

LBNE Reconfiguration Steering Committee 12th Meeting

June 27, 2012

Participants: See the lists at the end of this summary for those participating.

Agenda:

- Mel Shochet on Physics WG Issues Update
- Pier Oddone on Meeting with Dan Lehman and Jim Siegrist
- Bob Svoboda Update on Surface Backgrounds
- James Symons on Town Meeting at LBNL
- Final Steering Committee Report Schedule

Mel Shochet on Physics WG Issues Update

Key players for work assigned to the Physics Working Group are deeply involved in preparations for the DOE LBNE CD-1 Review. So, there is no new information on the impact of having no near detector as formally now in Phase 1.

It was noted that the Fermilab Physics Advisory Committee, at its meeting last week, was very concerned about the effects of cosmic rays for a surface detector (see Svoboda update topic below) and the lack of a near detector.

Pier Oddone on Meeting with Dan Lehman and Jim Siegrist

On Tuesday, June 26, Pier Oddone gave a briefing on the reconfiguration effort and preparations for the CD-1 review to Dan Lehman (Chair of the CD-1 Review) and Jim Siegrist (Head of OHEP). The briefing was said to have gone very well, with agreement on proceeding to CD-1 this calendar year based on a 10 kT surface detector at the Homestake site. Changes to this plan were possible between CD-1 and CD-2, allowing for the addition of new collaborators and sources of funds/in-kind-contributions which would allow a change of scope relative to CD-1 (e.g., going underground and/or adding a near detector). CD-2 would be expected about two years after CD-1. The date for the CD-1 review would be the end of October to meet the new timeline, with CD-1-approval

estimated date moved up from February 2013 to December 2012. Dan Lehman agreed that there is a credible case for the cost at the CD-1 level. It is understood that the cost range for the preferred option is not a show-stopper. Jim Siegrist understands that this will require squeezing the base program, since no funding bump appears feasible for the first years of the LBNE project.

Pier Oddone will prepare a Director's Corner article on the LBNE situation, and Mike Procaro has indicated that there will be a draft cost profile in the next week or two.

Steve Vigdor noted that there is some unease in parts of the HEP community, with the pressure on other programs obviously causing concern. See the LBNL Town Meeting agenda item below.

Bob Svoboda Update on Surface Backgrounds

Bob Svoboda discussed surface-background slides which were distributed by e-mail and are now on the meeting web site.

The slides report on results from GEANT simulation truth-table studies based on a single 10 kT fiducial volume with a 1.6 microsecond drift time (design specification is 1.4 microsecond). Three meters of rock are assumed above the detector. The muon spectrum and angular distribution used comes from Gaisser's article in the PDG compendium. With 75 muons per spill, neither data acquisition nor confusion in event reconstruction is thought to be a problem. On the other hand, backgrounds in the detector need study.

The slides discuss electrons from muon tracks, muon bremsstrahlung, and neutral hadrons, all these from $1E7$ muons passing through a surface extending 6 m out from the detector boundary, about 2 years of continuous running, 4 years of anticipated actual live run time. Assuming a 2% misidentification of photons as electrons, using cuts from distributions shown in the slides, one can expect 830 events per year with loose cuts down to 3.4 events/year with tight cuts.

The stated conclusion from this "initial estimate" is that "the backgrounds from high-angle muons [are] significant, but not overwhelming." No use is made of an

active veto system nor of any internal photon system. A slight change in depth (increased overburden) could further reduce the backgrounds, up to an order of magnitude additional suppression from 50 mwe (~18m).

A list of work to be done includes the calculation of electron-neutrino event efficiency, further optimizations, and more site-specific shielding modeling (noting that one can find a site with a high, local hill between Fermilab and the detector).

Concern was expressed at the Fermilab PAC meeting, which did not have the latest results available, for untracked muons, loss of fiducial volume due to volume segmentation to make use of photo-detection inside the detector, and loss of fiducial mass due to any cost overruns.

Young-Kee Kim asked that a short summary be written for the final Steering Committee report of what has been done on the issue of surface-detector backgrounds. Space-charge effects have also been raised as a concern for a detector on the surface. Critical outside eyes will be examining the document, and we should have such critical outside review for ourselves first.

James Symons on Town Meeting at LBNL

The DOE OHEP staff who had been at SLAC early last week made a site visit of LBNL afterwards. During presentations the DOE people asked for a Town Meeting at the end of the day of the visit. Symons kicked off the meeting with a review of the Brinkman letter, the reconfiguration process, breadth of Steering Committee membership, and the options being presented to the DOE.

There were about 40 people at the meeting, with backgrounds across of three HEP Frontiers, a ranging from graduate students to senior scientists. Questions were raised about international participation, the scientific scope of the project, and timescales. Concern was raised about so big a change as the LBNE reconfiguration without a HEPAP role. The DOE representatives noted the need to be clear for discussions of the FY 2014 budget which are going on now.

Young-Kee Kim noted that the presentations to Neutrino 2012 was just the beginning of presenting the options and preference to the community. A lot needs to be done before the August HEPAP meeting where the LBNE reconfiguration will certainly be discussed.

Final Steering Committee Report Schedule

It appears that the final report is no longer needed by July 1st. However, it is needed within a few weeks of that date.

The DPF is preparing community-input web sites in anticipation of its October Community Planning meeting at Fermilab, among them a separate web page for community input on the LBNE reconfiguration. That web page should have the Steering Committee Report (including the addenda) available. It is understood that the current link to the Interim Report is not visible enough on the current LBNE Reconfiguration web page.

It was suggested that the Lab set up a mechanism for direct community input to Young-Kee as chair of the Steering Committee.

POST MEETING NOTES

DPF has set up a public webpage for community feedback on the interim report. Young-Kee wrote a letter to the community requesting feedback, and DPF will use that. The input will come to either a blog or to the Committee (for those who want to provide private comments). Young-Kee asked for input by July 15. DPF will send out a note to the DPF membership and spokespersons of major collaborations.

Pier Oddone and Jim Siegrist agreed to a 2-3 week extension of the report due date so that we can include the community's feedback. They said okay. So the final report is due July 20.

Committee Members Participating:

- Young-Kee Kim, FNAL, Chair
- Jon Bagger, JHU
- Charlie Baltay, Yale
- Gary Feldman, Harvard
- Kevin Lesko, LBNL
- Ann Nelson, Washington-Seattle
- Mel Shochet, U. Chicago (chair of physics group)
- Bob Svoboda, UC Davis
- James Symons, LBNL
- Steve Vigdor, BNL
- Jeffrey Appel, FNAL, Scientific Secretary

Ex-Officio Members Participating:

- HEPAP Chair, NRC Study Chair: Andy Lankford, UC Irvine
- DOE's DUSEL Review Committee Co-chair: Jay Marx
- LBNE Project Manager: Jim Strait, Fermilab
- Fermilab Director: Pier Oddone, FNAL