

**Cost / Schedule
Executive Session
Director's Preliminary Review
of the
Super NuMI (SNUMI) Plan**

November 14-16, 2006

L. Edward Temple, Jr.

Agenda

Wednesday, November 15, 2006

8:00–8:30 AM	Cost and Schedule Executive Session (Comitium WH2SE)	Ed Temple
8:30–10:30 AM	Breakouts Sessions 5-7 (See Breakout Details for Room Assignments)	
10:30–10:45 AM	BREAK (Outside of Comitium)	
10:45 – 12:45 AM	Breakouts Sessions 8-10 (See Breakout Details for Room Assignments)	
12:45–1:45 PM	LUNCH (2 nd Floor Crossover)	
1:45–2:45 PM	SNuMI's Responses to Committee Questions (Comitium, WH2SE)	Nancy Grossman Alberto Marchionni
2::45 PM-6:30+ (Break at 3:45)	Executive Session and Report Writing (Comitium, WH2SE)	Ed Temple

Thursday November 16, 2006

8:30–2:00 PM	Closeout Dry Run with working lunch (Comitium - WH2SE) Breaks taken as necessary.
2:00 PM	Closeout (Curia II - WH2SW)

Agenda

(continued)

Breakout Session Details

Tuesday, November 14

3:30 – 4:30 PM	1) Booster and Main Injector (One North – WH1W)	Ioanis Kourbanis
	2) Recycler: injection line, extraction line (Black Hole – WH2NW)	Paul Derwent
	3) NuMI: primary proton line, decay pipe & hadron absorber (Snake Pit – WH2NE)	Mike Martens
	4) Management/Cost/Schedule/Strategy (Phase I & II) (Comitium - WH2SE)	Nancy Grossman

Wednesday, November 15

8:30 - 10:30 AM	5) Recycler: Kickers, Slip-Stacking Scheme, RF Systems (Black Hole – WH2NW)	Paul Derwent
	6) NuMI: target chase cooling, target and horns (Snake Pit – WH2NE)	Mike Martens
	7) Management/Cost/Schedule/Strategy (Phase I & II) (Comitium - WH2SE)	Nancy Grossman
10:45 – 12:45 AM	8) Overview of Phase II (Black Hole – WH2NW)	Ioanis Kourbanis
	9) Civil Construction (Phase I & II) (One North – WH1W)	Dixon Bogert
	10) Radiation safety/shielding (Phase I & II) (Snake Pit – WH2NE)	Anthony Leveling Kamran Vaziri

* Indicates attending via video conference.

SNuMI Phase I Plan is a “Campaign”

- As such we apply an appropriately tailored selection of project management tools
 - Design Documentation
 - Work Breakdown Structure
 - Cost Estimate
 - Resource Loaded Schedule
 - Change Control
 - Monthly Management Review / Report

Cost/Schedule Review Guidance

*These are
Baseline
Requirements.*

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

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.

Cost/Schedule Review Guidance

(Continued)

Baseline Reviews

When preparing a baseline, it can be helpful to be aware of and prepared for the types of things a Director's Technical/Cost/Schedule/Management Review Committee or a DOE Baseline Review Committee will be looking for. The following provides some insight into such reviews. Review Committees are frequently broken up into subgroups which are then assigned to look at specific systems or subprojects within a project.

To be available for reviewers one week prior to the review

- Conceptual &/or Technical Design Reports

- Design Review materials (web address was provided)

 - Materials presented at most recent design review for system

- Detailed schedule for system (to be looked at during breakout sessions)

- Cost Estimate Details for system (will be provided at low levels of the WBS)

 - Including WBS Dictionary and BOE – Basis of Estimate detail sheets

 - (BOE notebooks will be available in breakout rooms)

Tabbed hardcopies of review materials and presentations to be available at the review.
Enough for committee, observers, and a half dozen extras

Cost/Schedule Review Guidance

(Continued)

Technical / Cost / Schedule / Management Review Guidelines (things reviewers are asked to do)

Technical

Examine Design Review Materials (including TDRs & CDRs) for your system

Assess level at which **scope is understood and defined**

Assess level that **technical aspects of the system are understood, planned, designed, procured/fabricated and/or prototyped**

Cost

Choose >~5 top level WBS elements from your system

Drill down to successively lower levels of the WBS; while at each step

Understanding the **scope** of that element

Understanding the **schedule** for that element

Understanding the **basis of estimate** (BOE) for **both M&S and effort** for that element

Choose a few elements next lowest level of the WBS

And repeat this procedure until you get to the bottom level.

I.e., the lowest level of the WBS

Choose >~5 items in the system for which you have personal experience

Interact with the responsible managers to **determine if**

The Estimate is complete, documented, reviewable, and credible

Cost/Schedule Review Guidance

(Continued)

Check that there is a **detailed BOE for all work elements** in your system

Check whether the **estimate for your system “rolls-up”** from the lowest level WBS element to the total for your system

Does each level of the WBS contain all costs from lower level WBS elements

Assess the **“bottoms up” contingency that the WBS level 3 managers would assign** their components.

Assess the **“top down” contingency analysis assignments by the Project Manager**

Schedule

Is there a detailed schedule, including a critical path, for completing the project? Are milestones appropriate in number and type identified so that the project teams, Fermilab management, and DOE can effectively track and manage progress? Based on past experience, can the proposed schedules be met? Are appropriate schedule contingencies provided? Is there a “resource loaded schedule” and plan for providing the needed resources (M&S and technical support staff and physicists)?

Cost/Schedule Review Guidance

(Continued)

Funding

Have techniques such as forward funding by collaborators and phased funding of large contracts been appropriately incorporated into the planning? Does the anticipated funding profile support the resource requirements?

Management

Is an **appropriate / adequate project organizational structure** in place and **staffed** (or are plans in place) to do the job.

Has the **appropriate project management documentation** been prepared. Is it of a quality adequate for this stage of the project? Are **appropriate / adequate management systems** (Cost and Schedule Control System / Earned Value Reporting, Critical Path Management, Risk Management, etc.) in place or planned for use during project execution?

Report Outline and Reviewer Assignments

Executive Summary	<u>Ed Temple</u>
1.0 Introduction	<u>Dean Hoffer</u>
2.0 Phase I	
2.1 Technical	
2.1.1 Booster Upgrades	<u>Stuart Henderson</u> Erk Jensen
2.1.2 Recycler Upgrades	<u>Erk Jensen</u> Mike Brennan Phil Martin
2.1.3 Main Injector Upgrades	<u>Mike Brennan</u> Stuart Henderson Erk Jensen
2.1.4 NuMI Upgrades	<u>Sayed Rokni</u> Thomas Roser Yoshi Yamazaki
2.2 Civil Construction	<u>Karen Hellman</u> Phil Martin
2.3 Project Management	
2.3.1 Cost	<u>Dean Hoffer</u> All
2.3.2 Schedule	<u>Dean Hoffer</u> All
2.3.3 Management	<u>Greg Bock</u> Karen Hellman

Report Outline and Reviewer Assignments

(continued)

2.4 Charge Questions	
2.4.1 Are the physics requirements that SNUMI addresses appropriately stated?	<u>Stuart Henderson</u> Thomas Roser
2.4.2 Have these physics requirements been translated into accelerator technical performance requirements / specifications?	
2.4.3 Are the design features of the defined elements of SNUMI documented in a Conceptual Design Report, Design Handbook, or other appropriate manner?	
2.4.4 Are the prototype plans and decision paths appropriate for the less well-developed elements?	
2.4.5 Do the elements of SNUMI address the performance requirements / specifications? Are the designs of these elements reasonable?	
2.4.6 Has a Work Breakdown Structure (WBS) been developed?	<u>Dean Hoffer</u>
2.4.7 Do the cost estimates for each WBS element have a sound basis and are they reasonable?	
2.4.8 Is there a schedule for the project?	
2.4.9 Are the activity durations reasonable for the assumed resources?	
2.4.10 Has the schedule been “resource loaded?”	
2.4.11 Has the schedule been developed with contingency or slack included?	
2.4.12 For the less well-developed technical elements have decision milestones been included in the schedule?	

Report Outline and Reviewer Assignments

(continued)

2.4.13 Is there an appropriate management organizational structure in place or proposed to accomplish the design and construction?	<u>Greg Bock</u>
2.4.14 Have responsibilities been assigned or have they been proposed?	
2.4.15 Is there a Project Management Plan outlining the organizational structure, summarizing the technical, cost and schedule (including milestones) baselines, and setting forth the change control procedures and reporting processes that will be used?	
2.4.16 Are there adequate staffing resources available or planned for this effort?	
2.4.17 Is there a funding plan available or proposed to meet the resource requirements to realize SNuMI?	
3.0 Phase II	
3.1 Technical	<u>Thomas Roser</u> All
3.2 Civil Construction	<u>Karen Hellman</u> Phil Martin
3.3 Project Management (Cost, Schedule and Management)	<u>Greg Bock</u> All
3.4 Charge Questions	
3.4.1 Does the design concept for Phase II support the objective of delivering at least 1 MW beam power onto the neutrino production target?	<u>Thomas Roser</u> Stuart Henderson
3.4.2 Is the strategy for Phase II viable and does it support the implementation of Phase II in the timeframe presented?	<u>Greg Bock</u> Karen Hellman

Reviewer Breakout Assignments

November 14, (3:30 – 4:30 PM)	
1) Booster and Main (One North – WH1W)	Mike Brennan Stuart Henderson Erk Jensen
2) Recycler: injection line, extraction line (Black Hole – WH2NW)	Phil Martin Thomas Roser
3) NuMI: primary proton line, decay pipe & hadron absorber (phase I + II) (Snake Pit – WH2NE)	Sayed Rokni Yoshi Yamazaki
4) Management/Cost/Schedule/Strategy (Phase I & II) (Comitium - WH2SE)	Greg Bock Karen Hellman Dean Hoffer Ed Temple
November 15, (8:30 – 10:30 AM)	
5) Recycler: kickers, slip-stacking scheme, RF systems (Black Hole – WH2NW)	Mike Brennan Stuart Henderson Erk Jensen Phil Martin
6) NuMI: target chase cooling, target and horns (Snake Pit – WH2NE)	Sayed Rokni Thomas Roser Yoshi Yamazaki
7) Management/Cost/Schedule/Strategy (Phase I & II) (Comitium - WH2SE)	Greg Bock Karen Hellman Dean Hoffer Ed Temple

Reviewer Breakout Assignments (continued)

November 15, (10:45 – 12:45 PM)	
8) Overview of Phase II (Black Hole – WH2NW)	Mike Brennan Stuart Henderson Erk Jensen Thomas Roser Yoshi Yamazaki
9) Civil Construction (Phase I & II) (One North – WH1W)	Karen Hellman Dean Hoffer Phil Martin
10) Radiation safety/shielding (Phase I & II) (Snake Pit – WH2NE)	Greg Bock Sayed Rokni Ed Temple

SNuMI's Cost Estimate (Phase 1)

PHASE I: Base Costs, no G&A (indirects) or contingency, FY06\$k

WBS	Name	Cont %	Labor	M&S	Total
1	SNuMI Phase I	41%	\$13,136	\$20,307	\$33,443
1.1	Booster Upgrades	30%	\$139	\$518	\$657
1.2	Recycler Upgrades	36%	\$4,540	\$11,697	\$16,236
1.3	Main Injector Upgrades	31%	\$571	\$1,091	\$1,662
1.4	NuMI Upgrades	62%	\$2,665	\$6,101	\$8,766
1.5	Beam Physics	37%	\$463	\$35	\$498
1.6	Project Management	30%	\$4,759	\$865	\$5,624

SNuMI's Cost Estimate (Phase II)

PHASE II: Base Costs, no G&A (indirects) or contingency, FY06\$k				
WBS	Task Name	M&S Cost	Labor	Total
1	SNuMI Phase II	\$31,428	\$22,240	\$53,668
1.1	Booster	\$0	\$0	\$0
1.2	Recycler	\$1,500	\$1,500	\$3,000
1.3	Main Injector	\$6,979	\$2,200	\$9,179
1.4	NuMI	\$4,800	\$4,800	\$9,600
1.5	Beam Physics	\$100	\$500	\$600
1.6	Accumlulator	\$5,835	\$5,840	\$11,675
1.7	Civil (includes 20% overhead)	\$11,214	\$0	\$11,214
1.8	Radition Safety	\$0	\$500	\$500
1.9	Project Management	\$1,000	\$6,900	\$7,900