

**Charge for the Director's CD-2/3a Review
of the
NOvA Project
June 04-06, 2007**

This charge is for the Committee to conduct a Director's CD-2/3a Review of the proposed NOvA project at Fermilab. The review is to assure that all the requirements will be met for DOE to approve CD-2/3a. The DOE CD-2/3a review is currently scheduled for July 17-19, 2007.

The purpose of the NOvA project is to fabricate the NOvA near and far detectors and to provide a detector hall for the far detector, as well as upgrade the Fermilab Recycler and Main Injector accelerators and the NuMI beamline. The ensemble will permit the experimenters to study neutrino oscillations, in particular, to search for the oscillation of muon-type neutrinos to electron-type neutrinos. If these oscillations can be observed then the experimenters may be able to determine the mass-ordering of the neutrinos and to observe Charge Parity (CP) violation in the neutrino sector. Determination of the mass-ordering is a unique contribution made possible by NOvA's very long baseline.

CD-2 is approval of the Performance Baseline. The Performance Baseline is developed based on a design document (Preliminary Design or a Technical Design Report), a well-defined and documented scope, a resource-loaded detailed schedule, a definitive cost estimate, defined Key Performance Parameters and some additional project management documents. Approval of CD-2 authorizes submission of a budget request for the Total Project Cost (TPC) and detailed engineering design.

CD-3a is approval to start limited Construction. NOvA is requesting CD-3a for infrastructure and site preparation work to support the start of building construction and limited items for the Detector and ANU activities that are either long lead time items or parts required to start construction of critical items. The design and engineering for these items should be completed to the degree appropriate to initiate construction as scheduled. A review of the CD-3a items should be performed to assure that all environmental, safety and security criteria are met. DOE CD-3a approval provides authorization to complete procurement and construction of the specified work.

The technical part of the review should focus on the designs for the detector and building as well as the upgrades to the accelerator and NuMI. Respond as to whether the designs meet the technical specifications and whether the designs are sound. The cost and schedule baselines are based on a detailed WBS – Work Breakdown Structure, WBS Dictionary, BOE – Basis of Estimate documentation, risk and contingency analyses, RLS – Resource Loaded Schedule, and time phased funding and cost profiles. The committee is asked to review each of these items, for quality, completeness, and accuracy. The committee is also asked to review and assess the quality of and comment on the additional formal project management documentation provided in support of CD-2/3a.

DOE's guidance to NOvA is to not exceed a Total Project Cost (TPC) of \$260M. Based on the scope of work presented during the review, the committee is to assess whether the project can be built within the guidance. If it is determined that the work scope as presently defined cannot be completed within the guidance, then the Far Detector mass will be the relevant scope parameter.

As part of this assessment the questions listed in Attachment 1 of this charge should be addressed. Additionally the review committee is to review and comment on the Project's response and actions taken on the recommendations from the Director's CD-1 Review of NOvA on February 28 - March 2, 2006 and from the DOE CD-1 Review conducted April 4-6, 2006. The review committee is to also review and comment on the Project's response and actions taken on the relevant ANU related recommendations from the Director's Preliminary Review of the Super NuMI (SNUMI) Plan conducted on November 14-16, 2006. Constructive comments on presentation content, format, and style are also requested.

Finally, the committee should present findings, comments, and conclusions at a closeout meeting with NOvA's and Fermilab's management and provide a written report soon after the review.

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Attachment 1

Technical

- Are the technical specifications clearly stated and documented?
- Can the design be built? Does the design meet the technical specifications? Is it a reasonable design?
- Does the baseline design meet the project's objectives (mission need)?

Cost

- Is the Work Breakdown Structure (WBS) appropriate for the project scope?
- Do the cost estimates for each WBS (or cost) element have a sound documented basis and are they reasonable?
- Does an obligation profile exist? How does it compare with the funding guidance?

Schedule

- Is the schedule well developed and appropriately structured by specifying relationships, predecessors, successors, critical path, resource loaded, etc?
- Are the durations for the activities and overall schedule reasonable and achievable with the assumed resources?
- Does the schedule contain appropriate levels of milestones, sufficient quantity of milestones for tracking progress and do they appear to be achievable?
- Does the schedule include activities for design reviews, which include assessment of the designs readiness for procuring prototypes, preproduction and production materials?

Management

- Is there an appropriate management organizational structure in place to accomplish the design and construction?
- Is the organization structure well documented, responsibilities defined and appropriate for the scope of work?
- Are there adequate staffing resources available or planned for this effort?
- Is there a funding plan available or proposed to meet the resource requirements to realize the project?
- Has a Risk Plan been developed, risks identified, risks analyzed, risk responses planned/implemented, risk monitoring/control process established and do they seem appropriate?

Procurement

- Have the critical procurements been identified and are they included in the schedule with adequate lead time built in?
- Have critical make vs. buy decisions been evaluated in conjunction with the scope and is that reflected in the baseline cost estimate, schedule and technical risk plan?
- Are the Project designs final and procurement packages prepared to the degree appropriate to order materials and initiate construction as scheduled?