



Response to Recommendations
from the
DOE CD-1 Review
of
NOvA

June 1, 2007

PVC Modules

1. Revisit the time and motion studies for module assembly using experience gained with 16-cell extrusions.

We have done considerable time and motion studies over the past year with full length, 16 cell extrusions as well as full length 32 cell extrusions using 2 16-cell extrusions glued together.

2. Perform an ergonomic assessment for module assembly; in particular, the manual trolley crane movement.

This was done with the parts used for the time and motion studies.

3. Develop a plan for use and maintenance of the vacuum lifters.

We have built and tested vacuum lifting fixtures and tested them on full length 32-cell extrusions. We have explicit plans for module assembly and block assembly that both incorporate vacuum lifting fixtures.

4. Design the fiber retainer to maintain fiber bend radius for filling and during transportation.

Done.

5. Develop designs for strain relief of utilities on modules.

Designs exist. They will be tested and refined as the IPND is assembled.

6. Develop designs for access to install utilities on the top and sides of module blocks.

Done. Access to the top and sides of module blocks was an important input requirement for the building design and has been the subject of many integration meetings. Access to the sides of the blocks will be available from the 7 levels of catwalks that run the length of the building on both sides. Access to the top of the detector is made from moving platforms that run along the length of the detector hall immediately above the detector.

7. Reinforce the systems engineering team at the project management level for control of interfaces.

Still to be done.

8. Evaluate filling operations for static electricity hazards.

Done. We have expended a considerable effort to understand and mitigate this risk. Liquid scintillator supply lines will all be metal and properly grounded. The liquid scintillator will be made semi conductive, in accordance with industry standards, by adding 3 ppm of Stadis 425, a commercial anti static agent.

9. Develop a more robust plan for sensing liquid level during detector filling.

Done. Level sensors will be deployed on the module expansion tanks and will automatically shut off the filling machine when the extrusion is full.

Trigger and DAQ

1. Include off-project labor access to review the man-power resource estimates.

Done. Physicist labor is fully included in the cost and schedule for the entire project, including the Trigger and DAQ subsystem.

2. Consider the suggested increase in software man-power to meet the presented schedule.

We recognize the labor shortfall in this area and are trying to find additional resources.

Cost Estimate

1. Reassess contingency on the entire project after finalizing the conventional building acquisition strategy and siting.

Done.

Schedule and Funding

1. Develop FTE resource estimates for the NOvA project (including zero cost physicists) immediately and communicate the project's needs throughout laboratory management and the NOvA collaboration.

Done.

ES&H

1. Include ES&H criteria in selection of mineral oil if a “mildly refined” mineral oil is considered.

This recommendation led to a risk analysis of our mineral oil, documented in NOvA-doc-1835. We are using a technical grade mineral oil. We have looked at the possibility of using lower grade, less refined, mineral oil but they do not meet our performance specifications. We will continue to use the technical grade mineral oil, so this will not be an ES&H concern.

2. Determine the impact of DOE 10 CFR 851, Worker Safety and Health Program, on the project. The rule codifies, with enforcement, the DOE worker protection program and is effective February 2007.

The Laboratory ES&H section has done a gap analysis and determined that Fermilab is in compliance with 10CFR851. NOvA is in full compliance with Fermilab requirements and hence, in full compliance with 10CFR851.

Procurement

1. Pursue potential import duty exemptions on major foreign procurement activities in support of NOvA prior to finalizing and placing obligating business documents.

We have determined that the WLS fiber from Japan is not currently exempt from import duty, though a number of similar optical fiber products are exempt. We are in the process of seeking an exemption. The APDs, also from Japan, are already exempt.

2. Continue to ensure project personnel work closely with procurement personnel to quantify costs on major procurements prior to CD-2 submission.

We continue to work very closely with Fermilab procurement. They are an integral part of the Project Team.

Management

1. Establish (DOE and NOvA) an overall project funding profile and a mechanism for the design and construction of the far assembly building to proceed to CD-2.

Done. We have had a funding profile for many months now. The design and construction of the far Detector Hall will be funded through a Cooperative Agreement to the University of Minnesota.