

## LBNF Primary Beamline Magnet Preliminary Design Review Charge

FNAL is collaborating with BARC, India, on the LBNF beamline. BARC will build and deliver to FNAL the primary beamline main dipole and quadrupole magnets (including spare magnets). The magnets consist of the following types:

1. IDAL – 6m-long dipole
2. IDDL – 4m-long dipole
3. QQD – 120”-long quadrupole
4. QQE – 60”-long quadrupole

The LBNF Primary Beamline Magnets are currently in the Preliminary Design phase at BARC, India. In order to ensure that the level of preliminary design is sufficient to move to prototype magnet fabrication, the panel is asked to perform a Preliminary Design Review of all four magnets.

The review is scheduled for February 16-18, 2021, 7:30am-10:30am each day.

The specific charge questions are:

1. Does the preliminary design meet the requirements for the magnetic field and the operational parameters (cooling, power and vacuum)?
2. Are the proposed production techniques and methods well described and documented?
3. Have suitable engineering analyses been performed, documented, peer-reviewed, and approved, where applicable?
4. Is the level of integration with other LBNF beamline entities appropriate for this stage of the work? Are interfaces and collaborative design inputs such as power supplies, water-cooling, beam vacuum, support, and alignment being managed appropriately?
5. Have potential risks and opportunities been identified and documented? Are the mitigation plans to address the risks and challenges appropriate?
6. Is QA/QC for the magnet manufacturing adequately planned?
7. Are the final measurements and acceptance testing well-defined?
8. Is the fabrication process for the prototype well developed? (equivalent to FNAL traveler)
9. Is the schedule for building the prototypes as well as the production magnets adequately planned and credible?

In addition to answering the charge questions, we ask the panel explore all aspects of the LBNF Primary-beam Magnet Preliminary Designs using the format of findings, comments, and recommendations.

We expect a brief oral close-out report at the end of the review. We request that the panel chairperson collect the findings, comments, and recommendations of the panel, and summarize them along with the answers to the charge questions in a written report within two weeks after the review.

Review Panel Members:

1. Steve Holmes (chair)
2. Vladimir Kashikhin – APS-TD
3. Dave Harding - APS-TD
4. Michael Anerella from BNL
5. Jeremie Bauche from CERN