

# Charge for the Technical Design Review of the Mu2e Radiation Safety Improvements

The Mu2e project received CD-2/3b approval from the DOE in March 2015. The project is in the process of completing the final design and preparations for a CD-3c DOE review in early CY 2016. External peer reviews of key technical elements of the project are a part of this process. The availability of completed reviews to the CD3c review complete will streamline the CD3c review process.

The primary objective of the Radiation Safety subsystem is to design and implement the radiation safety upgrades that are required to permit the operation of the muon campus with a beam power of 8 kW. The scope of work includes:

- Design, fabrication, and implementation of an AP1 to Delivery Ring Total Loss Monitor (TLM) radiation safety system.
- Design, fabrication, and implementation of the Delivery Ring radiation safety system upgrades, which includes a Delivery Ring TLM radiation safety system and in-tunnel shielding of known beam loss points.
- Design, fabrication, and implementation of the external (M4) beamline radiation safety system, which includes M4 beamline safety system interlocks, M4 beamline TLM system, and M4 beamline in-tunnel shielding.
- Design, fabrication, and implementation of the Mu2e proton target hall radiation safety interlock system.
- ODH systems for the Production Solenoid, Transport Solenoid, and Detector Solenoid spaces of the Mu2e building.
- Deployment of Friskers, Wallflowers, and Air Monitors

The Mu2e project management would like the committee to review and comment on the current technical design of Mu2e Radiation Safety Improvements. In particular, the committee is asked to address the following questions:

1. Is the scope of the Radiation Safety Improvements subproject adequate to meet the requirements of the Fermilab Radiological Controls Manual (FRCM)?
2. Is the design, fabrication, and implementation of the TLM systems for the AP1 to Delivery Ring, Delivery Ring, and M4 beam line technically sound and mature enough to be considered a final design? Are there any remaining issues that require attention prior to the fabrication and installation of TLM systems?
3. Is the design of the Electrical and Radiation Safety Systems for the Delivery Ring, M4 beam line, Production Solenoid Room, Transport Solenoid Room, and Detector Solenoid Room technically sound and mature enough to be considered a final design? Are there any remaining issues that require attention prior to the fabrication and installation of these systems?
4. Is the design of the ODH systems for the Production Solenoid, Transport Solenoid, and Detector Solenoid rooms technically sound and mature enough to be considered a final design?
5. Is the plan to deploy Friskers, Wallflowers, and Air Monitors technically sound and mature enough to be considered a final design?
6. Has the design of in-tunnel shielding systems been adequately reviewed? Can these designs be considered final designs?

7. MARS simulations have recently been completed for the Production Solenoid room shielding berm. Supplemental concrete and steel shielding masses have been included as a result of the latest simulations. Is the final simulation result compliant with the requirements of the FRCM? Was the final simulation completed using acceptable modeling techniques?

The review is scheduled for the week beginning October 19, 2015. The committee is requested to submit a report containing its answers to the charge questions and its recommendations to the Mu2e Accelerator project manager within two weeks after the conclusion of the review.