

Closeout for 2x2 Demonstrator

Committee Members:

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Executive Summary

- The project has a lean but effective management team and the level of detail in the project planning documentation seems appropriate for a project of this size.
- The team is to be congratulated for assembling detailed presentations on the project planning, and for responding quickly and thoroughly to the committee's questions from the first day of talks.

Charge Question #1

- Does the installation have an appropriate level of project management for its scale?
 - The committee's concern is less with the number of managers, but more with the number of people available to address each specific task. Management level is appropriate, but management is struggling to get enough of the identified resources. The team has an appropriate set of management tools to characterize labor resource needs and M&S needs as a function of time. Although there were some risks identified, they were not quantified as much as would be helpful from a management perspective. One example: there's a schedule risk associated with the ODH analysis, and one could mitigate that by starting this task earlier.

Charge Question #2

- Is there a resource loaded schedule and is it thorough? Is it developed to the appropriate level of detail so that it can serve as a useful tool for managing cost and schedule performance?
 - Yes, and it is serving for tracking cost and schedule. (see response to question 1).

Charge Question #3

- Have a complete set of milestones been defined that enable adequate tracking of progress?
 - More milestones are needed, we suggest roughly one per month for adequate tracking.

Charge Question #4

- Are all required M&S and labor resources included at the appropriate level of detail and are the associated costs and schedule durations realistic?
 - The project that was presented was adequate from a detail point of view of the list of tasks, but the committee considers some of the labor resource efforts needed optimistic. One example was inserting the modules in the cryostat at LArTPC: the task was listed 10 technician days but during the discussion it was agreed that the effort will “probably take 1-2 weeks of a 3-person crew”, this should be listed at 15-30 technician days instead of 10.
 - The prohibition on performing electrical work on a Time and Materials basis likely increases the overall cost for performing such work and clearly substantially increases the cost of managing the work.

Charge Question #5

- Are major procurements, interfaces between the subsystems, and integration of the installation being adequately identified, planned for, and managed?
 - The interfaces are in the process of being documented: The interface document we were presented had many interfaces listed but not all the interfaces had supporting documentation referenced. This is an experienced team that understands the importance of interfaces, and they are in the process of planning and managing these interfaces.

Charge Question #6

- Are the dependencies on non-Fermilab resources understood and integrated into the planning?
 - The dependencies are understood reasonably well for the delivery of the modules and electronics. The dependencies on non-Fermilab labor resources are not as well-documented. The committee is happy to see that a new person has been added to the planning effort, Jay Hyun Jo (from Yale) and we encourage the team to document the expected non-Fermilab scientific effort to the specific tasks where it is needed. This way the Consortium can plan long stays at Fermilab as needed.

Layout and Installation Support

- Recommendations:
 - Prepare the engineering design for the walking working surface in the MINOS hall, include safety professional review of the design, and document in an engineering note per FESHM 5100.
 - Perform a heat load analysis in the cavern to verify that the ambient temperature in the cavern will remain at an acceptable level.
 - Develop the cryostat lifting fixture design so that the lift angle is not less than 45 degrees.
 - Communicate with the stock room prior to starting the cryostat argon fill to give the stockroom and the vendor notice of the relatively large argon needs.

Cryogenics and Related Instrumentation

- Recommendations:
 - Revisit the labor estimates for the cryogenic work based on a more thorough assessment of as-realized costs for other projects.
 - Revisit the duration and cost estimates for the large cryo procurements that have yet to begin.

Electronics and Readout Integration

- Recommendations:
 - A risk should be added to account for potential problems with the refurbishment of the Wiener DC power supplies.

TPC and Consortium Deliverables

- Recommendations:
 - Take credit for the consortium labor contributions in the schedule to facilitate planning (see below)

Management:

- Recommendations:
 - A complete cost/benefits analysis should be performed for the installation and test program at the Liquid Argon Test Facility.
 - A reevaluation of the plan should be performed in an attempt to satisfy the schedule requirements of DUNE. If this schedule requirement cannot be met, the plan should be reconciled within the experiment.

Cost and Schedule

- Recommendations:
 - Calculate the total cost of the project.
 - Determine the resource profile required to meet the schedule requirement of DUNE.