Fermilab accelerator operations summary for FY17 – Q3

4/3/2017 – 7/3/2017

Executive Summary:

During the reporting period beam was delivered to the NuMI target for NOvA, MINOS+ and MINERvA data taking. Beam was also delivered to Switchyard 120 for SeaQuest and to support a program of test beam experiments at the Fermilab Test Beam Facility (FTBF), to the BNB target for MicroBooNE data taking, and to the new muon g-2 beamline and storage ring to begin commissioning.

During the quarter there were periods of scheduled and unscheduled downtime. During the full reporting period, 2.00×10^{20} protons were delivered on target for NuMI and 1.17×10^{20} protons were delivered on the BNB target.

More detailed information is available in presentations at the weekly All Experimenters' Meetings. See reports on the web at

http://www.fnal.gov/directorate/program_planning/all_experimenters_meetings/index.html

Status and Plans:

This quarter started with NuMI, BNB and the Fixed Target program receiving beam. We established a new one hour power on target record of 725.88 kW on April 17th. At the end of the last quarter we were steadily delivering 641 kW to NuMI with Switchyard operating and maintaining above 5.4e16 protons on target to BNB. We were able to maintain the NuMI power on target throughout this quarter. This quarter continued to be plagued with problems in the MI520 region around the extraction septa. Initial problems with the septa were primarily due to broken wires in the septa wire plane. The downstream tank was replaced on April 16th, after the tank replacement the problem transferred to vacuum instability in the region. The instability would periodically inhibit both Switchyard and NuMI beam. Repair attempts never fully corrected the problems, but incremental improvements finally allowed the vacuum to pump down and remain stable at the end of May.

The Muon Campus facility began beam commissioning in the evening of Wednesday, April 5th, with the goal of delivering beam to the g-2 experiment by June 1st. They made steady progress in the time allotted. An 8 GeV beam was injected into the delivery ring the week of April 24th, and circulated around the ring the following week. A 3.1 GeV beam was transmitted through the Muon Campus facility the week of May 8th, and beam was delivered to the g-2 ring on May 23rd. By May 31st, beam was circulating in the g-2 ring for the experiment to begin commissioning their facility.

At the end of June we were able commission the 750 KeV Linac laser notcher, to be used on all the beam cycles through Booster. This will reduce injection losses in the Booster ring.

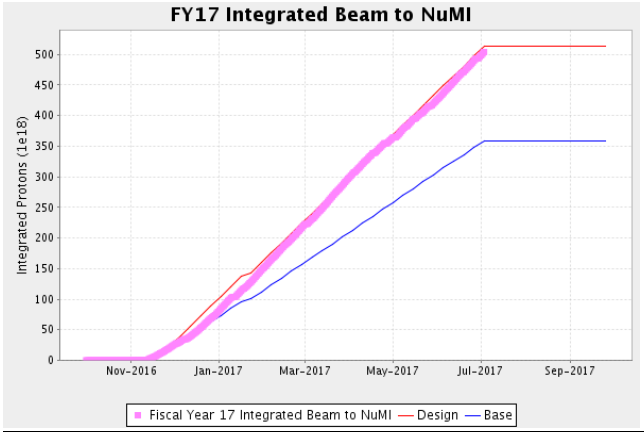
This quarter ends prior to our scheduled maintenance period, but until then the plan is to provide beam to all users until noon on July 7th.

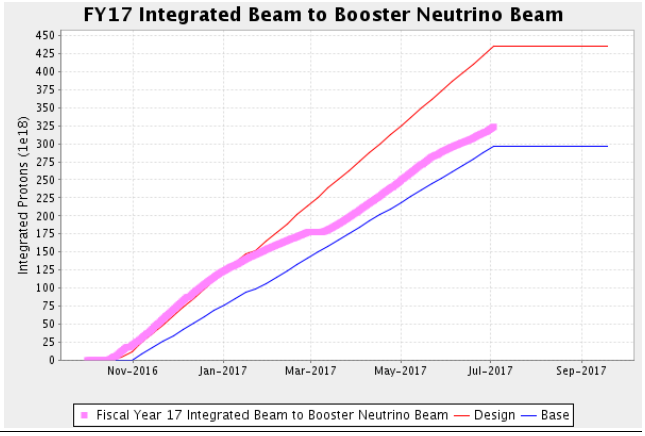
The quarter included such notable events as:

- MI-52 septa replaced.
- Set new 1 hour NuMI target power record of 727.88 kW on 4/17.
- Consistently, delivered above 641 kW to NuMI with Switchyard operation.
- Commissioned the 750 kV Linac Laser notcher to be used on all beam cycles.
- Commissioned Muon Campus facility to deliver beam to the g-2 experiment.

Performance

	Metric	Achieved
Average protons on NuMI target per week	-	1.54×10^{19}
Integrated POT for NuMI for period	1.67×10^{20}	2.00×10^{20}
FY17 integrated POT for NuMI to date	**4.05×10^{20}**	**5.04×10^{20}**
FY17 actual NuMI uptime to date (hours)	-	4723.24
Percent Uptime (Recorded/Scheduled FY17)	-	88.0%
Average protons on BNB target per week	-	8.98×10^{18}
Integrated POT for BNB for period	1.28×10^{20}	1.17×10^{20}
FY17 integrated POT for BNB to date	**3.44×10^{19}**	**3.28×10^{20}**
FY17 actual BNB uptime to date (hours)	-	5441.65
Percent Uptime (Recorded/Scheduled FY17)	-	94.0%





Notes

1) ”Metric” corresponds to the projected expected Protons-on-Target. The “Design” and “Base” profiles are respectively 125% and 87.5% of the “Metric” profile. The numbers quoted correspond to the proposed FY17 metric.
2) “Achieved” corresponds to the performance during the reporting period.
3) Percent uptime (actual/scheduled) since October 2016.