

Proton Improvement Plan-II Injector Test Facility
25 MeV Beam Commissioning
Operational Readiness ORC
25 – 26 August 2020

Charge

Over the last several years, the Fermilab Proton Improvement Plan-II (PIP-II) Project has steadily been installing and testing components for the PIP-II Injector at the PIP-II Injector Test (PIP2IT) Facility at the Cryomodule Test Facility (CMTF). These tests verify the PIP-II Injector front end can achieve the necessary performance parameters for the final PIP-II project, thus retiring several project risks.

The next phase at PIP2IT is 25 MeV beam commissioning to verify the functionality of the PIP-II warm front end and characterize the beam properties after being accelerated by the first two cryomodule types. This will include initial measurements of the output beam parameters and to establish procedures and conditions for subsequent PIP2IT 25 MeV beam operations.

The PIP2IT layout consists of the following major systems.

- 30 keV H⁻ ion source (IS);
- Low Energy Beam Transport (LEBT) line;
- 2.1 MeV Radio Frequency Quadrupole (RFQ);
- Medium Energy Beam Transport (MEBT) line;
- Two Superconducting RF cryomodules: Half Wave Resonator (HWR) and prototype Single-Spoke Resonator (pSSR1);
- High Energy Beam Transport (HEBT) line; and a
- Beam dump located at the downstream end of the machine.

To be fully prepared to achieve the goals of the Fermilab experimental program, an Operational Readiness ORC is being commissioned to review the projects readiness to begin beam commissioning at the PIP2IT Facility. Fermilab requested that the ORC Committee conduct a readiness review of the PIP2IT Facility to assess if the hardware, personnel, and administrative systems and programs are ready for safe commissioning and operations.

To support initial operation of the PIP2IT Facility, a Shielding Assessment and Hazard Analysis for same were developed by the project. The shielding assessment has been reviewed and

approved in accordance with Fermilab policies. The Hazard Analysis has been reviewed and approved by project management.

In performance of the ORC of PIP2IT and the identification of potential issues, the committee is asked to address the following charge questions. Finally, the committee should present findings, opportunities for improvement, noteworthy practices and specific answers to the charge questions at a closeout meeting with Fermilab's management. Recommendations will be entered into the ORC tool to track to completion.

ORC Charge Questions

1. Has an adequate hazard analysis for this phase of commissioning been developed?
2. Has an appropriate commissioning plan been developed?
3. Has the Radiation Safety Interlock System been installed and approved in accordance with the Fermilab Radiological Control Manual (FRCM)?
4. Has a Configuration Management plan been developed for the Machine Protection System?
5. Have the procedures necessary for commissioning been developed and approved?
6. Have qualified staff members been trained and are available to perform the commissioning within the established roles, responsibilities, authorities and accountabilities?
7. Is the necessary accelerator hardware, beamline controls and monitoring systems in place and adequate to support the commissioning and operations of PIP2IT Facility?