I would like to get some technical feedback from the TWG. There are sometimes situations which arise with the storage ring that require us to deviate from what can be considered our "normal" operating conditions.

Effects like lifetime, top-up interval, and coupling are now all linked together since top-up is required to compensate for a number of effects which limit lifetime. Normally, everything is balanced, but when something fails, we need to compensate. There are some situations which would require us to dump the stored beam in order to bring the beam back to nominal conditions even though there may not be a loss in beam current. I'd like TWG to help me identify ***what sorts of deviations are tolerable for various experiments for machine operating parameters such as beam size, beam aspect ratio, top-up interval, stability and whatever else might be appropriate*** before APS management should consider a decision to dump the stored beam and attempt a repair.

Let me give a few examples of what I mean:

1) ***Bunch Purity***: We measure the bunch purity and for certain timing experiments this criteria can be very high 10-7. I have, in the past, ordered a dump and refill of the stored beam in order to fix this problem since with top-up there is no natural interval that can be used to remedy problems of this sort.
2) Power Supply Failure: During the last weekend, we lost a sextupole power supply which affected the ***lifetime***. The effective orbit stability on the beamlines may have been affected as well during our attempts to keep beam in the machine and adjust the beam parameters in order to offset the lifetime. It is possible that either an ***increase in top-up interval*** would have helped. Certainly, dumping the ring and replacing the supply would have solved this problem as well. I need to give the control room and floor coordinators better guidance as to when to contact me for a decision to dump/fix/refill. Clearly if a 1% adjustment is needed to fix a problem, they should be empowered to do this themselves. I would like some guidance as to what various experiments tolerate in terms of ***increased beam size***, etc. before they call me.
3) Loss of other system components, such as the realtime feedback system. How much ***beam instability*** can be tolerated for different experiments. Again this would involve a dump/refill decision with associated downtime.

John Quintana
Associate Division Director - Facilities Operations
APS Operations Division
Advanced Photon Source
Argonne National Laboratory

Most important for us is beam position, with vertical position being most important. Due to our Rowland geometry with the Laue crystals, vertical source position (not angle) gives us energy shifts (e.g. 10 micron shift => 1 eV at 80 keV). Vertical position is also important to keep the vertical focus fixed when we're in a 1:0.7 geometry with refractive lenses (not much demag).

So I'd say if we lose beam position feedback, but BPM_VP drifts are under 10 microns over many hours, we are still OK.

I suggest a warning be sent out every time there is a significant deviation from normal operations. The warning should go out as a PA announcement, on the TV monitors, as a PV (both a flag and a description), and as an email. Then we will be aware that there is a potential problem.

People will complain if the problem becomes intolerable for a particular experiment. (Of course!)

What could really mess me up (for instance) is an unannounced bunch purity problem. But this is only true for some percentage of our experiments. I think communication will make us much more tolerable of occasional large deviations from standard parameters.

The worst thing is having to discover on your own a problem with the machine.

Further comments ?!