

**Director's Conceptual Design Review  
of the  
Muon to Electron Conversion Experiment (Mu2e) Project  
May 03-05, 2011**

**Charge**

The Committee is to conduct a Director's Conceptual Design Review of the Muon to Electron Conversion Experiment (Mu2e) Project to assess the status and adequacy of the overall Mu2e conceptual design effort. Mu2e received CD-0 on November 25, 2009. This is an independent review to verify that Mu2e's design is at the state for a DOE Critical Decision 1 (CD-1) "Approve Alternative Selection & Cost Range" Review. This is not a cost, schedule, or management review. These aspects of the project will be assessed during a separate Director's Review.

The Mu2e Project will construct a new facility to enable the world's most sensitive search for charged lepton flavor violation by searching for the conversion of a muon to an electron in the field of a nucleus. Mu2e will be ~10,000 more sensitive than the world's current best limit. The project consists of modifications to the existing Fermilab accelerator complex, construction of a new external beamline, construction of a new detector hall on the Fermilab site and construction of a new detector to search for muon conversion. The detector includes a complex system of superconducting solenoids, a collimation and charge selection scheme for producing the world's most intense muon beam, a low mass tracking detector operating in vacuum, a crystal calorimeter and a cosmic ray veto. Many aspects of the project will be executed by other collaborating National Laboratories and universities.

The review team is asked to address the following questions:

1. Is the design technically adequate? Is the design likely to meet the technical requirements? Are the physics requirements clearly stated and documented? Have these requirements been translated into technical performance requirements and specifications?
2. Can the design be constructed, inspected, tested, installed, operated and maintained in a satisfactory way?
3. Is there adequate supporting documentation to support the conceptual design and the transition to developing the preliminary design?
4. Are the risks (on technical, cost, and schedule basis) of the selected base design approach and alternatives understood and are appropriate steps being taken to manage and mitigate these risks? Have areas been identified where value engineering should be done? If value engineering has been performed is it documented?
5. Are the project organization and lines of responsibility clearly defined and sufficient to ensure the successful engineering and design of the project? Are the design interfaces between the Accelerator Systems, Experimental Facilities, and Conventional Facilities groups understood and well enough defined to ensure a coordinated effort and an integrated design? Is there a reasonable plan in place for implementing configuration management to ensure changes to the technical requirements/specifications are controlled and communicated to all affected groups?

Finally, the committee should present findings, comments, recommendations, and answers to the above question at a closeout meeting with Mu2e and Fermilab's management. A written report will be provided soon after the review.