

First Executive Session
Director's CD-2/3a Review of the
NOvA Project

June 4-6, 2007

L. Edward Temple, Jr.

Agenda for Exec Session

- Charge to Reviewers
- Review Agenda
- DOE O 413.3 Critical Decision Table
- Project Decision Matrix
- Cost/Schedule Review Guidance
- Reporting Out Structure
 - Findings, Comments, and Recommendations
- Assignments
 - Technical Reviewer Assignments
 - Breakout Groupings
- Cost / Contingency Table
- Discussion

Charge

This charge is for the Committee to conduct a Director's CD-2/3a Review of the proposed NOvA project at Fermilab. The review is to assure that all the requirements will be met for DOE to approve CD-2/3a. The DOE CD-2/3a review is currently scheduled for July 17-19, 2007.

The purpose of the NOvA project is to fabricate the NOvA near and far detectors and to provide a detector hall for the far detector, as well as upgrade the Fermilab Recycler and Main Injector accelerators and the NuMI beamline. The ensemble will permit the experimenters to study neutrino oscillations, in particular, to search for the oscillation of muon-type neutrinos to electron-type neutrinos. If these oscillations can be observed then the experimenters may be able to determine the mass-ordering of the neutrinos and to observe Charge Parity (CP) violation in the neutrino sector. Determination of the mass-ordering is a unique contribution made possible by NOvA's very long baseline.

CD-2 is approval of the Performance Baseline. The Performance Baseline is developed based on a design document (Preliminary Design or a Technical Design Report), a well-defined and documented scope, a resource-loaded detailed schedule, a definitive cost estimate, defined Key Performance Parameters and some additional project management documents. Approval of CD-2 authorizes submission of a budget request for the Total Project Cost (TPC) and detailed engineering design.

CD-3a is approval to start limited Construction. NOvA is requesting CD-3a for infrastructure and site preparation work to support the start of building construction and limited items for the Detector and ANU activities that are either long lead time items or parts required to start construction of critical items. The design and engineering for these items should be completed to the degree appropriate to initiate construction as scheduled. A review of the CD-3a items should be performed to assure that all environmental, safety and security criteria are met. DOE CD-3a approval provides authorization to complete procurement and construction of the specified work.

Charge (continued)

The technical part of the review should focus on the designs for the detector and building as well as the upgrades to the accelerator and NuMI. Respond as to whether the designs meet the technical specifications and whether the designs are sound. The cost and schedule baselines are based on a detailed WBS – Work Breakdown Structure, WBS Dictionary, BOE – Basis of Estimate documentation, risk and contingency analyses, RLS – Resource Loaded Schedule, and time phased funding and cost profiles. The committee is asked to review each of these items, for quality, completeness, and accuracy. The committee is also asked to review and assess the quality of and comment on the additional formal project management documentation provided in support of CD-2/3a.

DOE's guidance to NOvA is to not exceed a Total Project Cost (TPC) of \$260M. Based on the scope of work presented during the review, the committee is to assess whether the project can be built within the guidance. If it is determined that the work scope as presently defined cannot be completed within the guidance, then the Far Detector mass will be the relevant scope parameter.

As part of this assessment the questions listed in Attachment 1 of this charge should be addressed. Additionally the review committee is to review and comment on the Project's response and actions taken on the recommendations from the Director's CD-1 Review of NOvA on February 28 - March 2, 2006 and from the DOE CD-1 Review conducted April 4-6, 2006. The review committee is to also review and comment on the Project's response and actions taken on the relevant ANU related recommendations from the Director's Preliminary Review of the Super NuMI (SNUMI) Plan conducted on November 14-16, 2006. Constructive comments on presentation content, format, and style are also requested.

Finally, the committee should present findings, comments, and conclusions at a closeout meeting with NOvA's and Fermilab's management and provide a written report soon after the review.

Charge Attachment #1

Technical

- Are the technical specifications clearly stated and documented?
- Can the design be built? Does the design meet the technical specifications? Is it a reasonable design?
- Does the baseline design meet the project's objectives (mission need)?

Cost

- Is the Work Breakdown Structure (WBS) appropriate for the project scope?
- Do the cost estimates for each WBS (or cost) element have a sound documented basis and are they reasonable?
- Does an obligation profile exist? How does it compare with the funding guidance?

Schedule

- Is the schedule well developed and appropriately structured by specifying relationships, predecessors, successors, critical path, resource loaded, etc?
- Are the durations for the activities and overall schedule reasonable and achievable with the assumed resources?
- Does the schedule contain appropriate levels of milestones, sufficient quantity of milestones for tracking progress and do they appear to be achievable?
- Does the schedule include activities for design reviews, which include assessment of the designs readiness for procuring prototypes, preproduction and production materials?

Charge Attachment #1 (continued)

Management

- Is there an appropriate management organizational structure in place to accomplish the design and construction?
- Is the organization structure well documented, responsibilities defined and appropriate for the scope of work?
- Are there adequate staffing resources available or planned for this effort?
- Is there a funding plan available or proposed to meet the resource requirements to realize the project?
- Has a Risk Plan been developed, risks identified, risks analyzed, risk responses planned/implemented, risk monitoring/control process established and do they seem appropriate?

Procurement

- Have the critical procurements been identified and are they included in the schedule with adequate lead time built in?
- Have critical make vs. buy decisions been evaluated in conjunction with the scope and is that reflected in the baseline cost estimate, schedule and technical risk plan?
- Are the Project designs final and procurement packages prepared to the degree appropriate to order materials and initiate construction as scheduled?

Agenda

Monday, Jun. 04

8:00 – 8:45 AM	45	Executive Session (Comitium, WH2SE)	Ed Temple
9:00 – 9:10 AM	10	Welcome and Laboratory Overview (Hornets Nest - WH8X, Overflow in Racetrack – WH7X)	Hugh Montgomery
9:10 – 9:55 AM	45	Project Overview	John Cooper
9:55 – 10:15 AM	20	Project Cost Drivers	Ron Ray
10:15 – 10:45 AM	30	Accelerator and NuMI Upgrades	Nancy Grossman
10:45 – 11:00 AM	15	BREAK (Outside Hornets Nest - WH8X)	
11:00 – 11:30 AM	30	Site and Building	Steve Dixon
11:30 – 11:50 AM	20	Scintillator	Stuart Mufson
11:50 – 12:00 PM	10	Fiber	Carl Bromberg
12:00 – 12:20 PM	20	PVC and Extrusions	Rich Talaga
12:20 – 1:20 PM	60	LUNCH (WH2 Crossover)	
1:20 – 1:40 PM	20	Extrusion Modules	Ken Heller
1:40 – 2:05 PM	25	Electronics and DAQ	Leon Mualem
2:05 – 2:40 PM	35	Near/Far Detector Assembly	Dave Ayres
2:40 – 2:55 PM	15	NOvA Science & Detector Performance	Mark Messier or Gary Feldman

Agenda (continued)

Monday, Jun. 04

- | | | | |
|----------------|----|--|-----------------|
| 2:55 – 3:10 PM | 15 | BREAK (Outside Hornets Nest - WH8X) | |
| 3:10 – 4:25 PM | 75 | BREAKOUT SESSIONS | |
| | | 1) <u>Site and Building</u> (Confessional – WH5NE) | Steve Dixon* |
| | | 2) <u>Commodities - Scintillator, Fiber, PVC</u> (Snake Pit – WH2NE) | Rich Talaga* |
| | | 3) <u>Far and Near Detector Assembly</u> (The Req. Room – WH4NW) | Dave Ayres* |
| | | 4) <u>Electronics and DAQ</u> (Hornets Nest - WH8X) | Leon Mualem* |
| | | 5) <u>Extrusion Module Production</u> (Black Hole – WH2NW) | Ken Heller* |
| | | 6) <u>Accelerator and NuMI Upgrades</u> (Racetrack – WH7X) | Nancy Grossman* |
| 4:30 – 6:30 PM | | Executive Session (Comitium, WH2SE) | |

Agenda (continued)

Tuesday, Jun. 05

8:00 – 8:30 AM	Cost and Schedule Executive Session (Comitium, WH2SE)	Ed Temple
8:30 – 8:45 AM	Cost and Schedule Methodology (Comitium, WH2SE)	Bill Freeman
8:45 – 10:45 AM	BREAKOUT SESSIONS	
	1) <u>Site and Building</u> (Confessional – WH5NE)	Steve Dixon*
	2) <u>Commodities - Scintillator, Fiber, PVC</u> (Snake Pit – WH2NE)	Rich Talaga*
	3) <u>Far and Near Detector Assembly</u> (The Req. Room – WH4NW)	Dave Ayres*
	4) <u>Electronics and DAQ</u> (Hornets Nest - WH8X)	Leon Mualem*
	5) <u>Extrusion Module Production</u> (Black Hole – WH2NW)	Ken Heller*
	6) <u>Accelerator and NuMI Upgrades</u> (Racetrack – WH7X)	Elaine McCluskey*
	7) <u>Cost, Schedule and Management</u> (Comitium, WH2SE)	John Cooper*

* Notes Breakout Session Lead

Agenda (continued)

Tuesday, Jun. 05

10:45 – 11:00AM

BREAK (Outside Comitium, WH2SE)

11:00 – 12:45 PM

BREAKOUT SESSIONS – Continued
(Same breakouts and locations as for the
8:45 – 10:45 AM sessions)

12:45 – 1:45 PM

LUNCH (WH2 Crossover)

1:45 – 2:45 PM

NOvA Respond to Committee Questions
from 1st Day (Comitium, WH2SE)

2:45 – 6:30 PM

Executive Session and Report Writing
(Comitium, WH2SE) Breaks taken as
necessary.

Wednesday, Jun. 06

8:00 – 9:30 PM

**Subcommittee Working Sessions and
Report Writing**

10:00 – 2:00 PM

**Committee Closeout Dry Run with working
lunch (Comitium, WH2SE) Breaks taken as
necessary.**

2:00 PM

**Closeout ((Hornets Nest - WH8X,
Overflow in Racetrack – WH7X)**

DOE O 413.3 Critical Decision Table

DOE O 413.3A (Updated 10/30/06)

Preconceptual Planning	Conceptual Design	Preliminary Design	Final Design	Construction	Operations
❖ CD-0	❖ CD-1	❖ CD-2	❖ CD-3	❖ CD-4	
Approve Mission Need	Approve Alternative Selection & Cost Range	Approve Performance Baseline	Approve Start of Construction	Approve Start of Operations or Project Completion	

Actions Authorized by Critical Decision (CD) Approval				
CD-0	CD-1	CD-2	CD-3	CD-4
<ul style="list-style-type: none"> Proceed with Conceptual Design Request PED funding Start monthly PARS & Quarterly Project Performance reporting 	<ul style="list-style-type: none"> Allow Expenditure of PED Funds for preliminary design Approval of long-lead procurement if necessary 	<ul style="list-style-type: none"> Establish Performance Baseline Continue design Request construction funding 	<ul style="list-style-type: none"> Approve expenditure of funds for construction 	<ul style="list-style-type: none"> Allow start of operations or project completion
Non-Nuclear Facilities—Prerequisite Activities for CDs				
<ul style="list-style-type: none"> Review of Mission Need Statement (MSN) by Office of Program Analysis & Evaluation (CF-20) for \$100M or greater. Perform Mission Need Independent Project Review (IPR) for Major System (MS) projects (>=\$750K) Perform Pre-conceptual Planning Evaluate Information Technology (IT) projects with Departmental Enterprise Architecture framework 	<ul style="list-style-type: none"> Review of Acquisition Strategy (AS) (OECM review for MS project) Review of Conceptual Design <ul style="list-style-type: none"> Requirements Analysis Risk Analysis Alternative Analysis Value Management determination Assess Requirements Analysis, Risk Analysis, Alternative Analysis, & Value Management. Appoint FPD Establish & charter Integrated Project Team Ensure compliance with One-for-One Replacement requirement for building square footage Ensure Integrated Safety Management Implementation Ensure consideration for High Performance Sustainable Building Assess if QA Program is acceptable 	<ul style="list-style-type: none"> Perform Baseline External Independent Review (EIR) & validation by OECM for \$100M or greater. Perform Independent Cost Review or Independent Cost Estimates for MS project as part of EIR Program IPR for \$20M to less than \$100M Review of Preliminary Design Establish compliant project EVMS for \$20M or more, & OECM certifiable EVMS for project TPC with \$50M or more Conduct Value Engineering (as applicable) Incorporate High Performance Sustainable Building provisions into design Determine if QA Program is acceptable 	<ul style="list-style-type: none"> Perform Executability EIR by OECM for MS projects Perform IPR for Non-MS projects by Program (SC) 	<ul style="list-style-type: none"> Verify Key Performance Parameter or Completion Criteria achieved Perform Readiness Assessment or Operational Readiness Review Revise environmental management system. <p>Post CD-4 Closeout</p> <ul style="list-style-type: none"> Perform Final Administrative & Financial Closeout Conduct Post Implementation Review for IT projects
Hazard Category 1, 2, and 3 Nuclear Facilities—Additional Prerequisite Activities/Documents for CDs				
	<ul style="list-style-type: none"> Perform Technical IPR Prepare Conceptual Safety Design Report (SDR) Prepare a Preliminary Safety Validation Report (PSVR) 	<ul style="list-style-type: none"> Prepare Preliminary SDR Prepare a PSVR based on updated design 	<ul style="list-style-type: none"> Prepare Prelim Documented Safety Analysis Report (SAR) Prepare SER 	<ul style="list-style-type: none"> Prepare Documented SAR with Technical Safety Requirements Prepare SER
Prerequisite Documents				
<ul style="list-style-type: none"> MNS Tailoring Strategy 	<ul style="list-style-type: none"> Acquisition Strategy Conceptual Design Report Risk Management Plan Risk Assessment Preliminary PEP Preliminary Hazard Analysis (HA) Preliminary Security Vulnerability Assessment Report (SVAR) Initial Cyber Security Plan for IT projects 	<ul style="list-style-type: none"> Performance Baseline Preliminary Design Updated Risk Assessment Updated PEP Updated HA (Approved at Field Level) Updated Preliminary SVAR NEPA Documentation Updated Initial Cyber Security Plan for IT projects 	<ul style="list-style-type: none"> Final Design Updated CD-2 documents Updated QA Program An Approved Construction Project Safety & Health Plan Updated Cyber Security Plan for IT projects 	<ul style="list-style-type: none"> Checkout, Testing & Commissioning Plan Project Transition/ Closeout Plan Transition-to-Operations Plan Finalized QA Plan, SVAR, HA Report, Construction Project Safety & Health Plan, Finalized Cyber Security Plan for IT projects & completed Certification & Accreditation, as required <p>Post CD-4 Closeout</p> <ul style="list-style-type: none"> Final Project Closeout Report Lessons Learned Report Required Operational Documentation
<ul style="list-style-type: none"> AS-Acquisition Strategy EIR-External Independent Review EVMS-Earned Value Mgmt. System HA-Hazard Analysis IPR-Internal Project Review 	<ul style="list-style-type: none"> MSN-Mission Need Statement MS-Major Systems OECM-Office of Engr. & Const. Mgmt. QA-Quality Assurance PSVR-Prelim. Safety Validation Report 	<ul style="list-style-type: none"> SAR-Safety Analysis Report SDR-Safety Design Report SER-Safety Evaluation Report SVAR-Security Vulnerability Assess. Report TPC-Total Project Cost 		
Budget Related Documents				
<ul style="list-style-type: none"> After CD-0 approval, Exhibit 300 for Projects >=\$20M: Annual submission initiated during the federal budget cycle when funds are requested. Project Data Sheets: Annual submission initiated during the federal budget cycle when TEC funds are requested. 				

OFFICE OF SCIENCE PROJECT MANAGEMENT DECISION/APPROVAL MATRIX (Updated 10/30/06)

TOTAL PROJECT COST (TPC)		\$750M or more	Less than \$750M to \$400M	Less than \$400M to \$100M	Less than \$100M to \$20M	Less than \$20M to \$5M
			Delegation Allowed to SC-1 for less than \$400M		Delegation Allowed	
DECISION/APPROVAL						
Prior to CD-0, Mission Need Statement		Reviewed by PA&E Approved by SC-1	Reviewed by PA&E Approved by SC-1	Reviewed by PA&E Approved by SC-1	Reviewed by SC-1.3 Approved by SC-1	Reviewed by SC-1.3 Approved by SC-AD
Prior to CD-1, Acquisition Strategy		Reviewed by OEMC Approved by SC-1	Reviewed by SC-1.3 Approved by SC-1	Reviewed by SC-1.3 Approved by SC-1	Reviewed by SC-1.3 Approved by SC-1	Reviewed by SC-1.3 Approved by SC-AD
CRITICAL DECISIONS	CD-0 --Approve Mission Need	S-2	US-SC	US-SC delegated to SC-1	SC-1	SC-AD
	CD-1--Approve Alternative Selection and Cost Range	S-2	US-SC	US-SC delegated to SC-1	SC-1 delegated to SC AD	PM or SOM if delegated
	CD-2 --Approve Performance Baseline	S-2	US-SC	US-SC delegated to SC-1	SC-1 delegated to SC AD	PM or SOM if delegated
	CD-3 --Approve Start of Construction	S-2	US-SC	US-SC delegated to SC-1	SC-1 delegated to SC AD	PM or SOM if delegated
	CD-4 --Approve Start of Operation or Project Completion	S-2	US-SC	US-SC delegated to SC-1	SC-1 delegated to SC AD	PM or SOM if delegated
BASELINE MANAGEMENT	Deviations	If performance, scope, schedule, or cost baseline at CD-2 cannot be met, the S-2 must be notified & a determination made to terminate the project or establish a new performance baseline.				N/A
	New Performance Baseline Approval	S-2 approval is needed if cumulative change in Performance Baseline of >6 months or >\$25M or 25% of Original Cost Baseline at CD-2 or change in scope not meeting the mission need or not in conformance with the Project Execution Plan; or US-SC approval if preceding threshold is not exceeded; or PSO approval if delegated.				N/A
	Directed Change	Project changes caused by DOE Policy Directive, Regulatory, or Statutory action such as changes in approved budget or requirements.				
	Routine Project Changes/Control	Program	SC-1	SC-1	SC-AD	SC AD
	Project	PM, SOM or FPD (Optional)	PM, SOM or FPD (Optional)	PM, SOM or FPD (Optional)	PM, SOM or FPD (Optional)	PM, SOM or FPD (Optional)
	Contractor	Contractor	Contractor	Contractor	Contractor	Contractor
PEP --Project Execution Plan Approval		S-2	US-SC	US-SC delegated to SC-1	SC-1 delegated to SC AD	PM or SOM if delegated
Site Selection		S-2	S-2	S-2	S-2	N/A
REVIEWS	EIR --External Independent Review by OEMC	Prior to CD-2 & CD-3	Prior to CD-2	Prior to CD-2	N/A	N/A
	IPR--Independent Project Review by SC-1.3	Prior to CD-0 & CD--3	Prior to CD-3	Prior to CD-3	Prior to CD-2 & CD-3	Optional prior to CD-2 & CD-3
	ORR/RA--Operational Readiness Review/Readiness Assessment by Program	Prior to CD-4	Prior to CD-4	Prior to CD-4	Prior to CD-4	Prior to CD-4
	Design Review*	Prior to CD-1, CD-2, CD-3	Prior to CD-1, CD-2, CD-3	Prior to CD-1, CD-2, CD-3	Prior to CD-1, CD-2, CD-3	Optional
	Technical IPR for Nuclear Facility**	Prior to CD-1	Prior to CD-1	Prior to CD-1	Prior to CD-1	Optional
PARS Reporting (EVMS for Projects >\$20 M)		Monthly Project Status After CD-0 and Monthly Project Performance After CD-2				Monthly Project Status After CD-0
QPPR --Quarterly Project Performance Review		Quarterly After CD-0 by SAE/AE				N/A
FPD --Federal Project Director		Appointed by SAE at CD-1	Appointed by AE at CD-1			

AD=Associate Director; AE=Acquisition Executive; EIR=External Independent Review Conducted by OEMC; FPD=Federal Project Director; IPR =Independent Project Review Conducted by SC; ORR=Operational Readiness Review Conducted by SC; PARS= Project Analysis and Reporting System; PM=HQ Office of Science Program Manager; S-2=Deputy Secretary; SAE=Secretarial Acquisition Executive; SC=Office of Science; SC-1=Director, Office of Science; SOM=Site Office Manager; US-SC=Under Secretary of Science; *=Design Reviews by individuals external to the project.; **=for high risk, hazard, and Category 1, 2, & 3 nuclear facilities only

CD-2 and CD-3 Review Criteria

(Excerpt from DOE M 413.3-1 (3-28-03))

Performance Baseline Review (CD-2)	Construction or Execution Readiness Review (CD-3)
<p>Key review elements for a Performance Baseline Review are:</p> <ul style="list-style-type: none"> - System Functions and Requirements - Preliminary Design and Design Review - Work Breakdown Structure - Resource Loaded Schedule - Total Project Cost and Project Schedule - Risk Management - Project Execution Plan - Acquisition Strategy - Integrated Project Team - Hazards Analysis - Value Management/Engineering - Project Controls/Earned Value Management System 	<p>Key review elements for a Construction or Execution Readiness Review are:</p> <ul style="list-style-type: none"> - Final Design Functions and Requirements/Site Final Design Review - Final Drawings and Specifications - Construction/Execution Planning - Resource Loaded Schedule - Risk Management - Project Execution Plan - Acquisition Strategy - Integrated Project Team - Value Management/Engineering - Project Controls/Earned Value Management System
<p>The following documents are to available and assessed:</p> <ul style="list-style-type: none"> - System Functions and Requirements Document (also referred to as the “Design-to” requirements or Design Criteria) - Results of and Responses to Site Preliminary Design Review - Detailed Resource Loaded Schedule - Detailed Cost Estimate - Risk Management Assessment - Project Execution Plan - Acquisition Strategy - Hazards Analysis - <i>Preliminary Safety Analysis Document</i> 	<p>The following documents are to available and assessed:</p> <ul style="list-style-type: none"> - System Functions and Requirements Document - Final Design Drawings and Specifications - Results of and Responses to Site Final Design Review - Construction Planning Document - Detailed Resource Loaded Schedule - Detailed Cost Estimate - Risk Management Assessment - Project Execution Plan - Acquisition Strategy - Safety Documentation

Cost/Schedule Review Guidance

These are CD-2 Requirements.

The cost/schedule reviews are key elements of the CD-2 Performance (Technical, Cost, Schedule) Baseline Reviews.

- 1) This Director's Review*
- 2) Lehman DOE Review*
- 3) EIR – External Independent Review*

04-Jun-07

Project Technical, Cost, and Schedule Baseline Development

To Succeed in Cost / Schedule Arena

Estimate must be

Complete

Scope well understood and defined

Technical goal must be clear

Technology to be used to meet this goal known

Designate how technical systems will be acquired

I.e. buy, have fabricated, self fabricated

Buy parts / fabricate / assemble

How will this be accomplished

Self fabricate / assemble – lab or university(ies)

How will person power requirements be met

And paid for

All tasks defined and specified in a work breakdown structure

WBS dictionary

Documented at lowest level of WBS and include

M&S – materials and services

SWF – salaries, wages, & fringes

Accompanied by schedule showing appropriate durations

Adders – overheads / G&A (general & administrative)

Escalated – shown both with and without escalation with funding

profile based on laboratory/DOE/Federal

budget/appropriation guidance

Cost/Schedule Review Guidance

(Continued)

Reviewable

Estimate must “roll-up” from the lowest level to the total and reviewers must be able to drill down from the top to the lowest level

Credible

Basis of estimate must be specified

Catalog prices

Similar work, where cost is documented

Engineering estimates

WAG – wild ass guess

This material forms basis for DOE approving a baseline, for Fermilab/Collaboration Project Management to measure performance and take appropriate corrective actions during execution and for Laboratory Management and DOE to monitor progress.

Reviewer Assignments

Executive Summary	<u>Ed Temple</u>
1.0 Introduction	<u>Dean Hoffer</u>
2.0 Science	<u>Heidi Schellman,</u> and All
3.0 Site and Building (WBS 1/2.1)	<u>Karen Hellman,</u> Jeff Sims
4.0 Commodities – Scintillator/Fiber/PVC (WBS 1/2.2, 1/2.3 & 1/2.4)	<u>Linda Stutte,</u> Joe Ingraffia
5.0 Extrusion Module Production (WBS 1/2.5)	<u>Alan Bross,</u> Heidi Schellman
6.0 Electronics, Trigger DAQ (WBS 1/2.6 & 1/2.7)	<u>Jonathan Lewis,</u> Eric James
7.0 Far and Near Detector Assembly (WBS 1/2.8 & 2.9)	<u>Richard Boyce,</u> Pat Hurh Charlie Cooper
8.0 Accelerator Upgrades (WBS 1/2.0.1, 1/2.0.2)	<u>Thomas Roser,</u> Rod Gerig
9.0 NuMI Beamline Upgrades (WBS 1/2.0.3, 1.0.4) a) Beamline / Target Modifications b) Shielding	<u>Phil Martin,</u> Sayed Rokni
10.0 Cost and Schedule	<u>Bill Boroski,</u> Dean Hoffer
11.0 Project Management (WBS 1.9 & 2.10)	<u>Mike Lindgren,</u> Ed Temple

- Note underlined names are the primary writer.

Reviewer Assignments (continued)

12.0 Charge Questions	
TECHNICAL	
12.1 Are the technical specifications clearly stated and documented?	<u>Heidi Schellman</u> , Tom Roser
12.2 Can the design be built? Does the design meet the technical specifications? Is it a reasonable design?	<u>Heidi Schellman</u> , Tom Roser
12.3 Does the baseline design meet the project's objectives (mission need)?	<u>Heidi Schellman</u> , Tom Roser
COST	
12.4 Is the Work Breakdown Structure (WBS) appropriate for the project scope?	<u>Bill Boroski</u> , Dean Hoffer
12.5 Do the cost estimates for each WBS (or cost) element have a sound documented basis and are they reasonable?	
12.6 Does an obligation profile exist? How does it compare with the funding guidance?	
SCHEDULE	
12.7 Is the schedule well developed and appropriately structured by specifying relationships, predecessors, successors, critical path, resource loaded, etc?	<u>Dean Hoffer</u> , Bill Boroski
12.8 Are the durations for the activities and overall schedule reasonable and achievable with the assumed resources?	
12.9 Does the schedule contain appropriate levels of milestones, sufficient quantity of milestones for tracking progress and do they appear to be achievable?	
12.10 Does the schedule include activities for design reviews, which include assessment of the designs readiness for procuring prototypes, preproduction and production materials?	

- Note underlined names are the primary writer.

Reviewer Assignments (continued)

MANAGEMENT	
12.11 Is there an appropriate management organizational structure in place to accomplish the design and construction?	<u>Mike Lindgren</u> , Bill Boroski
12.12 Is the organization structure well documented, responsibilities defined and appropriate for the scope of work?	
12.13 Are there adequate staffing resources available or planned for this effort?	
12.14 Is there a funding plan available or proposed to meet the resource requirements to realize the project?	
12.15 Has a Risk Plan been developed, risks identified, risks analyzed, risk responses planned/implemented, risk monitoring/control process established and do they seem appropriate?	
PROCUREMENT	
12.16 Have the critical procurements been identified and are they included in the schedule with adequate lead time built in?	<u>Joe Ingraffia</u> , Mike Lindgren
12.17 Have critical make vs. buy decisions been evaluated in conjunction with the scope and is that reflected in the baseline cost estimate, schedule and technical risk plan?	<u>Joe Ingraffia</u> , Mike Lindgren
12.18 Are the Project designs final and procurement packages prepared to the degree appropriate to order materials and initiate construction as scheduled?	<u>Joe Ingraffia</u> , Mike Lindgren

- Note underlined names are the primary writer.

Reviewer Assignments for Breakouts

1) Site and Building (Confessional, WH5NE)	Karen Hellman, Jeff Sims
2) Commodities – Scintillator/Fiber/PVC (Snake Pit – WH2NE)	Joe Ingraffia, Linda Stutte
3) Far and Near Detector Assembly (The Req. Room – WH4NW)	Richard Boyce, Charlie Cooper, Pat Hurh
4) Electronics and DAQ (Hornets Nest - WH8)	Jonathan Lewis, Eric James
5) Extrusion Module Production (Black Hole – WH2NW)	Alan Bross, Heidi Schellman
6) Accelerator and NuMI Beamline Upgrades (Racetrack – WH7X)	Rod Gerig, Phil Martin, Sayed Rockni, Thomas Roser
7), Cost, Schedule and Management (Comitium, WH2SE)	Bill Boroski, Mike Lindgren, Dean Hoffer, Ed Temple

Reporting Structure

- Review findings, comments, and recommendations should be presented in writing at a closeout with the Collaboration and Fermilab management.
- Section for each “Level 2” WBS plus Cost, Schedule, Management and Science sections.

Findings, Comments, and Recommendations

- Findings
 - Findings are statements of fact that summarize noteworthy information presented during the review.
- Comments
 - Comments are judgment statements about the facts presented during the review. The reviewers' comments are based on their experiences and expertise.
 - The comments are to be evaluated by the project team and actions taken as deemed appropriate.
- Recommendations
 - Recommendations are statements of actions that should be addressed by the project team.
 - A response to the recommendation is expected and that the actions taken would be reported on during future reviews.

Examples of Findings, Comments, and Recommendations

[NOvA CD-1 Director's Review @ Fermilab]

Findings

- Adhesive choice has an impact on work schedule and ventilation system design. The baseline adhesive was listed as 3M2216 and was said to have a safety factor of 5 for buckling. However a Devcon adhesive was discussed a great deal also. The Devcon adhesive has a sheer strength which was approximately 150% better but it contained a toxic solvent which the 3M2216 did not.
- An adhesive dispenser will be used to apply the adhesive to attach the modules together and to attach the blocks together. The adhesive dispenser can't be defined until the adhesive is chosen.

Examples of Findings, Comments, and Recommendations (continued)

[NOvA CD-1 Director's Review @ Fermilab]

Comment

- Adhesive needs to be determined as quickly as possible to meet timelines. If the 3M2216 meets the design SF of 5 for buckling and over a SF of 4 for shear stress between the planes it seems like it should be used over the Devcon adhesive which has toxic solvent vapors. Adhesive choice will affect assembly and the building (exhaust required) requirements.

Recommendation

1. Determine which adhesive to use as soon as possible. This affects building design and assembly time.

Project's Cost & Contingency Estimate

WBS	Items	NOVA 's Cost Estimate AY \$M										
		Estimated Cost (with indirects)			Contingency Estimate			Contingency %			Total Cost	
		M&S	Labor ¹	Total	M&S	Labor ¹	Total	M&S	Labor ¹	Total		
TEC	2.0	Accelerator & NuMI Upgrades	\$ 13.2	\$ 20.5	\$ 33.7	\$ 4.4	\$ 6.5	\$ 11.0	34%	32%	33%	\$ 44.7
	2.1	Far Detector Site and Building	\$ -	\$ 1.9	\$ 1.9	\$ -	\$ 0.5	\$ 0.5	0%	24%	24%	\$ 2.4
	2.2	Liquid Scintillator	\$ 23.0	\$ 0.4	\$ 23.4	\$ 6.1	\$ 0.3	\$ 6.5	27%	87%	28%	\$ 29.8
	2.3	Wave-Length-Shifting Fiber	\$ 12.3	\$ 1.2	\$ 13.6	\$ 3.4	\$ 0.1	\$ 3.6	28%	10%	26%	\$ 17.1
	2.4	PVC Extrusions	\$ 28.4	\$ 1.7	\$ 30.1	\$ 8.0	\$ 0.6	\$ 8.6	28%	35%	28%	\$ 38.7
	2.5	PVC Modules	\$ 6.8	\$ 8.6	\$ 15.4	\$ 2.0	\$ 3.7	\$ 5.7	29%	43%	37%	\$ 21.1
	2.6	Electronics Production	\$ 14.3	\$ 1.1	\$ 15.4	\$ 6.2	\$ 0.6	\$ 6.8	43%	53%	44%	\$ 22.2
	2.7	Data Acquisition System	\$ 1.6	\$ 1.8	\$ 3.4	\$ 0.4	\$ 0.5	\$ 0.9	25%	29%	27%	\$ 4.3
	2.8	Near Detector Assembly	\$ 3.6	\$ 0.4	\$ 4.1	\$ 1.5	\$ 0.2	\$ 1.7	40%	50%	41%	\$ 5.7
	2.9	Far Detector Assembly	\$ 7.9	\$ 6.0	\$ 13.9	\$ 4.8	\$ 6.0	\$ 10.8	61%	100%	78%	\$ 24.8
	2.10	Project Management	\$ 0.6	\$ 5.7	\$ 6.3	\$ 0.1	\$ -	\$ 0.1	25%	0%	2%	\$ 6.4
Subtotal Construction		\$ 111.7	\$ 49.5	\$ 161.2	\$ 36.9	\$ 19.1	\$ 56.0	33%	39%	35%	\$ 217.2	
OPC	R&D - Accelerator		\$ 1.4	\$ 7.8	\$ 9.3	\$ 0.4	\$ 3.0	\$ 3.4	30%	38%	37%	\$ 12.7
	R&D - Detector		\$ 4.1	\$ 5.0	\$ 9.1	\$ 0.2	\$ 0.1	\$ 0.3	5%	1%	3%	\$ 9.3
	Cooperative Agreement		\$ 46.9	\$ -	\$ 46.9	\$ 9.3	\$ -	\$ 9.3	20%	0%	20%	\$ 56.2
	Operating		\$ 0.2	\$ 1.2	\$ 1.3	\$ 0.1	\$ 0.6	\$ 0.7	36%	51%	49%	\$ 2.0
	Total OPC:		\$ 52.6	\$ 14.0	\$ 66.6	\$ 10.0	\$ 3.6	\$ 13.6	19%	26%	20%	\$ 80.2
TPC:		\$ 164.3	\$ 63.5	\$ 227.8	\$ 46.9	\$ 22.7	\$ 69.6	29%	36%	31%	\$ 297.4	

Notes:

¹ Labor costs presented here include all project labor from Fermilab, other DOE facilities and Universities.

Reviewer Write-ups

- Write-up template is posted on Director's Review Webpage.

http://www.fnal.gov/directorate/OPMO/Projects/NOvA/DirRev/2007/06_04/CloseoutPresentations/NOvA06-06-07template.doc

- Write-ups are to be sent to Terry Erickson at terickson@fnal.gov prior to 9:30 AM on Wednesday, June 6 for the Closeout Dry Run
- A final report will be issued within 2 weeks after the closeout.

Discussion

- Questions and Answers