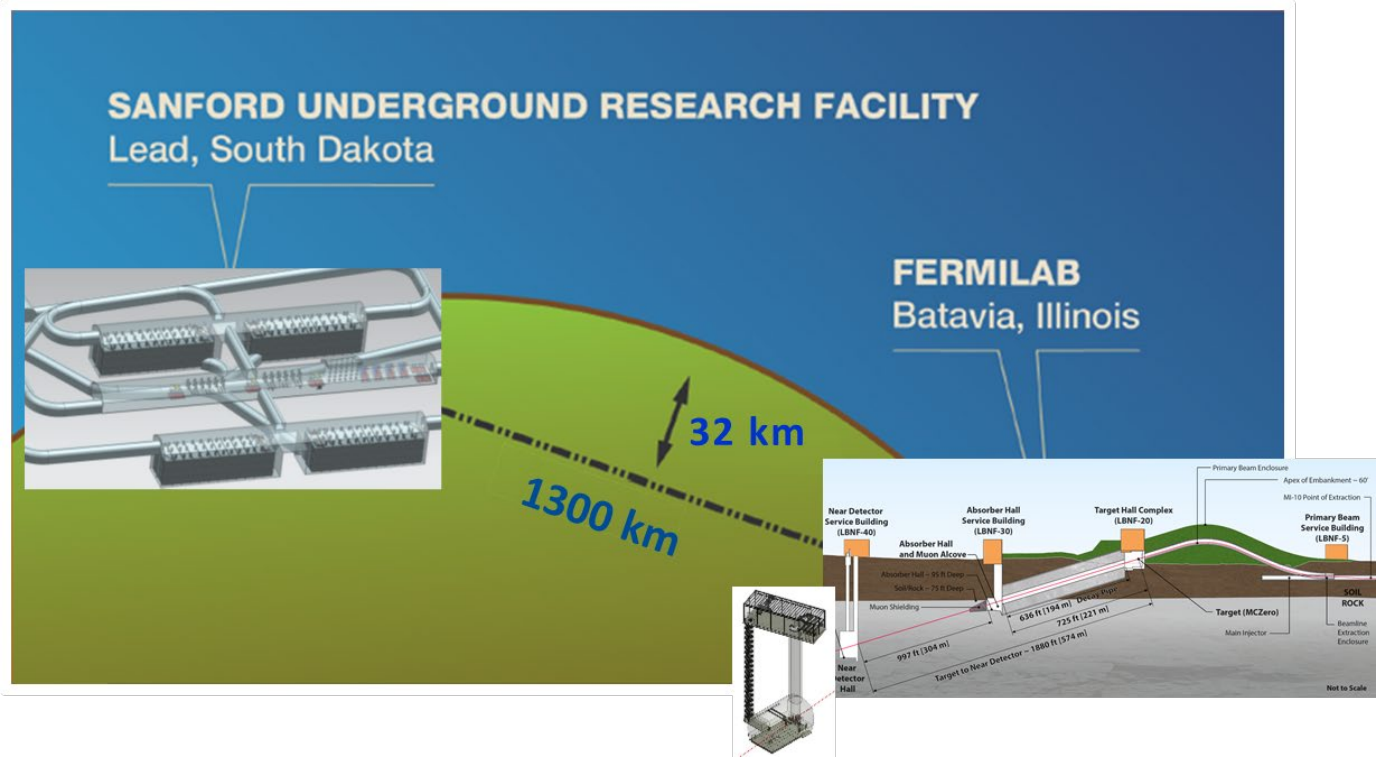
Fermilab

Operated by Fermi Research Alliance, LLC for the U.S. Department of Energy Office of Science

LBNC Closeout: LBNF

LBNC

14 June 2016



Findings / LBNF

- LBNF executed a lease with SDSTA on 1 May 2016 for the underground space for caverns and drifts and the surface space for the control room, cryogenics support building, and parking.
- Easements need to be set up for those areas within SURF that are outside of the leased area, but which are necessary for LBNF/DUNE success (e.g. shaft utility space).
- LBNF Near Site / Beamline efforts are focused on beamline optimization trades that require analysis, conceptual development, and estimating to determine whether they should replace existing beamline approach.
- Radically different beamline approach was presented at May 2016 DUNE collaboration meeting. First determination of potential viability with be before EFIG in July 2016.

Findings / LBNF

- Cryogenics work has focused on ProtoDUNE as both a engineering prototype and as design verification tests
- RFI has been issued for LN_2 system and is being evaluated
- The SURF operations contract between FNAL and SDSTA is being put in place. It is separate from LBNF/DUNE and will be managed under the FNAL COO Organization
- The LBNF plan is to have SDSTA perform project related SURF reliability activities
- CM/GC procurement process has consumed all of its schedule float. Goal is to have CM/GC in place no later than 6 Dec 2016 to allow effective interaction with final excavation design effort. Draft RFP has been released and pre-proposal conference is scheduled for 19 July 2016

Findings / LBNF

- Fermilab has finalized a process for establishing equivalences for international design codes and standards.
  - 1 equivalency review complete
  - 1 equivalency review underway
  - 4 others planned, not including electrical device standards
- LBNF continues to staff up immediate hires completed or in process include:
  - LBNF/DUNE QA Manager
  - LBNF/DUNE Financial Manager
  - Senior Procurement Administrator
- LBNF continues an active risk management approach
- LBNF is looking at contingent planning for FY2017 budget uncertainties

Comments / LBNF

- The iterations with the DOE for approvals for the CM/GC contracting consumed all schedule float. This may reflect unfamiliarity of Fermilab with the demands associated with complex contracting instruments within the DOE system
- Fermilab should look to strengthen its sophistication of procurement and contracting support to ensure that development and approval chains do become schedule limiting steps in the future
- Complications associated with the easements and infrastructure improvements to non-Federal government property could easily represent a source of schedule risk if additional care and effort are not fully engaged.

Comments / LBNF

- Fermilab should exercise care to ensure the careful coordination and integration of the SURF operations contracts within the COO organization and the LBNF improvements
  - In particular Ross Shaft refurbishment could be problematic
- A formal MOU between FNAL COO and LBNF/DUNE should be considered as has been done on other major system DOE-SC projects
- Every effort to avoid any further delay in engaging the CM/GC as issues associated with the CM/GC approach almost always are related to delay in engaging the CM/GC
- LBNF should carefully set up “freeze” dates where major variations in the design can no longer be entertained or significant cost and schedule growth could result.

Comments / LBNF

- LBNF should consider careful reviewing / oversight of the reliability activities at SURF. Approaches and perspectives from from past mining operations standpoint may not adequate for fully appreciating reliability and availability requirements. SURF would likely appreciate welcome a degree independent advising as it looks to strengthen its overall operations.

Recommendations

- None

Findings / Far-Site Construction

- Far-Site Construction is both a combination of
  - Underground excavation
    - ~800,000 tons of material
  - Underground and surface infrastructure improvements
    - Ross Shaft refurbishment completion
    - Ross Shaft utilities
    - Cryogenic compressor building and cryogenic systems (LAr and LN2)
    - Excavated rock handling system
    - 12kV power feed and transformer upgrade
    - Control room

Findings / Far-Site Construction

- The final design plan is a standard design development
  - 30%, 60%, 90%, and 100% design completion deliverables
  - CM/GC involvement and independent estimates as early as possible as well as constructability reviews
- Design divided into two major scopes:
  - Pre-excavation work (rock handling / utilities upgrade)
    - 30% March 2016;
    - 60% July 2016;
    - 90% Oct. 2016;
    - 100% Nov. 2016
  - Main Scope (excavation)
    - 30% March 2017
    - 60% July 2017
    - 90% Oct. 2017
    - 100% Dec 2017

Findings / Far-Site Construction

- Construction sequence has been modified to avoid mobilizing the excavating contractor twice.
  - Requires installing protection to the refurbished steel in the Ross Shaft (cost neutral)
- Blast vibration studies indicate that the Federal guidelines (related to cracking plaster) would restrict blasting to about ~2 ft. / blast. Using SNOLab experience indicates closer to 8 ft / blast may be realized (impacting activities ~300 ft from blast)
- Lead, SD has approved the easement of the conveyor system to open cut disposal site.
- Excavated rock handling progress
- Ross Shaft refurbishment at 73% complete covered by SURF operating contract
- SDSTA plans on exercising option to purchase 33.4 additional acres of adjacent land from Barrick. This will improve access.

Comments / Far-Site Construction

- The progress on the conveyor system is notable progress and reduces uncertainty and risk to the project.

- The purchase of the 33.4 acres (Ellison tract?) by SDSTA for SURF is a very significant risk reduction action and will both simplify access and provide some lay down space.

- The blast study appears carefully developed, and care will need to be exercised as an acceptable overpressure specification for adjacent operations is selected.

Recommendations

- None