Dec 1, 2005

SCIBAR Impact Statement for the Accelerator Division

MiniBooNE Running

There will be minimal impact of SCIBAR on the accelerator Division while MiniBooNE is taking data. The neutrinos that are produced for MiniBooNE will be used for SCIBAR. All access issues will be covered by PPD including confined space issues. There will be no water run to the SCIBAR enclosure and less than 10 kW will be run to the enclosure from MI-12.

MiniBooNE not Running

If MiniBooNE were not to run then the cost of running the Booster Neutrino Beam (BNB) would be totally due to SCIBAR. The experiment wishes to have 2E20 protons on target (POT) delivered to the BNB in one year. In the NuMI era this would imply that the Booster would run ~2Hz more than it would run without the BNB. Eric Prebys has estimated that this would cost $40/hour in increased power consumption. If the BNB were to run for one "Snowmass year" (2E7 seconds), this would imply an increased cost of $220000.

The beamline and target station run with very little maintenance required and spares for all elements will exist before SCIBAR running. The first horn failed after 94 million pulses. A retrofit was made to the current horn, which should have fixed the most plausible failure mechanism. The current horn has 45 million pulses and there is no indication of any problem.

The power to the MI-12 service building was measured by G. Krafczyk and using a cost of $.05/kW-hr the cost per hour of running the MI-12 portion of the BNB was $10.58. Since 90% of the BNB elements are powered from MI-12 the total electrical power cost of the BNB is less than $12/hour (assuming $.05/kW-hr) Again assuming a "Snowmass year that would be $67000/yr.

In normal running the Mechanical Support Department (MSD) effort is minimal with the largest effort spent on maintaining the RAW system. No magnets have needed replacement, and the only issue has been the installation of Bellville washers on the electrical flags of the magnets. This work will be completed before SCIBAR running. In general the technical aspects of all the various air and water systems will have been debugged before SCIBAR running and only maintenance issues in the range of a few thousand dollars per year will be an issue.

The Operations Department will have to do normal search and secure procedures, normal lock out procedures, and some tuning. However the bulk of the tuning is handled by an automated tuning program (AUTOTUNE) and operator intervention is usually only required when large changes occur in the MI8 beamline (there are internal limits in the program to keep it from wandering into left field).

The EE Support Department handles power supply maintenance issues at the level of a few supplies/year. The largest item for EE Support is the horn power supply and operationally it is changes to normal operation that cause the most time and effort, e.g. running less than full current or changing polarity. These issues have been addressed for MiniBooNE running and should be well understood for SCIBAR running.

The ES&H Department will have to continue to monitor air, water, and residual activation issues. In general the activation along the beam line is minimal until the final focus region. The air and water issues are well understood and procedures are in place to do routine monitoring. It should be mentioned that even if the BNB ceases operation, the ES&H department would still have some monitoring efforts with respect to the decay pipe region and its associated bathtub.

The beamline is well understood and there are three members of the External Beamline Department who are very familiar with the beamline. Keeping the beamline running will take less than 1 FTE (on average).

Instrumentation and controls have not been an issue for some period of time and this situation should continue through SCIBAR running.

Conclusion

If MiniBooNE is running SCIBAR is a minimal impact on the Accelerator Division. If MiniBooNE is not running SCIBAR would inherit a well running beamline and target area system with relatively low cost for power, $67K/yr. The additional Booster cost would be $220K/yr. Normal operations would cause a minimal impact. There is also the issue of whether the additional running may cause an increase in component failure in the Linac and Booster. MiniBooNE running has shown that this is not a large issue (so far). Finally the protons on target per year are not out of line with the “Proton Plan”.

Caveat

If the horn failed there would be a big impact on MSD and ES&H. The previous horn replacement went very well in terms of total dose picked up, 327 mrem. There were some lessons learned and the next replacement would be even smoother in terms of total dose and time spent. The time actually spent on taking the old horn out, safely storing the old horn, and hooking up the new horn was around three weeks involving mechanical techs, EE support techs, instrumentation techs, surveyors, riggers, and EBD and ES&H personnel. There were additional weeks spent on rigging out shielding blocks, reinstalling the blocks and all the radiological control necessary. A point to consider is that the lab would not have to do this job during a large shutdown, and depending on the details of the lab schedule the experiment would probably take some horn off running for studying systematics as MiniBooNE is currently doing.