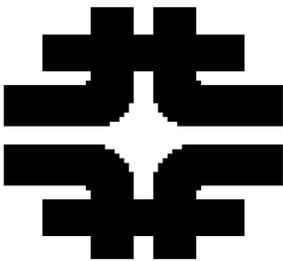


Project Execution Plan

Rev. 1

February 2003



MI-31

BEAMS DIVISION
FERMI NATIONAL ACCELERATOR LABORATORY

SECTION 1	PROJECT OBJECTIVES
SECTION 2	PROJECT SCOPE
SECTION 3	PROJECT ORGANIZATION STRUCTURE DOE Management Fermilab Management ES&H Management
SECTION 4	RESOURCE REQUIREMENTS
SECTION 5	PROJECT BASELINE WBS Breakdown Structure and Dictionary Baseline Project Costs Escalation Baseline Project Schedule and Milestones
SECTION 6	ACQUISITION EXECUTION PLAN
SECTION 7	PROJECT CONTROLS Cost Control Schedule Control Change Control Procedures and Authorities
SECTION 8	DESIGN AND CONSTRUCTION PRINCIPALS Integrated Safety Management Quality Assurance Sustainable Building Design Reliability and Maintainability Value Engineering Risk Management Design Reviews
SECTION 9	REPORTING
APPENDIX	DETAILED CONSTRUCTION SCHEDULE RESPONSIBILITIES MATRIX

PROJECT OBJECTIVES**Introduction**

The Project Execution Plan (PEP) describes the management, control systems and procedures used by Fermi National Accelerator Laboratory (Fermilab) to meet the technical, cost, and schedule objectives of the MI-31 building (MI-31). This controlling document establishes the basis against which progress will be measured. The PEP has been prepared in accordance with Fermilab Project Control System Guidelines.

The PEP is to be viewed as a “living document,” and as such, will be revised when necessary. The MI-31 Project Manager is authorized to approve non-substantive changes to the PEP, e.g. name changes to the positions sited in the PEP, but will inform the DOE Project Manager via e-mail of such changes. Baseline changes will require approval by the Department of Energy’s (DOE) Fermi Area Office.

Project Justification

The MI-31 building project is comprised of the construction of a new 4,000 square foot building to the south of the existing MI-30 service building in the Main Injector complex. This new facility will be a multipurpose facility, the first use of which is planned to be the housing of the existing electron cooling equipment necessary to increase the luminosity of the antiprotons within the recycler magnet string that is housed within the Main Injector. This project is thus a unique effort in support of Fermilab’s mission meeting the project definition contained in DOE Order 423.3.

The new structure will consist of a high bay area, a control room and a tunnel, connecting the lower level of the high bay to the MI/Recycler tunnel. This project also includes the installation of steel shielding blocks in the connecting tunnel so as to allow personnel to occupy the MI-31 enclosure while the Main Injector complex is operating.

The first use of the MI-31 building is planned to be the housing of the existing equipment for the electron cooling project. The required equipment consists of a 5 MeV electron accelerator (Pelletron), beamlines, an outside SF₆ gas storage tank, and various other components needed to deliver the electron beam to the MI/Recycler tunnel and to return it back to the Pelletron for energy recovery.

PROJECT SCOPE

The MI-31 building project involves the construction of a 4000 square foot industrial building required to house future experimental related equipment. The planned initial use is the housing of the existing experimental equipment called the Pelletron, including a vertical pressure vessel that requires vacuum piping access to the Main Injector (MI) enclosure located some 30 feet east of the MI-31 building. The design team works closely with Fermilab radiation safety and beams personnel to determine all required radiation safety requirements.

The pressure vessel is housed in a 2300 square foot 28' deep pit area. The cast in place structural concrete pit area includes appurtenances such as a connecting enclosure to the MI enclosure, a hydraulic equipment lift, necessary building and electric power distribution, a water chiller, and a stairway (egress to the grade level floors above). The connecting enclosure is required to initially install vacuum pipe and conventional magnets from the Pelletron to the Recycler magnets in the MI enclosure. This 6' wide by 8' high enclosure will be partially filled with shielding steel after this initial piping installation. Personnel access will not be possible between the MI-31 building and the MI enclosure after completion of construction. A hydraulic lift will allow personnel to transfer light and or delicate equipment from the upper level to the lower level safely. Personnel access from the upper areas of MI-31 to the pit area will be via a 2-hour rated stairway along the east side of the building. Elevated walkways will be provided around 3 sides of the perimeter of the pit area at grade level. Temporary earth retention walls will be required to construct a portion of the below grade walls adjacent to the MI in order to maintain the required radiation shielding during construction. With the help of Beams division radiation safety personnel, the design team has determined that 18.5 feet of earth shielding will be required in this area during construction. With this amount of earth shielding, radiation loss monitors located at critical locations in the excavation will be required.

The above grade portion of this project involves primarily a 30' high industrial type metal building similar to many of the existing MI service buildings. A structural steel frame will carry lateral and gravity forces to a cast in place structural concrete foundation. Much of the above mentioned pit structural concrete will act as foundation for this building.

The building is comprised of two major areas. The first is the highbay truckdock/pit area (3150 sf). This area houses all open type experimental areas needed to house and commission the equipment. Lightly reinforced cast in place concrete walls (8' in height) will form the perimeter of this area and serve as shielding from the xrays emitted by the equipment. A 15-ton overhead crane serves this area. One overhead door is required adjacent to the truck dock on the west wall. High bay metal halide lighting, convenience

PROJECT SCOPE

outlets and welding outlets are included in this area as required. Access to this area will not be allowed during operation of the machine due to radiation conditions. All doors will be outfitted with interlocks and radiation monitors, as required.

The second area located immediately south of the truck bay area is the control room (850 sf). This area houses control equipment and personnel as required during commissioning. Once commissioned, the experimental equipment will be operated remotely by the main site control room. This room will be able to be occupied during operations. Finish will include siding liner panels, aluminum framed windows, painted floor, suspended ceiling, fluorescent lighting, a restroom, and convenience outlets.

Heating ventilation and air conditioning will be provided via three wall mounted heating and air conditioning units similar to the adjacent MI service building. Two wall mounted units will be tributary to the truck dock/ pit area and one will be tributary to the control room. Additional ventilation fans will be installed as required to provide two air exchanges per hour in case a loss of insulating gas within the vertical pressure vessel occurs.

Utilities are primarily provided from the adjacent MI-30 Service Building. However, domestic water will be trenched approximately 5000' from MI-8 Service Building to serve the restroom. The sanitary sewer will discharge to a holding tank. LCW and ICW will be provided from MI-30 Service Building. Electrical service will begin at an open bay of the existing 4-bay air switch adjacent to MI-30. 13.8 KV feeder will pass through the existing and new duct banks to the south side of the proposed building where a new 500 KVA transformer will be located. From the new transformer, 480v power will be fed to the building and separated into two 400 amp distribution panel boards. The two panel boards will distribute to smaller panels for equipment and building power.

PROJECT ORGANIZATION STRUCTURE**DOE Management**

The Department of Energy provides funding for this project through the Fermilab annual budget process. The Manager of the Chicago Field Office (CH) has been delegated the authority and responsibility for field oversight of the project. This includes line management authority, responsibility and accountability for overall project implementation and contract administration. Specific responsibilities of CH include support to the Fermi Area Office in the following areas:

- Quality Assurance
- Implementation of ES&H
- Project Management Systems
- Design Review
- Legal

The Fermi Area Office administers the M&O contract with URA for operations of Fermilab and exercises oversight of Fermilab. The Fermi Area Office Manager, Ms. Jane Monhart, has been delegated responsibility and authority for execution of the project. The specific responsibilities of the Fermi Area Office manager are:

- Supervision of DOE Project Manager and Fermi Area Office staff
- Review of and concurrence with this PEP
- Review and approval of documents as required by federal regulations or departmental orders or notices
- Approval of Fermilab subcontract actions, within the authority delegated to Fermi Area Office
- Financial management functions as delegated by CH

Funds will be made available to DOE for the project on an annual basis following passage of legislation in the U.S. Congress. The Fermi Area Office will make funds available to Fermilab for the project based on the existing directive system.

The Fermi Area Office Manager has delegated authority and responsibility for management and direction of the project to the DOE Project Manager, Mr. Paul Philp. The specific responsibilities of the DOE Project Manager include:

- Review and approval of this PEP and changes thereto
- Measurement of performance against established goals including technical performance, cost levels, and schedule milestones
- Making any necessary changes or corrective actions within the appropriate thresholds established in this PEP
- Overseeing Fermilab's management of construction activities
- Monitoring project progress via reports prepared by the Project Manager

PROJECT ORGANIZATION STRUCTURE

- Controlling the project contingency funds and authorizing its use within the levels established within this PEP
- Coordinating the approval by the Fermi Area Office Manager, the construction project directives and modifications thereto

The DOE has delegated the responsibility for design and construction of this project to Fermilab.

Fermilab Management

Fermilab through Beams Division Management has designated Mr. Sergei Nagaitsev Project Manager and Mr. Jerry Leibfritz Deputy Project Manager. Design, construction management, cost and schedule for this project are the responsibility of the Facilities Engineering Services Section (FESS). The project management team structure shown in Figure 1 identifies the organizational structure which will be responsible for design, procurement and construction of the Project. As with all activities at Fermilab, the Directorate is at the highest level of responsibility.

FESS, headed by David Nevin, will manage the engineering, and civil construction associated with this project, as well as accept line management responsibility for safety. This effort will be accomplished using the resources of the FESS Engineering Group, led by manager Ed Crumpley. The Project Manager shall assure proper attention to the coordination and timely completion of the project.

Jeff Sims, of FESS/Engineering, will serve as Project Coordinator and Construction Manager for this project. The Project Coordinator/ Construction Manager will utilize the resources of the Engineering Group as appropriate for design, construction phase support, and construction coordination. Portions of the civil design will be subcontracted to an Architectural/Engineering firm. Coordination of design team efforts will be handled by the Task Coordinator, Paul Lahn. A summary of each project member's functions and responsibilities is provided in the attached responsibilities matrix.

The Business Services Section (BSS), headed by Dave Carlson, has the responsibility for contract administration, providing budget status and contract/requisition information.

PROJECT ORGANIZATION STRUCTURE**ES&H Management**

The ES&H Section, headed by Bill Griffing, with Mary Logue as Associate Head of the Health & Safety Group, has the responsibility for providing safety coordination support and oversight of safety throughout the project. As with all Fermilab projects, attention to ES&H concerns will be part of project management and safety will be incorporated into all processes. Line management for safety on this project will be the responsibility of FESS.

Section
3

The ability to perform the construction work safely will be designed into the project. Construction documents (drawings and specifications) will be reviewed as the documents are developed, by Fermilab engineering, construction, and safety professionals to ensure ES&H concerns are addressed. Project specific safety and health requirements for construction will be outlined in the construction documents.

Job coordination during construction will be accomplished through the Fermilab Construction Coordinator (FCC), a member of FESS/Engineering, who shall be responsible for daily monitoring of all work at the site, including the ES&H program. The Construction Manager shall be the first line of contact with the Construction Subcontractor's organization. The FCC reports to the Construction Manager for this project and is the designated Fermilab "Competent Person" as defined by OSHA 1926. The Subcontractors will be prequalified for bidding by submitting specific information about their safety and health program with the bids. During construction the Subcontractors will use Project Hazard Analyzes (PHA) to plan the work and mitigate hazards. The FCC will audit the Subcontractor's compliance with the PHA's and with their overall Safety Plan. The Fermilab ES&H Section will support the FCC with safety personnel during construction.

The Project Manager, Construction Manager, Project Engineer, and Task Coordinator will be largely responsible for coordination during design and construction. The details of the responsibilities of these individuals have been identified and are given in a Responsibilities matrix attached in the appendix of this document.

PROJECT ORGANIZATION STRUCTURE

MI-31 Design/Procurement/Construction Organization

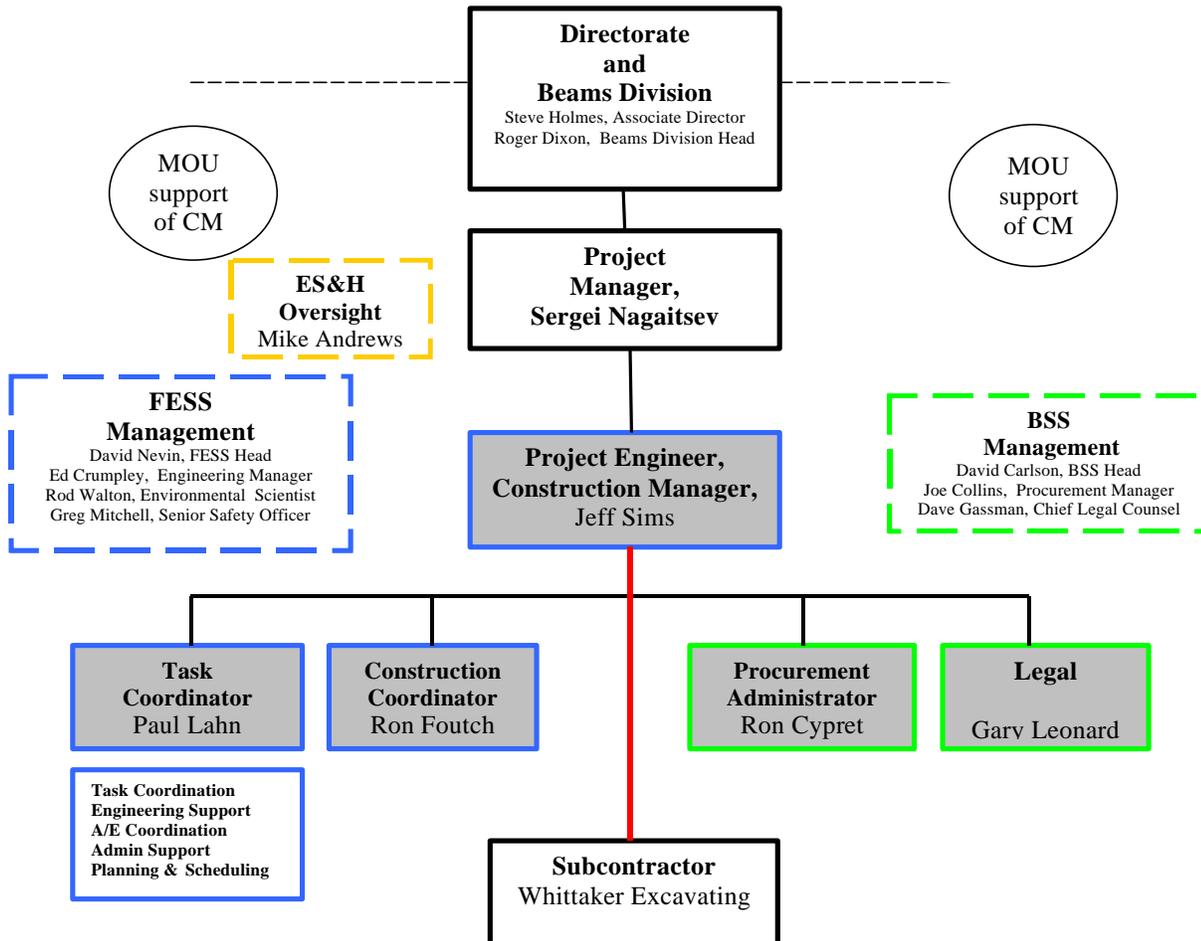


Figure 1 –Organizational Chart

Note: MOU indicates a memorandum of understanding of responsibilities of individuals and groups supporting the CMO. **Subcontractor, Construction Coordinator, Procurement Administrator, Legal, and Beams Division Head names have been updated above**

RESOURCE REQUIREMENTS**Funding**

This project is an Accelerator Improvement Project (AIP) with a Total Project Cost (TPC) of \$3.8 million.

Personnel

Divisions and sections will be responsible for assigning the responsibilities of individuals within the design and construction organization as indicated in Figure 1 of Section 3. In addition, Fermilab will provide the personnel required to adequately review and oversee design and construction phases.

Design reviews will occur at varying levels throughout Title II. All Divisions and Sections are aware of the design review process and will assign appropriate personnel to complete the reviews for conformance and compliance.

Divisions and Sections will provide required personnel to coordinate construction phase activities that directly affect them. For example, Beams Division will provide personnel to coordinate Main Injector related activities with the Construction Manager and Construction Coordinator.

PROJECT BASELINE

The Project Baseline identifies the basis for evaluating project performance. The components are the Work Breakdown Structure, which identifies each component of the project, the Baseline Costs, Escalation Rates, and Baseline Schedule and Milestones.

WORK BREAKDOWN STRUCTURE (WBS) DICTIONARY

Items covered under Other Project Costs are noted as such.

1.0 MI-31 Electron Cooling Building Project**1.1 General Construction**

- 1.1.1 Construction**
Construction of MI-31
- 1.1.2 Construction Contingency**
- 1.1.3 Construction G&A**
- 1.1.4 Escalation**

1.2 Project Support

- 1.2.1 Project Engineering**
Work by consultant for design of building,
design and coordination work by FESS/Eng during T2 and
Construction Management and Inspection during T3.
- 1.2.2 Project Support Contingency**
- 1.2.3 Project Support G&A**
- 1.2.4 Escalation**

PROJECT BASELINE

BASELINE PROJECT COSTS

		ORIGINAL BASELINE PROJECT COSTS (2001 dollars)	Cost Restructure 2/03	
1.1	General Construction	\$3,047,000	\$3,130,948	
1.1.1	Construction W / 18% OHP	\$2,323,000	\$2,654,817	
1.1.2	Construction Contingency 22%	\$511,000	\$373,904	14%
1.1.3	Construction G&A	\$83,000	\$102,227	
1.1.4	Escalation (4.6%) 4.6%	\$130,000	\$0	
1.2	Project Support	\$763,000	\$679,031	
1.2.1	Project Engineering	\$465,000	\$461,687	
1.2.2	Project Support Contingency 21%	\$99,000	\$87,653	19%
1.2.3	Project Support G&A	\$166,000	\$129,691	
1.2.4	Escalation (4.6%)	\$33,000	\$0	
Total Project Cost		\$3,810,000	\$3,810,000	

Section
5

ESCALATION

Escalated to the mid point of construction (1st quarter of FY04) per the DOE published escalation rates from January 2002 (4.6%) were originally included in 1.1.4 and 1.2.4. Escalation was moved to 1.1.1 and 1.2.1 in February of 03

BASELINE PROJECT SCHEDULE AND MILESTONES

The baseline schedule shown below sets forth the major activities and milestones essential for the completion of the project.

The milestones are defined as:

MILESTONE	DEFINITION	BASELINE
Start Project	Directive signed	30 May 02
T2 Design Complete	Contract documents submitted for procurement	15 Jan 03
Begin Construction	Notice To Proceed Issued	27 Jun 03
Construction Complete	Final acceptance of all work	9 Jun 04
Project Complete	Project closed	30 Nov 04

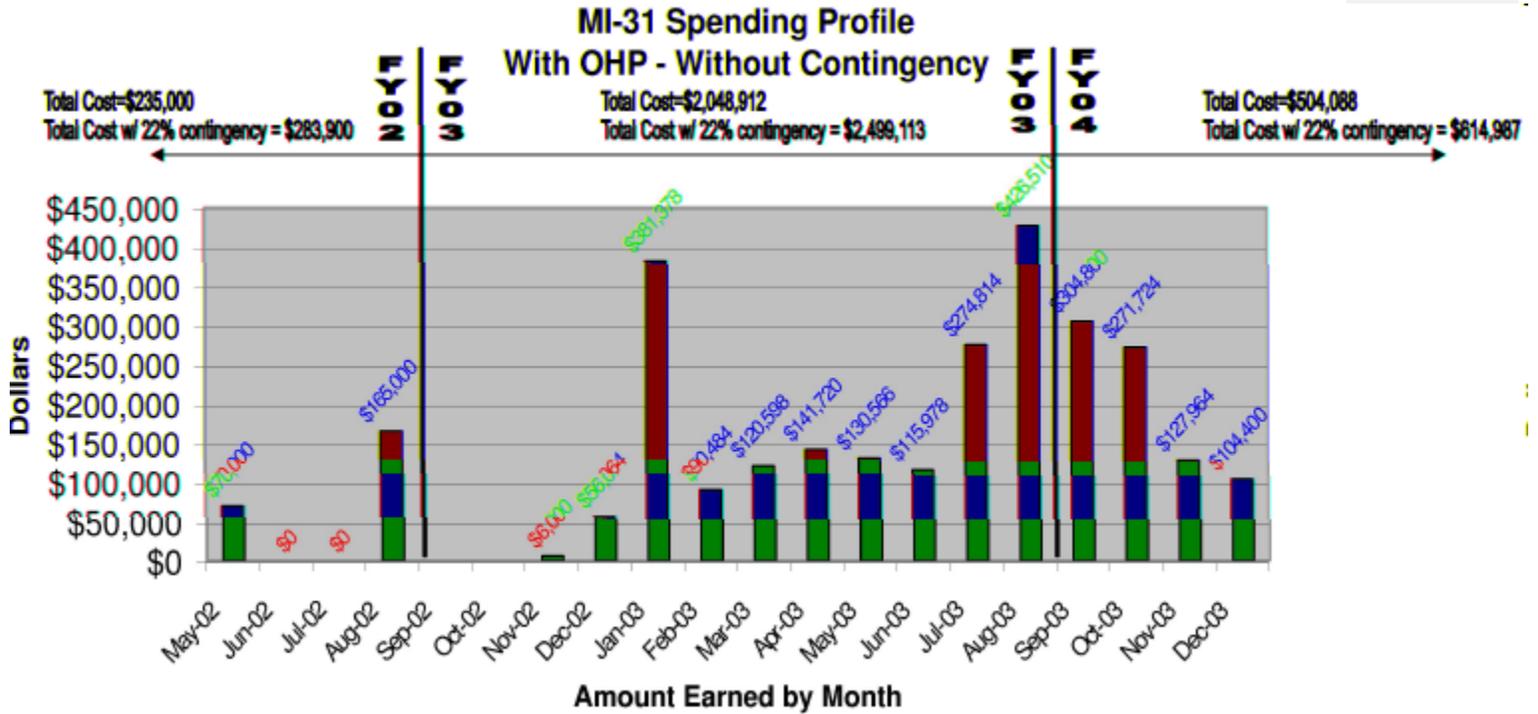
The detailed MS Project schedule contained in the Appendix provides a more detailed **anticipated** construction schedule with specific activities. The Critical Path is indicated in red. **The actual construction schedule for WBS 1.1 will be based on the Subcontractors schedule.**

PROJECT BASELINE

Cost and Funding Summary	
a. Construction Costs	\$1,968,300
b. Estimated Overhead and Profit @ 18% of above cost	\$354,300
<hr/>	
SUBTOTAL (expected contractor bid)	\$2,323,000
c. EDIA (@ 20%) of above costs	\$465,000
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SUBTOTAL	\$2,788,000
d. Contingency @ 22% of above costs	\$610,000
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SUBTOTAL	\$3,398,000
e. G&A	\$249,000
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SUBTOTAL	\$3,647,000
f. Escalation	\$163,000
TOTAL PROJECT COST	\$3,810,000

PROJECT BASELINE

ANTICIPATED SPENDING PROFILE WITH OVERHEAD AND PROFIT



Anticipated Total Costs by Fiscal Year:

	Cost with Contingency	G&A	Escalation	Total
FY02 =	\$284,000	\$83,000	\$0	\$367,000
FY03 =	\$2,499,000	\$134,000	\$133,000	\$2,766,000
FY04 =	\$615,000	\$32,000	\$30,000	<u>\$677,000</u>
				\$3,810,000

Note: The above spending distribution is approximate and is presented to anticipate funding requirements. The actual spending for WBS 1.1 will be based on the Subcontractors schedule. See monthly reports for actual spending distribution.

ACQUISITION EXECUTION PLAN

The project management, construction management, design, construction and inspection for this project is being performed in compliance with the applicable DOE Orders and Laboratory Policy and Procedures and in accordance with the Work Breakdown Structure.

Design

Title I including advanced conceptual design was performed during FY01 and FY02 to verify design concepts and further refine costs and schedule.

The development of working drawings and bid packages will be accomplished by use of an Architectural-Engineering (A/E) firm in conjunction with the FESS/Engineering Project Team during Title II. The selection of the A/E firm was based on qualifications and past performance on similar FESS projects. The selected A/E firm is Hanson Professional Services Inc. The existing professional services contract with Hanson will be tasked to accomplish this work. Hanson Will be retained during Title III for engineering support of shop drawing reviews and field changes.

Construction

The FESS/Engineering group will function as the construction manager for the construction projects, coordinating the subcontractor's construction contract. Field inspection, environment, safety and health, and quality control of construction activity will be the responsibility of the subcontractor. Fermilab FESS/Engineering will provide quality and safety assurance during construction.

Contract Packages

Construction work for the MI-31 Project will be accomplished by means of one Civil Construction package and two Time and Material (T&M) contracts. The Civil Construction package will be a competitively bid, lump sum contract. The T& M Contracts will include cable pulling and placing of steel shielding. Both of these activities are somewhat specialized and fit better with our standard T&M contractor qualifications.

Possible Sources for the Civil Construction

Fermilab has access to several Subcontractors that have sufficient qualifications to execute this Subcontract. This contract includes many of the elements of construction previously experienced at the recently constructed MI-12 (Mini BoONE Target Hall), MI Service Buildings and C0 Service Building. Multiple proposals were received for all of these contracts.

Performance Based Incentive Process

The subcontractor will be paid only when definitive milestones are met. These Milestone based payments will provide the subcontractor incentive to keep the

ACQUISITION EXECUTION PLAN

project on schedule. In addition, we anticipate reducing retention from 10% to as little as 2% during the subcontract if the subcontractor maintains a safe environment and meets milestones.

Methods of Competition

Through the Request for Proposal (RFP) process we will solicit proposals from area Subcontractors with the appropriate safety records and experience to accomplish this work.

Source Selection Process

We will establish a Source Evaluation Team (SET) including the Project Manager, Construction Manager, and Procurement Officer to evaluate and select a Subcontractor for the Civil Construction Package. Evaluation criteria will be included in the RFP documents as a basis for the SET evaluation of proposals.

Justification for Non-competitive Acquisitions

The only anticipated non-competitive acquisitions will include T&M contracts for cable pulling and shielding steel placement. Due to the nature of required training and inter-laboratory coordination we feel it is essential to perform this work with our T&M Subcontractor.

Milestones for Acquisition

We will establish up to eight (8) construction milestones for inclusion into the subcontract documents. Progress payment by milestone will provide the subcontractor with additional incentive to maintain the project schedule.

PROJECT CONTROLS**Cost Control**

A separate cost account will be maintained for the following elements listed in the project WBS: Construction, and Engineering & Construction Management. The baseline budget for each element will be shown on all reports. Costs accrued by these accounts will be reported monthly on a report issued by the Business Section. The report will be reviewed by the Project Manager. The Project Manager will verify the validity of all cost charges during the reporting period, that commitments are correct and that projections of costs can be covered by the baseline budget for each work element.

The Project Manager has the responsibility for the use and commitment of project funds. Any costs or commitments that are made without his signed approval or that of higher Laboratory management may be rejected. Progress payments to the Architect/Engineer, suppliers, and subcontractors will be made upon receipt and approval of acceptable invoices by the Project Manager, nominally on a monthly basis.

The Project Manager, within his authorized limits, will be responsible for the administration of the project's contingency funds as they are released by the DOE Fermi Area Office. The project contingency is included as a work breakdown structure element to provide the necessary financial information to the Project Manager for traceability of contingency use.

Management Reserve (defined as monies returned to the project as funds are decommitted) will be identified in monthly reports by the Project Manager as tasks are closed. These funds may be used by the Project Manager at his discretion, and do not need to be requested for use unless it involves changes to scope or schedule. DOE will be notified when Management Reserve is going to be used.

The Cost Plan, depicted in Section 5, is based on the current DOE funding profile. This plan reflects the best estimate of funding levels and the baseline schedule. The Cost Plan establishes the planned rate of accrued costs for the life of the project. As a minimum it will be updated once a year, one month following the end of the fiscal year. The Project Manager is responsible for updating, as needed, the project Estimate at Completion (EAC) for each work element to reflect changes in design and construction, and for overall project fiscal management.

Schedule Control

MI-31 Baseline Schedule, shown in Section 5 of this report, depicts the milestones and their expected achievement dates. As the project develops,

PROJECT CONTROLS

the schedule will be further refined. The Project Manager shall have the responsibility to monitor and control these tasks within the baseline. The baseline may be revised with DOE Fermi Area Office concurrence.

The Project Team will review work progress with the subcontractor at regular intervals. Any identified difficulties will require the subcontractor to provide a plan for their resolution. Significant schedule slippage will be cause for expediting actions by Business Services at the request of the Project Manager.

Change Control Procedures and Authorities

Change to the project baseline can occur to the scope, cost, or schedule aspects of the project. Changes at WBS Level 1 and below will be made with the approval of the Project Manager for cost changes up to \$25,000 and schedule changes up to 3 months. Cost and schedule changes above these amounts and changes to the scope of the project as outlined in the CDR will require the approvals of the Change Control Board. Any change to the Total Project Cost will require the approval of the Change Control Board and DOE Fermi Area Office. Project change control will be accomplished in accordance with practices listed below.

Change Control Procedures		
Change	Approval Required	Change Request Form
Normal Field Changes no added cost or time	Project Coordinator and Construction Manager	None
In scope \leq \$25k or \leq 3 mos. schedule change	Project Manager And Construction Manager	None
In scope $>$ \$25k or $>$ 3 mos. schedule change	Control Board	Required
Total Project Cost	Control Board DOE Fermilab Directorate	Required
Non-Emergency Required for ES&H regulations	Control Board	Required
Change to Project Scope or Schedule	Control Board DOE Fermilab Director	Required

PROJECT CONTROLS

The MI-31 Change Control Board (Control Board) will be comprised of the following named individuals or the designees:

DOE Fermi Area Office	Paul Philp (non-voting)
Fermilab Directorate	Jed Brown
Fermilab FESS	David Nevin
Fermilab FESS/Eng	Ed Crumpley
Fermilab Business Service Section	David Carlson
Project Manager, Chair	Sergei Nagaitsev
Deputy Project Manager	Jerry Leibfritz
Project Engineer/ Construction Manager	Jeff Sims

The Project Manager will act as Chair to the Control Board. The Control Board will consider the change requests promptly and, in cases not requiring additional information or discussion, will respond within two weeks.

Design and Construction Principals**Integrated Safety Management (ISM)**

Fermilab subscribes to the philosophy of Integrated Safety Management (ISM), in accordance with Department of Energy Order 413.3 "Program and Project Management for the Acquisition of Capital Assets." Fermilab requires its subcontractors and sub-tier subcontractors to do the same. ISM is a system for performing work safely and in an environmentally responsible manner. The term "integrated" is used to indicate that the Environment, Safety & Health (ES&H) management systems are normal and natural elements of doing work. The intent is to integrate the management of ES&H with the management of the other primary elements of construction: quality, cost, and schedule.

The subcontractors shall submit proof of an effective integrated safety management program. The program must be described in the terms listed below.

- Line Management Responsibility for Safety
- Clear Roles and Responsibilities
- Competence Commensurate with Responsibility
- Balanced Priorities
- Identification of Safety Standards and Requirements
- Hazard Controls Tailored to Work Being Performed
- Operations Authorization

Quality Assurance

All aspects of this project will be periodically reviewed with regard to Quality Assurance issues from Conceptual Design through Title III completion. This review process will be completed in accordance with the applicable portions of the Director's Policy Manual, Section 10. The following elements will be included in the design and construction effort:

- An identification of staff assigned to this project with clear definition of responsibility levels and limit of authority as well as delineated lines of communication for exchange of information

Design and Construction Principals

- Requirements for control of design criteria and criteria changes and recording of standards and codes used in the development of the criteria
- Periodic review of design process, drawings and specification to insure compliance with accepted design criteria
- Identification of underground utilities and facility interface points prior to the commencement of any construction in affected areas
- Conformance to procedures regarding project updating and compliance with the approved construction schedule
- Conformance to procedures regarding the review and approval of shop drawings, samples test results and other required submittals
- Conformance to procedures for site inspection by Fermilab personnel to record construction progress and adherence to the approved contract documents
- Verification of project completion, satisfactory system start-up and final project acceptance

Sustainable Building Design

The project process and each project element are evaluated to reduce their impact on our natural resources without sacrificing the program. Fermilab designs will incorporate maintainability, aesthetics, environmental justice and program requirements to deliver a well balanced project. Internal and external reviews of design and construction provide a check and balance system for environmental, aesthetic and maintenance issues.

Reliability and Maintainability

Both reliability and future maintenance are considered in the design of all components of Fermilab buildings. Building equipment and appurtenances are selected and located during the design process to provide adequate design life, accessibility, and minimal maintenance.

Design and Construction Principals**Value Engineering**

We do not anticipate performing a detailed value engineering exercise on this design. However, internal reviews of designs at various levels of completion will be performed by the most experienced individuals at Fermilab in hopes that more cost effective solutions will be discovered.

Risk Management

The majority of the risk management on this project involves the coordinated activities affecting the Main Injector. Sufficient schedule float is currently anticipated for the activities related to constructing the MI connecting tunnel. A temporary earth retention wall has been included to isolate the MI beamline activities from that of the MI-31 construction.

Design Reviews

Internal design reviews are performed at approximately 50% completion and 100% completion. Designs are checked for conformance to project requirements at each review.

On May 8, 2002 the project underwent a detailed Director's review. All aspects of scope, cost and schedule were reviewed. All recommendations were incorporated at that time.

REPORTING

The objective of the reporting and review activity is to provide the assemblage and integration of project related cost data, schedule status and performance progress into reports for the monitoring and management of the project.

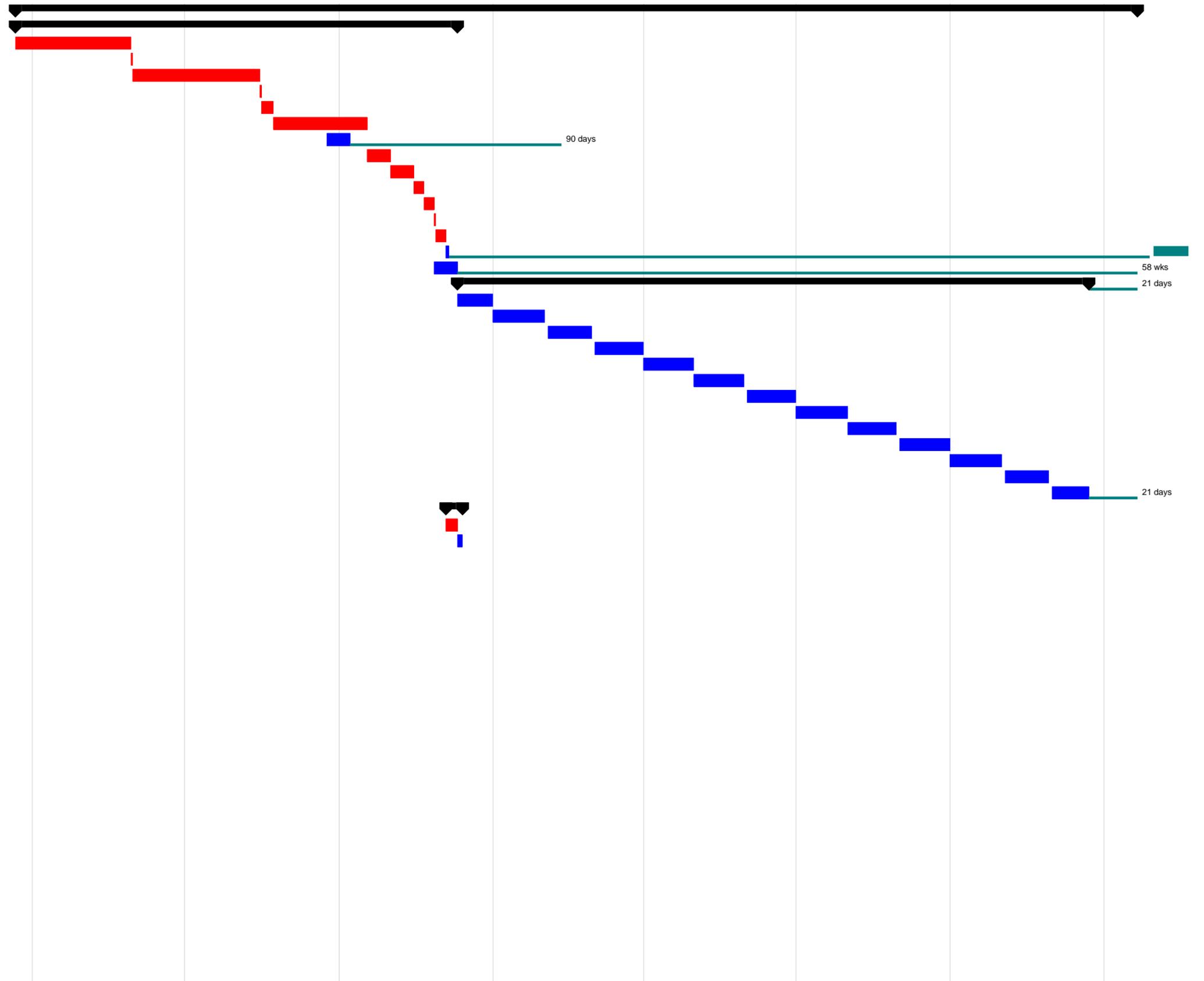
Daily – Construction reports are prepared by the **Construction Manager** that document the ongoing progress and change issues. **The Construction Coordinator may prepare personal daily field notes documenting conditions in the field.** The Subcontractor prepares daily quality control reports documenting their efforts on field activities. The Project Manager and Construction Manager are provided these reports on the following work day.

Weekly – The Subcontractor submits a summary report of quality control activities for the previous week at the weekly construction meeting. **The Construction Coordinator prepares a weekly field report that documents the work activities and issues for the work that has occurred in the proceeding week.**

Monthly - A Project Management Group (PMG) meeting may occur on a monthly basis. The Construction Manger and the Project Manager will review construction progress, changes and Subcontractor payouts with the PMG.

Quarterly - A Cost Management Report will be generated Quarterly by the FESS group and incorporated into a Quarterly MI-31 Activity Report by the Project Manager. This report will also include schedule data and description of the technical progress. The earned value will be calculated and reported, as well as any cost variances over \$5,000 and schedule variances more than one quarter. The report will be issued to the Directorate, the MI-31 Change Control Board, the Fermilab Budget Office, and DOE Fermi Area Office.

ID	Task Name	Duration	Start
1	MI-31 Civil Construction	478 days	Fri 3/22/02
2	-T2/RFP/NTP	188 days	Fri 3/22/02
3	Prepare Concept Design Documents ACD	49 days	Fri 3/22/02
4	Milestone #0 - Start Project - Directive Signed	1 day	Thu 5/30/02
5	Prepare Final Design Documents T2	54 days	Fri 5/31/02
6	Milestone #1 - Design Complete - Submit for Procurement	1 day	Thu 8/15/02
7	Prepare RFP	5 days	Fri 8/16/02
8	Solicitation of RFP	40 days	Fri 8/23/02
9	Fabricate Shielding Steel (By Fermi)	10 days	Tue 9/24/02
10	Evaluate Proposals and select source	10 days	Fri 10/18/02
11	DOE Review of selected source	10 days	Fri 11/1/02
12	Submit bond and insurance documents	4 days	Fri 11/15/02
13	Receive notice to proceed and sign contract	4 days	Thu 11/21/02
14	Milestone #2 - Begin Construction - Issue NTP	1 day	Wed 11/27/02
15	Prepare and submit project schedule	4 days	Thu 11/28/02
16	Prepare and submit schedule of values	2 days	Wed 12/4/02
17	Submit preliminary shop drawings	2 wks	Wed 11/27/02
18	-T3 EDIA	269 days	Wed 12/11/02
19	FESS EDIA December	15 days	Wed 12/11/02
20	FESS EDIA January	23 days	Wed 1/1/03
21	FESS EDIA February	20 days	Mon 2/3/03
22	FESS EDIA March	21 days	Mon 3/3/03
23	FESS EDIA April	22 days	Tue 4/1/03
24	FESS EDIA May	22 days	Thu 5/1/03
25	FESS EDIA June	21 days	Mon 6/2/03
26	FESS EDIA July	23 days	Tue 7/1/03
27	FESS EDIA August	21 days	Fri 8/1/03
28	FESS EDIA September	22 days	Mon 9/1/03
29	FESS EDIA October	23 days	Wed 10/1/03
30	FESS EDIA November	20 days	Mon 11/3/03
31	FESS EDIA December	16 days	Mon 12/1/03
32	-Mobilize on Site	8 days	Wed 12/4/02
33	Mobilize	5 days	Wed 12/4/02
34	Set line and grade benchmarks	3 days	Wed 12/11/02
35	-Site Grading and Utilities	198 days	Wed 12/11/02
36	Pavement removal/ install erosion control	3 days	Wed 12/11/02
37	Strip Topsoil	4 days	Mon 12/16/02
38	Site Utilities	27 days	Fri 12/20/02
39	Hardstand	7 days	Thu 6/19/03
40	Site storm Drainage	2 days	Mon 6/30/03
41	Perform final site grading and paving	3 wks	Fri 8/22/03
42	Seeding	1 day	Fri 9/12/03
43	Earth Retention System	16 days	Fri 12/20/02
44	-Excavate for Foundations/ MI Tie in	70 days	Fri 12/20/02
45	Excavation of MI-31 and hauling	2 wks	Mon 1/13/03
46	Begin Main Injector Shut Down	1 day	Fri 12/20/02
47	Excavate for MI access	4 days	Mon 12/23/02
48	Remove MI Beam Pipe in Tie in area (By Fermi)	1 day	Mon 12/23/02
49	Construct New Dust Partitions in MI Enclosure	2 days	Tue 12/24/02
50	Sawcut and remove Conc. For MI opening/ core duct holes	2 days	Tue 1/7/03
51	New comm duct to MI enclosure	5 days	Tue 2/4/03
52	Upturn beam on MI enclosure	7 days	Fri 12/27/02
53	Install Fermi Supplied Shielding Steel	5 days	Tue 2/4/03
54	Remove Dust Partitions in MI Enclosure	1 day	Tue 2/11/03
55	Replace MI Beam pipe within tie in area (by Fermi)	3 days	Wed 2/12/03
56	Backfill MI Access	4 days	Tue 2/4/03
57	End Main Injector Shut Down	1 day	Mon 2/17/03
58	Mud Slab for MI-31	5 days	Mon 1/27/03
59	Artificial Float - For Weather related Delays of Winter Concreting	20 days	Mon 2/3/03
60	Base Matt for MI-31	12 days	Mon 3/3/03
61	MI-31 Footings	7 days	Wed 3/19/03



INTEGRATED PROJECT TEAM
RESPONSIBILITY MATRIX

Phase of Work	Project Manager	Directorate	Div/ Sect Head	Business Services													
				Procurement	Legal	Accounting	FESS Management (1)	Project Engineer	FESS Construction Manager	Construction Coordinator	Environment	ES&H Health & Safety	Security				
	TBD	TBD	TBD	TBD	TBD	Department	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD		
Project Justification CD-0															LEGEND		
establish mission need, identify funding	prepare/submit mission need	approve mission need, place in GPP/AIP queue	approve mission need														indicates initiator of action
Preliminary Design CD-1															indicates that action is not to be taken without approval of CM		
set up Engineering task	define project		assess resource availability					define project									indicates approval action required
	approve Engineering task	review Engineering task					review Engineering task	submit Engineering task									
	establish T2 performance baseline with PE							establish T2 performance baseline with PM									
	establish budget code						identify available resources	coordinates engineering resources, selection, tasking									
select & task A/E	approve selection			issue A/E RFP	assist w/ contracting		approve selection	draft A/E RFP									A/E architectural / structural consultant
	approve tasking			establish contract w/ A/E			approve tasking	review proposals, select A/E									AP acquisition plan
				establish task w/ A/E				initiate task requisition									BO beneficial occupancy
prepare CDR	coordinate customer team	provide aesthetic input	provide resources as required				provide resources as required	directs design effort									CCB change control board
	document requirements																CDR conceptual design report
	monitor design efforts							interface w/ customer									CM construction manager
CDR approval	approve CDR	approve CDR	approve CDR				approve CDR	submit for approval									D/S divisions/sections
prepare PEP/AP	assist preparation of PEP/AP			assist preparation of PEP/AP	assist preparation of PEP/AP			develop PEP/AP			assist preparation of PEP/AP	assist preparation of PEP/AP	assist preparation of PEP/AP				ICE independent cost estimate
approve PEP/AP	approve PEP/AP	approve PEP/AP	approve PEP/AP				approve PEP/AP	submit for approval									NTP notice to proceed
prepare NEPA documentation	submit PIF to ES&H						interface with ES&H	draft PIF			review PIF						PEP project execution plan
											submit recommendation to DOE						PIF project information form (NEPA)
prepare project request form	approve & submit project request	create & submit directive request (Budget office)	approve PRF				approve PRF	draft PRF			review submittal						PEP project engineer
lab-wide review	approve for release			review & comment	review & comment		review & comment	coordinates CDR review, comment resolution			review & comment	review & comment	review & comment				PM project manager
submit package to Directorate	participate in director review	organize director review	participate in director review	participate in director review			participate in director review	participate in director review									PO purchase order
		aesthetic approval															PRF project request form
		approve project submission															QA quality assurance
submit package for Construction Directive Authorization		submit Construction Directive Authorization															RFI request for information
establish funding	request work package	create work package (Budget office)															RFP request for proposal
cost tracking & control	monitor design progress and costs					provide timely cost data to PM	track/invoice FESS Engineering costs	track/project engineering costs									SET source evaluation team
	approve A/E invoices			approve A/E invoices			approve A/E invoices	review/approve A/E invoices									
project filing	monitor filing						monitor filing	maintain project files									

INTEGRATED PROJECT TEAM
RESPONSIBILITY MATRIX

Phase of Work	Project Manager	Directorate	Div/ Sect Head	Business Services				FESS		ES&H						
				Procurement	Legal	Accounting	FESS Management (1)	Project Engineer	Construction Manager	Construction Coordinator	Environment	Health & Safety	Security			
Final Design CD-2																
select & task A/E	approve selection			issue RFP				draft A/E RFP								
	approve tasking			establish contract w/ A/E	assist w/ contracting			review proposals, select A/E								
				establish task w/ A/E (PO)				initiate task requisition								
direction of A/E	approve change orders		approve change orders	issue change orders				interface w/ customer & Lab organizations								
								lead development of construction documents, drawings, exhibits								
cost tracking & control	monitor design progress & costs					provide timely cost data to PM	track/invoice FESS Engineering costs	track/project engineering costs								
	approve A/E invoices			approve A/E invoices		pay invoices	approve A/E invoices	review / approve A/E invoices								
change control for design	requirements change control															
	approve changes to design performance baseline							submit changes to design performance baseline to PM								
assign Construction Manager	approve assignment						assign construction manager									
design coordination meetings								coordinate and lead meetings								
source evaluation	participate in SET			participate in SET	provide counsel as requested		participate in SET	participate in SET	chair SET							
Exhibit A&B				assist in writing Exhibit A	provide counsel as requested			coordinate writing of Exhibit A&B	assist in writing Exhibit A							
lab-wide design review	approve for release			review & comment	review & comment		review & comment	coordinates review, comment resolution	review & comment		review & comment	review & comment	review & comment	review & comment		
cost tracking & control	monitor design progress							coordinate engineering resources, selection, tasking, invoices								
	monitor project costs															
	approve A/E invoices			approve A/E invoices		pay invoices	approve A/E invoices	review / approve A/E invoices								
									establish CCB for T3							
value engineering (tailored)	participate in value engineering						participate in value engineering	coordinate & conduct value engineering	participate in value engineering							
Title II estimate & schedule	review T2 construction estimate & schedule						review T2 construction estimate & schedule	lead development of T2 construction schedule and estimate								
ICE schedule & estimate	review ICE for cost & schedule						review ICE for cost & schedule		develop ICE for cost & schedule							
design sign-off	sign-off						sign off	sign off	sign off							
develop RFP	review RFP documents			develop RFP documents				review RFP documents	review RFP documents							
assemble proposal documents				assemble proposal documents				assemble drawings, specs, Exhibit A								
regulatory permits	monitor permitting process				provide counsel as requested		identify required permits	identify required permits	monitor permitting process		identify required permits					
							provide permit information	provide permit information			prepare permit application					
	approve permit submittal						approve permit submittal				submit application to DOE					

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Phase of Work	Project Manager	Directorate	Div/ Sect Head	Procurement	Business Services	Legal	Accounting	FESS Management (1)	Project Engineer	FESS Construction Manager	Construction Coordinator	Environment	Health & Safety	Security
performance baseline for construction	reconcile T2 & ICE schedule & estimate								reconcile T2 & ICE schedule & estimate	reconcile T2 & ICE schedule & estimate				
	establish T3 performance baseline with CM									establish T3 performance baseline with PM				
update PEP/AP	update PEP/AP									assist update PEP/AP				
project reporting	periodic updates to Lab management								provide input for periodic updates to Lab management	provide input for periodic updates to Lab management				
	quarterly reports to DOE								provide input for quarterly reports to DOE	provide input for quarterly reports to DOE				
directive mods	prepare requests for directive mods, submit to D/S	review & approve requests, submit to DOE	review & approve requests, submit to Directorate							assist preparation of directive mods				
project filing	monitor filing			maintain project files				monitor filing	maintain project files					

INTEGRATED PROJECT TEAM
RESPONSIBILITY MATRIX

Phase of Work	Project Manager	Directorate	Div/ Sect Head	Business Services										Environment	Health & Safety	Security
				Procurement	Legal	Accounting	FESS Management (1)	Project Engineer	Construction Manager	Construction Coordinator	FESS	ES&H				
Procurement CD-3																
issue RFP				issue RFP						initiate construction requisition						
pre-proposal meeting	participate in pre-proposal meeting			coordinate & chair pre-proposal meeting					participate in pre-proposal meeting	participate in pre-proposal meeting				participate in pre-proposal meeting		
requests for information				issue replies to RFIs					prepare replies to RFIs	review & approve replies to RFIs						
amendments	review & approve ammendment packages			issue ammendments				review & approve ammendment packages	assemble ammendment packages	review & approve ammendment packages						
proposal evaluations	participate in SET			participate in SET	provide counsel as requested			participate in SET	participate in SET	chair SET				evaluate safety submittals		
				review proposals for business related issues						evaluate corporate quality control plan						
										evaluate schedule submittal forward recommendation to source selection officer						
negotiations	approve negotiation			assist in negotiations	provide counsel as requested					conduct negotiations						
subcontract award										initiate requisition for proposal						
	approve award			award subcontract	provide counsel as requested					approve award			review /accept safety documentation			
update performance baseline for construction	chair CCB							participate in CCB		participate in CCB						
	incorporate approved changes															
project filing	monitor filing			maintain project files				monitor filing	maintain project files	maintain project files						

INTEGRATED PROJECT TEAM
RESPONSIBILITY MATRIX

Phase of Work	Project Manager	Directorate	Div/ Sect Head	Business Services				FESS		FESS		ES&H		Security
				Procurement	Legal	Accounting	FESS Management (1)	Project Engineer	Construction Manager	Construction Coordinator	Environment	Health & Safety		
Construction														
pre-construction meeting	participate in pre-construction meeting			coordinate & chair pre-construction meeting					participate in pre-construction meeting	participate in pre-construction meeting	participate in pre-construction meeting	participate in pre-construction meeting	participate in pre-construction meeting	
ES&H Plan									review plan	review plan		review / accept plan		
project quality control plan									review/ authorize plan	review / accept plan				
SESC plan								review plan	review/ authorize plan	review / accept plan				
hazard analysis review / acceptance									review/ authorize plan	review / accept		assist review as requested		
Fermilab permits									monitor process and currency	obtain and maintain currency	oversight of process			
Notice To Proceed				issue NTP					approve NTP	assure precursors are in place				
cost loaded schedule review / acceptance	review & comment								review / accept	review & comment				
submittal list review									review	review / accept				
oversight / direction of A/E	approve change orders			issue change orders			approve change orders	initiate change orders & reqs	approve change orders					
				contract oversight - funding / currency			monitor A/E performance	tasking / direction of A/E effort	monitor A/E performance					
daily inspections / reports							safety support as requested		monitor QA program	daily QA inspections for technical & safety program compliance		safety support as requested		
	monitor progress, trends						monitor progress, trends		issue daily construction report to PM, PE, FESS mgmt	daily construction report to CM				
ES&H inspections / reports	monitor safety program								monitor safety program		periodic walkthroughs	periodic walkthroughs		
manhour reports				review DB payroll submittals						obtain manhour reports from subcontractor		written reports to PM	written reports to PM	
deficiency log									monitor deficiency log	maintain deficiency log				
shop drawing review								coordinate shop drawing reviews	monitor shop drawing status	participate in shop drawing reviews				
								issue actions	approve actions					
								maintain shop drawing log						
engineering change proposals	review / approve			issue request to sub			review / approve	initiate request	approve request					
revisions	review / approve			issue revision to sub			review / approve	coordinate documents	approve revision					
engineering change requests	review / approve			issue change to sub			review / approve	initiate change w/ req	approve change					
claim review / negotiations	assist review / negotiations			assist review / negotiation	provide counsel as requested		assist review	assist review	lead review / negotiation	assist review				
	approve settlements			issue related correspondence										
supplemental agreements				issue supplemental agreements					approve supplemental agreements					
non-compliance memos	monitor non-compliance memos			provide counsel as requested	provide counsel as requested			monitor non-compliance memos	issue non-compliance memos	draft non-compliance memos				
weekly construction meeting				attend as requested				attend as requested	chair meetings	attend as requested		attend as requested		
weekly project team meeting	participate in meetings			participate in meetings			participate in meetings	participate in meetings	chair meetings	participate in meetings		participate in meetings		
PMG meetings	participate in meetings	participate in meetings	participate in meetings	participate in meetings			participate in meetings	participate in meetings	lead presentation	participate in meetings		participate in meetings		
quarterly DOE reports	approve / submit reports								draft reports					
cost tracking & control	monitor construction progress					provide timely cost data to CM, PM	track/invoice FESS Engineering costs	track/project engineering costs	monitor construction progress	effort & progress reporting				
	monitor project costs													

INTEGRATED PROJECT TEAM
RESPONSIBILITY MATRIX

Phase of Work	Project Manager	Directorate	Div/ Sect Head	Business Services				FESS		ES&H						
				Procurement	Legal	Accounting	FESS Management (1)	Project Engineer	Construction Manager	Construction Coordinator	Environment	Health & Safety				Security
subcontractor progress updates	review & comment on schedule update submittals			review & comment on schedule update submittals			monitor update process		conduct progress updates w/ subcontractor	review & comment on schedule update submittals						
invoice approvals (sub & A/E)	approve invoices			approve invoices			approve invoices	review/approve A/E invoices	review/approve A/E & Subcontractor invoices	assure invoice checklist is complete						
punch list										review & comment on subcontractors punchlist						
	coordinate customer walkthroughs			monitor punchlist activity			monitor punchlist activity	coordinate Engineering portion of walkthroughs		coordinate punchlist walkthroughs						
									transmit punchlist to subcontractor	assemble Lab punchlist						
										monitor completion of punchlist items						
beneficial occupancy	coordinate customer div/sect responsibilities									coordinate walkthroughs						
	approve B.O.			approve B.O.			approve B.O.		transmit B.O. to subcontractor	initiate B.O. Form						
final acceptance	approve final acceptance			approve final acceptance			approve final acceptance		transmit final acceptance to subcontractor	initiate final acceptance form						
update PEP/AP	update PEP/AP								assist update PEP/AP							
incident investigations										initiate call tree						
										obtain report form subcontractor	monitor process	monitor process	monitor process			
	monitor response to incident						assist as required		issue incident report	prepare report for CM	assist as requested	assist as requested	assist as requested			
lessons learned							develop lessons learned			assist as requested						
ES&H compliance	monitor safety compliance			monitor safety compliance			assist on technical issues		interface w/ subcontractor on issues	attend safety meetings			assist on technical issues as requested			
							monitor safety compliance		monitor safety compliance	assure subcontractor compliance			monitor safety compliance for PM			
environmental compliance	monitor environmental compliance			monitor environmental compliance			assist on technical issues		interface w/ subcontractor on issues	assure subcontractor compliance	assist on technical issues as requested					
							monitor environmental compliance		monitor environmental compliance		monitor environmental compliance for PM					
as-builts										assure as-builts kept current / accurate						
change control for construction	requirements change control															
	approve changes to constructon baseline								submit changes to construction baseline							
directive mods	prepare requests for directive mods, submit to D/S	review & approve requests, submit to DOE	review & approve requests, submit to Directorate													
project filing	monitor filing			maintain project files			monitor filing	maintain project files	maintain project files							

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				Procurement	Legal	Accounting	FESS Management (1)	Project Engineer	Construction Manager	Construction Coordinator	Environment	Health & Safety	Security				
Close-out CD-4 subcontractor performance reviews																	
	participate in review			coordinate & lead review			participate in review		participate in review	participate in review	submit personal review to FESS mgmt.			participate in review			
final payment/release retention	approve invoices			approve invoices			approve invoices		review/approve Subcontractor invoices	assure invoice checklist is complete							
				move open items to warrantee						move open items to warranty							
level1 budget close	assure all commitments in place									assure all commitments in place							
	request budget close	activate level 1 budget close	approve budget close														
notice of project closout	submit request		approve closeout														
final budget close		activate final budget close															
final directive	prepare request for directive mods, submit to D/S	review & approve request, submit to DOE	review & approve request, submit to Directorate							assist preparation of directive mods							
project filing	monitor filing			maintain project files			monitor filing	maintain project files	maintain project files								