APS Users Organization/Partner User Council Joint Meeting

September 18, 2013

Advanced Photon Source

Building 401, Room A5000/B5100

Robert Leheny, Chair, APSUO

Mark Rivers, Chair, PUC

Presentations available at:
http://www.aps.anl.gov/About/Committees/APS_Users_Organization/Meetings/2013/20130918_presentations.htm

APS Update – *Brian Stephenson*

Safety: The APS has a very good (and improving) safety record. A challenging year in 2011 resulted in increased attention to conducting work safely, which is clearly paying off.

Science Highlights: HEDM: A New paradigm for Engineering Design, A Sponge Path to Better Catalysts and Energy materials, A New Family of Quasicrystals, and A Key Target for Diabetes Drugs (see slides).

Radioactive samples: DOE requires exposure to be "ALARA" or as low as reasonably achievable. Background radiation is considered in this requirement—naturally occurring sources of radiation contribute to background levels. DOE requires controlling exposure for any radiation exposure beyond the background level. At APS, the first step is to identify radioactive samples on the ESAF; however, we need to provide a clear definition of what constitutes a radioactive sample. The definition is available on the web (http://www.aps.anl.gov/Safety_and_Training/Hazardous_Materials/RadioactiveSamples.html). Exemptions for "natural" radioactivity have been proposed (http://www.aps.anl.gov/Safety_and_Training/Hazardous_Materials/naturalradioactivity.html). Essentially a non-processed natural sample is part of the background and not considered to be radioactive (see slides for examples of what materials would be considered radioactive because their radioactive elements or isotopes are present at levels above a natural abundance). The group was asked to provide feedback about the language to identify any possible loopholes. It is better to have a user check the box but then approach the sample safety mitigation with a graded response based on the sample's particular properties. Natural abundance levels need to be considered. Although some samples may not require special packaging for transportation, but would still need to be labeled as radioactive upon arrival at the Lab.

Liquid Nitrogen: EPICS is used to track LN2 levels out on the experiment hall floor. Stephenson reviewed the incident from June and the formation of the task force. A set of issues was identified for review. The task force has been meeting regularly and they are trying to determine where the ice is coming from. In August, a delivery truck arrived with insufficient supply and only partially filled the tank. As a result, the C-D interconnect valve was opened again, resulting in problems for some beamlines. Contractual requirements with Airgas were reviewed and many of the corporate representatives came to Argonne to discuss the matter. Contract changes have been made that will result in APS being filled first rather than last for on-site deliveries, among other language and procedural changes.

Budget: Stephenson reviewed a historic chart of BES requested budget vs. appropriation (1997-2013). Also presented excerpts from FY2014 BES HEWD and SEWD marks and compared them (see slides). For FY2014, year we anticipate a flat funding scenario on the heels of a low funding level from this year. In 2013, we got the budget two days before the beginning of the fourth quarter, so a decision is not expected for a long time.

APS Construction: A photo overview of various current construction projects was presented (LOM 437 build out, Dynamic Compression Sector 35 hutches, LOM 438F construction, Advanced Protein Crystallization Facility, new parking lot near 437/CNM area). We've fortunately not experienced any safety incidents related to parking. We should all set an example by using the new parking areas and walking the few extra yards rather than continuing to park on the roads.

APS Upgrade: Overview and Status – *George Srajer*

Update on current activities in the accelerator area: Planning at APS in the wake of the BESAC review is aligned with DOE to evaluate incorporating multi-bend achromat (MBA) technology in to the Upgrade. The approach includes 6 GeV MBA storage ring, emittance of 60-100 ppm with 200 mA current, small-gap superconducting and conventional undulators, and enhanced beam stability. A brightness graph comparing APS, SPring-8, ERSF, and NSLS was shown. LDRD work that began approximately a year ago has enabled the development of a preliminary set of parameters for an APS MBA. Preliminary APS MBA fill patterns, ID parameters, dipole source parameters, and expected performance metrics were presented. A web application is available that allows you to design your own undulator:
www.aps.anl.gov/asd/oag/cgi-bin/chooseBestMBAID.cgi

A preliminary MBA lattice layout was shown. There are 14 different magnet types currently in play in the design and over 1800 total magnets. Design of quadrupoles and dipoles is underway at ANL and Fermi, respectively. A slide of the MBA accelerator scope was presented—it's a very large effort. Srajer presented a list of high-priority technical tasks that have been divided across nine groups. Every effort will be made to minimize the shutdown time.

Comments: For crystallography, beam stability and low vibrational characteristics are extremely important. Outreach efforts and focus groups (e.g., optics) are going to be formed to address topics such as this—this input is very important for the upcoming workshop.

Workshop on New Science Opportunities Provided by a Multi-bend Achromat Lattice at the APS: Topics: Transformational Brightness improvement with MBA—"4th Generation" Storage Ring, and What are the New Capabilities?, and Scientific Opportunities. A point was raised about what capabilities will be *lost* due to the new brightness (e.g., environmental samples). A calendar of community engagement activities was presented. Everyone was encouraged to look at the Upgrade web page. Srajer presented the architecture of the upcoming workshop and the preliminary meetings that have been scheduled. The organizing committee has been very pleased with the input received so far in the preliminary topic areas. Additionally, a series of optics tool tutorial sessions (Ruben Reininger) and an optics talk (Lahsen Assoufid and the Optics Group) have been organized. A question was asked about what the timeline for the Upgrade effort is vis a vis this new paradigm: Long term not much has changed, and the Upgrade should be completed around 2020-2021. The next few months will focus on technical reviews of the lattice, followed by preparation for the next DOE review (need to set a new scope to accommodate the new pieces of the work). This will include a re-visiting of the beamlines although a large fraction of the initial layout will still be in play. The biggest changes will result from the accelerator-based differences. The science opportunities do represent a fresh look at the capabilities offered by the new lattice. We are trying to be as aggressive as possible to set the new scope. This new plan means that every beamline will be affected, not just the "new" beamlines that were a part of the original scope of the Upgrade. However, every beamline will get a new undulator and new BPMs as part of this, plus this work will set the facility to be operating for the next 20 to 30 years. Putting new optics on the beamlines to enable new science would be very cost-effective. Suggestion: add a possible coherence/imaging workshop topic added.

Updates on NUFO and the User Office –*Susan White-DePace*

The use of the End of Experiment forms (EEF) system for collecting (at a minimum) the mandatory satisfaction data is going "live" on Oct. 1 across all beamlines. The User Office is

working to follow a full-circle approach for science: proposal to BTR to ESAFs to EEFs to publications. These individual modules do not all talk to each other and programming efforts are considerable to make this work. The End of Experiment forms will be activated for all beamlines at the start of the next run. The mandatory question (satisfaction) will be active for all, with the possibility of another mandatory question regarding whether or not the work accomplished will likely lead to a publication. For biology, the grant number can lead to publications—the funding agency is currently in the GUP, can add a request for a grant number to the GUP, too. Will notify All beamlines will be contacted regarding their participation in the EEF system. XSD beamline staff will be responsible to ensure that all EEFs are completed and submitted for their beamlines.

All x-ray time needs to be linked to a BTR, which must come from a proposal. Currently, not all CAT work is linkable to a BTR. Need to have CATs create proposals (these do not expire) from which to make BTRs. This then feeds forward to the ESAFs, there by creating the link back to the proposal.

The zip code + 4 system will be implemented for US citizen users only. The software enables auto filling of fields based on street address and provides us with the +4 zip code information in the user database.

The Inspector General visit to ORNL: Oak Ridge has not yet received the report from the visit.

The issue of minors on the experiment hall floor issue has been raised to the Director's Safety Council and a Laboratory-wide policy is anticipated. The APS has offered to draft a policy for consideration. Minors involved in tours, educational programs, and minors conducting hands-on research, etc. all must be considered. The group seems to feel that the requirement for proof of medical insurance is too onerous and doesn't provide an added benefit. How do user agreements play in to high school students? Insurance for users is covered by User Agreements. Parental permission is very important, but the insurance issue needs to be looked at carefully. Need to apply an age limit to youth on the floor—it could also be tied to an "educational benefit" aspect of a visit.

NUFO Update: White-DePace also covered the issue raised by the American Physical Society regarding the helium supply and noted that AAAS meeting planning continues.

Foreign Visits and Assignments: The number of countries identified as "sensitive" may double—this could have a very significant impact. The APS is receiving many applications from individuals from T4 countries. The User Office is working to standardize visa application letters.

D. Mills noted that additional one-time funds are being invested in staff and equipment (13-BM) along with other XSD beamlines to address the x-ray 'drought' that is resulting from the NSLS black out period.

Partner User Council:
Report from the Life Sciences Council: The council met to discuss plans for the Upgrade workshop.

Consensus is that the APS is doing a good job communicating with the user community regarding Upgrade-related planning. The user community has concerns about shut down. How would privately funded beamlines survive a long shutdown? How would they justify their expenses while not getting beam time? CATs that would be able to supply their own funding for beamline upgrades could have an advantage in being ready to run after the shutdown because they will not be competing for Upgrade project funds. The term "4th generation" to describe the source is terminology that will be used. It would be beneficial to let funding agencies know that significant funding requests might be made in the future. Funding sources other than DOE should be made aware of Upgrade project (e.g., NIH, NSF, BER, NNSA). It might be helpful for the APS to offer to "brief" them on the project. APS could possibly invite funding agencies to attend the Upgrade Workshop. However, APS must be careful not to get in between CATs and sponsors. Maybe a trusted member of the CAT should join APS if they go to funding agencies to review the Upgrade project. After workshop, CAT members would have the understanding to discuss the Upgrade with their funding agencies without the APS. Running during the Upgrade has not been totally ruled out but there is probably not a real time savings advantage to this scenario. The advantages of building new beamlines during the shutdown were discussed.

Q: Is all future work on SPX stopped? A: No, the current work continuing on SPX; it will be wrapped-up by October. SPX has moved into the unfunded category in the Upgrade project. DOE has not provided any guidance regarding the budget of the new Upgrade project. The implication is that DOE may provide additional funding; but this is still unknown. LCLS plans have also been changed.

APSUO Steering Committee:

Minutes approved.

MBA Workshop: Given the rapid developments in the changing scope of the Upgrade project, we need to ensure that the user community is sufficiently engaged in the process. Can the APSUO SC contribute to the process? How is the user community currently being involved in this process? Is it sufficient? The duration of a shut down time period is off putting and seems to be the primary concern. If the CD review of the scope isn't until 2014, the shutdown would likely be around FY2016. Would foreign hard x-ray rings shutdowns be in parallel or offset with this one? Would NSLS-II be on line when the APS goes in to shutdown? The shutdown could be an opportunity to repair and update beamlines. Previous Upgrade plans would require huge efforts to reconfigure beamlines that would not match time wise with the limited amount of down time that the original plan called for. The new scenario gives a realistic platform for serious beamline improvements. It can't be "the elephant in the room." Need to ensure that this is clearly and honestly conveyed. Is there a concern that users will go to other synchrotrons and decide not to go back to APS? How does an APS shutdown map against the NSLS shutdown and the NSLS-II coming back up? Remote data collection will offer a good option for the macromolecular crystallography community.

A 2016 shutdown gives enough time for grant proposals to be considered—shutdown is several years away so this is being considered. There was also talk of APS and CATs going to the main funding agencies to make sure that they are aware of the impending shutdown and the potential impact.

Regarding the passing of long-time Users Meeting exhibitor Dave Rognlie, Michael Pierce wrote up some thoughts about Dave. Idea: Donation from the APSUO SC to the American Cancer Society in memory of Dave using corporate contribution funds from exhibitors ($500). Need to compose a letter to incorporate input from APSUO SC, the users, and APS management to send to Dave's daughter.

Users Meeting Planning: Call for APS workshops needs to be planned, also need to ask G. Srajer about a possible Upgrade workshop at the Users Meeting. We are presently assuming the same number of workshops as the past year will be scheduled. Several possible off-site banquet locations were suggested: the National Museum of Mexican Art (180 capacity) in Pilsen, the Chicago Historical Society, a sporting event such as the Chicago Fire, the Museum of Contemporary Art, the Goose Island Brewery, and the Bridgeport Art Center. Tracey Stancik of

Argonne's Conference Services will be contacted to investigate these possible venues in more detail.

Could solicit via e-mail to key beamline scientists regarding ideas for keynote speakers. Alan Alda gives a very good talk on communicating science. AI: SWD to pursue Alan Alda. Could consider a crystallographer (Cele Abad Zapatero, crystallography and art; Katherine Kantarjieff, IUCr, social media promoting science or as the APS keynote speaker). Need to consider a special symposium or a workshop to recognize the International Year of Crystallography. E-mailed suggestion received from Les Butler as possible keynote: Nick Veasey: Exposing the Invisible.

This year is the 30th anniversary of the APSUO. Could potentially plan for a cake with candles to be served during a slightly longer break in the afternoon of the first day of the meeting (May 12). Peter Eisenberger is a possibility as APS plenary keynote and then would be there as first chair of the APSUO for the cake event.

Closeout:
No wrap-up topics from the PUC.
From the APSUO: For the Upgrade workshop, B. Leheny to send out a reminder e-mail (including a point to the white paper) regarding registration deadline and comment collection via RegOnline (ROL) from those users unable to attend. Stephenson mentioned that input could be sent as viewgraphs to the session organizers that could be considered for presentation at the meeting (or perhaps only solicit viewgraphs from selected ideas from the ROL query. Should also consider doing a videoconference option for the MBA Lattice Workshop—incoming input from the audience is the tricky part to this. The plenary session could generate some "conversation." It could be challenging to have individual two-way conferencing in the individual sessions.

The shutdown: If possible, coordinate the timing of a shut down with other synchrotrons (both US and international). One upside to a larger shutdown period: the "no dark time" aspect of the old Upgrade limited the possibilities for beamline improvements. This longer shutdown enables a time frame for not only building new beamlines but also having the time to do other work that would not have been possible in the old scenario. Every beamline gets something in the new scenario—if CATs can contribute funding there can be some major opportunities for improvement. Another issue is letting funding agencies know dates as soon as they are determined. Should at least come up with a straw man schedule—Stephenson mentioned 2019 or 2020 as the shutdown year. CD-2 (the big deal) sets the scope and baseline for the project and

long-lead procurements are possible before that hits. CD-2 could happen around 2015. The Users Meeting could be an opportunity to engage the various sponsor entities for non-APS beamlines.

AI:
--The group was asked to provide feedback about the language for the “natural” radioactivity exemption to identify any possible loopholes that could result in exemption of material(s) that could contaminate a beamline station.
--Consider the possibility of modifying the EEF form with mandatory question regarding whether or not the work accomplished will likely lead to a publication and adding a request for a grant number to the GUP form
--Need to pursue having CATs create proposals (non-expiring) from which to make BTRs

Attendees: L. Assoufid, M. Beno, K. Brister, P. Focia, S. Gleber, T. Irving, A. Joachimiak, D. Keane, E. Landahl, R. Leheny, I. McNulty, D. Mills, L. Morisco, K. Mulfort, G. Shen, C. Ogata, B. Ruzicka, B. Stephenson, S. Strasser, G. Srajer, S. Sutton, C. Vanni, S. White-DePace, L. Young,