

To: Fabrice Matichard, Gordon Cline, Mike Wilking, Peter Wilson
From: LBNF/DUNE-US Near Detector Subproject
Date: 10/18/2023



Internal Assessment of ND Installation Plans
with Fermilab Subject Matter Experts (SMEs)

Working with Fermilab SMEs, we ask that you please complete an initial assessment of our near detector installation plans by considering similar installations that have already taken place at Fermilab. This is important needed input to determining CD milestones and the end date for the LBNF/DUNE-US Near Detector Subproject. Specifically, we ask that you please address the following:

- **Timeline**

- Starting point is [Fabrice's 30,000 foot installation summary](#)
- Is the duration allocated for the installation of each sub-system reasonable?
- What is the most optimal installation sequence, paying close attention to activities which can and cannot be done in parallel. How much can we serialize? Please explicitly call out any activities that will require 100% (solo) occupancy of the hall because of crane usage needs or otherwise.
- Have we properly accounted for the time needed for safety reviews and ORCs?
- Have we clearly defined the boundary between the end of project-supported installation activities and the start of commissioning for each subsystem? How do we validate the installation?
- Does the overall efficiency of work seem reasonable? Please consider both surface and underground activities.
- What is our total estimated duration of near detector installation underground?
- Please identify any impacts the installation sequencing may have on possible design features (re: safety, tooling, motorized vs. manual PRISM movement).

- **Resources**

- Does the level of costed resources in support of near detector installation seem reasonable given how similar installations have occurred at Fermilab? Please also consider what we are considering for uncosted labor.
- Are we double counting any installation resources held in I&I and at the detector subsystem level?
- Please review assumptions about on-project equipment rental versus existing resources at Fermilab. Are there any resources we are including on-project that would instead be provided by the host lab?

- **Prior Reviews**

- Please review and comment on the recommendations from the [ND I&I Cost Review](#) in April 2022. See [final report](#).

- **Possible Opportunities (bonus question)**

- Are there any obvious installation-related activities that should be considered to be performed above ground so as to increase ease of installation underground?
- Please identify any components that exceed the capacity of the 15 ton surface crane. Is there an optimization to be had between increasing the capacity of the surface crane versus having to rent an external crane?
- What worries you?
 - What are the largest risks in the installation plan?
 - Are there any gaps in the current plan?

Assumptions:

- Assume that SAND and LHe cryogenics are off-project. Please do not include either of these activities for now in this U.S. Project-based exercise.
- Assume detector commissioning and argon fill will be done on Operations, not as part of the LBNF/DUNE-US Project.
- Assume availability of the near site hall in August 2028. This is when our ND installation activities can start.
- Assume start of physics beam in October 2031. It is useful to consider the state of each of the near detectors in the near hall when first neutrino beam turns on for DUNE.

As part of this process, please pull in any additional SMEs from Fermilab in reviewing our plans for on-site underground installation of the LBNF/DUNE-US Project near detectors. Suggested additional consultants: Cat James (MINOS), Roberto Acciarri (SBND, protoDUNE), Jen Raaf (MicroBooNE, 2x2).

We ask that you please complete this high level review of ND I&I activities, resources, and installation sequencing/overlap in the form of a written summary by December 15, 2023.

Thank you,

Lidija Kokoska
LBNF/DUNE-US Near Detector Project Manager (PM)

Hirohisa Tanaka
DUNE Near Detector Technical Coordinator

Sam Zeller
LBNF/DUNE-US Near Detector Deputy Project Director (DPD)