

| Parameter   | Measurement  | Commissioning Goal   |
|---|--|--|
| Proton intensity in target hall   | Toroid (or equivalent) beam intensity monitor at entrance to the Target Hall | Greater than $1 \times 10^{12}$ 120 GeV protons/spill  |
| Beam alignment  | Transverse distributions of the proton beam and secondary beams.             | Proton direction established to within 1 mr of the known direction to the Far Detector in the Soudan mine. |
| Neutrino beam energy  | Near detector event energy   | Low energy, 2-4 GeV  |
| Cosmic ray muons detected in the MINOS Near Detector  | Near Detector data read out through DAQ system                               | Majority of the 153 Near Detector planes sensitive to muons  |
| Near detector neutrino flux   | Charged current event rate in 1.5 ton fiducial region                        | Observe neutrinos in the Near Detector produced by the NuMI beam   |
| Cosmic ray muons and atmospheric neutrinos detected in each of the two MINOS Far Detector Super Modules | Far Detector data read out through DAQ system                                | Majority of the 484 planes of the Far Detector sensitive to muons and atmospheric neutrinos.               |

**Table 1(a)** Technical Commissioning Goals

| Parameter  | Measurement  | Operational Goal   |
|--|--|--|
| Proton intensity in target hall                              | Toroid (or equivalent) beam intensity monitor at entrance to the Target Hall | $4 \times 10^{13}$ /spill<br>$3.6 \times 10^{20}$ /year                |
| Beam alignment   | Transverse distributions of the proton beam and secondary beams.             | Neutrino Beam centered on Far Detector to $\pm 0.2$ m                  |
| Neutrino beam energy   | Near detector event energy   | Low energy, 2-4 GeV<br>Medium energy, 4-8 GeV<br>High energy, 8-16 GeV |
| Near detector neutrino flux                                  | Charged current event rate in 1.5 ton fiducial region                        | $1.5 \times 10^{-15}$ events/proton                                    |
| Far detector neutrino flux*                                  | Charged current event rate   | $4 \times 10^{-18}$ events/proton                                      |
| Muon momentum resolution <sup>+</sup>                        | Curvature vs. range in magnetic overlap region                               | 14%  |
| Hadron energy resolution <sup>+</sup>                        | Test beam  | $\sigma E/E = 70\%/E^{1/2} + 8\%$                                      |
| Detection efficiency for charged current events <sup>+</sup> | Event length distribution  | 90% with <4% neutral current contamination                             |

\*Assuming 50% reduction from neutrino oscillations

+Applies to both near and far detectors

**Table 1(b)** Technical Operational Goals