InterCAT Technical Working Group Meeting
November 20, 2003

Agenda Review and TWG Activity Summary:
Eric Dufresne called the meeting to order and reviewed the agenda.

APS Updates

`APS Facility Update` (Roger Klaffky, APS/AOD)
Roger reviewed the main activities scheduled during the upcoming APS shutdown:

- The 'Decker distortion' will be implemented at Sectors 24, 25 and 31.
- Routine maintenance of the switchgear X1 will affect power in Bldg 434 and 435, as well as the adjacent experimental floor area.
- Sector 3 and 4 Insertion Devices will be taken out for magnetic field measurements.
- Ohm Singh will continue to install narrow band BPMs between sector 27 and 40. Some study time will be made available in order to re-steer the beam for sector 31 to 34 during the January startup.
- Recently, an Uninteruptable Power Supply (UPS) battery failed on the ACIS system resulting in downtime of the APS. A redundant UPS system has been procured to back up the ACIS system.
- There is wall collimator work planned on beamline 1-ID and 6-ID.
- Multiple PSS revalidations are scheduled as well.

`Status of Handling Critical Components.` `(Mohan Ramanathan, APS/AOD)`
Mohan introduced Tony Passi who will work with him to organize the beamline drawings received from CATs design report documents. For the moment, the organized drawings will be put in the Design Exchange. Based on the list on documents kept by the floor coordinators, there are at least 70 thermal components installed on the floor. Since many thermal calculations were made early around 1994, the audience encouraged Mohan to check the thermal calculations with actual measurements from several installed beamlines around the ring since it is possible that several of the thermal components were overdesigned, thus allowing room for possible ring current upgrades.

`AOD Technical User Support.` `(Patricia Fernandez, APS/AOD)`
Patricia introduced the mission of her group which is to facilitate the research done at the APS. Recently, Kevin Randall was hired for the position of User Technical Interface. Responsibilities of the Beamline Technical Support Group include the Detector Pool, the Equipment Pool, and Support for Shipping and Receiving. The group will also help to facilitate APS Interdivisional technical support and allow users to access APS resources. Patricia is seeking user input to identify opportunities for user support. Her presentation can be found in the minutes section of the TWG web site at http://www.aps.anl.gov/cats/twg.

`Storage ring status and possible upgrade paths: higher current, customized beta functions etc.` `(Glenn Decker, APS,AOD).`

Glenn presented some interesting data from the APS storage ring showing a direct correlation of operation parameters with an earthquake that occurred recently in Hawaii. He discussed the status of the X-ray BPM Feedback and Feedforward algorithm. This system can now reliably provide 1-10 micron beam stability at a position of ~20 m from the source, providing a four fold improved angular steering stability. A change has been made to the software such that a sector XBPM is removed from the correction algorithm if the undulator is opened beyond 30 mm. This change allows to keep the algorithm active at all times. With the current ring emittance, Glenn stated that 5.5 mA is the limit for the single bunch stability, thus a maximum ring current of 130 mA will be possible in the 24-bunch operation mode. Recently, there has been discussion to increase the number of filled bunches to 48 to increase the total ring current. There is enough RF power to boost the ring current to 200 mA but the ceramic pulsed injection magnetic vacuum chambers could limit the maximum current due to overheating. Mohan pointed out that the front ends are currently designed for a maximum current of 130 mA when Undulator-A is to be used without operating limits.
The machine physicists now understand fairly well the beta function of the lattice. Therefore Glenn is confident to make incremental changes to a given sector's beta function within a range of 10-20 % from the existing ones to optimize performance to users needs. Each sector request could be independent. He encouraged the attendees to contact their management to request these changes. His presentation can be found on the TWG web site.

Presentations

PUC Update (Jim Viccaro, CARS)
Jim reported on recent activities of the Partner User Council: Himself, John Quintana and a representative from the User Executive Committee attended an APS Operation meeting discussing possible higher current operation. They are seeking inputs from all Partner Users regarding the potential of changing the APS operating mode from a 24- to a 48-bunch mode. John Quintana also attended a presentation regarding the proposal for a 10m insertion device. APS is preparing a report to be discussed in the TWG in near future. He encouraged users to provide input for the summer APS operation schedule. Resident users are encouraged to raise issues with their management to discuss at the PUC.

Fast X-ray BPM Update (Mark Rivers, CARS)
Mark presented some data collected at 13-ID using some new X-ray BPM electronics designed by Steve Ross. This system allows the following to be running simultaneously:

- Averaging the BPM measurements into an EPICS analog input record at up to 10Hz
- Capturing the BPM measurements at up to 815 Hz into the EPICS MCA record, typically with 2048 samples
- Using the BPM measurements at up to 815 Hz to run D/A converters for fast feedback

Utilizing their large KB mirror system, 13-ID can deliver a focused beam of 20µm at a distance of 8 m from the mirror. The mirror and monochromator must be stable to better than 0.1 µrad. They have been running the monochromator with fast feedback at 50Hz feedback rate, using an in-vacuum foil BPM upstream of the mirrors. The fast feedback

controls the monochromator second crystal theta and chi angles via associated piezo transducer voltages. The mirrors are controlled with slow feedback at 1Hz, utilizing the signal from a split ion chamber just before the sample.
A capture of a top-up injection pulse and an energy scan of the monochromator showed the performance of the feedback system, capturing >100Hz vibration of the monochromator and the 20msec recovery after the top-up injection. Mark also wrote some new medm screens, allowing power spectrums to be displayed with frequencies up to 400 Hz.

Next TWG meeting:
The next meeting will be held at 10:00am on Thursday, 18 December 2003, in Bldg.401, Room A1100. Cookies and coffee will be served at 9:45am.