FNAL Baseline Milestone Milestone Complete

NuMI WBS Level 3 Milestones
(12/2003 - 9/2005)

4/15/04

Mlstn#	WBS Lev	Name	FNAL Cur Forecast	FNAL Base Date	Float
L-3-326	118	Personnel Safety Interlock Syst Enginering & Des Compl	4/23/04	6/29/04	183 d
L-3-217	115	Downstream Hadron Monitors Ready for Installation	5/13/04	8/9/04	154 d
L-3-230	111	Kicker Ready to Install	5/17/04	6/29/04	90 d
L-3-252	111	Instrumentation Ready for Installation (except Multiwires)	5/17/04	7/5/04	102 d
L-3-250	113	Power Supply Refurbishing Complete	5/24/04	7/9/04	58 d
L-3-321	117	All Water System Skid Instrumentation Connected	5/28/04	8/6/04	181 d
L-3-239	114	Test of VacuumIntegrity Complete	6/9/04	8/13/04	87 d
L-3-199	113	Compl Install of Horn Power Supply in PS Room	6/11/04	6/1/04	101 d
L-3-259	118	Personnel Safety Interlock System Installation Complete	6/21/04	8/27/04	142 d
L-3-258	115	Downstream Hadron Monitor Installed	6/23/04	10/1/04	157 d
L-3-254	112	Compl Placement of Horn 1 into Target Station	6/24/04	7/19/04	56 d
L-3-309	112	Assy of Target Baffle on Module Complete	6/30/04	7/5/04	59 d
L-3-251	111	Primary Beam Instrumentation Construction Compl	7/1/04	8/27/04	118 d
L-3-271	111	Target Interface Baffle/Window Ready for Install	7/7/04	7/12/04	64 d
L-3-232	114	Start Absorber Outer Shielding Installation	7/9/04	9/23/04	109 d
L-3-314	112	Compl Placement of Horn 2 Assy into Target Station	7/15/04	8/9/04	56 d
L-3-276	113	Complete Assy/Installation of Stripline	7/20/04	8/19/04	101 d
L-3-255	115	Muon Monitors Installed	7/20/04	10/6/04	139 d
L-3-297	115	Downstream Hadron Monitor Operational	8/3/04	10/20/04	139 d
L-3-256	114	Assy of Core on Carrier Complete	8/5/04	10/11/04	87 d
L-3-270	112	Target & Horn Installation Complete	8/25/04	10/8/04	108 d
L-3-324	118	NuMI Stub Cables Installed	8/30/04	9/13/04	29 d
L-3-257	118	MI60 Cable Syst Install Compl (Excl Trim Elements)	8/30/04	9/20/04	43 d
L-3-293	118	MI-62 Cable System Installation Complete	9/7/04	9/24/04	38 d
L-3-311	111	Install Pre-target Instrumentation Complete	9/9/04	9/23/04	103 d
L-3-274	113	Power Test of TH Conventional Power Supplies Compl	9/13/04	9/22/04	19 d

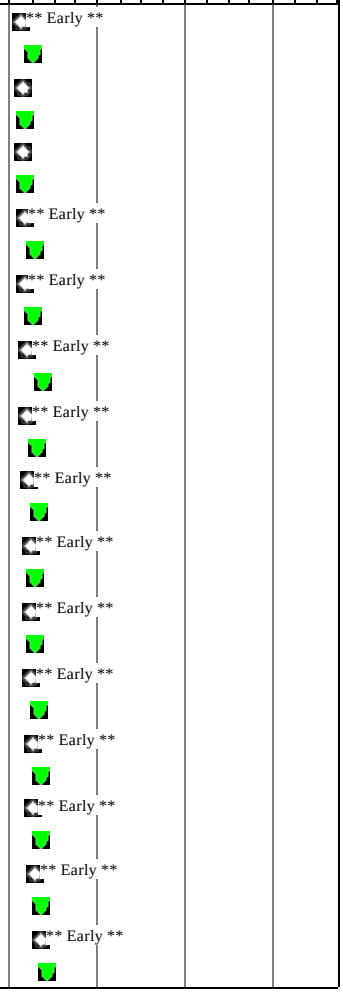


FNAL Current Forecast FNAL Baseline Milestone Milestone Complete

NuMI WBS Level 3 Milestones
(12/2003 - 9/2005)

4/15/04

Mlstn#	WBS Lev	Name	FNAL Cur Forecast	FNAL Base Date	Float
L-3-278	111	Pre-Target Checkout Complete	9/23/04	11/8/04	103 d
L-3-277	113	Compl Install & Testing of Kicker PS	9/29/04	10/8/04	22 d
L-3-318	113	Power Test of MI60 & MI-62 Power Supplies Complete	9/29/04	10/8/04	22 d
L-3-272	117	All Water Systems Checked Out	10/5/04	11/19/04	92 d
L-3-291	111	MI Stub Installation Complete	10/7/04	11/15/04	80 d
L-3-294	114	Checkout Absorber Complete	10/15/04	12/20/04	87 d
L-3-298	117	VacuumSystems Checked Out	10/19/04	11/29/04	82 d
L-3-299	111	Extraction & Primary Beam Checked Out	10/21/04	12/1/04	83 d
L-3-290	112	Shielding Installation Complete (Pre-Hot Handling)	10/28/04	11/18/04	42 d
L-3-319	113	Start to Pulse & Checkout Horn System	10/29/04	11/19/04	42 d
L-3-253	118	Pre-Targ Hall & Targ Hall Cable Syst Installation Compl	10/29/04	12/6/04	77 d
L-3-295	112	Pulse & Checkout Horn System Complete	11/12/04	12/7/04	42 d
L-3-279	118	Controls Installation Complete	11/12/04	12/7/04	47 d
L-3-325	118	Controls Checkout Complete	11/19/04	12/14/04	62 d
L-3-296	115	Muon Monitors Operational	12/14/04	1/6/05	47 d

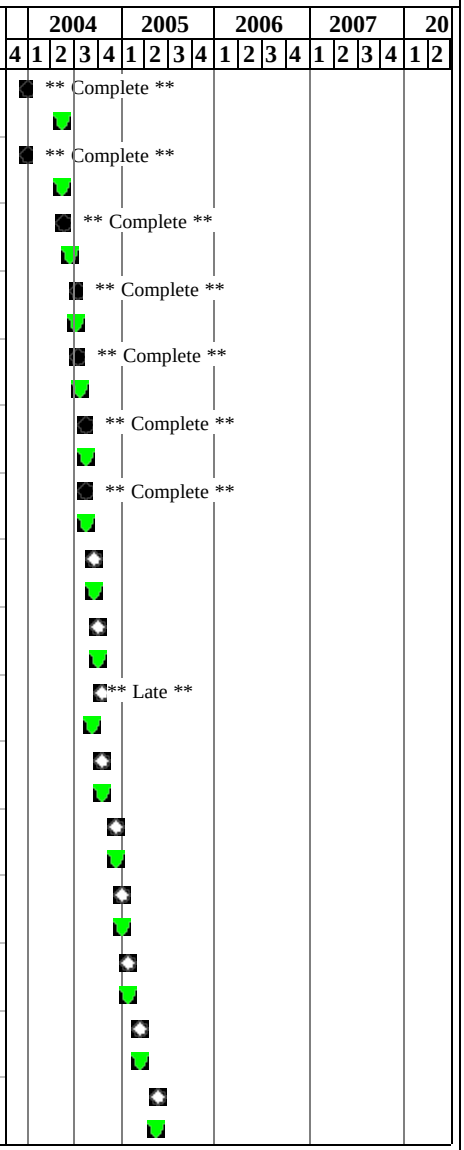


FNAL Current Forecast FNAL Baseline Milestone Milestone Complete

MINOS WBS Level 3 Milestones
(12/2003 - 9/2005)

4/15/04

Mlstn #	WBS Lev 3	Name	FNAL Cur Forecast	FNAL Base Date	Float
L-3-288	222	100% of ND Clear Cables Complete	8/15/03	12/31/03	0d
L-3-285	225	100% of Near MUX Boxes Complete	8/15/03	12/30/03	0d
L-3-303	251	80% of ND Rack Assy Complete	1/5/04	1/30/04	0d
L-3-336	251	Checkout of Readout Equipment	2/20/04	2/15/04	0d
L-3-302	250	Near Detector Infrastructure Installation Started	2/27/04	3/8/04	0d
L-3-304	253	Begin Spectrometer Plane Installation	3/31/04	3/31/04	0d
L-3-341	253	Plane 281 Installed	3/31/04	3/31/04	0d
L-3-305	253	25% Detector Installed	4/29/04	4/29/04	110d
L-3-340	251	PORC for Electronics Operation Obtained	5/12/04	5/12/04	203d
L-3-301	231	Begin Near FE Electronics Installation	5/27/04	4/19/04	56d
L-3-337	253	Spectrometer Installation Complete	5/27/04	5/27/04	110d
L-3-338	253	50% of Calorimeter Planes Installed	7/19/04	7/19/04	110d
L-3-342	253	Calortimeter Readout Installed	8/16/04	8/16/04	157d
L-3-339	253	100% Detector Planes Installed	9/7/04	9/7/04	142d
L-3-343	253	Obtain PORC for Magnet Operation	10/18/04	10/18/04	110d
L-3-306	250	Near Detector Installation Complete	12/27/04	12/24/04	66d



FNAL Current Forecast FNAL Baseline Date Milestone Complete

Variance Summary Table

(Cumulative to Date as of 3/31/04)

WBS / Description	Budgeted Cost		Actual Cost	Variance	
	Work Scheduled	Work Performed	Work Performed	Schedule	Cost
1.1 Technical Components	23,331	24,566	24,910	1,235	(345)
1.2 Facility Construction	68,893	68,893	69,460	0	(566)
1.3 Project Management	3,395	3,395	2,916	0	479
1.0 TEC Total	**95,620**	**96,854**	**97,286**	**1,235**	**(432)**
2.1 Magnets: Steel & Coils	7,621	7,621	7,621	0	0
2.2 Scintillator Detector Fabrication	19,525	19,525	19,525	0	(0)
2.3 Electronics, DAQ & Database	9,019	8,993	8,937	(27)	56
2.4 Far Detector Installation	4,581	4,581	4,576	0	4
2.5 Near Detector Installation	4,168	4,156	4,245	(12)	(90)
2.6 MINOS Project Management	1,621	1,621	1,630	(0)	(9)
UK In-Kind Contribution	(4,820)	(4,802)	(4,802)	18	0
2.0 MINOS Detector	**41,716**	**41,695**	**41,734**	**(21)**	**(39)**
3.1. NuMI Conceptual Design	1,934	1,934	1,928	0	6
3.2 MINOS Detector R&D	1,768	1,768	1,768	(0)	0
3.3 MINOS Cavern	14,527	14,527	14,527	0	0
3.4 Soudan/MINOS Operating	1,677	1,677	1,677	0	(0)
Minnesota Preconstruction Funds	(758)	(758)	(758)	0	0
Minnesota Contruction Funds FY99	(3,000)	(3,000)	(3,000)	0	0
3.0 NuMI Project Support	**16,148**	**16,148**	**16,142**	**0**	**6**
OPC Total	**57,864**	**57,843**	**57,876**	**(21)**	**(33)**
TPC Total	**153,483**	**154,697**	**155,162**	**1,214**	**(465)**

IX. COST REPORTS

Cost and earned value reports for the NuMI Project are presented in two sets, one for WBS 1.0 Total Estimated Cost (TEC), and a second for Other Project Costs (OPC) that includes both the MINOS Detector (WBS 2.0) and Project Support (WBS 3.0). Information for all segments of the project is summarized at WBS Level 3 except in the case of the OPC CURVE Reports that are at WBS Level 2 instead. The actual cost of work performed (ACWP) is comprised of the following: 1) costs collected and reported by the Fermilab financial system, 2) costs collected and reported to NuMI Project Management by the University of Minnesota in their monthly progress report for WBS 3.3 MINOS Cavern, and 3) an estimate of the value of work performed by the United Kingdom (UK) collaborating institutions towards their in-kind contribution. Since the UK collaborating institutions are not required to report their actual costs to NuMI Project Management, we are assuming that actual current period costs and cumulative costs are equal to current period earned value and cumulative earned value, respectively. Each set of cost and earned value reports includes the following:

CPR Format 1A
This is a modified version of the traditional CPR Format 1 report that shows indirect cost for each WBS Level 3 rather than as a single line item for the entire project. As a result it is possible to review the status of both burdened and unburdened costs for each major system or cost component. In addition, the report for the OPC includes a summary section at the end, with WBS Level 2 totals for the MINOS Detector and Project Support segments of the project.

CPR Format 3
This is the traditional format for reporting changes to the project baseline that were approved and implemented in the current reporting period, as well as their impact on the time phased project baseline.

CURVE Reports
These graphically depict cumulative Budgeted Cost of Work Scheduled (BCWS), Budgeted Cost of Work Performed (BCWP), and Actual Cost of Work Performed (ACWP), at WBS Level 3 and WBS Level 2 for the TEC and OPC, respectively. The OPC reports reflect all project costs, including the UK In-Kind Contribution, and also funding contributed ($3.758M) by the University of Minnesota. All amounts shown are fully burdened.

Plan v Act Reports
These reports compare burdened planned costs (BCWS) with burdened actual costs (ACWP) on a cumulative basis through the end of the prior fiscal year, and by month for the current fiscal year. There are two versions of this report, one for total cost, and a second for labor costs only. Both OPC versions exclude the value of UK In-Kind Contributions and thus represent US Funds only.

NuMI Project Obligations
This report reflects burdened obligations to date, including requisitions in progress, for the entire project, as recorded in the Fermilab financial system. Consequently, it does not include any assumed obligations with respect to work performed by the UK collaborating institutions. Nor does it reflect actual amounts obligated by the University of Minnesota under the grant for WBS

3.3 MINOS Cavern; instead, obligations shown for WBS 3.3 represent the cumulative amount of the Financial Plan transfers to the University of Minnesota from the Fermilab budget.

NuMI Project TEC

($000's Omitted)

Cost Performance Report - Work Breakdown Structure														
Contractor:	Fermi National Accelerator Laboratory				Contract Type/No:			Project Name/No:		Report Period:				
Location:	Batavia							NuMI TEC		2/29/04	3/31/04			
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling			
1	109,242		0		0	0	109,242	0		0	0			
WBS[2]	Current Period					Cumulative to Date					At Completion			
WBS[3]	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance			Latest		
Results... Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted	Revised Estimate	Variance	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
1.1 Technical Components														
1.1.1 Extraction & Primary Beam														
Direct Cost + Escalation	94	54	92	(40)	(38)	3,918	3,943	4,192	25	(248)	4,345	4,345	0	
Indirect Cost	15	11	24	(5)	(13)	868	878	997	10	(119)	942	942	0	
WBS[3]Totals:	109	65	115	(44)	(51)	4,786	4,821	5,188	35	(367)	5,287	5,287	0	
1.1.2 Neutrino Beam Devices														
Direct Cost + Escalation	483	309	322	(174)	(13)	7,536	7,829	8,186	294	(356)	8,639	8,639	0	
Indirect Cost	109	75	70	(34)	5	1,757	1,823	1,845	66	(22)	1,998	1,998	0	
WBS[3]Totals:	592	384	392	(208)	(8)	9,293	9,652	10,030	359	(378)	10,638	10,638	0	
1.1.3 Power Supply System														
Direct Cost + Escalation	65	101	171	36	(70)	3,684	3,714	3,829	30	(114)	4,045	4,045	0	
Indirect Cost	12	18	43	6	(25)	883	891	901	8	(11)	970	970	0	
WBS[3]Totals:	77	119	214	42	(95)	4,567	4,605	4,730	38	(125)	5,015	5,015	0	
1.1.4 Hadron Decay and Absorber														
Direct Cost + Escalation	9	76	30	67	46	652	754	669	102	85	1,166	1,166	0	
Indirect Cost	3	15	7	12	8	167	187	170	20	17	268	268	0	
WBS[3]Totals:	12	91	37	79	55	819	941	839	122	102	1,434	1,434	0	
1.1.5 Neutrino Beam Monitoring														
Direct Cost + Escalation	2	4	32	1	(28)	392	394	381	3	13	455	455	0	
Indirect Cost	0	0	0	0	(0)	25	25	37	0	(12)	26	26	0	
WBS[3]Totals:	2	4	32	1	(28)	416	419	418	3	2	481	481	0	
1.1.6 Alignment Systems														
Direct Cost + Escalation	2	2	3	0	(0)	209	214	159	5	55	240	240	0	
Indirect Cost	1	1	1	0	(0)	60	61	40	1	21	68	68	0	
WBS[3]Totals:	3	3	4	0	(0)	269	275	199	6	76	308	308	0	
1.1.7 Water, Vacuum & Gas Systems														
Direct Cost + Escalation	82	141	70	59	71	1,329	1,470	1,431	141	39	2,059	2,059	0	
Indirect Cost	14	29	16	15	13	296	334	316	38	18	475	475	0	
WBS[3]Totals:	96	170	86	74	84	1,626	1,804	1,747	179	57	2,535	2,535	0	
1.1.8 Installation and Integration														
Direct Cost + Escalation	123	155	60	32	95	1,212	1,616	1,424	404	192	2,348	2,348	0	
Indirect Cost	25	31	10	6	21	281	369	272	88	97	516	516	0	
WBS[3]Totals:	148	186	70	39	116	1,493	1,985	1,696	493	289	2,865	2,865	0	
1.1.9 Hadronic Hose (Close-out)														
Direct Cost + Escalation	0	0	0	0	0	53	53	54	0	(0)	53	53	0	
Indirect Cost	0	0	0	0	0	9	9	9	0	(0)	9	9	0	
WBS[3]Totals:	0	0	0	0	0	62	62	63	0	(1)	62	62	0	
WBS[2]Totals:	1,039	1,022	949	(17)	73	23,331	24,566	24,910	1,235	(345)	28,624	28,624	0	

NuMI Project TEC

($000's Omitted)

Cost Performance Report - Work Breakdown Structure														
Contractor: Fermi National Accelerator Laboratory					Contract Type/No:			Project Name/No:		Report Period:				
Location: Batavia								NuMI TEC		2/29/04	3/31/04			
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling			
1	109,242		0		0	0	109,242	0		0	0			
WBS[2] WBS[3] Results...	Current Period					Cumulative to Date					At Completion			
	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance			Latest		
Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted	Revised Estimate	Variance	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
1.2 Facility Construction														
1.2.1 Facility Physics Design Phase														
Direct Cost + Escalation	0	0	0	0	0	49	49	52	0	(3)	49	49	0	
Indirect Cost	0	0	0	0	0	21	21	19	0	2	21	21	0	
WBS[3]Totals:	0	0	0	0	0	70	70	70	0	(0)	70	70	0	
1.2.2 Facility Construction Title I Design Phase														
Direct Cost + Escalation	0	0	0	0	0	1,254	1,254	1,288	0	(34)	1,254	1,254	0	
Indirect Cost	0	0	0	0	0	184	184	149	0	35	184	184	0	
WBS[3]Totals:	0	0	0	0	0	1,438	1,438	1,437	0	1	1,438	1,438	0	
1.2.3 Facility Construction Title II Design Phase														
Direct Cost + Escalation	0	0	0	0	0	2,620	2,620	2,807	0	(187)	2,620	2,620	0	
Indirect Cost	0	0	0	0	0	355	355	167	0	188	355	355	0	
WBS[3]Totals:	0	0	0	0	0	2,975	2,975	2,974	0	1	2,975	2,975	0	
1.2.4 Facility Construction Phase														
Direct Cost + Escalation	2	445	(101)	444	547	62,813	62,813	63,487	0	(674)	62,813	62,813	0	
Indirect Cost	0	2	23	2	(21)	1,596	1,596	1,491	0	105	1,596	1,596	0	
WBS[3]Totals:	2	448	(78)	446	526	64,410	64,410	64,978	0	(568)	64,410	64,410	0	
WBS[2]Totals:	2	448	(78)	446	526	68,893	68,893	69,460	0	(566)	68,893	68,893	0	
1.3 Project Management														
1.3.1 FY 98 Project Management														
Direct Cost + Escalation	0	0	0	0	0	208	208	104	0	104	208	208	0	
Indirect Cost	0	0	0	0	0	66	66	37	0	29	66	66	0	
WBS[3]Totals:	0	0	0	0	0	275	275	141	0	133	275	275	0	
1.3.2 FY 99 Project Management														
Direct Cost + Escalation	0	0	0	0	0	425	425	512	0	(88)	425	425	0	
Indirect Cost	0	0	0	0	0	135	135	149	0	(14)	135	135	0	
WBS[3]Totals:	0	0	0	0	0	560	560	661	0	(102)	560	560	0	
1.3.3 FY 00 Project Management														
Direct Cost + Escalation	0	0	0	0	0	436	436	521	0	(85)	436	436	0	
Indirect Cost	0	0	0	0	0	139	139	142	0	(3)	139	139	0	
WBS[3]Totals:	0	0	0	0	0	575	575	663	0	(88)	575	575	0	
1.3.4 FY 01 Project Management														
Direct Cost + Escalation	0	0	0	0	0	522	522	331	0	191	522	522	0	
Indirect Cost	0	0	0	0	0	166	166	92	0	74	166	166	0	
WBS[3]Totals:	0	0	0	0	0	688	688	423	0	265	688	688	0	

NuMI Project TEC

($000's Omitted)

Cost Performance Report - Work Breakdown Structure													
Contractor: Fermi National Accelerator Laboratory				Contract Type/No:			Project Name/No: NuMI TEC		Report Period: 2/29/04	3/31/04			
Location: Batavia													
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work	Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling			
1	109,242		0	0	0	109,242	0		0	0			
WBS[2] WBS[3] Results...	Current Period					Cumulative to Date					At Completion		
	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance			Latest	
Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted	Revised Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1.3.5 FY 02 Project Management													
Direct Cost + Escalation	0	0	0	0	0	533	533	253	0	281	533	533	0
Indirect Cost	0	0	0	0	0	170	170	72	0	98	170	170	0
WBS[3]Totals:	0	0	0	0	0	703	703	324	0	378	703	703	0
1.3.6 FY 03 Project Management													
Direct Cost + Escalation	0	0	0	0	0	411	411	324	0	87	411	411	0
Indirect Cost	0	0	0	0	0	131	131	98	0	33	131	131	0
WBS[3]Totals:	0	0	0	0	0	541	541	421	0	120	541	541	0
1.3.7 FY 04 Project Management													
Direct Cost + Escalation	7	(8)	34	(15)	(42)	41	41	217	0	(176)	82	82	0
Indirect Cost	2	(3)	10	(5)	(13)	13	13	66	0	(52)	26	26	0
WBS[3]Totals:	10	(11)	44	(20)	(55)	54	54	283	0	(228)	108	108	0
1.3.8 FY 05 Project Management													
Direct Cost + Escalation	0	0	0	0	0	0	0	0	0	0	99	99	0
Indirect Cost	0	0	0	0	0	0	0	0	0	0	31	31	0
WBS[3]Totals:	0	0	0	0	0	0	0	0	0	0	130	130	0
WBS[2]Totals:	10	(11)	44	(20)	(55)	3,395	3,395	2,916	0	479	3,580	3,580	0
General and Administrative	0	0	0	0	0	0	0	0	0	0	0	0	0
Undistributed Budget											0	0	0
Sub Total	1,051	1,459	915	408	543	95,620	96,854	97,286	1,235	(432)	101,097	101,097	0
Contingency											8,145	8,145	0
Total	1,051	1,459	915	408	543	95,620	96,854	97,286	1,235	(432)	109,242	109,242	0

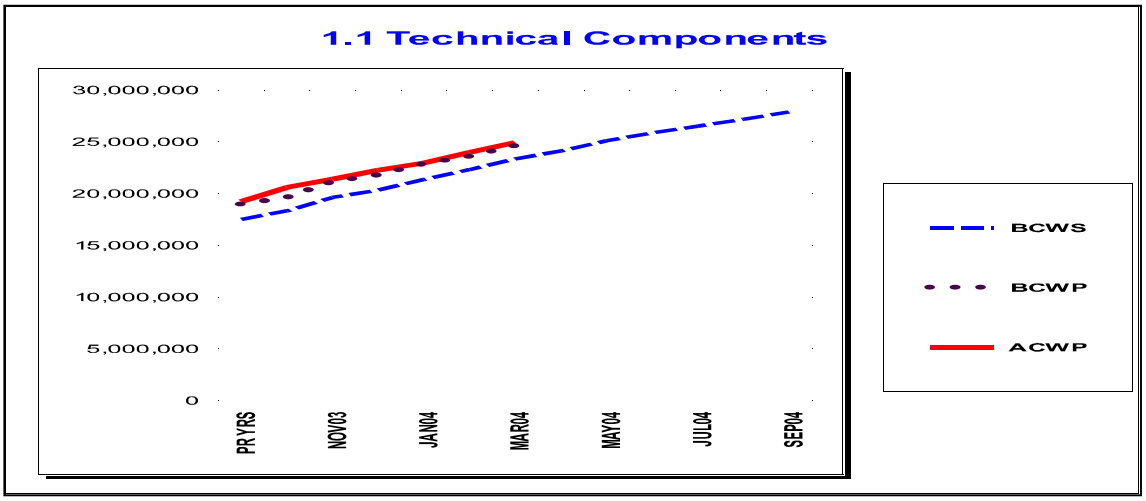
NuMI Other Project Costs

($000's Omitted)

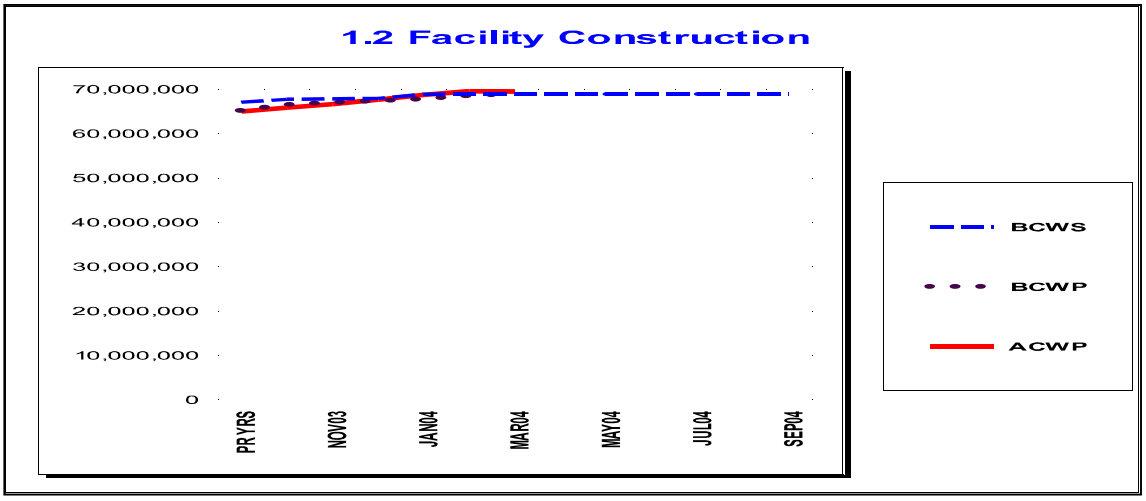
Cost Performance Report - Baseline															
Contractor:	Fermi National Accelerator Laboratory			Contract Type/No:		Project Name/No:			Report Period:						
Location:	Batavia					NuMI Other Proj Costs			2/29/04				3/31/04		
(1) Original Contract Target Cost		(2) Negotiated Contract Changes		(3) Current Target Cost		(4) Est. Cost Authorized Authorized Unpriced Work			(5) Contract Budget Base (3) + (4)			(6) Total Allocated Budget		(7) Difference (5) - (6)	
62,200		0		62,200		0			62,200			62,200		0	
(8) Contract Start Date 10/1/97		(9) Contract Definitization Date 10/1/97				(10) Last Item Delivery Date 4/30/04			(11) Contract Completion Date 4/30/04			(12) Estimated Completion Date 4/30/04			
Item	BCWS Cum to Date	BCWS for Report Period	Budgeted Cost for Work Scheduled (Non-Cumulative) Six Month Forecast +1 APR04	+2 MAY04	+3 JUN04	+4 JUL04	+5 AUG04	+6 SEP04	(Enter Specific Periods) FY05					Undist Budget	Total Budget
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
PM Baseline (Beginning of Period)	66,322	120	266	221	109	146	126	65	59	0	0	0	0	0	67,434
PM Baseline (End of Period)	66,441		266	221	109	146	126	65	59	0	0	0	0	0	67,434
Contingency + MINOS Scope Reserve															3,796
Total NuMI Other Project Costs															71,230
UK In-Kind Contribution															(5,272)
Minnesota Preconstruction Funds															(758)
Minnesota Preconstruction Funds FY99															(3,000)
Total US Funds															62,200

NuMI Project TEC

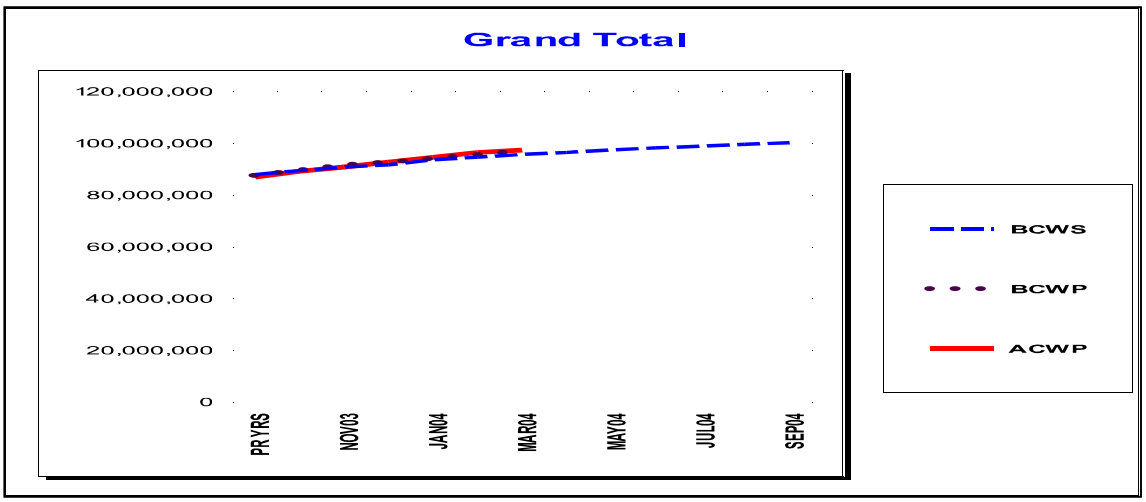
($000's Omitted)



	PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04
BCWS	17,490	18,312	19,607	20,314	21,346	22,292	23,331	24,099	25,076	25,834	26,491	27,164	27,859
BCWP	18,928	19,557	21,104	21,742	22,829	23,544	24,566						
ACWP	19,209	20,585	21,375	22,239	22,939	23,961	24,910						



	PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04
BCWS	67,035	67,697	67,793	67,911	68,834	68,891	68,893	68,893	68,893	68,893	68,893	68,893	68,893
BCWP	65,113	66,425	66,938	67,289	67,720	68,445	68,893						
ACWP	64,975	65,826	66,635	67,653	68,726	69,537	69,460						



	PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04
BCWS	87,866	89,360	90,760	91,593	93,558	94,569	95,620	96,397	97,382	98,150	98,816	99,498	100,202
BCWP	87,383	89,375	91,420	92,487	93,929	95,396	96,854						
ACWP	86,818	89,096	90,763	92,679	94,493	96,371	97,286						

NuMI Project TEC

($000's Omitted)

Program:	Description:	Approval:
NUMITEC	NuMI TEC	Program Manager
Run Date: 04/09/04	Status Date: 3/31/2004	Functional Manager
		Cost Account Manager

DESCRIPTION		PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04	FY05	TOTAL
1.1 Technical Components																
1.1.1 Extraction & Primary Beam	BCWS	3,823	136	339	127	109	143	109	104	182	52	60	25	52	24	5,287
	ACWP	3,769	558	145	340	78	183	115	0	0	0	0	0	0	0	5,188
1.1.2 Neutrino Beam Devices	BCWS	7,041	242	493	216	361	347	592	278	180	85	103	312	182	205	10,638
	ACWP	7,790	292	300	371	391	495	392	0	0	0	0	0	0	0	10,030
1.1.3 Power Supply System	BCWS	3,915	85	69	78	276	68	77	71	91	102	63	63	51	7	5,015
	ACWP	3,991	189	67	63	66	141	214	0	0	0	0	0	0	0	4,730
1.1.4 Hadron Decay and Absorber	BCWS	561	93	17	12	95	27	12	21	120	82	13	58	97	225	1,434
	ACWP	689	31	17	14	16	35	37	0	0	0	0	0	0	0	839
1.1.5 Neutrino Beam Monitoring	BCWS	285	15	13	95	5	3	2	1	1	3	3	16	14	26	481
	ACWP	283	31	22	15	10	26	32	0	0	0	0	0	0	0	418
1.1.6 Alignment Systems	BCWS	255	1	1	3	3	3	3	3	3	3	3	6	8	13	308
	ACWP	190	0	0	0	0	6	4	0	0	0	0	0	0	0	199
1.1.7 Water, Vacuum & Gas Systems	BCWS	802	190	215	102	109	112	96	122	220	263	190	26	40	49	2,535
	ACWP	1,371	63	90	23	42	72	86	0	0	0	0	0	0	0	1,747
1.1.8 Installation and Integration	BCWS	745	60	149	73	75	243	148	167	180	168	222	167	250	217	2,865
	ACWP	1,063	212	149	38	97	66	70	0	0	0	0	0	0	0	1,696
1.1.9 Hadronic Hose (Close-out)	BCWS	62	0	0	0	0	0	0	0	0	0	0	0	0	0	62
	ACWP	63	0	0	0	0	0	0	0	0	0	0	0	0	0	63
WBS[2] Totals:	BCWS	17,490	822	1,295	706	1,033	946	1,039	768	977	759	657	673	695	765	28,624
	ACWP	19,209	1,375	790	864	700	1,023	949	0	0	0	0	0	0	0	24,910
1.2 Facility Construction																
1.2.1 Facility Physics Design Phase	BCWS	70	0	0	0	0	0	0	0	0	0	0	0	0	0	70
	ACWP	70	0	0	0	0	0	0	0	0	0	0	0	0	0	70
1.2.2 Facility Construction Title I Design Phase	BCWS	1,438	0	0	0	0	0	0	0	0	0	0	0	0	0	1,438
	ACWP	1,437	0	0	0	0	0	0	0	0	0	0	0	0	0	1,437
1.2.3 Facility Construction Title II Design Phase	BCWS	2,975	0	0	0	0	0	0	0	0	0	0	0	0	0	2,975
	ACWP	2,974	0	0	0	0	0	0	0	0	0	0	0	0	0	2,974
1.2.4 Facility Construction Phase	BCWS	62,551	663	96	117	923	57	2	0	0	0	0	0	0	0	64,410
	ACWP	60,493	851	809	1,018	1,073	811	(78)	0	0	0	0	0	0	0	64,978
WBS[2] Totals:	BCWS	67,035	663	96	117	923	57	2	0	0	0	0	0	0	0	68,893
	ACWP	64,975	851	809	1,018	1,073	811	(78)	0	0	0	0	0	0	0	69,460
1.3 Project Management																
1.3.1 FY 98 Project Management	BCWS	275	0	0	0	0	0	0	0	0	0	0	0	0	0	275
	ACWP	141	0	0	0	0	0	0	0	0	0	0	0	0	0	141
1.3.2 FY 99 Project Management	BCWS	560	0	0	0	0	0	0	0	0	0	0	0	0	0	560
	ACWP	661	0	0	0	0	0	0	0	0	0	0	0	0	0	661
1.3.3 FY 00 Project Management	BCWS	575	0	0	0	0	0	0	0	0	0	0	0	0	0	575
	ACWP	663	0	0	0	0	0	0	0	0	0	0	0	0	0	663

NuMI Project TEC

($000's Omitted)

Program:	Description:	Approval:
NUMITEC	NuMI TEC	Program Manager
Run Date: 04/09/04	Status Date: 3/31/2004	Functional Manager
		Cost Account Manager

DESCRIPTION		PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04	FY05	TOTAL
1.3.4 FY 01 Project Management	BCWS	688	0	0	0	0	0	0	0	0	0	0	0	0	0	688
	ACWP	423	0	0	0	0	0	0	0	0	0	0	0	0	0	423
1.3.5 FY 02 Project Management	BCWS	703	0	0	0	0	0	0	0	0	0	0	0	0	0	703
	ACWP	324	0	0	0	0	0	0	0	0	0	0	0	0	0	324
1.3.6 FY 03 Project Management	BCWS	541	0	0	0	0	0	0	0	0	0	0	0	0	0	541
	ACWP	421	0	0	0	0	0	0	0	0	0	0	0	0	0	421
1.3.7 FY 04 Project Management	BCWS	0	10	8	10	9	8	10	9	9	9	9	9	9	0	108
	ACWP	0	52	67	34	40	44	44	0	0	0	0	0	0	0	283
1.3.8 FY 05 Project Management	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	130	130
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WBS[2] Totals:	BCWS	3,341	10	8	10	9	8	10	9	9	9	9	9	9	130	3,580
	ACWP	2,634	52	67	34	40	44	44	0	0	0	0	0	0	0	2,916
Grand Totals:	BCWS	87,866	1,495	1,399	833	1,965	1,011	1,051	777	985	768	666	682	704	896	101,097
	ACWP	86,818	2,278	1,667	1,916	1,814	1,878	915	0	0	0	0	0	0	0	97,286

NuMI Project TEC - Labor Only

($000's Omitted)

Program:	Description:	Approval:
NUMITEC	NuMI TEC	Program Manager
Run Date: 04/09/04	Status Date: 3/31/2004	Functional Manager
		Cost Account Manager

DESCRIPTION		PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04	FY05	TOTAL
1.1 Technical Components																
1.1.1 Extraction & Primary Beam	BCWS	1,846	38	95	32	30	27	26	26	34	25	37	5	18	24	2,263
	ACWP	2,388	135	106	80	61	74	81	0	0	0	0	0	0	0	2,925
1.1.2 Neutrino Beam Devices	BCWS	3,798	69	112	115	139	108	246	90	96	68	46	48	35	115	5,086
	ACWP	4,630	118	174	104	79	182	164	0	0	0	0	0	0	0	5,451
1.1.3 Power Supply System	BCWS	2,071	20	12	10	209	8	10	13	31	48	40	63	33	7	2,576
	ACWP	2,622	21	19	32	26	88	137	0	0	0	0	0	0	0	2,945
1.1.4 Hadron Decay and Absorber	BCWS	448	9	17	12	7	8	10	10	24	8	3	14	16	62	647
	ACWP	555	11	7	10	13	27	17	0	0	0	0	0	0	0	641
1.1.5 Neutrino Beam Monitoring	BCWS	78	0	0	0	0	0	0	0	0	0	0	0	0	0	78
	ACWP	74	0	0	0	0	0	1	0	0	0	0	0	0	0	75
1.1.6 Alignment Systems	BCWS	207	1	1	3	3	2	3	3	3	3	3	3	6	5	244
	ACWP	140	0	0	0	0	1	4	0	0	0	0	0	0	0	145
1.1.7 Water, Vacuum & Gas Systems	BCWS	410	18	173	16	8	25	3	25	114	128	122	23	37	49	1,151
	ACWP	634	20	34	4	21	55	42	0	0	0	0	0	0	0	811
1.1.8 Installation and Integration	BCWS	497	29	31	34	32	29	37	42	39	44	44	46	54	131	1,088
	ACWP	383	12	17	5	13	1	4	0	0	0	0	0	0	0	436
1.1.9 Hadronic Hose (Close-out)	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WBS[2] Totals:	BCWS	9,354	184	442	222	427	208	335	209	341	323	295	201	199	392	13,132
	ACWP	11,426	319	358	236	212	429	449	0	0	0	0	0	0	0	13,429
1.2 Facility Construction																
1.2.1 Facility Physics Design Phase	BCWS	70	0	0	0	0	0	0	0	0	0	0	0	0	0	70
	ACWP	70	0	0	0	0	0	0	0	0	0	0	0	0	0	70
1.2.2 Facility Construction Title I Design Phase	BCWS	300	0	0	0	0	0	0	0	0	0	0	0	0	0	300
	ACWP	299	0	0	0	0	0	0	0	0	0	0	0	0	0	299
1.2.3 Facility Construction Title II Design Phase	BCWS	556	0	0	0	0	0	0	0	0	0	0	0	0	0	556
	ACWP	556	0	0	0	0	0	0	0	0	0	0	0	0	0	556
1.2.4 Facility Construction Phase	BCWS	2,827	52	45	52	49	45	2	0	0	0	0	0	0	0	3,071
	ACWP	2,853	76	91	77	74	90	80	0	0	0	0	0	0	0	3,340
WBS[2] Totals:	BCWS	3,754	52	45	52	49	45	2	0	0	0	0	0	0	0	3,998
	ACWP	3,778	76	91	77	74	90	80	0	0	0	0	0	0	0	4,266
1.3 Project Management																
1.3.1 FY 98 Project Management	BCWS	275	0	0	0	0	0	0	0	0	0	0	0	0	0	275
	ACWP	125	0	0	0	0	0	0	0	0	0	0	0	0	0	125
1.3.2 FY 99 Project Management	BCWS	560	0	0	0	0	0	0	0	0	0	0	0	0	0	560
	ACWP	595	0	0	0	0	0	0	0	0	0	0	0	0	0	595
1.3.3 FY 00 Project Management	BCWS	575	0	0	0	0	0	0	0	0	0	0	0	0	0	575
	ACWP	616	0	0	0	0	0	0	0	0	0	0	0	0	0	616

NuMI Project TEC - Labor Only

($000's Omitted)

Program:	Description:	Approval:
NUMITEC	NuMI TEC	Program Manager
Run Date: 04/09/04	Status Date: 3/31/2004	Functional Manager
		Cost Account Manager

DESCRIPTION		PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04	FY05	TOTAL
1.3.4 FY 01 Project Management	BCWS	688	0	0	0	0	0	0	0	0	0	0	0	0	0	688
	ACWP	416	0	0	0	0	0	0	0	0	0	0	0	0	0	416
1.3.5 FY 02 Project Management	BCWS	703	0	0	0	0	0	0	0	0	0	0	0	0	0	703
	ACWP	324	0	0	0	0	0	0	0	0	0	0	0	0	0	324
1.3.6 FY 03 Project Management	BCWS	541	0	0	0	0	0	0	0	0	0	0	0	0	0	541
	ACWP	416	0	0	0	0	0	0	0	0	0	0	0	0	0	416
1.3.7 FY 04 Project Management	BCWS	0	10	8	10	9	8	10	9	9	9	9	9	9	0	108
	ACWP	0	52	67	34	39	44	44	0	0	0	0	0	0	0	281
1.3.8 FY 05 Project Management	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	130	130
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WBS[2] Totals:	BCWS	3,341	10	8	10	9	8	10	9	9	9	9	9	9	130	3,580
	ACWP	2,493	52	67	34	39	44	44	0	0	0	0	0	0	0	2,773
Grand Totals:	BCWS	16,449	245	495	283	486	261	346	218	350	332	304	210	208	522	20,710
	ACWP	17,697	447	516	347	325	563	573	0	0	0	0	0	0	0	20,468

NuMI Other Project Costs

($000's Omitted)

Cost Performance Report - Work Breakdown Structure													
Contractor:	Fermi National Accelerator Laboratory				Contract Type/No:			Project Name/No:		Report Period:			
Location:	Batavia							NuMI Other Proj Costs		2/29/04	3/31/04		
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling		
1	62,200		0		0	0	62,200	0		0	0		
WBS[2] WBS[3] Results...	Current Period					Cumulative to Date					At Completion		
	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance			Latest	
Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted	Revised Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
2.1 Magnets: Steel & Coils													
2.1.1 Steel Plane Fabrication													
Direct Cost + Escalation	0	0	0	0	0	4,372	4,372	4,375	0	(3)	4,372	4,372	0
Indirect Cost	0	0	0	0	0	229	229	226	0	3	229	229	0
WBS[3]Totals:	0	0	0	0	0	4,601	4,601	4,601	0	0	4,601	4,601	0
2.1.2 Steel handling fixtures													
Direct Cost + Escalation	0	0	0	0	0	637	637	637	(0)	0	637	637	0
Indirect Cost	0	0	0	0	0	156	156	157	0	(0)	156	156	0
WBS[3]Totals:	0	0	0	0	0	793	793	793	0	(0)	793	793	0
2.1.3 Near Detector Support Structures													
Direct Cost + Escalation	0	0	0	0	0	(2)	(2)	1	0	(4)	(2)	(2)	0
Indirect Cost	0	0	0	0	0	4	4	0	0	4	4	4	0
WBS[3]Totals:	0	0	0	0	0	1	1	1	0	0	1	1	0
2.1.4 Magnet Coil													
Direct Cost + Escalation	0	0	0	0	0	1,386	1,386	1,372	(0)	15	1,386	1,386	0
Indirect Cost	0	0	0	0	0	286	286	300	0	(14)	286	286	0
WBS[3]Totals:	0	0	0	0	0	1,673	1,673	1,672	0	1	1,673	1,673	0
2.1.5 Detector Plane Prototypes													
Direct Cost + Escalation	0	0	0	0	0	390	390	394	0	(4)	390	390	0
Indirect Cost	0	0	0	0	0	106	106	102	(0)	4	106	106	0
WBS[3]Totals:	0	0	0	0	0	495	495	496	(0)	(0)	495	495	0
2.1.6 Steel Management													
Direct Cost + Escalation	0	0	0	0	0	53	53	53	0	(0)	53	53	0
Indirect Cost	0	0	0	0	0	4	4	5	(0)	(0)	4	4	0
WBS[3]Totals:	0	0	0	0	0	57	57	58	(0)	(0)	57	57	0
WBS[2]Totals:	0	0	0	0	0	7,621	7,621	7,621	0	0	7,621	7,621	0
2.2 Scintillator Detector Fabrication													
2.2.1 Scintillator Strips													
Direct Cost + Escalation	0	0	0	0	0	2,890	2,890	2,867	0	22	2,890	2,890	0
Indirect Cost	0	0	0	0	0	266	266	289	(0)	(23)	266	266	0
WBS[3]Totals:	0	0	0	0	0	3,156	3,156	3,156	0	(0)	3,156	3,156	0
2.2.2 Fiber													
Direct Cost + Escalation	0	0	0	0	0	4,236	4,236	4,270	0	(34)	4,236	4,236	0
Indirect Cost	0	0	0	0	0	60	60	26	(0)	34	60	60	0
WBS[3]Totals:	0	0	0	0	0	4,296	4,296	4,296	(0)	(0)	4,296	4,296	0
2.2.3 Scintillator Modules													
Direct Cost + Escalation	0	0	0	0	0	1,899	1,899	1,893	0	6	1,899	1,899	0
Indirect Cost	0	0	0	0	0	83	83	89	0	(6)	83	83	0
WBS[3]Totals:	0	0	0	0	0	1,982	1,982	1,982	0	0	1,982	1,982	0

NuMI Other Project Costs

($000's Omitted)

Cost Performance Report - Work Breakdown Structure													
Contractor:	Fermi National Accelerator Laboratory				Contract Type/No:			Project Name/No:		Report Period:			
Location:	Batavia							NuMI Other Proj Costs		2/29/04	3/31/04		
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling		
1	62,200		0		0	0	62,200	0		0	0		
WBS[2]	Current Period					Cumulative to Date					At Completion		
WBS[3]	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance				
Results... Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted	Latest Revised Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
2.2.4 Photodetector Systems													
Direct Cost + Escalation	0	0	0	0	0	2,156	2,156	2,170	0	(14)	2,156	2,156	0
Indirect Cost	0	0	0	0	0	23	23	9	0	14	23	23	0
WBS[3]Totals:	0	0	0	0	0	2,179	2,179	2,179	0	(0)	2,179	2,179	0
2.2.5 Mux Boxes & Connectors													
Direct Cost + Escalation	0	0	0	0	0	1,394	1,394	1,397	(0)	(4)	1,394	1,394	0
Indirect Cost	0	0	0	0	0	27	27	23	(0)	4	27	27	0
WBS[3]Totals:	0	0	0	0	0	1,421	1,421	1,421	(0)	0	1,421	1,421	0
2.2.6 Calibration Systems													
Direct Cost + Escalation	0	0	0	0	0	1,102	1,102	1,103	0	(0)	1,102	1,102	0
Indirect Cost	0	0	0	0	0	0	0	0	0	0	0	0	0
WBS[3]Totals:	0	0	0	0	0	1,103	1,103	1,103	0	0	1,103	1,103	0
2.2.7 Ass'y & Test Equipment													
Direct Cost + Escalation	0	0	0	0	0	1,677	1,677	1,677	(0)	(0)	1,677	1,677	0
Indirect Cost	0	0	0	0	0	53	53	53	(0)	(0)	53	53	0
WBS[3]Totals:	0	0	0	0	0	1,731	1,731	1,731	(0)	(0)	1,731	1,731	0
2.2.8 Factories													
Direct Cost + Escalation	0	0	0	0	0	3,232	3,232	3,275	0	(43)	3,232	3,232	0
Indirect Cost	0	0	0	0	0	47	47	4	0	43	47	47	0
WBS[3]Totals:	0	0	0	0	0	3,279	3,279	3,279	0	(0)	3,279	3,279	0
2.2.9 Scintillator Management													
Direct Cost + Escalation	0	0	0	0	0	371	371	375	(0)	(4)	371	371	0
Indirect Cost	0	0	0	0	0	9	9	5	0	4	9	9	0
WBS[3]Totals:	0	0	0	0	0	379	379	379	0	(0)	379	379	0
WBS[2]Totals:	0	0	0	0	0	19,525	19,525	19,525	0	(0)	19,525	19,525	0
2.3 Electronics, DAQ & Database													
2.3.1 Near Detector Front End													
Direct Cost + Escalation	1	11	54	10	(42)	4,107	4,107	3,956	(0)	151	4,138	4,138	0
Indirect Cost	0	3	8	3	(5)	446	446	491	0	(45)	446	446	0
WBS[3]Totals:	1	14	62	13	(48)	4,553	4,553	4,447	0	106	4,585	4,585	0
2.3.2 Far Detector Front-end													
Direct Cost + Escalation	0	0	0	0	0	1,590	1,590	1,593	0	(2)	1,590	1,590	0
Indirect Cost	0	0	0	0	0	82	82	79	0	3	82	82	0
WBS[3]Totals:	0	0	0	0	0	1,673	1,673	1,672	0	1	1,673	1,673	0
2.3.3 Data Routing & Trigger Farm													
Direct Cost + Escalation	3	0	0	(3)	0	1,226	1,210	1,210	(16)	0	1,241	1,241	0
WBS[3]Totals:	3	0	0	(3)	0	1,226	1,210	1,210	(16)	0	1,241	1,241	0

NuMI Other Project Costs

($000's Omitted)

Cost Performance Report - Work Breakdown Structure													
Contractor:	Fermi National Accelerator Laboratory				Contract Type/No:			Project Name/No:		Report Period:			
Location:	Batavia							NuMI Other Proj Costs		2/29/04	3/31/04		
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling		
1	62,200		0		0	0	62,200	0		0	0		
WBS[2] WBS[3] Results...	Current Period					Cumulative to Date					At Completion		
	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance				
Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted	Latest Revised Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
2.3.4 Data Acquisition & Triggering													
Direct Cost + Escalation	0	0	0	(0)	0	391	389	389	(2)	0	391	391	0
WBS[3]Totals:	0	0	0	(0)	0	391	389	389	(2)	0	391	391	0
2.3.5 Database													
Direct Cost + Escalation	0	0	0	0	0	10	10	10	0	(0)	10	10	0
Indirect Cost	0	0	0	0	0	0	0	0	0	0	0	0	0
WBS[3]Totals:	0	0	0	0	0	10	10	10	0	(0)	10	10	0
2.3.6 Auxilliary Systems													
Direct Cost + Escalation	0	0	0	(0)	0	459	452	491	(7)	(39)	460	460	0
Indirect Cost	0	0	0	(0)	0	36	35	49	(2)	(14)	37	37	0
WBS[3]Totals:	0	0	0	(0)	0	495	487	540	(9)	(54)	497	497	0
2.3.7 Electronics Management													
Direct Cost + Escalation	0	0	0	0	0	143	143	217	0	(74)	143	143	0
Indirect Cost	0	0	0	0	0	2	2	1	0	1	2	2	0
WBS[3]Totals:	0	0	0	0	0	146	146	218	0	(72)	146	146	0
2.3.8 Slow Control & Monitoring													
Direct Cost + Escalation	0	0	0	0	0	437	437	362	0	75	437	437	0
Indirect Cost	0	0	0	0	0	12	12	12	(0)	0	12	12	0
WBS[3]Totals:	0	0	0	0	0	449	449	375	0	75	449	449	0
2.3.9 HV System													
Direct Cost + Escalation	0	0	0	0	0	67	67	66	(0)	0	67	67	0
Indirect Cost	0	0	0	0	0	10	10	11	0	(0)	10	10	0
WBS[3]Totals:	0	0	0	0	0	77	77	77	(0)	0	77	77	0
WBS[2]Totals:	5	14	62	9	(48)	9,019	8,993	8,937	(27)	56	9,069	9,069	0
2.4 Far Detector Installation													
2.4.1 FDI Completed Design Tasks													
Direct Cost + Escalation	0	0	0	0	0	0	0	0	0	0	0	0	0
Indirect Cost	0	0	0	0	0	0	0	0	0	0	0	0	0
WBS[3]Totals:	0	0	0	0	0	0	0	0	0	0	0	0	0
2.4.2 FDI Management													
Direct Cost + Escalation	0	0	0	0	0	541	541	550	0	(9)	541	541	0
Indirect Cost	0	0	0	0	0	43	43	34	(0)	9	43	43	0
WBS[3]Totals:	0	0	0	0	0	584	584	584	0	(0)	584	584	0
2.4.3 SDN-FDI Construction Oversight													
Direct Cost + Escalation	0	0	0	0	0	115	115	115	0	0	115	115	0
WBS[3]Totals:	0	0	0	0	0	115	115	115	0	0	115	115	0

NuMI Other Project Costs

($000's Omitted)

Cost Performance Report - Work Breakdown Structure													
Contractor:	Fermi National Accelerator Laboratory				Contract Type/No:			Project Name/No:		Report Period:			
Location:	Batavia							NuMI Other Proj Costs		2/29/04	3/31/04		
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling		
1	62,200		0		0	0	62,200	0		0	0		
WBS[2]	Current Period					Cumulative to Date					At Completion		
WBS[3]			Actual					Actual					
Results...	Budgeted Cost		Cost	Variance		Budgeted Cost		Cost	Variance			Latest	
Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted	Revised Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
2.4.4 FDI Soudan Lab Infrastructure Setup													
Direct Cost + Escalation	0	0	0	0	0	470	470	469	0	1	470	470	0
Indirect Cost	0	0	0	0	0	3	3	4	0	(0)	3	3	0
WBS[3]Totals:	0	0	0	0	0	473	473	473	0	0	473	473	0
2.4.5 SDN-FDI Detector Installation													
Direct Cost + Escalation	0	0	0	0	0	2,960	2,960	2,953	0	7	2,960	2,960	0
Indirect Cost	0	0	0	0	0	0	0	6	0	(6)	0	0	0
WBS[3]Totals:	0	0	0	0	0	2,960	2,960	2,959	0	0	2,960	2,960	0
2.4.6 SDN-FDI DNR Costs													
Direct Cost + Escalation	0	0	0	0	0	382	382	378	0	4	382	382	0
Indirect Cost	0	0	0	0	0	0	0	1	0	(1)	0	0	0
WBS[3]Totals:	0	0	0	0	0	382	382	378	0	3	382	382	0
2.4.7 FDI Alignment & Survey													
Direct Cost + Escalation	0	0	0	0	0	58	58	58	0	(1)	58	58	0
Indirect Cost	0	0	0	0	0	10	10	9	0	0	10	10	0
WBS[3]Totals:	0	0	0	0	0	67	67	67	0	(0)	67	67	0
WBS[2]Totals:	0	0	0	0	0	4,581	4,581	4,576	0	4	4,581	4,581	0
2.5 Near Detector Installation													
2.5.1 NDI Infrastructure													
Direct Cost + Escalation	57	52	53	(5)	(1)	294	289	242	(6)	46	402	402	0
Indirect Cost	17	15	8	(1)	7	76	74	54	(2)	20	110	110	0
WBS[3]Totals:	74	67	61	(7)	6	370	363	296	(7)	66	512	512	0
2.5.2 NDI Plane Assembly													
Direct Cost + Escalation	0	0	0	0	0	393	393	403	0	(10)	393	393	0
Indirect Cost	0	0	0	0	0	123	123	111	(0)	12	123	123	0
WBS[3]Totals:	0	0	0	0	0	516	516	514	0	2	516	516	0
2.5.3 NDI Detector Installation													
Direct Cost + Escalation	23	7	55	(16)	(48)	193	192	258	(0)	(65)	778	778	0
Indirect Cost	5	2	15	(3)	(13)	33	31	56	(2)	(25)	200	200	0
WBS[3]Totals:	28	9	71	(18)	(61)	226	224	314	(2)	(90)	977	977	0
2.5.4 NDI Facility Experimental Infrastructure													
Direct Cost + Escalation	7	5	6	(2)	(1)	124	122	151	(2)	(29)	133	133	0
Indirect Cost	2	2	2	(1)	(0)	24	23	27	(1)	(4)	26	26	0
WBS[3]Totals:	10	7	8	(3)	(1)	148	145	177	(3)	(33)	160	160	0
2.5.5 RBI SB&O Experimental Systems Outfitting													
Direct Cost + Escalation	0	43	355	43	(312)	2,909	2,909	2,944	0	(35)	2,909	2,909	0
WBS[3]Totals:	0	43	355	43	(312)	2,909	2,909	2,944	0	(35)	2,909	2,909	0
WBS[2]Totals:	111	126	495	15	(370)	4,168	4,156	4,245	(12)	(90)	5,074	5,074	0

NuMI Other Project Costs

($000's Omitted)

Cost Performance Report - Work Breakdown Structure													
Contractor:	Fermi National Accelerator Laboratory				Contract Type/No:			Project Name/No:		Report Period:			
Location:	Batavia							NuMI Other Proj Costs		2/29/04	3/31/04		
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling		
1	62,200		0		0	0	62,200	0		0	0		
WBS[2]	Current Period					Cumulative to Date					At Completion		
WBS[3]	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance				
Results...	Work	Work	Work			Work	Work	Work				Latest Revised	
Item	Scheduled	Performed	Performed	Schedule	Cost	Scheduled	Performed	Performed	Schedule	Cost	Budgeted	Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
2.6 MINOS Project Management													
2.6.1 FNL-Project Management													
Direct Cost + Escalation	3	3	4	(0)	(1)	1,160	1,160	1,200	(0)	(40)	1,188	1,188	0
Indirect Cost	1	1	1	(0)	(0)	363	363	332	(0)	31	372	372	0
WBS[3]Totals:	4	4	5	(0)	(1)	1,523	1,523	1,532	(0)	(9)	1,560	1,560	0
2.6.2 ANL-Project Management													
Direct Cost + Escalation	0	0	0	0	0	96	96	96	0	(0)	96	96	0
Indirect Cost	0	0	0	0	0	1	1	1	0	0	1	1	0
WBS[3]Totals:	0	0	0	0	0	98	98	98	0	(0)	98	98	0
WBS[2]Totals:	4	4	5	(0)	(1)	1,621	1,621	1,630	(0)	(9)	1,658	1,658	0
3.1 NuMI Conceptual Design													
3.1.1 FNL-BD-NuMI CDR													
Direct Cost + Escalation	0	0	0	0	0	407	407	407	0	0	407	407	0
Indirect Cost	0	0	0	0	0	82	82	80	0	2	82	82	0
WBS[3]Totals:	0	0	0	0	0	489	489	487	0	2	489	489	0
3.1.2 FNL-BD-NuMI FESS CDR													
Direct Cost + Escalation	0	0	0	0	0	282	282	282	0	0	282	282	0
Indirect Cost	0	0	0	0	0	64	64	64	0	0	64	64	0
WBS[3]Totals:	0	0	0	0	0	346	346	346	0	0	346	346	0
3.1.3 FNL-NuMI Beam Design													
Direct Cost + Escalation	0	0	0	0	0	612	612	612	0	(0)	612	612	0
Indirect Cost	0	0	0	0	0	186	186	184	0	3	186	186	0
WBS[3]Totals:	0	0	0	0	0	798	798	796	0	3	798	798	0
3.1.4 FNL-BD-NuMI Project Management													
Direct Cost + Escalation	0	0	0	0	0	184	184	184	0	(0)	184	184	0
Indirect Cost	0	0	0	0	0	51	51	50	0	1	51	51	0
WBS[3]Totals:	0	0	0	0	0	235	235	234	0	1	235	235	0
3.1.5 FNL-Soudan Lab Design													
Direct Cost + Escalation	0	0	0	0	0	55	55	56	0	(1)	55	55	0
Indirect Cost	0	0	0	0	0	10	10	9	0	1	10	10	0
WBS[3]Totals:	0	0	0	0	0	65	65	65	0	0	65	65	0
WBS[2]Totals:	0	0	0	0	0	1,934	1,934	65	0	6	1,934	1,934	0
3.2 MINOS Detector R&D													
3.2.1 FNL-MINOS Scintillator R&D													
Direct Cost + Escalation	0	0	0	0	0	872	872	870	0	2	872	872	0
Indirect Cost	0	0	0	0	0	115	115	118	0	(2)	115	115	0
WBS[3]Totals:	0	0	0	0	0	988	988	988	0	0	988	988	0

NuMI Other Project Costs

($000's Omitted)

Cost Performance Report - Work Breakdown Structure													
Contractor:	Fermi National Accelerator Laboratory				Contract Type/No:			Project Name/No:		Report Period:			
Location:	Batavia							NuMI Other Proj Costs		2/29/04	3/31/04		
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling		
1	62,200		0		0	0	62,200	0		0	0		
WBS[2]	Current Period					Cumulative to Date					At Completion		
WBS[3]	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance			Latest	
Results... Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted	Revised Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
3.2.2 FNL-MINOS Steel R&D													
Direct Cost + Escalation	0	0	0	0	0	549	549	550	0	(1)	549	549	0
Indirect Cost	0	0	0	0	0	95	95	94	0	1	95	95	0
WBS[3]Totals:	0	0	0	0	0	644	644	644	0	(0)	644	644	0
3.2.3 FNL-RD-Neutrino Oscillation R&D													
Direct Cost + Escalation	0	0	0	0	0	116	116	116	0	0	116	116	0
Indirect Cost	0	0	0	0	0	20	20	20	(0)	0	20	20	0
WBS[3]Totals:	0	0	0	0	0	136	136	136	(0)	0	136	136	0
WBS[2]Totals:	0	0	0	0	0	1,768	1,768	1,768	(0)	0	1,768	1,768	0
3.3 MINOS Cavern													
3.3.0 Preconstruction Work													
Direct Cost + Escalation	0	0	0	0	0	758	758	758	0	0	758	758	0
WBS[3]Totals:	0	0	0	0	0	758	758	758	0	0	758	758	0
3.3.1 Cavern Construction													
Direct Cost + Escalation	0	0	0	0	0	6,597	6,597	6,597	0	0	6,597	6,597	0
WBS[3]Totals:	0	0	0	0	0	6,597	6,597	6,597	0	0	6,597	6,597	0
3.3.2 Cavern Outfitting													
Direct Cost + Escalation	0	0	0	0	0	7,171	7,171	7,171	0	0	7,171	7,171	0
WBS[3]Totals:	0	0	0	0	0	7,171	7,171	7,171	0	0	7,171	7,171	0
WBS[2]Totals:	0	0	0	0	0	14,527	14,527	14,527	0	0	14,527	14,527	0
3.4 Soudan/MINOS Operating													
3.4.1 UMN-Mine Crew Support/Soudan Gen'l Operations													
Direct Cost + Escalation	0	0	0	0	0	1,523	1,523	1,503	0	20	1,523	1,523	0
Indirect Cost	0	0	0	0	0	8	8	27	0	(20)	8	8	0
WBS[3]Totals:	0	0	0	0	0	1,531	1,531	1,531	0	(0)	1,531	1,531	0
3.4.2 UMN-Breitung Township Building Rental													
Direct Cost + Escalation	0	0	0	0	0	75	75	75	0	(0)	75	75	0
WBS[3]Totals:	0	0	0	0	0	75	75	75	0	(0)	75	75	0
3.4.3 UMN-E Peterson Salary													
Direct Cost + Escalation	0	0	0	0	0	71	71	71	0	0	71	71	0
WBS[3]Totals:	0	0	0	0	0	71	71	71	0	0	71	71	0
WBS[2]Totals:	0	0	0	0	0	1,677	1,677	1,677	0	(0)	1,677	1,677	0
General and Administrative	0	0	0	0	0	0	0	0	0	0	0	0	0
Undistributed Budget											0	0	0
Sub Total	120	143	561	24	(418)	66,441	66,402	66,435	(39)	(33)	67,434	67,434	0
Contingency + MINOS Scope Reserve											3,796	3,796	0
Total NuMI Other Proj Costs	120	143	561	24	(418)	66,441	66,402	66,435	(39)	(33)	71,230	71,230	0

NuMI Other Project Costs

($000's Omitted)

Cost Performance Report - Work Breakdown Structure													
Contractor: Fermi National Accelerator Laboratory					Contract Type/No:			Project Name/No:		Report Period:			
Location: Batavia								NuMI Other Proj Costs		2/29/04	3/31/04		
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling		
1	62,200		0		0	0	62,200	0		0	0		
WBS[2]	Current Period					Cumulative to Date					At Completion		
WBS[3] Results...	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance			Latest	
Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted	Revised Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
UK In-Kind Contribution	(3)	0	0	3	0	(4,820)	(4,802)	(4,802)	18	0	(5,272)	(5,272)	0
Minnesota Preconstruction Funds	0	0	0	0	0	(758)	(758)	(758)	0	0	(758)	(758)	0
Minnesota Construction Funds FY99	0	0	0	0	0	(3,000)	(3,000)	(3,000)	0	0	(3,000)	(3,000)	0
Total US Funds	117	143	561	27	(418)	57,864	57,843	57,876	(21)	(33)	62,200	62,200	0
WBS[2]Totals:													
Direct Cost + Escalation	95	121	527	26	(406)	43,915	43,882	43,970	(33)	(88)	44,694	44,694	0
Indirect Cost	25	22	35	(3)	(12)	2,620	2,614	2,565	(6)	49	2,834	2,834	0
Subtotal	120	143	561	24	(418)	46,535	46,496	46,535	(39)	(39)	47,528	47,528	0
UK In-Kind Contribution	(3)	0	0	3	0	(4,820)	(4,802)	(4,802)	18	0	(5,272)	(5,272)	0
Total MINOS Detector	117	143	561	27	(418)	41,716	41,695	41,734	(21)	(39)	42,257	42,257	0
Direct Cost + Escalation	0	0	0	0	0	19,273	19,273	19,253	0	20	19,273	19,273	0
Indirect Cost	0	0	0	0	0	633	633	646	0	(14)	633	633	0
Subtotal	0	0	0	0	0	19,906	19,906	19,900	0	6	19,906	19,906	0
Minnesota Preconstruction Funds	0	0	0	0	0	(758)	(758)	(758)	0	0	(758)	(758)	0
Minnesota Construction Funds FY99	0	0	0	0	0	(3,000)	(3,000)	(3,000)	0	0	(3,000)	(3,000)	0
Total Project Support	0	0	0	0	0	16,148	16,148	16,142	0	6	16,148	16,148	0
Contingency + MINOS Scope Reserve											3,796	3,796	0
Total US Funds	117	143	561	27	(418)	57,864	57,843	57,876	(21)	(33)	62,200	62,200	0

NuMI Other Project Costs

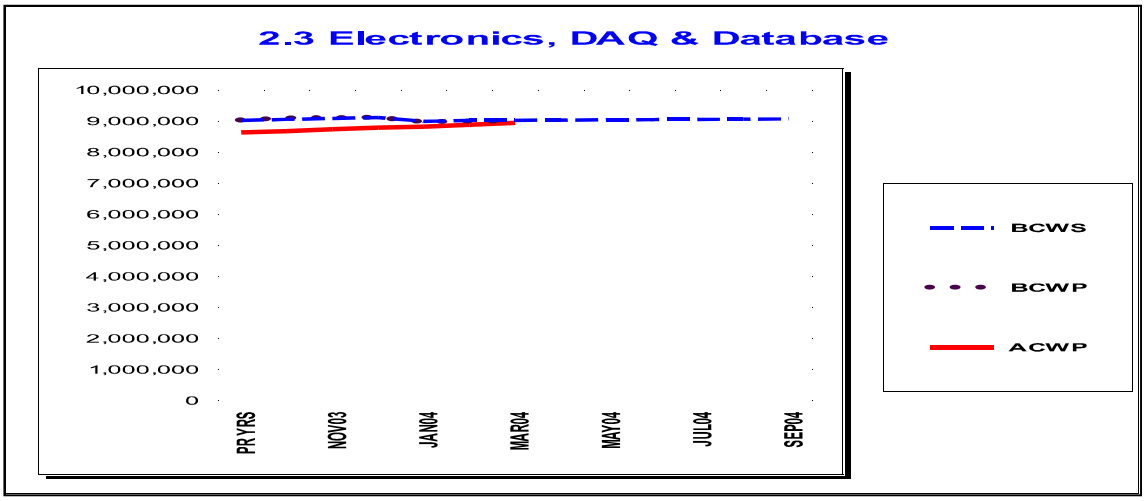
($000's Omitted)

Cost Performance Report - Baseline															
Contractor:	Fermi National Accelerator Laboratory			Contract Type/No:		Project Name/No:			Report Period:						
Location:	Batavia					NuMI Other Proj Costs			2/29/04				3/31/04		
(1) Original Contract Target Cost		(2) Negotiated Contract Changes		(3) Current Target Cost		(4) Est. Cost Authorized Authorized Unpriced Work			(5) Contract Budget Base (3) + (4)			(6) Total Allocated Budget		(7) Difference (5) - (6)	
62,200		0		62,200		0			62,200			62,200		0	
(8) Contract Start Date 10/1/97		(9) Contract Definitization Date 10/1/97				(10) Last Item Delivery Date 4/30/04			(11) Contract Completion Date 4/30/04			(12) Estimated Completion Date 4/30/04			
Item	BCWS Cum to Date	BCWS for Report Period	Budgeted Cost for Work Scheduled (Non-Cumulative) Six Month Forecast +1 APR04	+2 MAY04	+3 JUN04	+4 JUL04	+5 AUG04	+6 SEP04	(Enter Specific Periods) FY05					Undist Budget	Total Budget
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
PM Baseline (Beginning of Period)	66,322	120	266	221	109	146	126	65	59	0	0	0	0	0	67,434
PM Baseline (End of Period)	66,441		266	221	109	146	126	65	59	0	0	0	0	0	67,434
Contingency + MINOS Scope Reserve															3,796
Total NuMI Other Project Costs															71,230
UK In-Kind Contribution															(5,272)
Minnesota Preconstruction Funds															(758)
Minnesota Preconstruction Funds FY99															(3,000)
Total US Funds															62,200

NuMI Other Project Costs

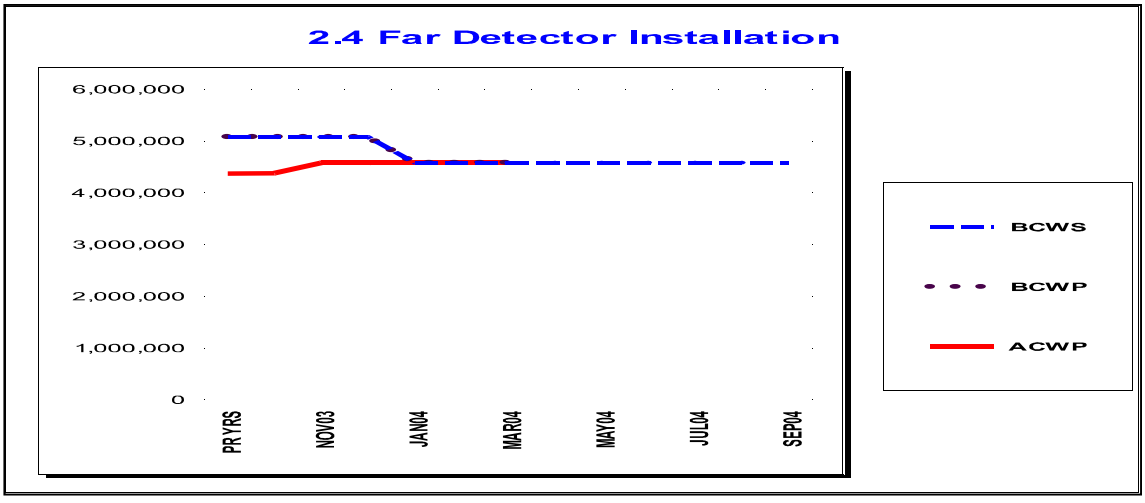
($000's Omitted)

2.3 Electronics, DAQ & Database



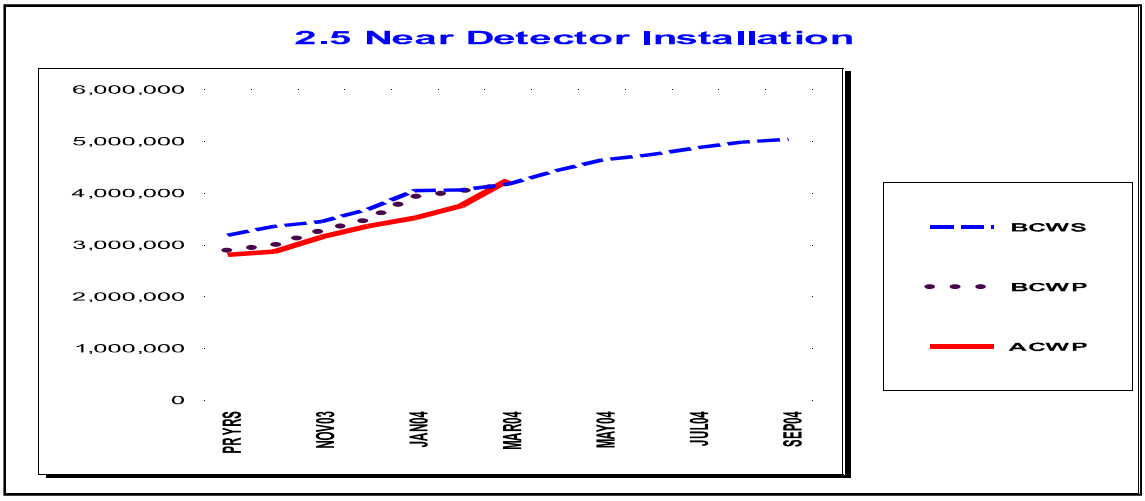
	PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04
BCWS	9,017	9,052	9,079	9,111	8,987	9,014	9,019	9,027	9,034	9,042	9,049	9,057	9,063
BCWP	9,018	9,086	9,095	9,104	8,958	8,979	8,993						
ACWP	8,628	8,669	8,734	8,781	8,815	8,875	8,937						

2.4 Far Detector Installation



	PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04
BCWS	5,077	5,077	5,077	5,077	4,581	4,581	4,581	4,581	4,581	4,581	4,581	4,581	4,581
BCWP	5,077	5,077	5,077	5,077	4,581	4,581	4,581						
ACWP	4,369	4,374	4,576	4,576	4,576	4,576	4,576						

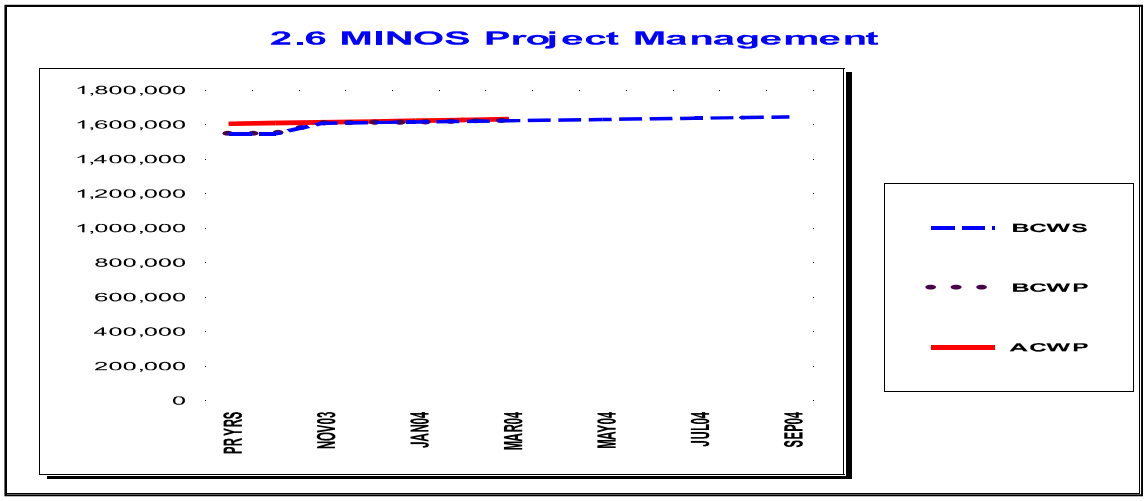
2.5 Near Detector Installation



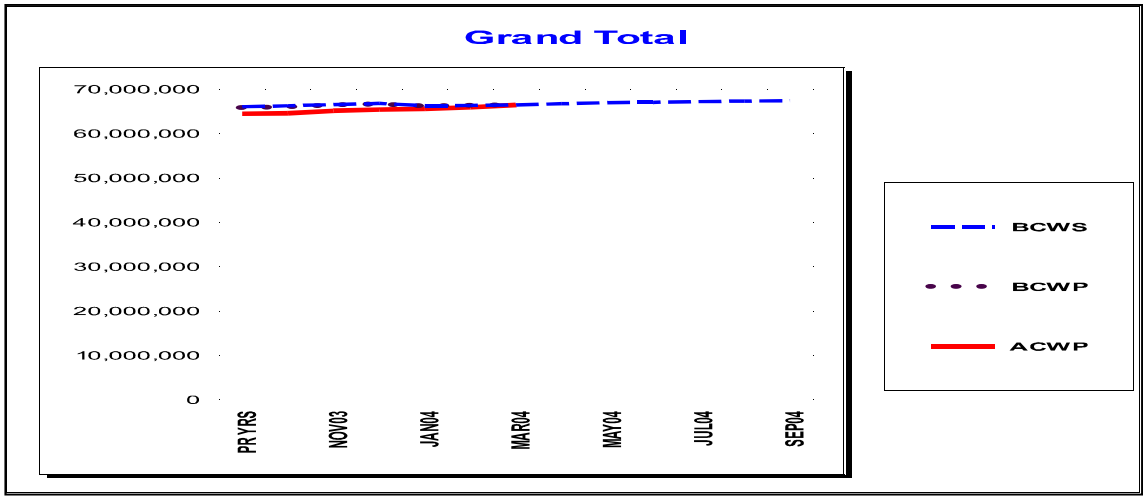
	PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04
BCWS	3,182	3,354	3,445	3,680	4,045	4,057	4,168	4,423	4,633	4,731	4,866	4,980	5,035
BCWP	2,886	2,983	3,262	3,473	3,920	4,030	4,156						
ACWP	2,805	2,868	3,146	3,357	3,514	3,750	4,245						

NuMI Other Project Costs

($000's Omitted)



	PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04
BCWS	1,546	1,546	1,606	1,610	1,614	1,617	1,621	1,625	1,628	1,632	1,636	1,639	1,643
BCWP	1,546	1,546	1,606	1,610	1,610	1,617	1,621						
ACWP	1,603	1,608	1,612	1,616	1,621	1,625	1,630						



	PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04
BCWS	66,033	66,242	66,505	66,760	66,278	66,322	66,441	66,707	66,928	67,038	67,183	67,309	67,374
BCWP	65,744	65,908	66,338	66,547	66,121	66,259	66,402						
ACWP	64,452	64,566	65,116	65,378	65,572	65,874	66,435						

NuMI Other Project Costs - US Funds

($000's Omitted)

Program:	Description:	Approval:
NUMIOPC	NuMI Other Proj Costs	Program Manager
Run Date: 04/14/04	Status Date: 3/31/2004	Functional Manager
		Cost Account Manager

DESCRIPTION		PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04	FY05	TOTAL
2.1 Magnets: Steel & Coils																
2.1.1 Steel Plane Fabrication	BCWS	4,628	1	-27	0	0	0	0	0	0	0	0	0	0	0	4,601
	ACWP	4,601	0	0	0	0	0	0	0	0	0	0	0	0	0	4,601
2.1.2 Steel handling fixtures	BCWS	773	0	20	0	0	0	0	0	0	0	0	0	0	0	793
	ACWP	793	0	0	0	0	0	0	0	0	0	0	0	0	0	793
2.1.3 Near Detector Support Structures	BCWS	5	0	-3	0	0	0	0	0	0	0	0	0	0	0	1
	ACWP	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2.1.4 Magnet Coil	BCWS	1,562	0	111	0	0	0	0	0	0	0	0	0	0	0	1,673
	ACWP	1,673	0	0	0	-1	0	0	0	0	0	0	0	0	0	1,672
2.1.5 Detector Plane Prototypes	BCWS	501	0	-5	0	0	0	0	0	0	0	0	0	0	0	495
	ACWP	496	0	0	0	0	0	0	0	0	0	0	0	0	0	496
2.1.6 Steel Management	BCWS	71	0	-14	0	0	0	0	0	0	0	0	0	0	0	57
	ACWP	57	0	0	0	0	0	0	0	0	0	0	0	0	0	58
WBS[2] Totals:	BCWS	7,539	1	81	0	0	0	0	0	0	0	0	0	0	0	7,621
	ACWP	7,622	0	0	0	-1	0	0	0	0	0	0	0	0	0	7,621
2.2 Scintillator Detector Fabrication																
2.2.1 Scintillator Strips	BCWS	2,998	0	0	-26	0	0	0	0	0	0	0	0	0	0	2,971
	ACWP	2,972	0	0	0	0	0	0	0	0	0	0	0	0	0	2,972
2.2.2 Fiber	BCWS	4,039	0	0	-78	0	0	0	0	0	0	0	0	0	0	3,961
	ACWP	3,961	0	0	0	0	0	0	0	0	0	0	0	0	0	3,961
2.2.3 Scintillator Modules	BCWS	2,008	0	0	-26	0	0	0	0	0	0	0	0	0	0	1,982
	ACWP	1,982	0	0	0	0	0	0	0	0	0	0	0	0	0	1,982
2.2.4 Photodetector Systems	BCWS	1,720	0	0	-19	0	0	0	0	0	0	0	0	0	0	1,702
	ACWP	1,702	0	0	0	0	0	0	0	0	0	0	0	0	0	1,702
2.2.5 Mux Boxes & Connectors	BCWS	1,063	0	0	30	0	0	0	0	0	0	0	0	0	0	1,094
	ACWP	1,093	0	0	0	0	0	0	0	0	0	0	0	0	0	1,093
2.2.6 Calibration Systems	BCWS	3	0	0	-3	0	0	0	0	0	0	0	0	0	0	0
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.2.7 Ass'y & Test Equipment	BCWS	1,729	0	0	-8	0	0	0	0	0	0	0	0	0	0	1,721
	ACWP	1,721	0	0	0	0	0	0	0	0	0	0	0	0	0	1,721
2.2.8 Factories	BCWS	3,188	0	0	91	0	0	0	0	0	0	0	0	0	0	3,279
	ACWP	3,279	0	0	0	0	0	0	0	0	0	0	0	0	0	3,279
2.2.9 Scintillator Management	BCWS	355	0	0	24	0	0	0	0	0	0	0	0	0	0	379
	ACWP	379	0	0	0	0	0	0	0	0	0	0	0	0	0	379
WBS[2] Totals:	BCWS	17,104	0	0	-15	0	0	0	0	0	0	0	0	0	0	17,089
	ACWP	17,089	0	0	0	0	0	0	0	0	0	0	0	0	0	17,089
2.3 Electronics, DAQ & Database																
2.3.1 Near Detector Front End	BCWS	4,545	30	24	28	-100	24	1	4	4	5	5	5	5	5	4,585
	ACWP	4,175	40	31	47	35	58	62	0	0	0	0	0	0	0	4,447
2.3.2 Far Detector Front-end	BCWS	1,184	0	0	0	12	0	0	0	0	0	0	0	0	0	1,197
	ACWP	1,197	0	0	0	-1	0	0	0	0	0	0	0	0	0	1,196
2.3.5 Database	BCWS	48	0	0	0	-38	0	0	0	0	0	0	0	0	0	10
	ACWP	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10

NuMI Other Project Costs - US Funds

($000's Omitted)

Program:	Description:	Approval:
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Run Date: 04/14/04	Status Date: 3/31/2004	Functional Manager
		Cost Account Manager

DESCRIPTION		PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04	FY05	TOTAL
2.3.6 Auxilliary Systems	BCWS	202	0	0	0	0	0	0	0	0	0	0	0	0	0	206
	ACWP	247	1	0	0	0	0	0	0	0	0	0	0	0	0	249
2.3.7 Electronics Management	BCWS	146	0	0	0	0	0	0	0	0	0	0	0	0	0	146
	ACWP	184	0	34	0	0	0	0	0	0	0	0	0	0	0	218
2.3.8 Slow Control & Monitoring	BCWS	445	0	0	0	5	0	0	0	0	0	0	0	0	0	449
	ACWP	373	0	0	0	-1	2	0	0	0	0	0	0	0	0	375
2.3.9 HV System	BCWS	82	1	0	0	-6	0	0	0	0	0	0	0	0	0	77
	ACWP	77	0	0	0	0	0	0	0	0	0	0	0	0	0	77
WBS[2] Totals:	BCWS	6,652	31	25	29	-126	25	2	5	5	5	5	5	5	5	6,670
	ACWP	6,263	41	65	47	34	60	62	0	0	0	0	0	0	0	6,572
2.4 Far Detector Installation																
2.4.1 FDI Completed Design Tasks	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.4.2 FDI Management	BCWS	661	0	0	0	-77	0	0	0	0	0	0	0	0	0	584
	ACWP	577	5	2	0	0	0	0	0	0	0	0	0	0	0	584
2.4.3 SDN-FDI Construction Oversight	BCWS	58	0	0	0	57	0	0	0	0	0	0	0	0	0	115
	ACWP	115	0	0	0	0	0	0	0	0	0	0	0	0	0	115
2.4.4 FDI Soudan Lab Infrastructure Setup	BCWS	509	0	0	0	-36	0	0	0	0	0	0	0	0	0	473
	ACWP	473	0	0	0	0	0	0	0	0	0	0	0	0	0	473
2.4.5 SDN-FDI Detector Installation	BCWS	3,084	0	0	0	-124	0	0	0	0	0	0	0	0	0	2,960
	ACWP	2,759	0	200	0	0	0	0	0	0	0	0	0	0	0	2,959
2.4.6 SDN-FDI DNR Costs	BCWS	708	0	0	0	-326	0	0	0	0	0	0	0	0	0	382
	ACWP	378	0	0	0	0	0	0	0	0	0	0	0	0	0	378
2.4.7 FDI Alignment & Survey	BCWS	57	0	0	0	10	0	0	0	0	0	0	0	0	0	67
	ACWP	67	0	0	0	0	0	0	0	0	0	0	0	0	0	67
WBS[2] Totals:	BCWS	5,077	0	0	0	-496	0	0	0	0	0	0	0	0	0	4,581
	ACWP	4,369	5	202	0	0	0	0	0	0	0	0	0	0	0	4,576
2.5 Near Detector Installation																
2.5.1 NDI Infrastructure	BCWS	253	6	24	6	2	5	74	62	35	3	26	17	0	0	512
	ACWP	170	20	14	13	2	16	61	0	0	0	0	0	0	0	296
2.5.2 NDI Plane Assembly	BCWS	516	0	0	0	0	0	0	0	0	0	0	0	0	0	516
	ACWP	514	0	0	0	0	0	0	0	0	0	0	0	0	0	514
2.5.3 NDI Detector Installation	BCWS	6	2	2	177	3	7	28	186	171	95	109	97	55	39	977
	ACWP	39	0	113	14	38	39	71	0	0	0	0	0	0	0	314
2.5.4 NDI Facility Experimental Infrastructure	BCWS	66	59	14	0	0	0	10	8	5	0	0	0	0	0	160
	ACWP	124	9	16	8	6	6	8	0	0	0	0	0	0	0	177
2.5.5 RBI SB&O Experimental Systems Outfitting	BCWS	2,341	106	51	52	359	0	0	0	0	0	0	0	0	0	2,909
	ACWP	1,957	33	135	177	111	176	355	0	0	0	0	0	0	0	2,944
WBS[2] Totals:	BCWS	3,182	172	91	235	364	12	111	255	210	98	134	115	55	39	5,074
	ACWP	2,805	63	278	211	157	237	495	0	0	0	0	0	0	0	4,245
2.6 MINOS Project Management																
2.6.1 FNL-Project Management	BCWS	1,448	0	61	4	4	3	4	4	4	4	4	4	4	15	1,560
	ACWP	1,505	5	4	4	4	5	5	0	0	0	0	0	0	0	1,532
2.6.2 ANL-Project Management	BCWS	98	0	0	0	0	0	0	0	0	0	0	0	0	0	98
	ACWP	98	0	0	0	0	0	0	0	0	0	0	0	0	0	98

NuMI Other Project Costs - US Funds

($000's Omitted)

Program:	Description:	Approval:
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		Cost Account Manager

DESCRIPTION		PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04	FY05	TOTAL
WBS[2] Totals:	BCWS	1,546	0	61	4	4	3	4	4	4	4	4	4	4	15	1,658
	ACWP	1,603	5	4	4	4	5	5	0	0	0	0	0	0	0	1,630
3.1 NuMI Conceptual Design																
3.1.1 FNL-BD-NuMI CDR	BCWS	489	0	0	0	0	0	0	0	0	0	0	0	0	0	489
	ACWP	487	0	0	0	0	0	0	0	0	0	0	0	0	0	487
3.1.2 FNL-BD-NuMI FESS CDR	BCWS	346	0	0	0	0	0	0	0	0	0	0	0	0	0	346
	ACWP	346	0	0	0	0	0	0	0	0	0	0	0	0	0	346
3.1.3 FNL-NuMI Beam Design	BCWS	798	0	0	0	0	0	0	0	0	0	0	0	0	0	798
	ACWP	796	0	0	0	0	0	0	0	0	0	0	0	0	0	796
3.1.4 FNL-BD-NuMI Project Management	BCWS	235	0	0	0	0	0	0	0	0	0	0	0	0	0	235
	ACWP	234	0	0	0	0	0	0	0	0	0	0	0	0	0	234
3.1.5 FNL-Soudan Lab Design	BCWS	65	0	0	0	0	0	0	0	0	0	0	0	0	0	65
	ACWP	65	0	0	0	0	0	0	0	0	0	0	0	0	0	65
WBS[2] Totals:	BCWS	1,934	0	0	0	0	0	0	0	0	0	0	0	0	0	1,934
	ACWP	1,928	0	0	0	0	0	0	0	0	0	0	0	0	0	1,928
3.2 MINOS Detector R&D																
3.2.1 FNL-MINOS Scintillator R&D	BCWS	995	0	0	0	-8	0	0	0	0	0	0	0	0	0	988
	ACWP	988	0	0	0	0	0	0	0	0	0	0	0	0	0	988
3.2.2 FNL-MINOS Steel R&D	BCWS	649	0	0	0	-4	0	0	0	0	0	0	0	0	0	644
	ACWP	644	0	0	0	0	0	0	0	0	0	0	0	0	0	644
3.2.3 FNL-RD-Neutrino Oscillation R&D	BCWS	136	0	0	0	0	0	0	0	0	0	0	0	0	0	136
	ACWP	136	0	0	0	0	0	0	0	0	0	0	0	0	0	136
WBS[2] Totals:	BCWS	1,780	0	0	0	-12	0	0	0	0	0	0	0	0	0	1,768
	ACWP	1,768	0	0	0	0	0	0	0	0	0	0	0	0	0	1,768
3.3 MINOS Cavern																
3.3.0 Preconstruction Work	BCWS	758	0	0	0	0	0	0	0	0	0	0	0	0	0	758
	ACWP	758	0	0	0	0	0	0	0	0	0	0	0	0	0	758
3.3.1 Cavern Construction	BCWS	6,597	0	0	0	0	0	0	0	0	0	0	0	0	0	6,597
	ACWP	6,597	0	0	0	0	0	0	0	0	0	0	0	0	0	6,597
3.3.2 Cavern Outfitting	BCWS	7,171	0	0	0	0	0	0	0	0	0	0	0	0	0	7,171
	ACWP	7,171	0	0	0	0	0	0	0	0	0	0	0	0	0	7,171
WBS[2] Totals:	BCWS	14,527	0	0	0	0	0	0	0	0	0	0	0	0	0	14,527
	ACWP	14,527	0	0	0	0	0	0	0	0	0	0	0	0	0	14,527
3.4 Soudan/MINOS Operating																
3.4.1 UMN-Mine Crew Support/Soudan Gen'l Operations	BCWS	1,709	0	0	0	-178	0	0	0	0	0	0	0	0	0	1,531
	ACWP	1,531	0	0	0	0	0	0	0	0	0	0	0	0	0	1,531
3.4.2 UMN-Breitung Township Building Rental	BCWS	114	0	0	0	-39	0	0	0	0	0	0	0	0	0	75
	ACWP	75	0	0	0	0	0	0	0	0	0	0	0	0	0	75
3.4.3 UMN-E Peterson Salary	BCWS	73	0	0	0	-2	0	0	0	0	0	0	0	0	0	71
	ACWP	71	0	0	0	0	0	0	0	0	0	0	0	0	0	71
WBS[2] Totals:	BCWS	1,896	0	0	0	-219	0	0	0	0	0	0	0	0	0	1,677
	ACWP	1,677	0	0	0	0	0	0	0	0	0	0	0	0	0	1,677
Grand Totals:	BCWS	61,236	203	258	252	-485	41	117	263	219	107	143	123	63	59	62,599
	ACWP	59,651	114	550	262	193	302	561	0	0	0	0	0	0	0	61,634

NuMI Other Project Costs - US Funds - Labor Only

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		Cost Account Manager

DESCRIPTION		PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04	FY05	TOTAL
2.1 Magnets: Steel & Coils																
2.1.1 Steel Plane Fabrication	BCWS	130	0	0	0	0	0	0	0	0	0	0	0	0	0	130
	ACWP	171	0	0	0	0	0	0	0	0	0	0	0	0	0	171
2.1.2 Steel handling fixtures	BCWS	437	0	0	0	0	0	0	0	0	0	0	0	0	0	437
	ACWP	560	0	0	0	0	0	0	0	0	0	0	0	0	0	560
2.1.3 Near Detector Support Structures	BCWS	36	0	0	0	0	0	0	0	0	0	0	0	0	0	36
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1.4 Magnet Coil	BCWS	564	0	0	0	0	0	0	0	0	0	0	0	0	0	564
	ACWP	839	0	0	0	0	0	0	0	0	0	0	0	0	0	839
2.1.5 Detector Plane Prototypes	BCWS	355	0	0	0	0	0	0	0	0	0	0	0	0	0	355
	ACWP	375	0	0	0	0	0	0	0	0	0	0	0	0	0	375
2.1.6 Steel Management	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
WBS[2] Totals:	BCWS	1,521	0	0	0	0	0	0	0	0	0	0	0	0	0	1,522
	ACWP	1,946	0	0	0	0	0	0	0	0	0	0	0	0	0	1,946
2.2 Scintillator Detector Fabrication																
2.2.1 Scintillator Strips	BCWS	111	0	0	0	0	0	0	0	0	0	0	0	0	0	111
	ACWP	344	0	0	0	0	0	0	0	0	0	0	0	0	0	344
2.2.2 Fiber	BCWS	8	0	0	0	0	0	0	0	0	0	0	0	0	0	8
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.2.3 Scintillator Modules	BCWS	11	0	0	0	0	0	0	0	0	0	0	0	0	0	11
	ACWP	284	0	0	0	0	0	0	0	0	0	0	0	0	0	284
2.2.5 Mux Boxes & Connectors	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	37	0	0	0	0	0	0	0	0	0	0	0	0	0	37
2.2.6 Calibration Systems	BCWS	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.2.7 Ass'y & Test Equipment	BCWS	9	0	0	0	0	0	0	0	0	0	0	0	0	0	9
	ACWP	139	0	0	0	0	0	0	0	0	0	0	0	0	0	139
2.2.8 Factories	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.2.9 Scintillator Management	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WBS[2] Totals:	BCWS	144	0	0	0	0	0	0	0	0	0	0	0	0	0	144
	ACWP	805	0	0	0	0	0	0	0	0	0	0	0	0	0	805
2.3 Electronics, DAQ & Database																
2.3.1 Near Detector Front End	BCWS	356	15	13	15	15	13	1	0	0	0	0	0	0	0	428
	ACWP	652	15	13	11	7	20	28	0	0	0	0	0	0	0	746
2.3.2 Far Detector Front-end	BCWS	112	0	0	0	0	0	0	0	0	0	0	0	0	0	112
	ACWP	176	0	0	0	0	0	0	0	0	0	0	0	0	0	176
2.3.6 Auxilliary Systems	BCWS	97	0	0	0	0	0	0	0	0	0	0	0	0	0	102
	ACWP	166	1	0	0	0	0	0	0	0	0	0	0	0	0	168
2.3.7 Electronics Management	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NuMI Other Project Costs - US Funds - Labor Only

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Run Date: 04/14/04	Status Date: 3/31/2004	Functional Manager
		Cost Account Manager

DESCRIPTION		PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04	FY05	TOTAL
2.3.8 Slow Control & Monitoring	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.3.9 HV System	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WBS[2] Totals:	BCWS	566	16	14	16	15	14	1	0	0	0	0	0	0	0	643
	ACWP	993	16	14	11	7	20	28	0	0	0	0	0	0	0	1,089
2.4 Far Detector Installation																
2.4.1 FDI Completed Design Tasks	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.4.2 FDI Management	BCWS	89	0	0	0	0	0	0	0	0	0	0	0	0	0	89
	ACWP	47	0	0	0	0	0	0	0	0	0	0	0	0	0	47
2.4.4 FDI Soudan Lab Infrastructure Setup	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	7	0	0	0	0	0	0	0	0	0	0	0	0	0	7
2.4.7 FDI Alignment & Survey	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WBS[2] Totals:	BCWS	89	0	0	0	0	0	0	0	0	0	0	0	0	0	89
	ACWP	54	0	0	0	0	0	0	0	0	0	0	0	0	0	54
2.5 Near Detector Installation																
2.5.1 NDI Infrastructure	BCWS	158	1	17	4	1	3	63	62	35	3	26	17	0	0	389
	ACWP	101	17	12	7	-2	4	0	0	0	0	0	0	0	0	139
2.5.2 NDI Plane Assembly	BCWS	501	0	0	0	0	0	0	0	0	0	0	0	0	0	501
	ACWP	468	0	0	0	0	0	0	0	0	0	0	0	0	0	468
2.5.3 NDI Detector Installation	BCWS	3	0	0	0	0	3	17	176	162	86	99	88	46	22	703
	ACWP	11	0	10	8	15	34	59	0	0	0	0	0	0	0	136
2.5.4 NDI Facility Experimental Infrastructure	BCWS	15	0	0	0	0	0	10	8	5	0	0	0	0	0	37
	ACWP	17	0	1	5	6	4	8	0	0	0	0	0	0	0	41
2.5.5 RBI SB&O Experimental Systems Outfitting	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WBS[2] Totals:	BCWS	677	1	17	4	1	6	90	246	201	89	125	105	46	22	1,630
	ACWP	596	17	22	20	18	43	66	0	0	0	0	0	0	0	784
2.6 MINOS Project Management																
2.6.1 FNL-Project Management	BCWS	1,398	0	61	4	4	3	4	4	4	4	4	4	4	15	1,511
	ACWP	1,356	5	4	4	4	5	5	0	0	0	0	0	0	0	1,383
2.6.2 ANL-Project Management	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WBS[2] Totals:	BCWS	1,398	0	61	4	4	3	4	4	4	4	4	4	4	15	1,511
	ACWP	1,356	5	4	4	4	5	5	0	0	0	0	0	0	0	1,383
3.1 NuMI Conceptual Design																
3.1.1 FNL-BD-NuMI CDR	BCWS	99	0	0	0	0	0	0	0	0	0	0	0	0	0	99
	ACWP	99	0	0	0	0	0	0	0	0	0	0	0	0	0	99
3.1.2 FNL-BD-NuMI FESS CDR	BCWS	112	0	0	0	0	0	0	0	0	0	0	0	0	0	112
	ACWP	112	0	0	0	0	0	0	0	0	0	0	0	0	0	112
3.1.3 FNL-NuMI Beam Design	BCWS	530	0	0	0	0	0	0	0	0	0	0	0	0	0	530
	ACWP	529	0	0	0	0	0	0	0	0	0	0	0	0	0	529

NuMI Other Project Costs - US Funds - Labor Only

($000's Omitted)

Program:	Description:	Approval:
NUMIOPC	NuMI Other Proj Costs	Program Manager
Run Date: 04/14/04	Status Date: 3/31/2004	Functional Manager
		Cost Account Manager

DESCRIPTION		PR YRS	OCT03	NOV03	DEC03	JAN04	FEB04	MAR04	APR04	MAY04	JUN04	JUL04	AUG04	SEP04	FY05	TOTAL
3.1.4 FNL-BD-NuMI Project Management	BCWS	132	0	0	0	0	0	0	0	0	0	0	0	0	0	132
	ACWP	132	0	0	0	0	0	0	0	0	0	0	0	0	0	132
3.1.5 FNL-Soudan Lab Design	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WBS[2] Totals:	BCWS	872	0	0	0	0	0	0	0	0	0	0	0	0	0	872
	ACWP	872	0	0	0	0	0	0	0	0	0	0	0	0	0	872
3.2 MINOS Detector R&D																
3.2.1 FNL-MINOS Scintillator R&D	BCWS	7	0	0	0	0	0	0	0	0	0	0	0	0	0	7
	ACWP	6	0	0	0	0	0	0	0	0	0	0	0	0	0	6
3.2.2 FNL-MINOS Steel R&D	BCWS	46	0	0	0	0	0	0	0	0	0	0	0	0	0	46
	ACWP	46	0	0	0	0	0	0	0	0	0	0	0	0	0	46
3.2.3 FNL-RD-Neutrino Oscillation R&D	BCWS	9	0	0	0	0	0	0	0	0	0	0	0	0	0	9
	ACWP	9	0	0	0	0	0	0	0	0	0	0	0	0	0	9
WBS[2] Totals:	BCWS	62	0	0	0	0	0	0	0	0	0	0	0	0	0	62
	ACWP	62	0	0	0	0	0	0	0	0	0	0	0	0	0	62
3.4 Soudan/MINOS Operating																
3.4.1 UMN-Mine Crew Support/Soudan Gen'l Operations	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3.4.2 UMN-Breitung Township Building Rental	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WBS[2] Totals:	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Grand Totals:	BCWS	5,330	17	91	24	20	23	95	250	205	93	129	109	49	38	6,472
	ACWP	6,686	38	40	36	30	68	99	0	0	0	0	0	0	0	6,996

NuMI Project Obligations

$000's Omitted

WBS #	DESCRIPTION	Total Budget Feb-04	Amounts as of March 31, 2004 PTD Cost	PO Encumbrances	Requisition Encumbrances	PTD Obligations	Remaining Obligation Authority
1.1.1	Extraction & Primary Beam	5,258	5,188	358	6	5,552	(294)
1.1.2	Neutrino Beam Devices	10,388	10,030	233	79	10,343	45
1.1.3	Power Supply System	5,015	4,730	89	52	4,872	143
1.1.4	Hadron Decay & Absorber	1,434	839	177	19	1,035	400
1.1.5	Neutrino Beam Monitoring	481	418	58	0	476	6
1.1.6	Alignment Systems	308	199	0	0	199	108
1.1.7	Water, Vacuum & Gas Systems	2,535	1,747	62	20	1,829	706
1.1.8	Installation & Integration	2,865	1,696	42	0	1,739	1,126
1.1.9	Hadronic Hose	62	63	0	0	63	(1)
1.1	**Technical Component**	**28,346**	**24,910**	**1,020**	**176**	**26,107**	**2,238**
1.2.1	Facility Physics Design Phase	70	70	0	0	70	(0)
1.2.2	Facility Construction Title I Design Phase	1,438	1,437	0	0	1,437	1
1.2.3	Facility Construction Title II Design Phase	2,975	2,974	0	0	2,974	1
1.2.4	Facility Construction Phase	64,410	64,978	46	145	65,169	(759)
1.2	**Facility Construction**	**68,893**	**69,460**	**46**	**145**	**69,650**	**(757)**
1.3.1	FY98 Project Management	275	141	0	0	141	133
1.3.2	FY99 Project Management	560	661	0	0	661	(102)
1.3.3	FY00 Project Management	575	663	0	0	663	(88)
1.3.4	FY01 Project Management	688	423	0	0	423	265
1.3.5	FY02 Project Management	703	324	0	0	324	378
1.3.6	FY03 Project Management	541	421	0	0	421	120
1.3.7	FY04 Project Management	158	283	0	0	283	(124)
1.3.9	Unallocated Budget	922	0	0	0	0	922
1.3	**Project Managemen**	**4,422**	**2,916**	**0**	**0**	**2,916**	**1,506**
1	**NuMI TEC (Total Estimated Cost)**	**101,661**	**97,286**	**1,066**	**321**	**98,674**	**2,987**
2.1.1	MINOS-Steel Plane Fabrication	4,601	4,601	0	0	4,601	0
2.1.2	MINOS-Steel Handling Fixtures	793	793	0	0	793	0
2.1.3	MINOS Near Detector Support Structures	1	1	0	0	1	0
2.1.4	MINOS Magnet Coil	1,673	1,672	1	0	1,673	0
2.1.5	MINOS Detector Plane Prototypes	496	496	0	0	496	0

NuMI Project Obligations

$000's Omitted

WBS #	DESCRIPTION	Total Budget Feb-04	Amounts as of March 31, 2004 PTD Cost	PO Encumbrances	Requisition Encumbrances	PTD Obligations	Remaining Obligation Authority
2.1.6	MINOS Steel Management	58	58	0	0	58	0
2.1	**MINOS-Magnets: Steel & Coil**	**7,622**	**7,621**	**1**	**0**	**7,622**	**0**
2.2.1	MINOS Scintillator Strips	2,972	2,972	0	0	2,972	0
2.2.2	MINOS Fiber	3,961	3,961	0	0	3,961	0
2.2.3	MINOS Scintillator Modules	1,982	1,982	0	0	1,982	0
2.2.4	MINOS Photodetector Systems	1,702	1,702	0	0	1,702	0
2.2.5	MINOS Mux Boxes & Connectors	1,093	1,093	0	0	1,093	0
2.2.6	MINOS Calibration Systems	0	0	0	0	0	0
2.2.7	MINOS Ass'y & Test Equipment	1,721	1,721	0	0	1,721	0
2.2.8	MINOS Factories	3,279	3,279	0	0	3,279	0
2.2.9	MINOS Scintillator Management	379	379	0	0	379	0
2.2	**MINOS-Scintillator Detector Fabricatio**	**17,089**	**17,089**	**0**	**0**	**17,089**	**0**
2.3.1	MINOS Near Detector Front-end	4,480	4,447	33	0	4,480	0
2.3.2	MINOS Far Detector Front-end	1,196	1,196	0	0	1,196	0
2.3.3	MINOS Data Routing & Trigger Farm	0	0	0	0	0	0
2.3.4	MINOS Data Acquisition & Triggering	0	0	0	0	0	0
2.3.5	MINOS Database	10	10	0	0	10	0
2.3.6	MINOS Auxiliary Systems	249	249	0	0	249	0
2.3.7	MINOS Electronics Management	218	218	0	0	218	0
2.3.8	MINOS Slow Control & Monitoring	460	375	86	0	460	0
2.3.9	MINOS HV System	77	77	0	0	77	0
2.3	**MINOS-Electronics: DAQ & Databas**	**6,690**	**6,572**	**119**	**0**	**6,690**	**0**
2.4.1	MINOS FDI Completed Design Tasks	0	0	0	0	0	0
2.4.2	MINOS FDI Minecrew Management	584	584	0	0	584	0
2.4.3	MINOS FDI MINOS Construction Oversight	115	115	0	0	115	0
2.4.4	MINOS FDI Soudan Lab Infrastructure Setup	473	473	0	0	473	0
2.4.5	MINOS FDI Detector Installation	2,959	2,959	0	0	2,959	0
2.4.6	MINOS FDI DNR Costs	378	378	0	0	378	0
2.4.7	MINOS FDI Alignment & Survey	67	67	0	0	67	0
2.4	**MINOS Far Detector Installation (FDI**	**4,577**	**4,576**	**0**	**0**	**4,577**	**0**
2.5.1	MINOS NDI Infrastructure	365	296	69	0	365	0

NuMI Project Obligations

$000's Omitted

WBS #	DESCRIPTION	Total Budget Feb-04	Amounts as of March 31, 2004 PTD Cost	PO Encumbrances	Requisition Encumbrances	PTD Obligations	Remaining Obligation Authority
2.5.2	MINOS NDI Plane Assembly	514	514	0	0	514	0
2.5.3	MINOS NDI Detector Installation	315	314	1	0	315	0
2.5.4	MINOS NDI Facility Experimental Infrastructure	247	177	69	0	247	0
2.5.5	MINOS NDI SB&O Experimental Systems Outfitting	2,944	2,944	0	0	2,944	0
2.5	**MINOS Near Detector Installation (NDI**	**4,385**	**4,245**	**140**	**0**	**4,385**	**0**
2.6.1	MINOS FNL Project Management	1,532	1,532	0	0	1,532	0
2.6.2	MINOS ANL Project Management	98	98	0	0	98	0
2.6	**MINOS Project Managemen**	**1,630**	**1,630**	**0**	**0**	**1,630**	**0**
2	**MINOS Detector**	**41,993**	**41,734**	**260**	**0**	**41,993**	**0**
3.1.1	NuMI CDR	487	487	0	0	487	0
3.1.2	NuMI FESS CDR	346	346	0	0	346	0
3.1.3	Beam Design	796	796	0	0	796	0
3.1.4	Project Management	234	234	0	0	234	0
3.1.5	Soudan Lab Design	65	65	0	0	65	0
3.1	**NuMI Conceptual Desig**	**1,928**	**1,928**	**0**	**0**	**1,928**	**0**
3.2.1	MINOS Scintillator R&D	988	988	0	0	988	0
3.2.2	MINOS Steel R&D	644	644	0	0	644	0
3.2.3	Neutrino Oscillation R&D	136	136	0	0	136	0
3.2	**MINOS Detector R&D**	**1,768**	**1,768**	**0**	**0**	**1,768**	**0**
3.3	**MINOS Cavern**	**10,769**	**0**	**10,769**	**0**	**10,769**	**0**
3.4.1	Mine Crew Support/Soudan Gen'l Operations	1,531	1,531	0	0	1,531	0
3.4.2	Breitung Township Building Rental	75	75	0	0	75	0
3.4.3	E Peterson Salary	71	71	0	0	71	0
3.4	**Soudan/MINOS Operating**	**1,677**	**1,677**	**0**	**0**	**1,677**	**0**
3	**Project Support**	**16,142**	**5,373**	**10,769**	**0**	**16,142**	**0**
	Total Other Project Costs (OPC's	**58,136**	**47,107**	**11,029**	**0**	**58,136**	**0**

NuMI Project Obligations

$000's Omitted

WBS #	DESCRIPTION	Total Budget Feb-04	Amounts as of March 31, 2004 PTD Cost	PO Encumbrances	Requisition Encumbrances	PTD Obligations	Remaining Obligation Authority
	NuMI TPC (Total Project Cost)	**159,796**	**144,393**	**12,095**	**321**	**156,809**	**2,987**