

**NSLS II
Conventional Facilities Advisory Committee
October 2010**

The following is a report of the review conducted by the Conventional Facilities Advisory Committee for the NSLS II Project. It is organized according to the charge provided to the committee by the NSLS II Project.

Members of the committee included:

Jack Stellern, Chairman (ORNL)

Joe Harkins (LBNL)

Marvin Kirshenbaum (ANL)

John Sidarous (ANL)

Greg Rowland (ORNL)

Elaine McCluskey (FERMI)

Jim Yeck (Consultant)

1. Are the Conventional Facilities Division's plans and performance consistent with achieving the cost, schedule, and technical objectives for the Project?

Overall CF is scheduled for completion in June 2012 and is not on the critical path for the overall project, SPI is at 1.05. The 1st pentant CF will be available February 2011 and is currently slightly behind schedule but there is at least 6 weeks of float in the February need date.

LOBs have been awarded and the contractor is preparing for mobilization on site. With this award 91% of the CF scope is awarded as fixed price contracts. This greatly reduces the risk of cost impacts. The AE design errors are currently running 1.5% of the construction costs, which is within the project expectations.

It is good to see that the project is allowing the CF team to increase their staffing to support the accelerated schedule for the facilities.

The cost and schedule performance of the conventional facilities and the overall project has been excellent and the CF group is well positioned to continue this success.

2. Are the plans and measures to assure construction worker safety appropriate and effective at minimizing potential for worker injury?

The previous CFAC Committee report from November 2009 listed several recommendations to strengthen the overall project safety culture. Areas for improvement included: (1) strengthening the subcontractors safety program by adding safety staff, requiring assessments and greater use of phase hazard analysis (PHAs); (2) NSLS staff assuring that ownership and accountability of the subcontractor safety program resides with the contractor by performing more programmatic assessments and random checks of PHAs; (3) verifying subcontractor PHAs are adequate in content and controls are being implemented in the field; and (4) modifying the subcontractor safety incentive program to allow more money to be available to the worker. Those recommendations were accepted and were implemented over the past year.

In addition to those improvements several other enhancements have been made. The site now has a on-site medical provider (EMT) and performs drug testing as well. Heat stress measurements are routinely taken during the warmer months and adjustments made to the work-rest regimen. Dust control utilizing a water truck/sprayer is now practiced around the site to reduce worker exposures to nuisance dust as well as reduce operational issues with sensitive equipment at surrounding facilities. Stair towers, scissor lifts and temporary guard rails are being utilized more frequently to reduce worker exposure to fall hazards. Steel erection activities are using more “beam clamps” to provide tie-off points during erection activities and confined space retrieval equipment is readily available.

The Beneficial Occupancy Review Evaluation (BORE) process will be used to allow access of the project technical staff to areas of the facility that are “substantially” complete. As with any project, this phase of “hand off” between construction personnel and project staff, and the temporary mixing of personnel, can lead to confusion about responsibilities and safety expectations. The use of this established approach and its dedicated coordinator and plan (NSLS-II Bore Plan) will reduce the likelihood of confusion and the associated potential for errors and injuries.

3. Are the proper plans, measures and resources in place for effectively managing the coexistence of the Ring Building and LOB contractors on the same construction site?

The introduction of a second prime contractor for construction of the Laboratory Office buildings (LOBs) will be a challenge to the project team. The team demonstrated that they are aware of the challenge and has started control measures and applied resources. To promote consistency and apply lessons learned, the following controls are now being planned and/or implemented: the worker safety and health plan is being developed using a template from the existing contractor; coordination meetings between both primes are being held; plan of day ES&H meetings will be held for the LOB subcontractor; the occupational medicine program and on-site medical provider will be consistent with expectations for the Ring Building contractor; segregation of employees to prevent daily “sharing” of workers between subcontractors; and seamless project oversight from all existing project levels. Additionally both contractors are covered by the same insurance carrier which will provide incentive for consistent safety performance.

Recommendation: The committee would like to see a plan documenting the management approach and associated controls and measures for managing the coexistence of the Ring Building and LOB contractors.

4. Are the plans and measures to assume beneficial occupancy of the facilities sufficient to enable orderly installation of accelerator systems and eventual transition to operations?

The NSLS II Facility Division has given a great deal of thought to the process required to achieve beneficial occupancy and transition to operations. The formation of the Facility Division itself is an excellent approach to providing the framework for the organizational entity essential to assuring a smooth beneficial occupancy and transition to operations process. Further, this division will ensure that the continued phased construction concurrent with the day to day operation of the facility will be an orderly process and able to maintain corporate memory necessary for a facility of this size and complexity.

Transition to operations for this project will be a stepped process, initially transitioning pentants to accommodate installation of equipment. The acceptance of each pentant is well defined and the schedule is understood. The BNL BORE process will be utilized for occupancy permits.

There is good progress on the planning for installation of accelerator components. It is time to start developing similar plans for installation of the experimental facilities. The beam line scope is considerable and includes the six beam lines constructed as part of the NSLS-II construction project, four beam lines supported by NIH, fourteen beam lines that will transfer from NSLS to the new NSLS-II facility, and an additional six beam lines supported by DOE-BES as an MIE. It is very likely that NSLS-II will have thirty beam lines installed and in operation within a few years after completion of the construction project. The installation and transition to operations plans should include plans for all of these beam lines.

It is good to see that BNL is moving to the Facility Management Model to improve their building management organization. The NSLS II facility project manager has been assigned and will be coordinating with the project on the readiness reviews, commissioning and startup of NSLS II. It is important to get him involved in this process.

The project should establish a mechanism for allowing controlled access to the occupied areas for construction and other contractors/ subcontractors (Work Entry Permit to be issued by the Building Manager) to finish pending or fix deficient work items. The WEP will spell out work area, access points, constraints, time frame, LOTO, safety and other conditions for entry to the building.

The CFAC is encouraged to learn of the ongoing plans for survey and alignment. It will be helpful to have these measurements taken from the very beginning and monitored on frequent basis to allow for quantitative bases for dimensional stability of the SR and Experimental floors (settlement, shrinkage, etc.). Ambient vibration measurements during off hours will be also be very useful.

The project assured the committee that HDR will produce CADD As-Built drawings using the contractors marked up drawings. This process must incorporate all the design and installation changes up to occupancy phase (including field changes, RFI, Change orders, electric panel ledgers, etc.). A digital (even scanned pdf files) should also be in place for other documents (manuals, warranties, relevant shop drawings, etc.)

There is an obvious weakness in the NSLS-II conventional facilities plans concerning the space planned for people. The current plan is to use the NSLS offices and other BNL space to house the NSLS-II staff. It is also planned to operate the new world-class NSLS-II facility from the NSLS. Locating the NSLS-II control room across the street at the decommissioned NSLS and locating NSLS-II staff in distributed space is far from an ideal solution. The traditional model, which by experience has resulted in achieving efficient interactions and the desired esprit de corps, is to construct a central office building as an integral element of a new facility and to ensure that this building includes adequate space for the operations group and the people necessary to support the facility.

The project is encouraged to push the LOB construction (LOB4 & 5 in particular) up the priority list of potential additional scope. The advantage to that is capturing the very competitive cost of existing contract options and to eliminate future disruption to operations of the light source. Generally speaking, it is easier to secure future funding for beam lines than for buildings. The LOB 4&5 shells can be put to many good uses in the interim period ahead of beamline development.

The suggestion below is offered for consideration by the project.

Establish a data base for all the drawings, O&M manuals, and other documents as they get finalized. This data base should have variety of searchable attributes for each document, e.g. indoors/outdoors, building number, wing number, floor number, column numbers, type of drawings (plan, elevations, sections, details, single line diagrams, schedules, etc.), discipline (Structural, Architectural, HVAC, Fire Protection, Electrical, Tel/data, Alarms, controls), subsystems (DI water, CW, steam, piping, power, roofing, exterior cladding, foundations, framing, grounding, parking, storm drainage, etc.). The searchable attributes should be as inclusive and detailed as possible since it is easy to develop a thorough database fields and checklists filled in during the closeout stage of each of the building phases.

Development of this data base may not be in the SOW of HDR. However the added cost for implementing this suggestion should be nominal (especially when it is done during the production stage of As-Builts and closeout documents) but will be extremely helpful in the ease of retrieval of documents throughout the facility's life. It should be a living data base to be kept up to date as new building renovation, new additions and other changes are needed.

Recommendations:

- a. The project is currently preparing a comprehensive Transition to Operations plan that will formalize the thinking and preliminary discussions that have occurred to date. It is recommended that a draft of this document be available prior to the end of the calendar year.
- b. More thought needs to be given to defining and expanding roles and responsibilities to the ongoing construction field inspections and reviews. Too much reliance appears to be placed on the commissioning agent with regard to ensuring the ongoing installation of equipment will meet the future maintenance accessibility needs. It is essential that the BNL maintenance staff be incorporated into a regular schedule of field inspections. Involvement of the maintenance staff is important for a successful transition to building operations.
- c. The current commissioning plan does not specifically identify the mechanical and electrical discipline engineers as part of the team. These individuals should be specifically identified as team members.
- d. It is recommended that a formal memorandum of understanding between the NSLS II Experimental Facilities, Accelerator Systems, and Facilities divisions be prepared that clearly defines the roles and responsibilities of each group with respect to the operation and maintenance of mechanical and electrical systems that make up the NSLS II

facility.

- e. Develop Guideline and Policy Document(s) for future users (Beam lines, LOB). Such a document (or draft thereof) will set the expectations by NSLS-II of the support to be given to the users (i.e. supplied air flow, available power and water systems, floor loading, avoid blocking access to items requiring maintenance access, etc.).
- f. Develop installation plans for the experimental facilities and ensure that the conventional facilities space allocated to the experimental facilities group is adequate to meet requirements.
- g. Include plans for the thirty beamlines currently planned as part of the transition to operations plan.
- h. Reevaluate the feasibility of constructing an office building adjacent to the new NSLS-II accelerator facility that includes space for a control room and the NSLS-II staff directly supporting the efficient operations of the facility.