January 30, 2015 Mu2e Proton Target Remote Handling Technical Review

The Mu2e project is in the process of completing its final design. As part of this process we would like this committee to conduct a technical review of the Mu2e proton target remote handling system.

The function of the Mu2e proton target remote handling system is to perform the initial installation of the Mu2e proton target as well as to provide a system whereby the proton target can be replaced by remote control. The proton target is located inside the cryostat of the Mu2e Production Solenoid, which is also under vacuum. The remote handing system must be capable of accessing and replacing the target as well as re-sealing the vacuum system after a new target is installed. Mu2e proton target replacements are expected to be required approximately once per year.

The baseline design of this system consists of a robotic chassis mounted on floor rails. The remote handling robot travels from an underground room that is adjacent to the target hall to a position behind (downstream) of the Production Solenoid. Once in position the robot can be manipulated to access the vacuum vessel and replace the target.

We also would like the committee to evaluate an alternative to the baseline design, which we have named the "Overhead Scheme." In the overhead scheme, the remote handling system would be a series of 3 modules, each lowered into place behind the Production Solenoid by a gantry crane. The crane is housed in an overhead surface building and access to the target hall is through a hatch with a removable shield pile.

We would like the committee to address the following questions:

1. Is the design of the baseline scheme technically sound? What are the technical risks associated with the baseline design? Are there any significant unaccounted for contingencies in the baseline scheme? Have the radiological hazards associated with replacing the Mu2e proton target been adequately addressed in the baseline remote handling design?
2. Is the design of the Overhead Scheme technically sound? Are there sufficient advantages to the Overhead Scheme to warrant the increased cost? Note that significant cost increases will be very difficult to achieve. Have the radiological hazards associated with replacing the Mu2e proton target in the Overhead Scheme been adequately addressed?

We would like the committee to submit a written report of its findings, comments, and recommendations by April 15, 2013