Fermilab

Closeout Presentation

Director's Mini-Review of LBNE: Readiness Check

July 15 - 16, 2010

This page intentionally left blank

Table of Contents

Executive Summary 5
2.0 Introduction 7
3.0 Charge Questions 8
4.0 Recommendations 11
5.0 Appendices 12
Charge 13
Agenda 15

This page intentionally left blank

Executive Summary

A Director's Mini-Review of the Long-Baseline Neutrino Experiment (LBNE) Project was held on July 15-16, 2010. The objective of the review was to assess the status and adequacy of the overall LBNL project conceptual design effort towards CD-1 and evaluating the likelihood of the project being ready for a DOE CD-1 Independent Project Review (IPR), currently scheduled to be on December 7-9, 2010. Committee assessment is documented in the body of this closeout presentation.

In a series of talks and discussions the committee saw evidence of a sound conceptual design, a reasonable approach toward formulating project cost and schedule, and a very experienced, knowledgeable and enthusiastic project team. The project has been built upon a fairly advanced R&D and ongoing design and technology development effort. The project team is built upon existing expertise from national laboratory and university communities. There is a well-established organization in place, although the project team has not reached necessary strength and a number of key positions are yet to be filled.

The committee is favorably impressed with the breadth and depth of planning performed by the project team over past few months. The project team made excellent progress on the conceptual design including preparation of required documents. Overall, the committee feels that the LBNE design is sound and progressing well, and will soon be of sufficient quality to support the CD-1.

A typical set of review charge questions which the project team needs to clearly and concisely answer at the CD-1 review are:

- *Is the conceptual design technically sound and likely to meet the performance expectation identified in the Mission Need Statement approved by DOE? Is there an R&D plan that adequately supports the design effort and mitigates the technical risks?*

- *Does the conceptual design optimally balance cost and performance? (i.e. value engineering)*

- *Are the cost and schedule estimates credible and reasonable for this stage of project based on the funding guidance from DOE? Do these estimates include adequate contingency margins that are based on a project-wide risk analysis?*

- *Does the project have a credible plan, as reflected in a Preliminary-PEP? Is the management team organized and staffed adequately to carry out both the current preliminary design and future execution phases of the project?*

- *Is the Acquisition Strategy appropriate considering the project's scope, and the attendant cost and schedule risks?*

- *Are ES&H aspects being properly addressed given the project's current state of development?*

The committee concluded that there are some issues that need to be addressed in order to be ready for the DOE CD-1 review. Addressing these issues will take considerable effort.

1. Staffing: A number of key management and technical positions still need to be filled. Some of the positions, such as a Project Control Manager, will have a significant impact on being ready for the CD-1 review. There are also a number of engineering positions that are vacant, and that need to be filled in order to proceed with the design and alternatives evaluation.

2. Scope: The present plans consider many alternatives for major subsystems, particularly in regards to the near and far detectors. Although some of these options are driven by external factors beyond the project's control and while some are well justified, their existence will result in complications for presenting a clear and concise project plan.

3. Cost and Schedule: No cost range and overall schedule were presented. Integrated and a self-consistent resource loaded schedule with a set of high level milestones is yet to be produced and contingency is still to be formulated.

4. Organization: The high-level organization is very complex and is yet to be agreed upon by corresponding parties (with DOE/NSF, DUSEL, laboratories (FNAL, BNL), and LBNE collaboration). This will result in additional difficulties for presenting a clear and concise project organization structure and potentially can be a crippling distraction at the CD-1 review.

5. Management: The laboratory Director's level of involvement in the LBNE project and the Laboratory's commitment to the project need to be strengthened and more visible.

6. Documentation: Although much progress has been made, a number of required documents are still in draft stage with a fair number of "to be filled" sections. Schedule for completing these documents are very tight without any schedule float.

7. ES&H: Underground construction is intrinsically dangerous and in the public eye. The issues and organization of underground safety should be moved to a high level in the WBS and MOUs.

2.0 Introduction

A Director's Mini-Review of the Long-Baseline Neutrino Experiment (LBNE) Project was held on July 15-16, 2010. The review was an independent readiness check focusing on the Project team's progress towards CD-1 and evaluating the likelihood of the project being ready for a DOE CD-1 Independent Project Review (IPR) on December 7-9, 2010. The charge included a list of specific questions that were answered. Committee assessment is documented in the body of this closeout presentation.

This presentation is broken down into three basic sections. The first section has the answers to all of the review charge questions. The second section covers the review team's Recommendations, which are statements of actions that should be addressed by the project team. The last section of this presentation is the Appendices that contain the reference materials for this review. Appendix A shows the charge for this review including the review team participants. The review was conducted per the agenda shown in Appendix B.

The LBNE Project is to develop a response to the review recommendations and present it to the Laboratory Directorate and regularly report the progress on resolving the recommendations.

3.0 Charge Questions

3.1 Is the Project making adequate progress on the development of the preliminary technical designs and alternatives, as required to be ready for a successful CD-1 review in December?

The project is making a good progress on developing the Conceptual Design Report and alternatives. However, a fair amount of work still remains to complete the CDR. The present plans consider alternatives, normal at this stage which could result in additional difficulties for presenting a clear and concise project plan at the CD-1 review.

3.2 Is the Project developing the information necessary, and do they have an adequate procedure planned to be able to make major technology and configuration decisions prior to CD-1?

The project is actively developing the information necessary for making major technology and configuration decisions. A clear plan should be developed to understand the logic that will be used in making these choices and when they must be made. Project has proposed a procedure to make these decisions based on the input and recommendation from LBNE collaboration. The presented timeline for making some of the major decisions prior to the CD-1 review might be too aggressive and not quite realistic given the expected immaturity of the necessary information and the challenge of building consensus among LBNE collaboration.

3.3 Is the Project making adequate progress in developing the resource loaded schedules required to support the cost and schedule ranges to be presented for CD-1?

The project is working on developing resource loaded schedules, but there is no common methodology/standards on how the resource loaded schedules were to be developed. Each Level 2 subproject was left on their own on developing their schedules without common resource types, labor rates, escalations, etc. This makes an integrated schedule for the entire project impossible to create at this time. The project could not present a high level overall project cost and schedule. The project has an understanding on what needs to be done to a RLS to support the cost and scheduler range needed for CD-1, but presently do not have the resources needed to pull this all together and do not have a sound timeframe to accomplish this work. A major task of integrating them to a project-wide self-consistent resource loaded schedule yet needs to be done by the yet-to-be-hired Project Control Manager. It does not appear the project can have a well developed cost and schedule range in time for a December CD-1 DOE review.

3.4 Is the Project making adequate progress in the preparation of other required documentation for CD-1?

Although much progress has been made, a number of required documents are still in draft stage with a fair number of “to be filled” sections. Schedule for completing these documents are very tight without any schedule float, if to be completed by December. This will require strong engagement of the scientific collaboration.

3.5 Are the Project organization and staffing levels, both current and planned adequate to manage the work leading to a successful CD-1 review and beyond?

The high-level organization is very complex and is yet to be agreed upon by corresponding parties (with DOE/NSF, DUSEL, laboratories (FNAL, BNL), and LBNE collaboration). This will result in additional difficulties for presenting a clear and concise project organization structure and potentially can be a crippling distraction at the CD-1 review as well as remain to be a long term challenge.

The committee did not have a chance to carefully review the adequacy of the planned staffing level. As for a current staffing level, a number of key management and technical positions which still need to be filled. Some of the positions, such as a Project Control Manager, will have a significant impact on being ready for the CD-1 review. If the upcoming key hires are accomplished as planned the project may be able to manage the remaining work, however, the committee was concerned that the ramp up of these new hires may have significant impact on initial productivity.

3.6 Is the coordination of the LBNE Project with the DUSEL Project adequate for this stage of the project, and to support a successful CD-1 review?

The coordination between two projects seems to be improving, adequate although it appears to be an additional management challenge. The DUSEL/ LBNE MOU that is thought to be necessary for CD-1 is only in draft form and will require significant negotiation in the coming months.

3.7 Are there other issues related to CD-1 readiness that the Project needs to address?

The laboratory Director's level of involvement in the LBNE project and the Laboratory's commitment to the project need to be strengthened and more visible.

MOU's should be developed with all collaborating partners and key MOUs should be finalized prior to CD-1.

ES&H management approach related to underground work needs to be highlighted because of its potential sensitivities.

The current approach for contracting consultants through DUSEL is too cumbersome. The Projects should work together to streamline a process for award of design contracts.

The committee suggests that the project team to identify areas where it might be beneficial to do value management/value engineering exercises, and then document them in a report.

3.8 Does it appear likely that the LBNE Project can be ready for a CD-1 review in December of this year?

It is the committee's assessment that given the number of major issues that need to be addressed and tasks that need to be completed, as summarized above, it will be extremely challenging for the project to be ready for a CD-1 review in December 2010.

4.0 Recommendations

1. Create a complete integrated resource loaded schedule as soon as possible.

2. Complete the CDR.

3. Accomplish hiring or assignments presently required to achieve CD-1. Develop a staffing plan through CD-2 to present at CD-1.

4. Develop a simplified organization chart (single page, if possible) which should be reflected in the MOUs.

5. Develop MOUs with all the collaborating partners. Key MOUs should be completed prior to CD-1.

6. Develop and have agreement with the collaboration on the methodology for making key technical decisions.

Closeout Presentation

5.0 Appendices

Charge

Agenda

Appendix A

Charge

Director's Mini-Review of LBNE: Readiness Check
July 15 - 16, 2010

The Fermilab Deputy Director Young-Kee Kim has called a Mini-Review of the LBNE Project to assess its progress towards a planned CD-1 Lehman Review, scheduled to be 7-9 December 2010. The review committee consists of:

Aesook Byon (BNL), Chair
Dean Hoffer (FNAL)
Peter Limon (consultant)
Jeff Sims (ANL)

The Long-Baseline Neutrino Experiment (LBNE) is a project to build a new facility that will enable a world-class program in neutrino physics focused on precision measurements of the neutrino mixing matrix via $\nu_\mu \rightarrow \nu_e$ appearance and ν_μ disappearance measurements, with goals of determining the sign of the mass hierarchy and searching for CP violation in the lepton sector. It will: build a new neutrino beam at Fermilab directed towards a detector complex >1000 km away, currently planned to be in the NSF's proposed Deep Underground Science and Engineering Laboratory in Lead, SD; one or more large detectors at the far site to measure the properties of the neutrinos after they travel 1300 km through the earth; a near detector on the Fermilab site to measure the neutrino beam properties at the source; and conventional facilities at Fermilab and far site required to support the beam and detector systems. The large detectors at the far site, in addition to measuring neutrino oscillation parameters, may also enable a broad program in proton decay and neutrino astrophysics. Fermilab is the lead laboratory for the overall LBNE Project, and is also the lead laboratory for the beam, liquid argon far detector option, and conventional facilities subprojects; BNL is the lead laboratory for the water Cherenkov far detector option; and LANL is the lead lab for the near detector. Many aspects of the project will be executed by other collaborating national laboratories and universities.

The LBNE Project received CD-0 on 8 January 2010. The Project is now working towards CD-1, with the goal of being ready for a Lehman Review on 7-9 December 2010. The purpose of this mini-review is to assess the progress that the Project team is making towards readiness for CD-1 and evaluate the likelihood of being ready for a CD-1 review by December, and to recommend actions to be taken to improve the likelihood of being ready on that time scale.

In particular, the Review Committee is asked to address the following questions:

- Is the Project making adequate progress on the development of the preliminary technical designs and alternatives, as required to be ready for a successful CD-1 review in December?
- Is the Project developing the information necessary, and do they have an adequate procedure planned to be able to make major technology and configuration decisions prior to CD-1?
- Is the Project making adequate progress in developing the resource loaded schedules required to support the cost and schedule ranges to be presented for CD-1?
- Is the Project making adequate progress in the preparation of other required documentation for CD-1?

- Are the Project organization and staffing levels, both current and planned adequate to manage the work leading to a successful CD-1 review and beyond?
- Is the coordination of the LBNE Project with the DUSEL Project adequate for this stage of the project, and to support a successful CD-1 review?
- Are there other issues related to CD-1 readiness that the Project needs to address?
- Does it appear likely that the LBNE Project can be ready for a CD-1 review in December of this year?

The review is expected to take one and one-half days. The detailed agenda for the review is attached to this charge. At the close of the review, the Committee is asked to present its findings, comments and recommendations addressing the questions and issues raised in this charge, including recommendations concerning actions that need to be taken to ensure a successful CD-1 review on the planned time scale. The report presented at the closeout should be in written form, and it is expected that this will be the final report from the review.

Appendix B

Agenda

Director's Mini-Review of LBNE: Readiness Check
July 15 - 16, 2010

Thursday 15 July 2010 - Hornet's Nest (WH8X)

Hornet's Nest (WH8X)

8:00	(0:30)	Committee Executive Session	
8:30	(0:10)	Welcome	Y.K.Kim
8:40	(0:30)	Project Overview	J.Strait
9:10	(0:30)	Alternatives Analysis and CDR	G.Rameika
9.40	(0.30)	PMP and DUSEL MOU	J.Strait
10:10	(0:15)	Risk Plan and QA Plan	M.Dinnon
10:25	(0:20)	Break	
10:45	(0:15)	Preliminary HA	M.Andrews
11:00	(0:15)	NEPA strategy	M.Andrews
11:15	(0:15)	RLS Development	E.McCluskey
11:30	(0:30)	WBS 1.2 Neutrino Beamline	V.Papadimitriou
12:00	(1:00)	Working Lunch	
13:00	(0:30)	WBS 1.3 Near Detector	C.Mauger
13:30	(0:30)	WBS 1.4 Water Cherenkov Detector	J.Stewart
14:00	(0:30)	WBS 1.5 LAr TPC	B.Baller
14:30	(0:30)	WBS 1.6 Conventional Facilities	E.McCluskey
15:00	(0:15)	Break	
15:15	(0:30)	Configuration Decision Process	J.Strait
15:45	(0:30)	Wrap-up discussion	All
16:15	(1:30)	Committee Executive Session	
17:45	(0:15)	Questions from Committee	
18:00		Adjourn for the day	

Friday 16 July 2010 - Comitium (WH2X)

Comitium (WH2X)

8:00	(1:00)	Response to questions / followup presentations
9:00	(2:30)	Committee Executive Session / report writing (working breaks as needed)
11:30	(0:30)	Closeout report by Committee to the Fermilab Directorate and the Project Team
12:00		Adjourn