SHUG (SNS HFIR User Group), http://neutrons.ornl.gov/users/shug/
SHUG executive committee minutes.
Teleconference held November 9, 2010.
Attendees:

Executive Committee: Cora Lind, Matthew Stone, Malcolm Guthrie, Greg Beaucage, Mike Crawford, Eugenia Kharlampieva

Guests: Ken Herwig,

Minutes submitted for review November 22, 2010 by M. B. Stone.

ACTION ITEMS:
Please note next telecon date: Tuesday January 11, 2011 (1/11/11 at 1 PM)

ATTACHMENTS and WEBSITES of interest from the teleconference:

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1. Report on status of and plans for POWGEN/Science Review Committee feedback (Ken Herwig). The September 2010 SHUG executive committee (EC) meeting minutes requested further information from the NSSD management regarding the timetable of the POWGEN instrument. Specifically, the September 2010 SHUG executive committee minutes were also sent to Ken Herwig and Dean Myles.

The following is Ken Herwig's report to the SHUG EC. The secretary has done his best to paraphrase these statements appropriately. This portion of the minutes will also be sent to Ken Herwig to make sure they are accurate:

We just completed our panel review for beam time proposals at SNS and HFIR. We took this opportunity to work with Angus Wilkinson (Georgia Tech) to lead a working dinner with members of the diffraction and engineering communities as represented on our Science Review Committee. We reviewed the current status of the diffraction instruments at SNS and HFIR and went over instrument abilities and how they complement each other. The group then spent the majority of the time discussing the POWGEN instrument. Jason Hodges spoke about POWGEN and the plans for the 2011 calendar year. Also discussed were the current POWGEN capabilities.

POWGEN currently works as a generation 3 machine reasonably well. One can combine detector data from many scattering angles into a single histogram. We have solved (at the expense of some count rate) the ghosting signal issue reducing it to a much lower proportion of the overall count rate. Currently there is only 10% (4.4 square meters or 12 modules) of the designed 44 square meter detector area. In the next SNS outage (Jan 2011), we will install another 10% detector coverage, to double the detector coverage. This addition will double the count rate, and these detectors will count as effectively as the current reworked detectors. It may be possible to get another detector installation in the second outage of 2011. This additional installation would be less than 10% though.

The instrument design originally called for a number of out of plane detectors, allowing for texture measurements to be done. This is not the major science driver for the instrument at present. As a consequence, the vertical divergence incident on the sample can be increased a factor of 2 without significantly compromising the instrument resolution. This would be done by changing the incident optics immediately before the sample. In combination with the increased detector coverage scheduled for Feb. 2011, this change would result in an overall factor of 4 increase in count rate by approximately summer 2011.

The next prospect to improve the instrument would be to improve the detector efficiencies. He3 detector measurements were used for a direct comparison to the current scintillator detectors. The current detectors are only 30 percent efficient as the anticipated design, so there is another factor of 2 in either electronics or scintillator design that may be gained. [The theoretical prediction/upper limit for this detector design is that they would be 60% as efficient as the He3 detectors, and that's why 30% means a factor of 2 and not 3.] Less certain than the other prospects, there may be an additional factor of 2 from new detector design that could be anticipated by the end of calendar year 2011. The first step would be to verify if thicker scintillators would improve efficiency. Also improved faster analog electronics are being built and will be tested in Feb 2011.

Also scheduled for this FY is a close look at a more robust engineering design for the secondary spectrometer, from sample to detector. Looking at better ways to mount detectors and shield this flight path.

We intend to invest in increasing detector coverage over the next several years.

Angus's summary from the working dinner discussed above
1) The community would like the ability to do parametric studies on several samples, with timescale of 5 minutes per powder pattern
2) The community would like the ability to do structural studies on samples of 100 mg.
3) The community would like the ability to get high resolution data-sets, and therefore would also like to see installation of the backscattering detectors at POWGEN.

(The following notes were taken during questions posed to Ken regarding POWGEN):
The scintillator is a Li-phosphate based material, with binder and a heavy metal in close proximity. These are not being used at ISIS, but have been developed at Oak Ridge. One hypothesis is that the digital electronics is too slow to capture the photons.

SNAP, TOPAZ and MANDI all have Li glass scintilators, but are not made by the same vendor or in the same way. Vulcan has the same type of detectors as POWGEN.

The NSSD management and POWGEN scientists would like to meet with this working group again this fiscal year.

Another thing being purchased this year is a set of radial collimators for POWGEN to suppress background from sample environment equipment

It is likely going to take 8-10 months to develop a further plan for the instrument concerning engineering of the secondary spectrometer. After this is done, then we would like to come back to the community for further discussion.

The EC suggests sharing samples with other instruments at ORNL and throughout the world to gauge performance among diffractometers.

POWGEN was originally designed for 0.1 % resolution, to have more flux than HIPD, but less flux then GEM.

We are also looking into optimizing sample environments for diffraction instruments.

2. Other updates from Ken,

We've been taking a look at how we bring in users and grow the community; we are anticipating a jump in our number of users due to the greater number of instruments available.

Sequoia got to use the 16 T magnet. The sample was a weak scatterer, but the magnet performed well. The magnet has a lot of aluminum in the beam. It has been requested a lot for the inelastic instruments.

Topaz ran its first cryo-cooled sample with a nitrogen stream (got to 100 K). They are planning on improving their background during the January outage.

Nomad is making progress, and may enter the user program early for the month of June 2011.

The HFIR cold-triple axis is being commissioned, and will likely do so for the next 2 HFIR cycles, hopefully doing user science in April 2011.

There was imaging capability in the proposal cycle this time. There were a limited number of days available, but there was a great deal of interest. Imaging is being done at cg1. And there is a group planning on a beamline at the SNS (VENUS).

We have half polarization running on HB1 at HFIR. And are continually working on getting the analyzer set-up.

Target Station two - TS2 – DOE said to sit back and wait, and build up TS1 to be successful.

* Next telecon date
Tuesday January 11, 2011 (1/11/11 at 1 PM)