

LBNF Working Groups - briefing document

This briefing document lays out the primary discussion issues regarding the initial LBNF Working Groups.

1) Aims of the Working Groups

We foresee two possible primary aims of the LBNF WGs that will be set up by the iiEB.

- **a) to provide input to the iiEB, defining the main scientific and technical issues for implementation of LBNF**, that will form the basis of the iiEB discussions on the main design parameters of the project;
- **b) to prepare the scientific and technical arguments for the LBNF Letter of Intent**, once the main parameters of LBNF have been defined.

In case **a)** it is assumed that the WGs will evolve to prepare the arguments for the LBNF (as in **b)** after the parameters have been defined. In both cases, once the new LBNF collaboration is fully functional, these WGs would be superseded by the new collaboration structure.

Action for the iiEB meeting: We ask the iiEB to consider these two options and to define the high-level aims of the LBNF WGs.

2) The LBNF Working Groups

At the July 2014 Fermilab Neutrino Summit, there was a consensus that there should be three main WGs covering:

- WG1: to present the scientific arguments for the LBNF physics programme, largely independent of the far detector site;
- WG2: to present the site-specific project implementation issues;
- WG3: to consider the impact of potential systematic uncertainties on the LBNF programme and to evaluate the required ancillary measurements/experiments that will be needed to meet the systematic uncertainty goals of LBNF.

At the Neutrino Summit there was a general consensus that WG1 and WG2 should be put in place immediately and that WG3 could be set up at a later date.

Action for the iiEB meeting: We ask the iiEB to endorse setting up WG1 and WG2 with immediate effect.

Action for the iiEB meeting: We ask the iiEB to consider the nature and timeline of WG3.

3) Organisation of the Working Groups

There are a number of options for the leadership and organisation of the working groups. Two options are presented below:

- each WG should have two co-chairs representing the interests of the existing LBNE collaboration and the wider international community (including LBNO);
- each WG should have an independent chair and two deputies, with the two deputies representing the interests of the existing LBNE collaboration and the wider international community (including LBNO);

The working assumption is that the iiEB will select the chairs/co-chairs.

Action for the iiEB meeting: We ask the iiEB to consider the options for the initial LBNF WG management structure.

4) Leadership of the Working Groups

The selection of the chairs of the working groups will be key to the success of this process. Rather than trying to select names today, we propose a one-week consultation period where all iiEB members will be consulted on potential candidates and a short-list will be set up.

Action for the iiEB meeting: We invite the iiEB to consider the proposed one-week consultation period, with the aim of producing a short list.

Action for the iiEB meeting: The iiEB needs to agree a process for selecting the WG leaders.

5) Operational model for the Working Groups

Two possible modes for the operation of the WGs could be:

- the WGs will be **closed** and made up of a relatively small group of experts selected by the chairs in consultation with the iiEB;
- the WGs should be **open** and organised along the line of a normal experimental collaboration, where all those wishing to contribute will be free to join.

Action for the iiEB meeting: We ask the iiEB to consider the options.

Action for the iiEB meeting: We propose that the iiEB should pass on responsibility for the membership of the WGs onto the chairs - does the iiEB agree?

6) Remit of the Working Groups

The remits of the WGs will depend on the overall aims as set out in 1), where the initial goal will be either a report to the iiEB, or presenting the scientific and technical arguments in the LoI. In either case a clear and agreed-upon presentation of the arguments will be required. As a starting point for the discussion, we propose that:

We propose that each WGs is charged to produce a short briefing document for the iiEB, that would lay out the key scientific and technical arguments that could then be distilled down to the LoI.

WG1 is charged to prepare a short briefing document (no more than ten pages) that outlines the key *scientific arguments* based on CPV and MH sensitivity:

- the discussion should be made in a site-independent manner, focussing only on the physics reach, with one exception: the design of the decay tunnel needs to account for the restrictions imposed by the host-laboratory site and coherence with the comparisons made in the context of WG2 need to be considered and taken into account;
- the WG should present the arguments for two cases:
 - independent of other experiments;
 - on the basis that the Hyper-Kamiokande experiment proceeds on a similar timescale.

WG2 is charged to prepare a short briefing document (no more than ten pages) that outlines the key *technical, cost and schedule arguments* of the project, covering

- the estimated overall costs of the experimental implementation at the two sites;
- the estimated, politically and technically limited schedules for the two sites.
- The WG should consider and clearly explain:
 - the resources expended to date on the development of the Homestake site;
 - the potential schedule and political impacts of selecting a new site;
 - the relative costs of excavation and experimental installation at the two sites.

Action for the iiEB meeting: The iiEB should agree on the general remit of the WGs.
