Responses to Comments and Recommendations from the 8th NSLS-II ASAC Committee Meeting May 2011

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1) The Committee recommends that NSLS-II consider the construction of a "day 1" or "year 1" injection kicker system with relaxed tolerances.
   We are building the injection kicker in-house and are willing to compromise on the ambitious final performance goal for the sake of being sure that there is an adequate system in place for commissioning and early operations. The septum is built in industry. The contract has been awarded and the vendor has started building.

2) The Committee recommends that NSLS-II continue to test the BPM electronics at other labs such as DIAMOND and SOLEIL. Particular attention should be devoted to verifying that performance will not be degraded by electronics noise from the Storage Ring power supplies and other sources.
   We continued to perform beam tests at ALS in 2011, which provided very useful information on system performance and stability.

3) The Committee recommends that NSLS-II prepare to provide strong support of control tools for rapid development of applications such as MATLab.
   MATLab development tools are supported by the NSLS-II controls group.

4) The Committee recommends that the Task Force be expanded to add members from XFD who will be responsible for designing x-ray beamlines.
   Oleg Tchoubar is a member of the taskforce and a member of the experimental division.

5) The Committee repeats its recommendation that an external review of the equipment protection system.
   The EPS systems will be reviewed after the formal review of Top-Off safety systems.

6) The committee further recommends that NSLS-II consider defining and employing the minimum useful (as opposed to maximum safe) stored currents for commissioning activities when this is feasible.
   It has been determined that a beam current of up to 50 mA is safe to operate without the active protection systems in place when no insertion device fields are seen by the beam. This level of beam intensity is sufficient to perform most of the commissioning tasks except for high intensity studies and study of coupled bunch instabilities) and is also sufficient for beam-line commissioning and early operation.

7) The scan rate specified for the SRX in-vacuum undulator appears to be very challenging. These items require additional resources, and the Committee recommends that the engineering support necessary to advance these designs be allocated.
The SRX vacuum undulator contract has been awarded with these requirements as one of the deliverables.

8) The Committee strongly recommends that an installation updated schedule based on best- and worst-case magnet delivery schedules be prepared prior to the Lehman review. The plan should demonstrate clearly the strategy for installing complete or partial girders.
The installation schedule is continuously being updated and refined. We now have sufficient magnets in stock for girder assembly and therefore magnet production, if continuing at present rate, will not be a schedule risk.. For specific work more refined versions are developed. For example for completion of LINAC and LTBTL installation, we developed a schedule with ~300 items with a granularity of 1day.

9) Define firm decision points for all future remedial actions, including conditions for NOT enacting these actions and deadline dates for enactment if conditions are not met: Second-source production, Extra girder alignment stations, expanded BNL measurement program, Revised girder installation strategy
We had established such deadlines have followed them through as well as have updated girder installation strategy. All magnets are now in production with a reasonable schedule float in respect to girder installation schedule.

10) The Committee urges the project to continue detailed communication with Budker on booster system interface issues.
The communication with Budker institute on interface issue has been very intense with many mutual visits and extended stays by NSLS-II staff at Budker institute. As a result, we have jointly formulated detailed plans and modalities of booster installation and commissioning.

11) The Committee suggests that the project pursue its own transfer line magnet measurement program.
The Transfer line magnets delivered have all been measured in-house at BNL.

12) Continue to closely monitor the progress of the RFP's for the pulsed magnets for the storage ring to insure that there will be no delays in receiving these critical components.
The septum is procured in industry. Manufactures are being visited regularly (last visit was at the end of November 2011).

13) Further beam-based experiments should be performed in order to assess the intensity and fill pattern dependence of the measured beam positions. If necessary the FPGA could be used for the compensation.
We are in the beginning of such tests. So far we did not observe beam pattern dependence of BPM signals.

14) Tests of the RF-BPMs should be done in a noisy environment (switching PS, pulsing of fast magnets, etc) and by using the final BPM power supplies.
We plan to get first input on this during LINAC commissioning in early March 2012.

15) NSLS-II should consider implementation of the digital BPMs in their current status in the booster while continuing the work on the storage ring BPMs. The enlarged vertical noise and any malfunctioning of components of the system should be investigated, understood and if possible cured before installation in the storage ring. Board layout changes can be time-consuming and the benefits and the risks of continued development should be assessed. Already now NSLS-II is leading the world in the area of digital RF-BPMs
This is what we are doing. Injector BPMs are at hand and we are still optimizing the pilot tone systems which provide continuous recalibration of the four ADC channels. Production of SR digital modules has started. AFE board production will start by the end of the month.

16) Synchrotron Radiation issues: Since development in this area is far enough along, after some additional work on FPGA and clarification
Conduct an external review by expert panel.
A review will be held in conjunction with the EPS review.

17) The IVU22 wall clearance issue has been raised at ASAC reviews over a year ago. When will engineering resources be made available to redesign a gap control mechanism? The Committee did not get a clear picture of the timetable for resolution of this and other R&D issues.
The RFP for this device has been issued with the proposal deadline of January 25th. No R&D is considered to be required. Multiple companies have shown the interest so far and the engineering solution for this issue will be provided by those vendors.

18) Investigate effects, for RF cavity, of metal particle generation in IVU due to gap drive mechanisms inside vacuum.
This effect is being considered but no large resources have been allocated. If such dust particle consists, they could be fended off by clearing electrodes.

19) Investigate how to apply techniques, demonstrated by S. Temynik at Cornell, for bake out & heat treatment of PrFeB magnet arrays.

We performed some very promising bake-out tests on PrFeB arrays.

20) A detailed full installation schedule was available for review but was dated January 2011 and marked “draft” and did not have girder install details, just full cells. An updated full installation schedule needs to be available by June 2011 before the DOE review.
The installation schedule is continuously updated and refined.

21) Have a detailed P1 schedule showing all work and individual girder installation with a view over the next 5-6 months.
A detailed girder assembly and installation schedule has been worked out and is being continuously updated as soon as more information from the current assembly process is available. At this point (end of Dec’11), we have assembled and installed 10 multipole girders. The present detailed assembly plan predicts a final assembly rate of 2 girders per week. With 80 girders to go, the last multipole girder will be installed in October 2012.

22) Commissioning Data base: Develop an estimate of effort, materials and time required to bring each of the five “use cases” to the level of maturity required for commissioning and early operation. Compare this estimate to comparable efforts at other accelerator labs and confirm that these resources will be made available. Do not start a development program for data archiving and organization without management commitment of sufficient resources.
We switched to a more pragmatic approach which should assure that all necessary data are available in some suitable form for commissioning.