

## Minutes of the September 11th UEC Meeting

Present: Alton, Artuso(video), Bertram, Bloom, Bose(GSA), Finley, Gottschalk, Hagopian, Messier, Nguyen, Rolli, Sheldon, Tanaka(video), Trischuk (apologies: Hughes)

Hagopian called the meeting to order at 9:05am.

### **Introduction of new UEC members:**

The newly-elected members of the UEC were introduced.

### **Introduction to the UEC:**

New members of the committee were introduced to the goals and operations of the UEC (formed in 1967).

Sharon provided an overview of the activities of the committee, the different officers roles (chair, secretary). The main activities of the UEC in recent years are the DC trip in the spring and the User's meeting in June. She summarized some of the highlights from last year. Other activities included discussions with other lab user's organizations on getting visas for foreign visitors. There is continuing concern and motivation in the UEC to address this issue. The UEC also interacts with the GSA to address their quality of life and organizing a "Career Night." The UEC also interacts with various US HEP committees (HEPAP, P5, etc.).

### **Meeting with Fermilab Director Witherell**

Fermilab Director Witherell was introduced to the new members of the committee. He discussed the status of the collider, showing a few slides from the DOE mini-review of the accelerator that was held September 8, 2004. (all talks at <http://www-bdnew.fnal.gov/doereview04/mini/>). Accelerator parameters, on the whole, doubled between FY03 and FY04. During the shutdown electron cooling equipment is being installed and will hopefully be commissioned next year. Another goal is to implement slip-stacking. The Lab looks forward to doubling the p-bar stacking rate this year. Next year's shutdown is projected to be about 12 weeks; one major activity will be the installation of the D0 silicon layer 0.

Luminosity projections for FY05: design:  $480\text{pb}^{-1}$ , base:  $370\text{pb}^{-1}$ . Witherell then showed some slides from Jeff Spalding's talk that looked into the future, including projections of major complex improvements over the next two years. The ultimate design and base integrated luminosity goals are 4 and  $8\text{fb}^{-1}$ , respectively.

### **Q: What ever happened to luminosity leveling?**

A: The accelerator division is now working on increasing luminosity for both experiments. When either collaboration develops a clear understanding that the useful physics output is no longer increasing with luminosity due to problems with multiple interactions, it will make a request to the laboratory that it would like a cap set on its luminosity at some value. At that point we will divert some of the precious study time needed to improve luminosity into reducing the luminosity

at the beginning of the spill. Because this will slow down the improvements to overall luminosity, it shouldn't be done before it is needed.

**Q: What are the plans for the shutdown?**

A: Major projects for the shut down include installation of electron cooling, completion of the MINOS beamline, replacing the MiniBooNE horn, replacing the feeder cable infrastructure (that have a 30 year lifetime), Tevatron alignment, smoothing out the other Booster dog-leg, and p-bar transfer line aperture evaluation. There has been a consolidation of technical help across divisions to assist the effort; things are going smoothly.

**Q: What are the results from Recycler studies?**

A: It is in very good shape. All performance has exceeded expectations. There have been mixed-mode stores that have more than broken even. It is now ready for the commissioning of electron cooling.

**Q: What are prospects for continuing MiniBooNE after MINOS turns on?**

A: There are some reports at: [http://www-bdnew.fnal.gov/directorate/program\\_planning/index.html](http://www-bdnew.fnal.gov/directorate/program_planning/index.html) including a letter stating that the continuation of MiniBooNE is possible now that delivery of protons at a rate necessary for stacking+NuMI has been exceeded. Initial estimates for rate are  $1 - 2 \times 10^{16}$  protons per hour. There will be more on this from Eric Prebys.

**Q: What are the next steps toward a proton driver?**

A: There will be a physics workshop in early October to outline and put together the physics case (neutrinos and beyond) leading to a DOE Critical Decision 0 (CD-0). A cold linac design leading to a cost estimate is also being prepared. Much of the superconducting RF infrastructure will advance both the ILC (International Linear Collider) and proton driver. Much additional R&D work will be uniquely for the ILC or uniquely for the proton driver.

**Q: How has the linear collider technology decision affected R&D on this at the lab?**

A: Fermilab was committed to linear collider R&D effort regardless of the technology choice and is prepared to put together a consortium with Cornell, Argonne, Jefferson Lab, and others to lead American R&D on high-gradient superconducting RF and its many applications to accelerators. The lab plans to build the Superconducting Module Test Facility (SMTF) in M-East that would be used to test cryomodules for linear collider, proton driver, RIA, and perhaps other accelerator facilities. Fermilab will continue siting studies and public outreach to the surrounding communities. Witherell will represent the lab directors at a meeting in Geneva with the funding agencies. The ILC (International Linear Collider) collaboration is meeting November 13-15 at KEK.

The Global Design Initiative team is being put together and will be sited in the next 6 months. 10 labs have proposed to host the team (including FNAL). The goal is to have a director for the design team by the end of the calendar year.

**Q: What is the status of BTeV?**

A: The P5 has reissued a letter that re-approved BTeV (posted on the website above), but admon-

ished against further delays particularly in light of the turn on of LHCb. This message has been sent to the funding agencies. BTeV will have a Director's review of CD-2/3a preparations. When CD-2/3 is formally passed (outside the lab!) this would lead to construction funds. Tentatively, a Lehman review has been scheduled for October 26-28.

**Q: Priorities and initiatives for remaining time as director?**

A: Witherell will maintain focus on Run II and have another positive year. Other goals:

- Get MiniBooNE as close to possible to its proton request.
- Get NuMI operational.
- Get BTeV approved.
- Establish FNAL's place in the ILC collaboration.
- Inaugurate center for astro-particle physics.

We expect the new Director to be named by the end of the year, with 6 months of overlap with current Directorship. The URA contract bidding process has not given any of the Director candidates pause for being considered.

**Q: Does the arrival a new Director complicate the next stages of approval of the NoVa project?**

A: This will be a long process, so the new Director will have plenty of opportunity to shape this process. There is no thought of delaying this process due to the Director search.

**Q: Status of the FY05 and FY06 budgets?**

A: The House passed a slight increase relative to the President's request. The Senate has not passed anything; it will almost certainly be after the election before a passed budget is in place, resulting in a continuing resolution.

**Q: Progress on ID-card and other issues for non-US users?**

A: Not particularly. The Laboratory is re-examining the protocol for badging and where they are needed on-site. However, there has not been any redefinition on foreign visitors and assignments.

**Presentation by Eric Prebys, Proton Source Department Head:**

**Limits to Booster output**

Limit on proton per pulse intensity are currently about  $5E12$ . Theoretically, overall output is limited by repetition rate (15Hz) and MI loading times for MI protons.

Practically, performance is currently limited by doses due to radiation losses and machine component heating. While losses could impact above ground dose problems, extensive shielding has made the primary concern losses in the tunnel. These are not regulated but access for repairs and component damage are a worry.

Prebys summarized the proton budget over the last couple of years and plans for the next few years, when NuMI turns on. Recent improvements have come from a number of sources, including:

- Smoothing out one of two doglegs that was found to considerably distort the lattice.
- Alignment: the Booster is being really aligned for the first time. 1/4" discrepancies have been found and fixed.
- A new collimator system has been commissioned to control losses before the critical RF losses.

The new collimator system has led to a new system of measuring losses. Previously, the “wattmeter”, or overall energy lost in accelerating the beam was used. This doesn’t distinguish between controlled and uncontrolled losses. The new system involves weekly radiation surveys and relying on loss monitors to understand the new relationship between losses and activation. This slowly allows the currents to be cranked up.

Prebys showed that the activation has been maintained at the target of x2-3 times pre-MiniBooNE rates since MiniBooNE has turned on. The new collimators (including the activation of those elements) has started a downward trend in activation despite the increase in intensity and output.

**Future Improvements:**

- The other dog-leg will be modified during the shutdown. This should be a big factor in overall loss
- The modeling of the machine is being improved; we are now convinced that the RF is aperture limited. As a result, larger aperture cavities are being installed and can be commissioned in the coming year.
- Further improvements will come from better alignment using the laser alignment tracking system.
- New injection components will allow the Booster to operate closer to the maximum 15 Hz instead of the current 7.5Hz – potentially doubling the number of protons it can supply.

**Further future:**

The proton source plan assumes that the current system must last 10 years, but will be succeeded at that point by a proton driver. This limits the investment that can be made to the current system. This in turn precludes major projects like the replacement of the linac triodes or decreasing the ramp time to the Main Injector. The focus instead will be on optimizing the existing system by limiting losses and increasing reliability and stability. Such projects would include installation of new power solid state power amplifiers, improving corrector trims and quads to further control losses.

**Priorities:**

PBar production will remain the first priority (slip-stacking etc. in place). NuMI loading comes

next. We can now say that NuMI goals can be made (thanks to efforts for MiniBooNE) and that there will be some protons left over to supply MiniBooNE after NuMI turns on.

**UEC chair election:**

Trischuk elected to chair.

**Committee Assignments**

Committee assignments as follows (Committee Chairs in capital letters):

- **Outreach:** MESSIER, Finley, Alton, Hughes
- **In Reach/Quality of Life:** ALTON, Hagopian, Messier, Bloom
- **Users Meeting:** BLOOM, Nguyen, Hughes, Rolli, Messier, Tanaka
- **DC trip:** GOTTSCHALK, Artuso, Nguyen, Hughes, Finley, Tanaka
- **Non-US issues:** ROLLI, Bertram, Finley, Artuso
- **Webmaster:** ROLLI
- **Secretary:** TANAKA

Future meetings dates: October 16, November 13 and December 11