

*Review Committee Report*

*of the*

**Spallation Neutron Source (SNS)  
Target-Instrument-Facilities  
Integrated Installation Plan**

August 2004



## Executive Summary

A review of the Spallation Neutron Source Source (SNS) Target-Instrument-Facilities Integrated Installation Plan was conducted at Oak Ridge, Tennessee during August 19-20, 2004 at the request of the Deputy Project Director, Carl Strawbridge. The purpose of the review is described in the provided Charter (see Attachment I). The committee membership and responsibilities are shown in Attachment II. The agenda for the review is provided in Attachment III.

Overall, the committee was impressed with the work done by the Project addressing the concerns related to the need for a “Target-Instruments-Facilities Integrated Installation Plan” identified in the *May 2004 DOE Technical, Cost, Schedule and Management Review of the Spallation Neutron Source (SNS) Project*. Plans regarding organization, schedule, staffing, procurements and the transition from the AE/CM contract, as well as assessing the attendant risks, were presented. Although time did not allow a more in-depth review of the schedule and resources, it is evident that, with appropriate management diligence, the plan is workable and can lead to a successful project completion.

Specific findings, comments and recommendations pertaining to the questions in the committee charter have been made by the committee and follow in this report. Where noted, recommendations indicating a November 2004 target for action are intended to be timely for the next DOE Technical, Cost, Schedule and Management Review of the SNS Project.

*1. Does the proposed integrated schedule contain all necessary milestones and activities in sufficient detail, including sequences and logic ties, labor and materials requirements, physical or other constraints, appropriate resource-loading, and will it satisfy project completion and final performance testing definitions?*

*2. Do the plans reflect sufficient staffing and management to oversee and, when required, execute the work? Is there adequate field engineering and coordination support planned between Conventional Facilities and technical installation staff?*

## **Findings**

Overall, the integrated schedule is in sufficient detail for this stage of the project. The project recognized that additional detail will be required for some of the instruments, especially those that are developed outside of the SNS Project.

Overall, staffing and management plans are adequate with minor exceptions that are addressed below. The current management structure appears adequate to ensure coordination between fielding engineering and conventional facilities and technical installation staff.

## **Target**

A key assumption in the target schedule is that the Target Installation Packages (FP Packages 2-9) are completed on schedule (~ Feb 05). The detail schedules for these packages are generated by the vendor and closely monitored by the project. The integrated project schedule shows each of these packages as one task. These packages represent the bulk of the work to be done on the target and completing them on schedule is critical. The project must closely monitor these tasks to avoid delays that will cascade through the project. In particular, a delay in package 3 (Hot Cell-Target carriage and Hg) will push out key target loop activities which only have ~32 days of float.

The installation activities that occur after the target carriage and Hg system (package 3) are installed in the hot cell, are sufficiently detailed (both task duration and resource loading). The main schedule risk is a failure of the RH manipulator that will be used to install Hg components. If this occurs,

the work around is hands on which will satisfy current requirements, but later problems may not be conducive to hands on workarounds.

## **Instruments**

Instruments like the Backscattering Spectrometer are also close to the critical path (with ~20 days float). The installation schedule for the instruments seems reasonable and has sufficient detail, however resource requirements are specified in less detail. The key to the first three instruments is building BOD (or RFE) occurring on time. Gaining access to the south instrument bay is a project priority and is being pursued.

## **RTBT Activities**

The RTBT schedule is also sufficiently detailed and resources are adequately defined. The key constraint is the use of the 50-ton crane which can be accommodated by shift work.

## **Comments**

1. The schedule is very tight and will require very close monitoring and coordination to avoid delays due to missing parts, unavailable resources, etc. The System Installation Engineers are key to avoiding these delays since they will likely be the first to see signs of trouble. Frequent and visible feed back from them is critical.
2. The System Installation Engineers (SIE) identified for target systems (6) and instrument systems (1) have been responsible for the design and procurement of these systems and are excellent choices. The level of SIE support for the target seems reasonable, however only one SIE for the instruments seems low, particularly if he is involved in the design/procurement of later instruments. Separately, the number of Field Coordinators appears inadequate and could impact schedule.
3. Consider the benefits and risks of the DB craft schedule being 4-10 hour days or 5-8 hour days and include this in the schedule planning.
4. Insufficient numbers of instrument installation technicians may be available during the early phases of installation. Using DB or ATLC craft to perform this work is being considered. The current plan has assumed DB rates for all craft labor categories. It is known that ATLC rigger services will be required for some of the transport of instruments and this will have

~\$20/hour delta. Alternatively, use of AIMS labor in lieu of ORNL technicians results in a lower hourly rate (~\$10/hour).

5. The project is commended on implementing the necessary streamlined communication lines between the SIE and the General contractor. The committee hopes that this will also foster a development of sustained relationships between the SIE and the field personnel crews.

## **Recommendations**

1. Define the responsibility and authority of the system installation engineers, including the responsibility for maintaining schedule (~November 2004).

2. Reassess the number of System Installation Engineers and Field Coordinators (~November 2004).

3. Add key deliveries and milestones for each of the Target and Instrumentation Installation FP Packages (especially interfaces to ORNL installation activities) to the project schedule. These are currently shown as one line in the schedule. The committee felt that it was necessary to add intermediate milestones, especially where specific areas are turned over prior to BOD. In this fashion the SIE's would have immediate visibility into specific problem areas.

4. Incorporate proper craft labor rates into the next ETC (~ November 2004).

5. Assign an overall coordinator of the SIE's by the next DOE review (~ November 2004).

6. Integrate all separate instrument installation schedules into the master schedule, with input from the various instrument projects.

***3. Are there plans to ensure the organization is/will be in place when needed to manage the remaining Target and Instruments Systems work, including installation? Are all responsibilities clearly assigned?***

The review committee was presented with the major elements of a plan for handling the installation of the target components and instruments in the Target Building. In the near-term, the efforts are managed by the AE/CM firm using the general contractor for the facility. In six months both organizations will vacate the site. In anticipation of this change a plan has been developed by the laboratory management to continue the installation efforts of XFD.

The project management has anticipated this need by reconfiguring the former Conventional Facilities staff into the Project Site and Support Office. That organization will absorb trained installation workers from ASD to execute the installation of components for the XFD engineers. The review team found that the plans are now in place to initiate those actions in the near future. Schedules were presented that described the tasks to be undertaken. They were backed up with cost estimates, manpower allocations, and assignments of responsibilities.

## **Findings**

The schedule for the overall installation effort was presented at a summary level. One of the observations of the committee is that only two high level milestones were identified. Intermediate milestones should be developed so that progress with installation can be tracked and monitored. The project stated that such an examination is currently underway and agrees that these secondary milestones are needed to monitor progress and to be able to take remedial action, as needed.

There is a critical transition period in Feb. '05 when the AE/CM contract ends and SNS assumes installations responsibility. There is a Transition Steering Group comprised of senior management that monitors and assigns tasks to the working groups. Installation activity has been split between the contractor and SNS to prepare for the end of the GC contract. The remaining installation activities are well defined, and work tasks have been re-sequenced from serial to parallel activities. Linkages affecting schedule activities have been integrated into the schedules. The activities need to be

monitored closely in order to complete the target installation and prepare the initial instrument installation.

Staffing reorganization plans are in place to shift installation responsibilities to PSSO and XFD. Managing the workflow process after the transition must be a high priority. Proven successful ASD workflow management experience is being transferred to XFD workflow planning. In addition, benefits have been derived relative to vendor oversight requirements from previous experience.

## **Recommendations**

1. Develop intermediate milestones in the summary schedule that track and monitor installation progress before the next DOE review.
2. Track the Target Building BOD in order to maintain the schedule for Instrument installation.



#### ***4. Are the plans consistent with current budgets and funding?***

### **Findings**

The delta cost of \$2.9M associated with the Target and Instruments installation plan has been incorporated within the Project's EAC. Furthermore, potential growth of the cost estimate has been addressed in the SNS Risk Summary and categorized as "Moderate" for the Target (WBS 1.6) and "Low" for Instruments (WBS 1.7).

### **Comments**

A number of issues exist that could possibly impact the risk assessments and also have the potential to effect SNS labor policy:

1. Although individual craft codes have been used in developing the installation cost estimates, the actual craft mix has not been finalized. The actual use of ORNL technicians, AMSI employees or ATLC staff against a different plan could create a rate variance of as much as \$20/hour.
2. The use of shift work and overtime has been mentioned to mitigate over demand of certain resources and space conflicts. This has not been addressed in either the Target or Instruments installation cost estimates.
3. The lead engineer for Instruments stated he has a need for a number of technicians and finding candidates has been problematic. Until he can hire these individuals, a process he feels could take months, he intends to use either AMSI employees and/or ATLC staff to fill this need.

### **Recommendations**

1. Re-examine the labor craft codes used for the Target and Instrument's installation cost estimate, modify as required and include any intended use of shift or overtime. This should be completed prior to the next DOE Review.
2. Accelerate recruitment efforts for Instrument installation technicians and re-examine the labor plan usage prior to the next DOE Review.

*5. Have risks to the plans been assessed and appropriate mitigation strategies developed?*

## **Findings**

The SNS Project has assessed major cost and schedule risks to the installation plans and has developed appropriate mitigation strategies for each identified risk. The risks are documented in the SNS Risk Summary and are updated monthly.

## **Comments**

Of course, new and unforeseeable problems will arise over the coming months and the SNS Project must be prepared to cope with them. Lines of communication within XFD, PSSO and with SNS Project senior management must be kept open and without reservation so that new risks will be identified early and brought to the attention of management for appropriate action.

***6. Do procurement plans for labor and materials support the schedule and adequately accommodate the transition of work from the AE/CM to the project?***

## **Findings**

The Committee agrees that a logical approach exists for transitioning labor and material support from the AE/CM contract to the SNS project to support project schedule activities exists. The Deputy Project Director, PSSO and XFD personnel are working closely together to put the final details in place to solidify this transition activity. However, the Committee recognizes that many variables exist that can influence AE/CM to SNS “hand-off” decisions and result in additional schedule or cost risks. The Committee’s concern of an abrupt cut-off of AE/CM and the General Contractor equipment installation support in February, 2005 is mitigated by the fact that AE/CM project core team and General Contractor staff will most likely be available for 90 days after February 2005 to assist with any continuing contract transition activity. In addition, SNS intends to place and award contracts to handle fixed price installation requirements less than \$ 500,000 each to support equipment and instrument installation activities. Like wise, the PSSO has developed a preliminary list of “hand-off” contracts for transfer consideration that will also bolster equipment installation activity and ease transition risks. The SNS team is aware of these risks and positioned to make decisions and adjustments to mitigate those risks.

## **Recommendations**

Committee recommendations to minimize contract “hand off” risks should be completed by the next DOE review and are as follows:

1. Develop exit strategies for:
  - Every AE/CM “hand-off” contract as each one may have different complications.
  - Initiating novation processes for “hand-off” contracts as early as practical to allow for recovery time in obtaining another contractor if the novations are not successful.
  - Addressing communication activities with the Knoxville Building Trades council, particularly as they relate to the current labor installation contract slated for transfer.

- Establishing a path forward to determine the types of labor needed for instrument installation.
  - Developing a comprehensive contract closeout checklist and share it with the AE/CM to help facilitate closeout activities.
2. Initiate and complete Advance Procurement Plans (APPs) for any new contracts required to support transition activities in the next 30 days.
  3. Re-examine all procurement personnel assumptions and resources associated with the transition for adequacy and completeness.

# Attachment I

## Charge for Target-Instrument-Facilities Integrated Installation Schedule Review

1. During the May 2004 DOE Office of Science semi-annual review of the Spallation Neutron Source (SNS) Project, several related recommendations were made regarding the integration of Target and Instrument Systems and Conventional Facilities work in the Target building and the transition to project ownership of this building and associated systems. Specifically, it was recommended that:
  - the project establish for review by July a plan to ensure a smooth transition to an efficient installation management organization after the Architect Engineer/Construction Manager contract has ended
  - Target, Instrument, and Conventional facilities management develop for review by July a comprehensive, integrated schedule for completing the Target building and all Target and Instrument Systems installation activities
2. In light of these recommendations, the committee is asked to review the project's plans in these areas for completeness, consistency, and workability. Specifically, the committee should ascertain:
  - Does the proposed integrated schedule contain all necessary milestones and activities in sufficient detail, including sequences and logic ties, labor and materials requirements, physical or other constraints, appropriate resource-loading, and will it satisfy project completion and final performance testing definitions?
  - Do the plans reflect sufficient staffing and management to oversee and, when required, execute the work? Is there adequate field engineering and coordination support planned between Conventional Facilities and technical installation staff?
  - Are there plans to ensure the organization is/will be in place when needed to manage the remaining Target and Instruments Systems work, including installation? Are all responsibilities clearly assigned?
  - Are the plans consistent with current budgets and funding?
  - Have risks to the plans been assessed and appropriate mitigation strategies developed?
  - Do procurement plans for labor and materials support the schedule and adequately accommodate the transition of work from the AE/CM to the project?
3. The committee will convene at the SNS Central Laboratory and Office Building at ORNL at 8:00 a.m. on August 19 and complete its assessment by 4:00 p.m. on August 20; a report of findings and recommendations to the SNS Contractor Project Manager, Dr. Thom Mason, and the SNS DOE Federal project Director, Les Price, is requested by August 30. The SNS point-of-contact for this review is Dr. Ian Anderson, Experimental Facilities Division Director (Tel: 865-574-0548).

## Attachment II

### Review of the Spallation Neutron Source (SNS) Project Target-Instrument-Facilities Integrated Installation Schedule

#### REVIEW PARTICIPANTS

Name	Affiliation	Phone	E-Mail	Responsibility
Dr. Paul C. Brand	NIST Center for Neutron Research	301-975-5072	<a href="mailto:paul.brand@nist.gov">paul.brand@nist.gov</a>	Instrument Systems
Mr. William J. Foyt	Consultant	727-542-7787	<a href="mailto:wfoyt@tampabay.rr.com">wfoyt@tampabay.rr.com</a>	Cost/Schedule
Mr. Donald Getz	Consultant	708-210-9549		Management/Conventional Facilities
Dr. George Goeppner	Argonne National Laboratory	630-252-5654	<a href="mailto:gag@aps.anl.gov">gag@aps.anl.gov</a>	Installation
Mr. Gary A. Johnson	Spallation Neutron Source	865-382-8088	<a href="mailto:johnsonga@ornl.gov">johnsonga@ornl.gov</a>	Target Systems
Mr. Barry Miller	Oak Ridge National Laboratory	865-576-0274	<a href="mailto:millerbr@ornl.gov">millerbr@ornl.gov</a>	Procurement
Dr. James Sanford	Consultant	631-296-9611	<a href="mailto:sanford@bnl.gov">sanford@bnl.gov</a>	Conventional Facilities
Mr. Robert Simmons	Princeton Plasma Physics Laboratory	609-243-2766	<a href="mailto:bsimmons@pppl.gov">bsimmons@pppl.gov</a>	Cost/Schedule
Mr. Mike Williams	Plasma Physics Laboratory	609-243-2866	<a href="mailto:williams@pppl.gov">williams@pppl.gov</a>	Chair

# Attachment III

**Review of the  
Spallation Neutron Source (SNS)  
Target-Instruments-Facilities Integrated Installation Plan  
DRAFT AGENDA**

**Thursday, August 19, 2004—SNS Central Lab and Office Building, Conference Room J-200**

- 7:30 Continental breakfast available
- 8:00 Executive session
- 8:30-12:00 **Plenary Session Presentations**
- 8:30 Opening Remarks ..... Strawbridge
- Project Overview
  - Committee charge
  - Organization
    - organization in place or planned to manage all of the remaining work and installation work thru CD-4
    - post-AECM site management issues
- 8:45-12:00 **Target-Instruments-Facilities Integrated Installation Plan**
- Installation Plan Summary..... Anderson
    - major work activities, schedule & budget summaries
    - meeting performance plan requirements/definitions
  - Cost and Schedule..... Thibadeau
    - principle milestones, critical path, important interfaces and schedule drivers, resource loading, deltas to current schedule baseline
    - changes to current baselines, updated EAC, adequate funding profiles
- 10:15-10:30 (Break)
- Procurement plans and labor strategies ..... Lawson
    - accommodate transition from AECM, labor and materials considered, contract vehicles appropriate, potential risks)
    - adequate to oversee and execute remaining CF and systems installation work
    - sufficient field engineering/coordination between facilities and technical staff
  - Risks/mitigation and open issues ..... Anderson/Strawbridge
- 12:00 Lunch

12:45-4:00 **Parallel Subcommittee Discussion Topics (backup presentations as requested by reviewers)**

- **Conventional and Experimental Facilities Work details  
(CLO Executive Conference Room, 4<sup>th</sup> Floor)  
(McManamy, Fornek, Murdoch, Dean)**
- **Cost/Schedule/Management details (Room J-200)  
(Thibadeau, Lawson, Gabriel, Crawford)**

4:00 **SNS Site Tour (as desired)**  
5:00 Committee questions for SNS staff  
5:15 Committee Executive session  
6:30 Dinner, Bleu Hound Restaurant, Oak Ridge

**Friday, August 20, 2004**

**Parallel Subcommittee Discussions (continued)**

7:30 Continental breakfast available, J-200  
7:45 Committee Executive session  
8:00 General Discussions or requested talks from reviewers  
10:00 Subcommittee working sessions and report preparation  
11:30 Working lunch, continue Subcommittee Working Sessions  
1:00 Committee Executive Session and report preparation Closeout Dry Run  
3:00 Closeout  
4:00 Adjourn