

Charge from the LBNF Project Director/Project Manager  
Independent Conceptual Design Review of the LBNF Beamline Project  
27-28 May 2015

The Committee is requested to conduct an independent conceptual design review for the Beamline of the Long-Baseline Neutrino Facility (LBNF) Project. This review is a prerequisite for a planned CD-1 Refresh DOE Independent Project Review/Independent Cost Review (IPR/ICR) scheduled for July 2015.

The Long-Baseline Neutrino Facility (LBNF) Project will enable a world-class program in neutrino physics for the Deep Underground Neutrino Experiment (DUNE) focused on precision measurements of the neutrino mixing matrix via  $\nu_e$  appearance and  $\nu_\mu$  disappearance measurements, with goals of determining the sign of the mass hierarchy and searching for CP violation in the lepton sector. LBNF consists of a high-power, broad-band neutrino beam at Fermilab that will illuminate the DUNE far detector at the Sanford Underground Research Facility in Lead, South Dakota as well as the near detector on the Fermilab site, the cryogenic infrastructure to support the far detector, and all the necessary conventional facilities.

The predecessor LBNE Project achieved CD-1 in Dec 2012. The configuration and scope of DUNE-LBNF has evolved since then to enable a broader physics program with international partners. Significant changes in the Beamline configuration include introduction of helium in the decay pipe and an associated upstream beam window, designing the Beamline components to accept 1.2 MW beam power at the beginning of operations, revised shielding thicknesses based on updated and improved shielding calculations, reconfiguration of target chase shielding to utilize recovered steel, and significant progression of the hadron absorber design. Design reviews have been conducted for a few of these elements.

There are several options that may be pursued that could result in future modifications to the Project's scope. These are not currently part of the CD-1 scope; however they will be presented briefly and the committee will be asked to comment on them.

The committee is to review the entire Beamline Project's design, focusing on the changes that have not been previously reviewed, to verify that it is technically adequate, and should achieve the Project's scientific goals. To meet the requirements for CD-1 the design has to be at the conceptual level or greater. The committee will make their assessment based on outcomes of prior design reviews, LBNF's Conceptual Design Report, drawings, specifications, and discussions with the project team.