

## LBNE Reconfiguration Engineering/Cost Working Group 3<sup>rd</sup> Meeting

April 23, 2012

### Present Committee Members:

- Jim Strait, FNAL (deputy chair)
- Bruce Baller, FNAL
- Mike Headley, SURF
- Marvin Marshak, U. Minnesota
- Christopher Mauger, LANL
- Elaine McCluskey, FNAL
- Vaia Papadimitriou, FNAL
- Bob O'Sullivan, FNAL
- Jeffrey Appel, FNAL (Scientific Secretary)

### Present Invitees:

- Tracy Lundin (LBNE CF project manager)
- Joel Sefcovic (LBNE project controls for CF)
- Jim Stewart (LBNE (former) WCD project manager and expert-at-large)
- Tim Wyman (LBNE target-hall infrastructure expert)

### Draft Agenda

Reviewing the presentations for the workshop

#### Jim Strait Overview Presentation

Jim's slides started with a list of Working Group members with relevant titles, the options whose costs and engineering issues were called for by the Steering Committee, and the list of building blocks.

He discussed cost summary tables for options 1 through 6, but had not yet added up costs for each option. Contingency is not consistently applied to the costs so far. All costs are in FY2010 dollars, with escalation expected to be greater than 20%. Note that the cost envelope from the DOE is in then-year dollars!

Numbers for the beam components and civil construction come from the recent Director's Review, and come to \$500M when escalated. That does not leave much for near and/or far detector costs. Jim will have a fuller table for the Workshop.

It was noted that it is desirable to keep the total project cost below the \$750M threshold that triggers special approvals in the DOE system. It is understood that the \$50M spent on LBNE by DOE so far, does not have to be included in the cost cap we are working with.

#### Christopher Mauger Near-Detector Presentation

Christopher showed only an outline of his talk so far. He listed staging and alternative near-detector-option slides. He noted that a LAr detector had yet to be fit into the MINOS near-detector hall, and that there were issues even for a straw-tube tracker near detector.

#### Tracy Lundin Detector Conventional Facilities Presentation

Tracy presented a phased approach to the LBNE Reference Design in which Phase 1 facilities are only those prior to excavation of a cavern. The use of "phase" in this context should be changed to "building block" to avoid confusion with the overall phased approach to LBNE. Numbers exist now for phased development of the Reference Design at Homestake; 5, 17, and 33 kT detectors at 4850 ft depth; 5, 17, and 33 kT on the surface; etc.

He described the assumptions and approach used to the estimates; e.g., NOvA construction costs with some "site-adapt" adjustments. There is no risk-based contingency, only a general 35% contingency for civil construction and 20% for other costs.

#### Vaia Papadimitriou Beam and Its Conventional Facilities Presentation

Vaia's slides began with a description of the Reference Design beam, and then described savings which might be possible from there. The savings include options for staging shielding, magnets of the primary beamline (meaning lower primary proton beam energy), value engineering options (e.g., reduced shielding with the use of impermeable membrane in the target area, and reusing shielding materials

from elsewhere rather than costing new shielding materials). Vaia also discussed cost savings implied by using NuMI-style target and horns for the first phase of LBNE. A cost-summary slide was called for.

#### Bruce Baller Far Detector Presentation

Bruce began with his assumptions and scaling model for the 200 parameters in his spreadsheet used for estimating costs. He also listed his design choices; e.g., not requiring (not costing) a 1 kT prototype for a 5 kT detector, though requiring one for all larger detectors. Cryogenic system overcapacity was required; 40% margin at depth, 20% on the surface. A photon system was kept in all configurations for triggering, etc. He did include risk-based contingency (30%), but only for the cryogenic systems, which in any case dominates the risk-based contingency for the LAr Far Detector.