

The Spallation Neutron Source Monthly Report

May 2004



SNS 102010000-TR0045-R00



A U.S. Department of Energy Multilaboratory Project

SPALLATION NEUTRON SOURCE
Argonne National Laboratory • Brookhaven National Laboratory • Thomas Jefferson National Accelerator Facility • Lawrence Berkeley National Laboratory • Los Alamos National Laboratory • Oak Ridge National Laboratory



CONTENTS

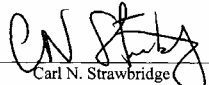
PROJECT OVERVIEW AND ASSESSMENT	3
TECHNICAL AND PROGRAMMATIC PROGRESS	
WBS 1.4 Los Alamos Linac	5
WBS 1.4 Thomas Jefferson Linac	6
WBS 1.5 Ring and Transfer Systems	7
WBS 1.6 Target Systems	8
WBS 1.7 Instrument Systems	9
WBS 1.8 Conventional Facilities	10
WBS 1.9 Integrated Control Systems	11
WBS 1.3, 1.4, 1.5 Accelerator Systems Division	12
WBS 1.2 Project Support	13
COST/SCHEDULE PERFORMANCE REPORTS	15
GLOSSARY	20



Project Overview and Assessment



Technical Assessment:	Satisfactory
Cost Assessment:	Satisfactory
Schedule Assessment:	Satisfactory


 Carl N. Strawbridge
 SNS Deputy Project Director
 7/7/04
 Date

Work on the CLO and Target Building continues

Highlights and Issues:

- Good project performance continues with minor cumulative cost and schedule variances of 0.7% and -1.1% respectively against the March 2006 early finish schedule. Through the end of May, 82.3% of the project is complete. Completion percentages are:
 - ◊ 99 % of R&D
 - ◊ 95 % of design
 - ◊ 79 % of technical hardware (including procurement and fabrication)
 - ◊ 90 % of conventional construction
 - ◊ 56 % of installation
- Contingency continues to be tight. The available contingency balance of \$28.2M will be reduced to \$24.1M once the changes identified in the Estimate at Completion are incorporated into the base-

line. Approximately \$5M of undistributed pre-operations budget is also available.

- Excellent safety performance continues. Through 22 May 2004, the total Project has worked in excess of 5.3 million hours with 69 recordable injuries (an increase of 6 from last month) and no lost work day (away) cases. The project's first lost workday away case occurred on 27 May.
- Management focus continues on executing/managing the critical path work of target installation and preparing the cryo plant for operation.
- FY04 BA is being closely managed and selected slow-downs will be directed if necessary.
- The project successfully completed the relocation of personnel from leased offices offsite to the CLO.

Assessment:

Accelerator Systems Division (ASD): Good progress is being made on hiring experienced accelerator operators needed for the Superconducting Linac beam commissioning. Preparations for the August warm linac beam commissioning remains solidly on schedule. DTL final alignment is complete and all RF windows are loaded. All DTL Resonance Control Cooling Systems are operating and flowing water, allowing the Magnet Group to begin their final testing of the DTL EMD drift tubes. DTL vacuum system cable connections and pump installation is progressing rapidly. CCL-2 vacuum terminations and the CCL-3 cooling manifold installation as well as CCL-4 bridge coupler vacuum leak testing and water orbital welding are complete. CCL-3 RF system is almost ready for testing. As the installation activity on the warm linac comes to a close, a very detailed integrated schedule is being developed by the Cryo, Accelerator Physics, Operations and other groups for the SCL installation, preoperational checkout, and cooldown, testing and beam commissioning. Production of medium-beta cavities is complete and a preliminary list of slot locations for these cryomodules has been made by the Physics Group. The installation of the temporary clean room for warm sections is almost complete and test pieces have been cleaned in it, satisfying the Review Committee requirements. The warm section beam pipe cleaning and installation review has been organized. The RTBT harp that determines the beam profile on the liquid Hg target is being supplied by LANL. Fabrication of this harp is proceeding on schedule and the electronic circuit boards are being manufactured.

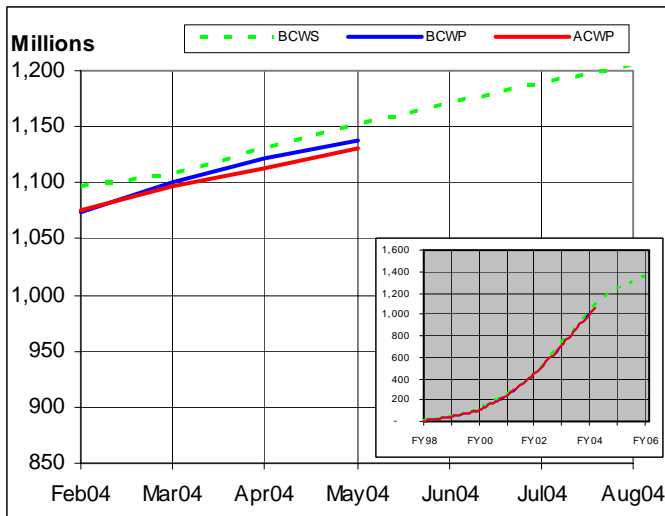
Experimental Systems Division (XFD): Installation efforts continue to be the focus of the division. Integrated installation planning for the Target and instruments is underway. The Hydrogen Design Validation and Training Module Final Design Review was completed and tests on the hydrogen loop will begin in October after refrigerator system commissioning has been completed. The four 470-mm inflatable seals for the PBW were successfully leak tested at the vendor. They are being shipped to the vendor fabricating the PBW assembly. They will be tested again in an identical configuration to SNS prior to shipping. The

Target Shroud Delay Tank is being fabricated and is on schedule for delivery in July. The Hg loop vacuum pump assembly is also being fabricated and will be shipped in August. Possible prototype development projects utilizing robotics in SNS sample environments are being investigated and the plans for use of graphite foam as a rapid heat exchange medium in sample environment components are being developed. Several paths toward development of compensated high-field magnets for neutron scattering research at SNS are being pursued. These include possible collaborative effort with PSI, Switzerland for a 15T magnet, and planning for a proposal for a technical feasibility study for lower field compensated superconducting magnets.

Conventional Facilities (CF): The first wave of occupants moved into the CLO on Monday, Jun 14, the second on Monday, June 21. The parking lot was completed and an on-site bus and taxi service will be provided to shuttle site occupants to different parking lots as required. With completion and now occupation of a portion of the CLO, the CUB has seen its highest cooling load since operation began last year of over 650 tons. It is likely that the load will continue to grow as more of the CLO is occupied and additional Accelerator hardware is commissioned. Site work around the Target Compressor Building is nearly complete and the building is sufficiently complete to receive the He compressor which is due in early July. Work in the utility vaults has picked up with the increase of assigned personnel in those areas. Installation of the chilled water and hot water systems is ongoing. The ringer crane which had been down for maintenance is now again operational. The lower Target hot cell door has been delivered. The door hinge test procedure for the upper shield door hinges is currently being reviewed by SNS staff. The test is intended to demonstrate the integrity of the hinges on the upper hot cell shield door, one of which recently failed during manufacturing. The contractor has started on-site production of pre-cast concrete "T"s for the shielding above the hot cell. With completion of the Target Building retaining wall, the additional backfill is being placed on top of the RTBT tunnel. The liner is expected to be placed by the end of June. The resulting settlement so far has been less than the 7.5" predicted.



Project Overview and Assessment (con't)



Total Project	May04	Cum-to-Date
BCWS	20,454	1,151,403
BCWP	16,758	1,138,233
ACWP	17,421	1,130,485
CV	-662	7,748
SV	-3,696	-13,170
CPI	0.96	1.01
SPI	0.82	0.99
Budget at Complete		1,383,526
Contingency		28,174
Total Project Cost		1,411,700

Total Project Cost (TPC)	\$1,411.7 M
Percent planned (cumulative)	83.2%
Percent complete (cumulative)	82.3%
Total Estimated Cost (TEC)	\$1,192.7 M
Cost and Commitments through 5/31/04	\$1,033M
Outstanding Phase Funded Awards	\$25.8M
Budget to Complete	\$131.9M
Contingency	\$28.2M
Estimate at Completion	\$1,168.6M
Remaining Contingency Based on EAC (21.8%)	\$ 24.1M

Critical Path:

Based on the March 30, 2006 completion date, no activities in the project schedule show negative float at this time.

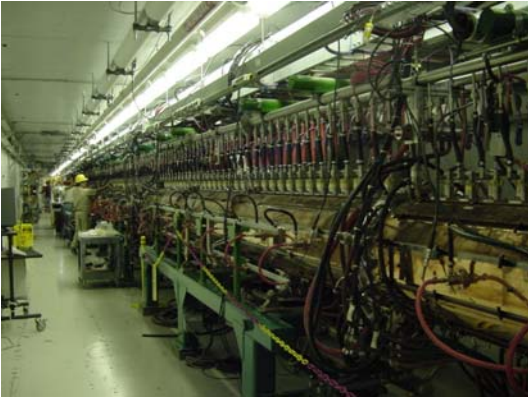
The project's longest path remains unchanged and is associated with the Target System's Hot Cell installation sequence. Currently, 22 days of positive float exist in this installation and integrated testing sequence. The schedule is being monitored closely to ensure that there are no delays in the loading of Target Mercury, conducting integrated startup testing of the Target systems and the Target Readiness assessment. Target Systems installation effort has been grouped into "installation packages" that are being performed by the General Construction Contractor. The package involving installation of the Hot Cell equipment is being finalized and SNS personnel worked closely with the General Contractor to capitalize on all schedule optimization opportunities including parallel sequencing and double shifting.

Milestones:

Description	Milestone Date	Forecast Date
CD-1 Mission Need	Aug-96	Aug-96 ✓
CD-2 Baseline Approved	Dec-97	Dec-97 ✓
CD-3 Begin Construction	Nov-99	Nov-99 ✓
CD-4 Project Complete	Jun-06	Mar-06



Linac Systems– Los Alamos National Lab



DTL tanks in the Linac Tunnel

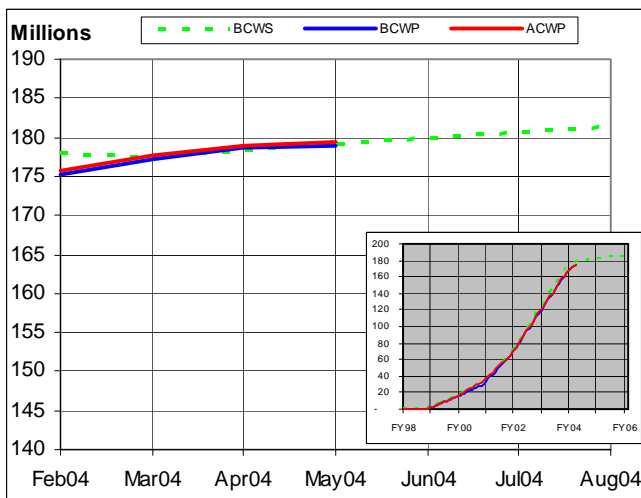
Highlights:

- The fourth Thales 5-MW klystron completed its heat run and site acceptance test successfully. This klystron, along with three Thales 550-kW klystrons, several magnets, and ancillary equipment, was shipped to ORNL.
- The final site acceptance test at LANL of a 5-MW klystron is going well. This klystron will be used at LANL for continuing CCL window, circulator, and load tests. Another 5-MW klystron is completing its factory test at Thales. This klystron will be shipped directly to ORNL.
- The fifth 550-kW Thales klystron just finished LANL site acceptance tests. It was 63% efficient, meeting the 62% specification. Two more Thales 550-kW klystrons require testing.
- The third pair of CCL windows, which have a new style vacuum seal that won't mar the surface, was installed. A pair of CCL windows is being baked out. The windows will be installed on the test stand in June.
- LANL personnel are at SNS providing installation support.
- Assembly of the RTBT harp 5th HV plane was finished and started the 6th. Tests showed the first version of the harp electronics card to be highly functional. The design has been modified to clean up some issues and was delivered to the ECAD shop. The new boards will be delivered in June.

Assessment/ Issues:

LANL project management for the SNS project has been disestablished and ASD-ORNL is coordinating remaining work.

Performance and Milestones:



	May04	Cum-to-Date
BCWS	885	179,201
BCWP	432	178,983
ACWP	612	179,405
CV	-180	-422
SV	-453	-218
<hr/>		
CPI	0.71	1.00
SPI	0.49	1.00
<hr/>		
Budget at Complete		183,448
<hr/>		
Planned % Complete		97.7%
Actual % Complete		97.6%

Cost Performance:

Cause and Impact: The current period variance is due to the correction of BCWP that was over-reported in April. The cumulative cost variance is of concern.

Corrective Action: It does not appear as if mitigation opportunity exists for this cost variance and contingency may be required.

Schedule Performance :

Cause and Impact: The current period variance is due to the correction of BCWP that was over-reported in April.

Corrective Action: None required.

Description	Milestone Date	Forecast Date
Linac Design Complete	Sep-02	Apr-02 ✓



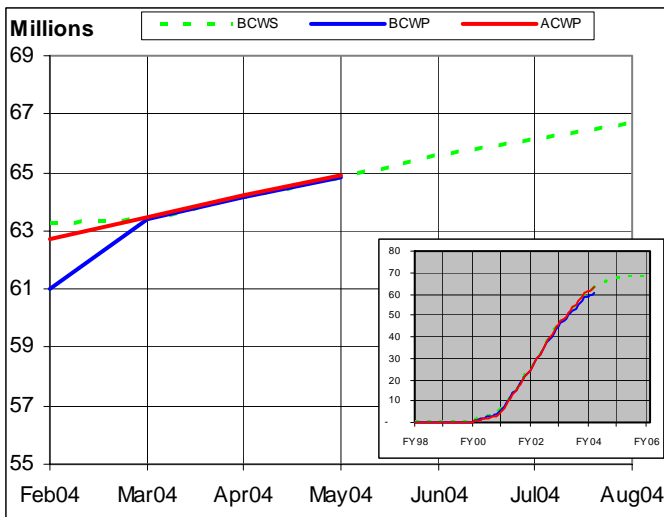
Highlights:

- Three additional High-β cavities were qualified this month.
- String Assembly for Cryomodule H-5 was started and assembly of Cryomodule H-3 and H-4 continued.
- Testing of H-1 was started.

Testing of cryomodule High-β 1

Assessment/Issues: Management attention is focused on maintaining the cryomodule fabrication schedule which is on track for March 2005 finish.

Performance and Milestones:



	May04	Cum-to-Date
BCWS	722	64,866
BCWP	711	64,858
ACWP	693	64,917
CV	18	-59
SV	-11	-8
CPI		
	1.03	1.00
SPI		
	0.99	1.00
Budget at Complete		68,358
Planned % Complete		94.9%
Actual % Complete		94.9%

Cost Performance:

Cause and Impact: Not required.
Corrective Action: None required.

Description	Milestone Date	Forecast Date
Linac Design Complete	Sep-02	Apr-02 ✓
Initiate Testing of Prototype Cryomodule	May-02	Apr-02 ✓

Schedule Performance:

Cause and Impact: Not required.
Corrective Action: None required.



Ring Collimator Stands

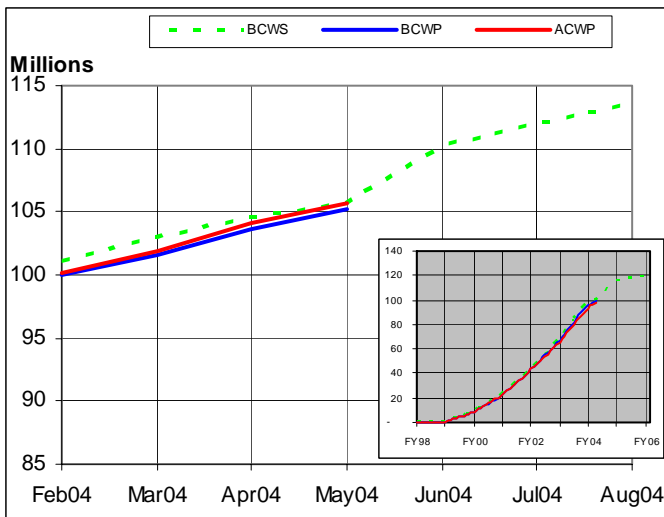
Highlights:

- Following the signed ring diagnostics production plan, the diagnostics group is progressing towards the pre-production review before the finalization of the Beam-Position-Monitor electronics.
- The vacuum group encountered complications in the TiN coating of the ferrite surface of the prototype extraction kicker module. Since a finite resistance was measured between the high voltage conductor and the eddy current plate, a gap of about 1.5 cm width will be masked at each corner around the HV conductor. Accelerator physics analysis is underway to evaluate the efficiency in electron cloud control.
- The mechanical interferences on the edge of two 30-cm ID quadrupole magnets were resolved. The mechanical groups, magnet measurement group, and the accelerator physics group work together to trim edge and to extra weld iron pieces positioned to maintain the chamfer while leaving the 1.0 and 1.3 GeV performances (magnetic transfer function and multipole harmonics) uncompromised.
- Work continued on injection straight section trial-assembly in building 905 to verify fit and function. The SDMS vacuum chamber for the injection dump septum magnet was successfully modified to bring it within specifications and the shape of the injection foil holder has been modified to meet the latest requirements for injection. Work continues to optimize the placement and to revise the chamfer design of the injection-dump combined function magnet for mechanical clearance and two-beam (H0, H- residuals) bending/focusing performance.
- Engineers from BNL and ORNL witnessed the successful tests and acceptance of the main dipole magnet power supplies at 6000 A current.
- Excessive wear was observed in the extraction kicker Pulse-Forming-Network steel gear pump. A new pump with PPS plastic gear has been procured and pre-tested, and is expected to be compatible with the silicon fluid used in the PFN. This pump will be sent to APS and tested with PFN units #3 and #4.
- Ring collimators #2 and 3 and the arc quadrupole-corrector-dipole half-cell assemblies #27 and 28 were shipped to ORNL. The assembly of the last three half-cells (#30 - 32) and the first two doublet cells is underway.

Assessment/Issues:

The globally high steel price is of concern. Vendor visits are revealing that costs are exceeding the baseline. Potential offsets are being explored.

Performance and Milestones:



	May04	Cum-to-Date
BCWS	974	105,606
BCWP	1,540	105,228
ACWP	1,650	105,692
CV	-109	-465
SV	566	-378
CPI	0.93	1.00
SPI	1.58	1.00
Budget at Complete		118,925
Planned % Complete		88.8%
Actual % Complete		88.5%

Cost Performance :

Cause and Impact: None required.
Corrective Action: None required.

Schedule Performance :

Cause and Impact: The current period variance is largely due earned value on high field magnet effort planned in prior periods. The cumulative schedule variance is associated with delays in the Lambertson magnets.

Corrective Action: None required.

Description	Milestone Date	Forecast Date
Ring Design Complete	Oct-03	Jul-03



Mercury Storage Tank

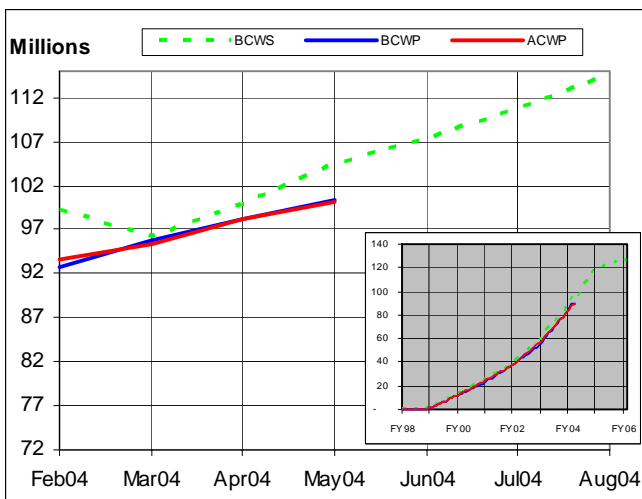
Highlights:

- Weekly discussions are held with the vendors of the Hg heat exchanger and inner reflector plug. Timely delivery of these components is critical to maintaining the installation schedule.
- The fabrication and vendor testing of the mercury storage tank is complete. The final data package has been reviewed and approved, and the vendor has been instructed to ship the vessel.
- The hot cell floor shielding CAD model was revised to reflect the as-built dimensions of the hot cell floor pan. The models were sent to the shielding vendor for use in procurement of the steel parts.
- A comprehensive stepwise procedure for the remote replacement of a mercury heat exchanger was completed and submitted to interested XFD operations and design personnel for review and comment. The procedure is intended to serve as the basis for a formal operating procedure. It was also used to develop a list of special tools required for this operation.
- The Proton Beam Window was successfully welded into the plenum ring. The ring was successfully welded to the stainless steel cooling blocks and the assembly leak test was successful.
- The steel components of the concrete shutter, the sixth of twenty upper interstitial blocks and six of eighteen shutter gates have been delivered to the site. Final installation of the hot cell bridge system rails began and the personnel bridge for the monolith has been ordered.
- Bubble injection testing on the Target Test Facility (TTF) began May 14. This process has been shown to reduce cavitation induced erosion and may allow future target systems to go to powers greater than 1 MW.

Assessment/ Issues:

Hardware deliveries and the installation schedule continue to be monitored closely. Critical deliveries are monitored weekly at the division level.

Performance and Milestones:



	May04	Cum-to-Date
BCWS	4,682	104,554
BCWP	2,231	100,460
ACWP	1,813	100,049
CV	418	411
SV	-2,450	-4,094
<hr/>		
CPI	1.23	1.00
SPI	0.48	0.96
<hr/>		
Budget at Complete		126,310
<hr/>		
Planned % Complete		82.8%
Actual % Complete		79.5%

Description	Milestone Date	Forecast Date
Target Design Complete	Jun-03	Jun-03 ✓
Start Target Installation	Jun-03	Apr-03 ✓
Start System Test with Beam	June-06	Mar-06

Cost Performance:

Cause and Impact: The current period cost variance is largely due to target shielding receipts. Due to financial concerns, the subcontractor bills weekly on incremental progress and the costs were incurred in April. However, earned value is taken only when the blocks are completed.

Corrective Action: None required.

Schedule Performance:

Cause and Impact: The schedule variance is dominated by delays in the target utilities installation package. However, delays in other areas (shielding, cryogenics and the target moderator) are also substantial. Many of the variances were resolved in June and the remainder will be resolved by the end of July.

Corrective Action: Both hardware deliveries and the installation packages are being watched closely to ensure that the critical path is not impacted.



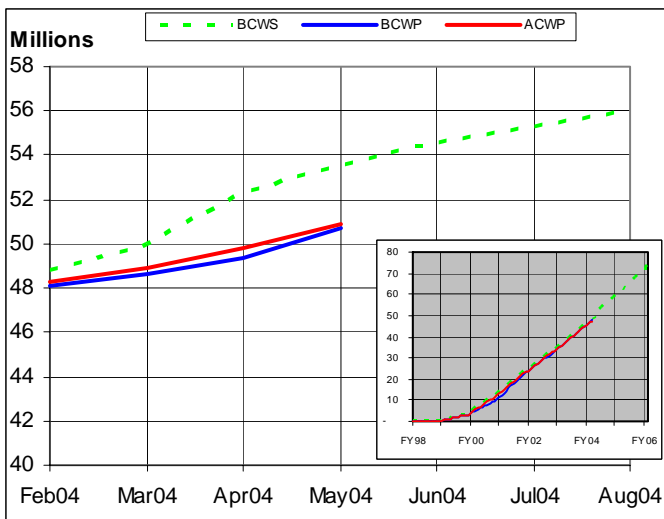
Target Building West Experimental Hall

Highlights:

- A draft of the Research Safety Summary for the liquids reflectometer has been completed.
- The resolution of one of the Reflectometer detector systems has been measured at the Californium Users Facility. The measurements were identical to predicted calculations.
- The Backscattering Spectrometer final flight path was evacuated Friday, May 14, 2004 for the first time. It achieved a pressure of < 10 mTorr upon first pump down in a total pumping time of approximately 1 hr 40 min. This performance exceeds the technical specification of 10 mTorr in under three hours of pumping time.
- An evaluation of the performance of different polarized devices for the Magnetism Reflectometer was conducted.
- Began discussions with the Condensed Matter Division x-ray group on x-ray laboratory transfer to the SNS CLO.
- A proposal to initiate a study of Compensated Magnet designs and capabilities has been drafted and distributed to Instrument Systems group for review and comment.
- The technical specifications document for the beam monitor for the liquids reflectometer are being developed.
- The SNS XFD neutronics calculations group is proceeding with closer examination of the activation of bandwidth choppers and the neighboring shielding to aid in operations planning for chopper maintenance. Results of these calculations will also impact the shielding design.

Assessment/ Issues: Focus on the integrated installation schedule continues.

Performance and Milestones:



	May04	Cum-to-Date
BCWS	1,253	53,573
BCWP	1,321	50,677
ACWP	1,023	50,855
CV	299	-178
SV	69	-2,896
CPI		
	1.29	1.00
SPI		
	1.05	0.95
Budget at Complete		
		78,121
Planned % Complete		
		68.6%
Actual % Complete		
		64.9%

Cost Performance:
Cause and Impact: Not required.
Corrective Action: None required.

Schedule Performance:
Cause and Impact: The cumulative schedule variance is dominated by two instruments in which the BCWS for several large procurements was baselined at the anticipated award date vs the anticipated delivery date. None of these delays affect the project’s early finish date.
Corrective Action: One large variance will be recovered by the end of FY04. While several of the erroneous resource loading issues were identified during the ETC, many were missed and need to be revised via the PCR process as many more of these variances will arise in the near future unless it is corrected.

Description	Milestone Date	Forecast Date
Start Instrument Installation	Mar-04	Mar-04 ✓
Instrument Design Complete	Oct-04	Oct-04
Complete Subproject Acceptance Tests	June-06	Mar-06



Conventional Facilities– Oak Ridge National Lab



Target Building

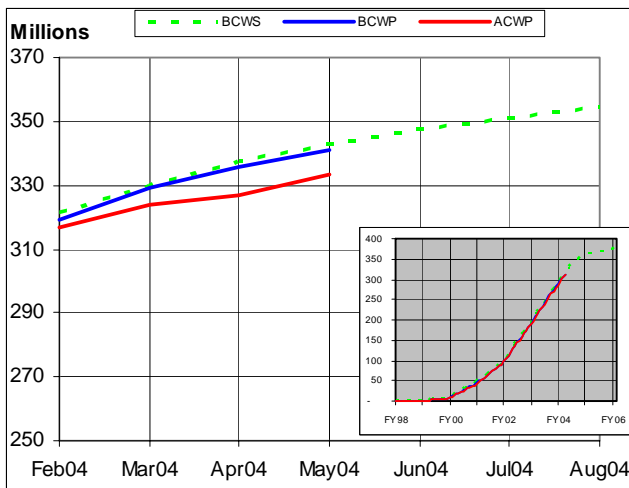
Highlights:

- The remaining backfill work over the RTBT Tunnel continued, with extensive monitoring of the RTBT settlement. This work is being coordinated with the installation of retaining walls and equipment pads associated with the Target Building.
- Target General Construction efforts continued with siding and window installation on the north and east sides of the Target Building. The 50 Ton NOG-1 crane was certified is now available for use. The Delay Tank Cavity concrete placement has been completed and Tee Beam and Zee Beam pre-casting is underway in the south side laydown area. Piping and painting continued in the basement and rough-in work for fire protection piping, system piping, duct and supports, and electrical work continued throughout the building. The elevator shaft and east stairway are in progress. Target Systems Package 2a installation is being re-sequenced to mitigate the impact of late deliveries of interstitial blocks.
- CLO General Construction met the June 2004, move-in of furniture and personnel. The Pedestrian bridge structural steel has been completed, along with elevated slab placements for the bridge. Site work continued on the CLO West Plaza concrete and retaining walls for the CLO East Plaza started. Progress continued with drywall installation, mechanical and electrical installation, installation of siding and windows, roofing and selected finishes.
- Installation of the Fire Alarm System in the CLO Building continues, where work is ongoing in all sectors. The Target Building task order has been released and the contractor will mobilize to start work in June 2004.
- The Communication Ductbank installation & testing is complete.

Assessment/ Issues:

RTBT settlement is projected to be within acceptable limits, requiring only minor repairs to the cracks in the tunnel walls.

Performance and Milestones:



	May04	Cum-to-Date
BCWS	5,530	342,938
BCWP	4,879	340,854
ACWP	6,323	333,364
CV	-1,444	7,490
SV	-651	-2,084
CPI	0.77	1.02
SPI	0.88	0.99
Budget at Complete		378,912
Planned % Complete		90.5%
Actual % Complete		90.0%

Description	Milestone Date	Forecast Date
Award AECM Contract	Nov-98	Nov-98 ✓
Start Site Work	Mar-00	Mar-00 ✓
BOD Front End Building	Dec-02	Oct-02 ✓
BOD 1000 MeV Linac	Apr-03	Dec-02 ✓
BOD Ring Tunnel	Aug-03	Jun-03 ✓
BOD Target Building	May-05	Feb-05
Construction Complete	Nov-05	Mar-05

Cost Performance:

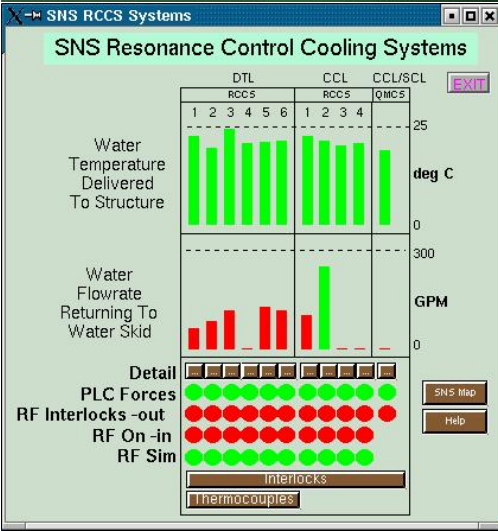
Cause and Impact: The current period positive cost variance is the result of the correction to the accrual error last month. Approximately \$1.2M of the cumulative cost variance is due to contractual issues with the structural steel, the remainder is due to unaccrued retention costs.

Corrective Action: The contractual issues with the steel are being worked.

Schedule Performance:

Cause and Impact: The current period negative schedule variance is primarily in the CLO General Construction (-\$1.1M), the Target Building (-0.5K) and CF Local Controls, which has been deferred until FY05 (-\$570K).

Corrective Action: None required.



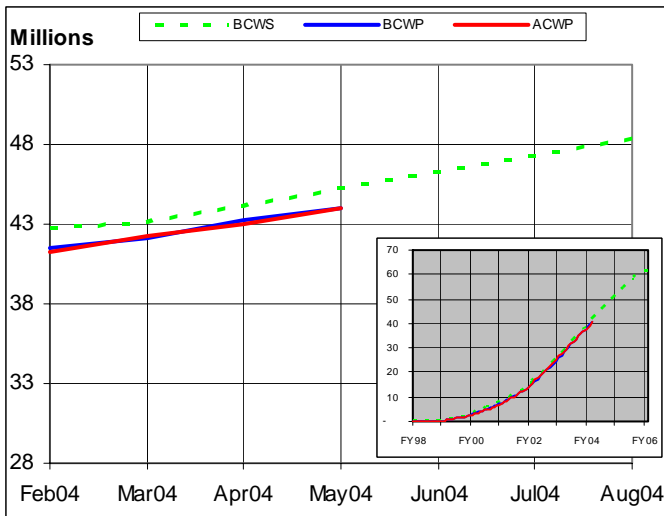
SNS RCCS System

Highlights:

- The CCL1 magnet power supply control IOC is operational
- The Resonance Cooling Control System (RCCS) and vacuum control software for DTL 4-6 and CCL 2-4 was installed and configured.
- All Personal Protection System (PPS) phase 1.1 field work for the Linac is complete. System integration testing is continuing and is 85% complete. Work on EPICS screens is 75% complete. Installation of PPS conduit and cable in the HEBT is 90% complete.
- The Ion Source Hot Spare Stand's RF Pulse generator was repaired and tested, including the remote control function from EPICS. A protection system for the Hot Spare Mass Flow Controller was set up.
- Checkout of the cryogenic control system for the first medium beta cryomodule (MB03) was started. IOC and PLC modules were installed.
- The Functional System Description (FSD) for Ring magnet power supplies was completely overhauled, including getting PV names corrected, PSC/PSI requirements, red (abnormal)/ green (normal) requirements, and flow loss protection for magnets.
- The Controls Group participated in the Beam Instrumentation Workshop held in Knoxville as well as the EPICS Collaboration Meeting in Santa Fe.

Assessment/Issues: No issues at this time.

Performance and Milestones:



	May04	Cum-to-Date
BCWS	1,019	45,188
BCWP	732	43,966
ACWP	928	43,987
CV	-196	-21
SV	-287	-1,223
CPI		
	0.79	1.00
SPI		
	0.72	0.97
Budget at Complete		61,449
Planned % Complete		73.5%
Actual % Complete		71.5%

Cost Performance:

Cause and Impact: The current period cost variance is largely due incorrect statusing of effort in target controls last month.

Corrective Action: None required

Schedule Performance:

Cause and Impact: The current period variance is due to incorrect statusing of effort in target controls last month. The cumulative schedule variance is largely due to activities in the Ring diagnostics and cryo controls areas. The diagnostics plan is overstated for the work being performed and the cryo controls are being delayed due to delayed ASD installation effort. None of these delays impact commissioning activities.

Corrective Action: The current plan is being reviewed and will be corrected by the end of FY04.

Description	Milestone Date	Forecast Date
Start Front End Controls Installation	Oct-02	Jun-02 ✓
Global Controls Design Complete	Jan-03	Sep-02 ✓
Global Controls Subproject Test Complete	May-06	Mar-06



5 MW Klystrons

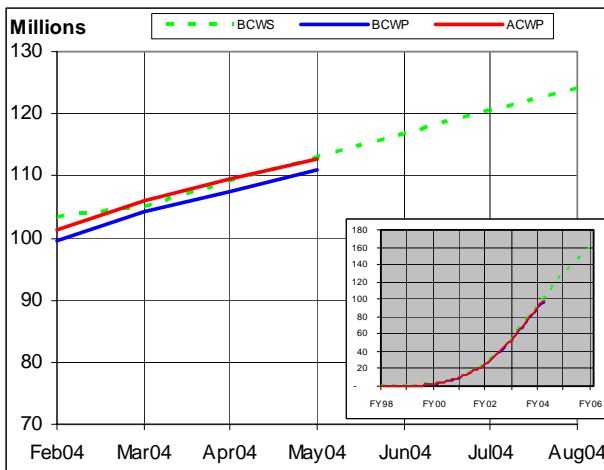
Highlights:

- Don Richied, Cryo Group Leader, suddenly and tragically died of a heart attack May 21, following shoulder surgery. The Cryo Group is operating under a six week plan for Don’s absence for his surgery. ASD is working on a fast way to provide cryo leadership into commissioning and operations.
- All DTLs and CCLs have been installed in the tunnel giving 302 feet of warm copper linac. All the DTLs have been tuned. CCL1 has been RF conditioned above the operating voltage level. CCL2 and CCL3 are tuned and under vacuum. The warm linac installation is on track for September beam commissioning.
- 120 of 125 HPM boards have been received to date. More than 50% of these have been tested and calibrated. All 125 FCM motherboards have been received. Suntron was given authorization this week to precede with the balance of the production of the RFO and DFE daughterboards. AFE daughterboards are due in early June.
- A detailed list of task, schedule and responsibilities is being worked through to get ready for the July 6 to 19 4.5K cold box run. The first 4.5K cold box run revealed several issues that will be resolved in the July run. CHL commissioning is ASD highest priority.
- The Injection straight section mock-up is being assembled at BNL. A second set of quad doublets has been included in the overall assembly. Vacuum chambers for the dump septum and chicane #4 are in the BNL Shops for minor rework. Chambers for chicane #2 and 3 should be ready for a trial fit next week with the thin foil chain drive mechanism.
- Twenty eight of 32 Ring arc half cells have been delivered in Oak Ridge. Numbers 29, 30 and 31 are being assembled in BNL.

Assessment/ Issues:

All deliveries that could affect the commissioning schedule are being monitored closely.

Performance and Milestones:



	May04	Cum-to-Date
BCWS	3,970	113,050
BCWP	3,449	111,049
ACWP	3,238	112,652
CV	210	-1,603
SV	-521	-2,001
CPI		
	1.06	0.99
SPI		
	0.87	0.98
Budget at Complete		172,139
Planned % Complete		65.7%
Actual % Complete		64.5%

Cost Performance:

Cause and Impact: The cumulative cost variance is due to klystron replumbing, DTL recovery, transfer line leaks, cryomodule production issues and CHL compressor skids manufacturing problems.
Corrective Action: Several potential offsets have been identified.

Schedule Performance:

Cause and Impact: The current and cumulative schedule variances are due to delays in CCL, DTL and CHL installation and klystron spares procurements and the under reporting of status for Linac diagnostics procurements.
Corrective Action: None required. The installation delays will be recovered and the delay in spares delivery does not impact the commissioning schedule.

Description	Milestone Date	Forecast Date
Start Front End Installation	Sep-02	Jun-02 ✓
Start Linac Installation	Sep-02	Apr-03 ✓
Start Ring Installation	Aug-03	Jul-03 ✓
FE Beam Available to DTL	Mar-03	Dec-02 ✓
Linac Beam Available to HEBT	Aug-05	May-05
HEBT& Ring Beam Available to RTBT and Target	Feb-06	Nov-05



Preparing the CLO

Highlights:

- 14 SNS Summer Students and 1 Faculty member attended a luncheon and orientation on Tuesday, June 8. The orientation included an SNS overview, ES&H, computer security, building access, and poster presentations.
- Meetings to plan for the SNS transition from construction to operations are occurring routinely. Topics discussed include craft resources needed for operations, research mechanic selection process, and control room functions.
- Detailed planning for the move from 701 Scarboro to the CLO was completed.

Assessment/Issues: Managing within budget. Continuing strong focus on BA management, cost control and contingency management.

External Review Data:

No progress on recommendations from external reviews was made in May.

Review	Recommendations	Closed This Month	Open Actions
DOE SC Review (11/03)	25	0	1

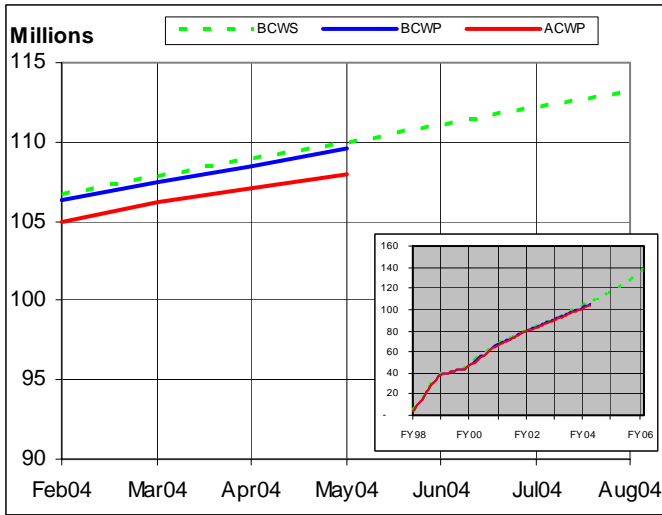
Life of Project Market Experience:

Major Awards (\$M)	Baseline Estimate (\$M)	Baseline Savings (\$M)	Percent savings over baseline
547.8	511.6	-36.2	-7.1%

Through June 14, 2004: 98% of the major procurements are already awarded.



Performance:



	May04	Cum-to-Date
BCWS	1,082	109,989
BCWP	1,083	109,573
ACWP	879	108,014
CV	204	1,559
SV	2	-416
CPI		
CPI	1.23	1.01
SPI		
SPI	1.00	1.00
BAC (1.2)		75,636
BAC (1.10.3, 1.1.13, 1.10.5)		71,284
Planned % Complete		74.9%
Actual % Complete		74.6%

Cost Performance:

Cause and Impact: The cost variance is largely due to increased efficiencies and improper phasing of move costs. The latter should have been isolated to June 2004 and rather was spread across FY04.
Corrective Action: None required.

Schedule Performance:

Cause and Impact: None required.
Corrective Action: None required.

Milestones:

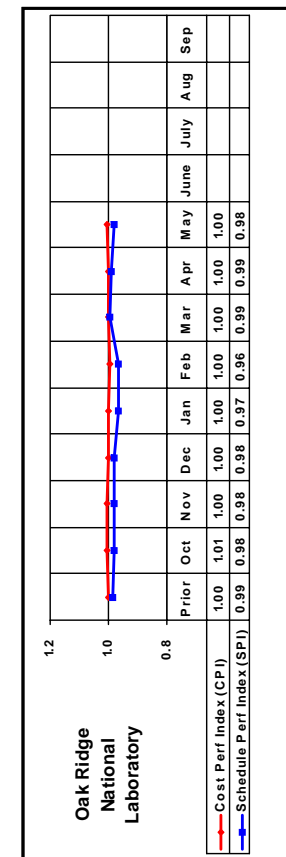
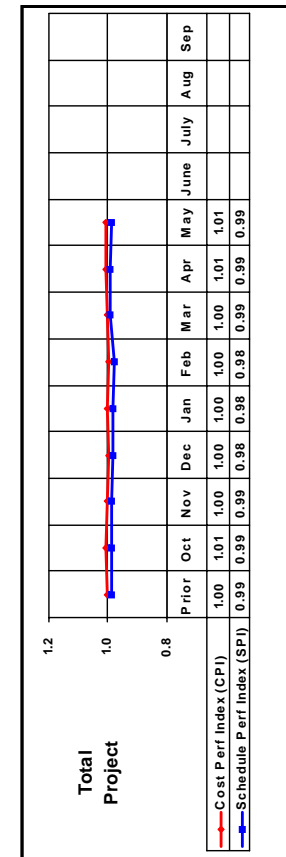
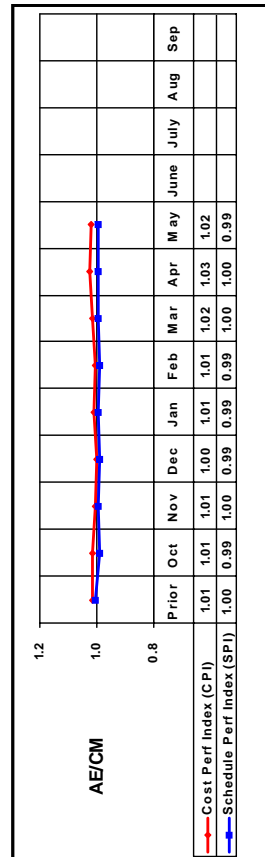
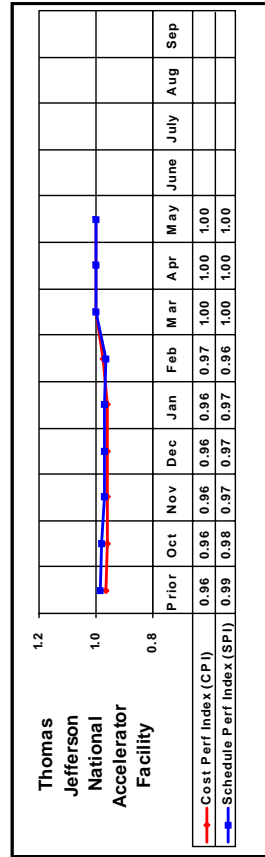
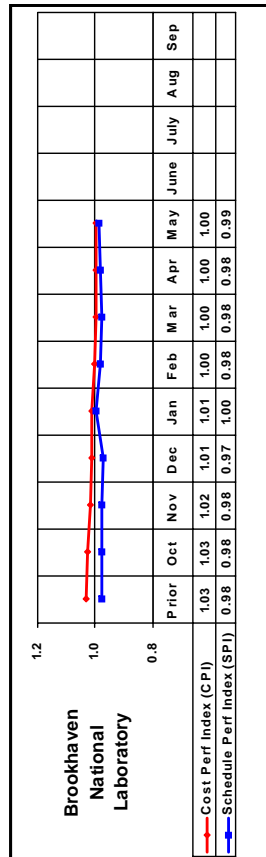
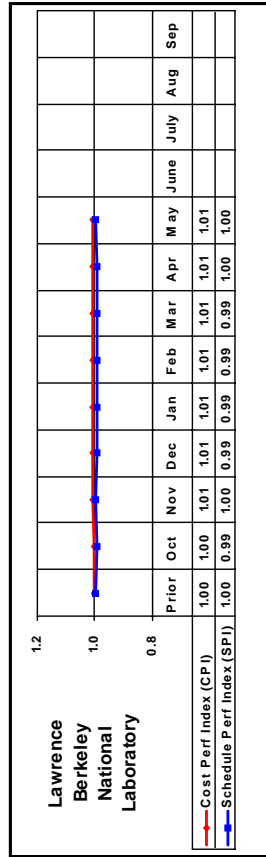
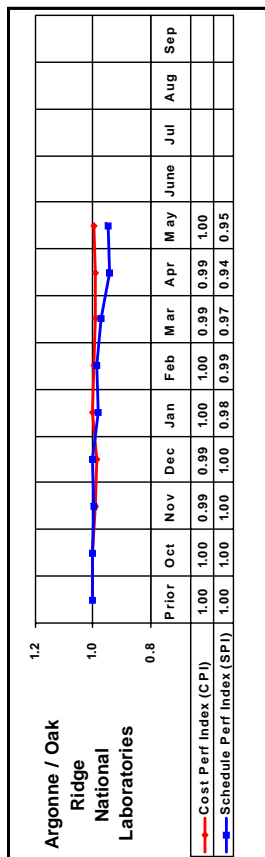
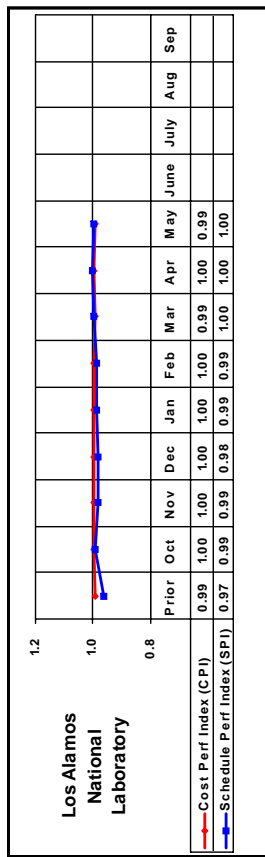
Description	Milestone Date	Forecast Date
EIS ROD	Jun-99	Jun-99 ✓
PSAR Issued for Approval	Dec-99	Dec-99 ✓
Submit PSAR to DOE for Approval	Dec-99	Dec-99 ✓
PSAD issued for Information	Sep-00	Sep-00 ✓
Issue FSAD for approval (Front End and Linac)	Sep-02	Aug-02 ✓
Issue FSAD for approval (Ring and Transfer Lines)	Jun-05	Apr-05
FSAR Issued for Approval	Aug-05	Jun-05
Complete Physical Construction and Project Acceptance Test	Jun-06	Mar-06

Temporary cubicles in the CLO



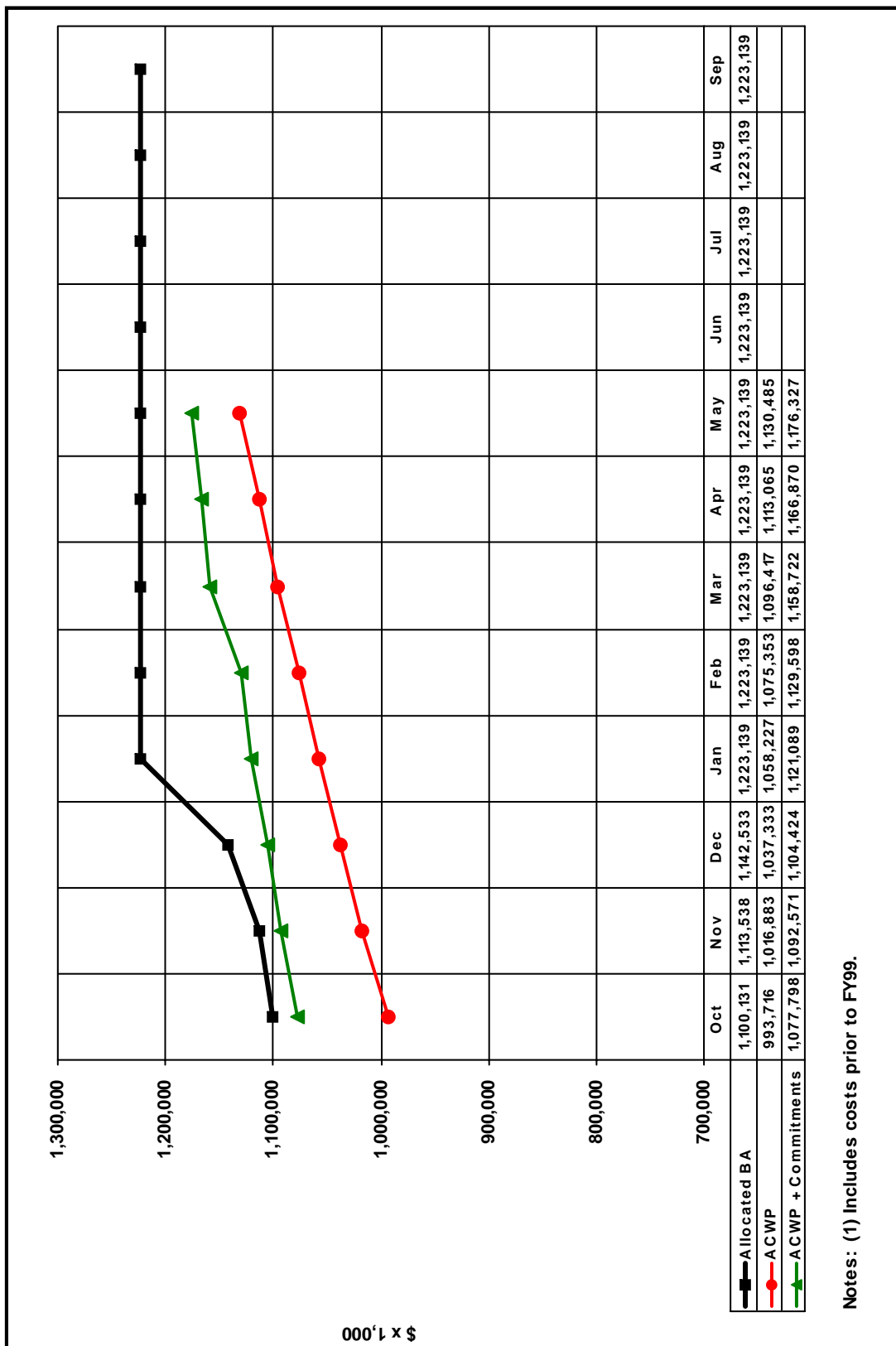


Overall Project Performance is stable





TPC Obligation Profile against BA



Notes: (1) Includes costs prior to FY99.

Phase funded procurements at the end of April could obligate an additional \$25.8M, raising the total obligation potential to \$1,202M.



PROJECT TITLE:	REPORTING PERIOD:										PROJECT NUMBER:															
	May 01, 2004 through May 31, 2004										99-E-334															
	BCWS PLAN DATE: May-04										START DATE: October 1998															
PARTICIPANT NAME AND ADDRESS:										COMPLETION DATE: June 2006		AT COMPLETION														
Oak Ridge National Laboratory Oak Ridge, TN																										
ITEM	BUDGETED COST			ACTUAL COST			VARIANCE			BUDGETED COST			ACTUAL COST			VARIANCE										
	WORK SCHED	WORK PERF	750.8	WORK SCHED	WORK PERF	547.3	SCHED	COST	WORK SCHED	WORK PERF	203.6	WORK SCHED	WORK PERF	65,144.9	WORK SCHED	WORK PERF	63,886.8	SCHED	COST	WORK SCHED	WORK PERF	1,258.2	BUDGET (BAC)	ESTIMATE (EAC)		
1.02 Project Support	750.8	750.8	750.8	0.0	0.0	547.3	0.0	203.6	65,144.9	65,144.9	203.6	0.0	0.0	65,144.9	65,144.9	63,886.8	(0.0)	1,258.2	75,636	75,636	75,636	75,636	75,636	75,636	75,636	
1.03 Front End Systems	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20,832.0	20,832.0	0.0	0.0	0.0	20,832.0	20,832.0	20,907.7	0.0	(75.7)	20,832	20,832	20,832	20,832	20,832	20,832	20,832	
1.04 Linac Systems	4,373.3	3,519.7	3,519.7	(853.6)	3,434.8	3,434.8	84.9	84.9	292,426.4	289,986.3	289,986.3	(2,440.1)	(2,440.1)	289,986.3	292,407.9	292,407.9	292,407.9	(2,421.6)	(2,421.6)	315,969	315,969	315,969	315,969	315,969	317,107	
1.05 Ring & Transfer System	1,340.6	1,775.5	1,775.5	434.9	2,092.4	2,092.4	(316.9)	(316.9)	116,271.6	116,106.9	116,106.9	(164.7)	(164.7)	116,106.9	116,672.5	116,672.5	116,672.5	(565.5)	(565.5)	142,001	142,001	142,001	142,001	142,001	142,361	
1.06 Target Systems	4,681.8	2,235.8	2,235.8	(2,446.0)	1,813.0	1,813.0	422.8	422.8	86,399.4	82,305.4	82,305.4	(4,093.9)	(4,093.9)	82,305.4	81,894.2	81,894.2	81,894.2	411.2	411.2	108,155	108,155	108,155	108,155	109,006		
1.07 Instrument Systems	1,184.7	1,237.6	1,237.6	52.8	956.9	956.9	280.7	280.7	39,591.6	36,867.1	36,867.1	(2,724.6)	(2,724.6)	36,867.1	36,872.9	36,872.9	36,872.9	(5.8)	(5.8)	63,277	63,277	63,277	63,277	63,498		
1.08 Conventional Facilities	5,529.9	4,878.7	4,878.7	(651.2)	6,323.0	6,323.0	(1,444.3)	(1,444.3)	342,938.3	340,854.2	340,854.2	(2,084.1)	(2,084.1)	340,854.2	333,363.7	333,363.7	333,363.7	7,490.5	7,490.5	378,912	378,912	378,912	378,912	380,666		
1.09 Integrated Control Systems	1,019.2	732.2	732.2	(287.0)	928.3	928.3	(196.1)	(196.1)	43,484.2	42,261.6	42,261.6	(1,222.6)	(1,222.6)	42,261.6	42,282.5	42,282.5	42,282.5	(21.0)	(21.0)	59,745	59,745	59,745	59,745	59,845		
LINE ITEM SUBTOTAL	18,880.3	15,130.3	15,130.3	(3,750.1)	16,095.6	16,095.6	(965.3)	(965.3)	1,007,088.4	994,358.3	994,358.3	(2,730.0)	(2,730.0)	994,358.3	988,288.1	988,288.1	988,288.1	6,070.2	6,070.2	1,164,526	1,164,526	1,164,526	1,164,526	1,168,582		
CONTINGENCY																										24,118
TOTAL LINE ITEM	18,880.3	15,130.3	15,130.3	(3,750.1)	16,095.6	16,095.6	(965.3)	(965.3)	1,007,088.4	994,358.3	994,358.3	(2,730.0)	(2,730.0)	994,358.3	988,288.1	988,288.1	988,288.1	6,070.2	6,070.2	1,192,700	1,192,700	1,192,700	1,192,700	1,192,700		
1.01 Research & Development	68.2	83.9	83.9	15.7	65.7	65.7	18.2	18.2	99,137.9	98,966.0	98,966.0	(172.0)	(172.0)	98,966.0	99,214.2	99,214.2	99,214.2	(248.2)	(248.2)	100,000	100,000	100,000	100,000	100,000	100,000	
1.10 Operations	1,505.9	1,548.4	1,548.4	42.5	1,259.3	1,259.3	289.1	289.1	46,176.6	44,908.5	44,908.5	(268.1)	(268.1)	44,908.5	42,983.0	42,983.0	42,983.0	1,925.5	1,925.5	119,000	119,000	119,000	119,000	119,000		
OTHER PROJECT COSTS SUBTOTAL	1,574.1	1,632.3	1,632.3	58.2	1,325.0	1,325.0	307.3	307.3	144,314.5	143,874.5	143,874.5	(440.1)	(440.1)	143,874.5	142,197.2	142,197.2	142,197.2	1,677.3	1,677.3	219,000	219,000	219,000	219,000	219,000		
TOTAL PROJECT COST	20,454.4	16,762.6	16,762.6	(3,691.8)	17,420.5	17,420.5	(657.9)	(657.9)	1,151,402.9	1,138,232.8	1,138,232.8	(13,170.1)	(13,170.1)	1,138,232.8	1,130,485.3	1,130,485.3	1,130,485.3	7,747.5	7,747.5	1,411,700	1,411,700	1,411,700	1,411,700	1,411,700		
DOLLARS EXPRESSED IN: Thousands										RECONCILIATION TO CONTRACT BUDGET BASE										DATE: June 21, 2004						



PROJECT TITLE:	REPORTING PERIOD:										PROJECT NUMBER:				
	May 01, 2004 through May 31, 2004										99-E-334				
	Spallation Neutron Source Project										October 1998				
PARTICIPANT NAME AND ADDRESS:	BCWS PLAN DATE:										START DATE:				
	May-04										June 2006				
	Oak Ridge National Laboratory Oak Ridge, TN										June 2006				
ITEM	CURRENT PERIOD				VARIANCE				CUMULATIVE TO DATE				AT COMPLETION		
	BUDGETED COST		ACTUAL COST		SCHED	COST	WORK SCHED	WORK PERF	SCHED	COST	WORK SCHED	WORK PERF	SCHED	COST	BUDGET
AE/CM	5,529.9	4,878.7	6,323.0	6,323.0	(651.2)	(1,444.3)	342,938.3	340,854.2	333,363.7	333,363.7	333,363.7	(2,084.1)	7,490.5	378,912	380,666
Argonne National Laboratory / ORNL	1,252.9	1,321.5	1,022.5	1,022.5	68.5	298.9	53,593.1	50,696.7	50,874.9	50,874.9	50,874.9	(2,896.3)	(178.2)	78,140	78,361
Brookhaven National Laboratory	1,181.6	1,789.6	1,862.2	1,862.2	608.0	(72.7)	113,599.8	112,414.9	112,665.7	112,665.7	112,665.7	(1,184.9)	(250.9)	129,212	129,212
Thomas Jefferson Laboratory	721.7	711.0	693.4	693.4	(10.6)	17.6	64,865.9	64,858.3	64,916.9	64,916.9	64,916.9	(7.6)	(58.6)	68,358	68,413
Los Alamos National Laboratory	1,043.3	667.0	814.5	814.5	(376.3)	(147.5)	189,098.2	189,080.3	190,041.4	190,041.4	190,041.4	(17.8)	(961.1)	194,927	195,186
Lawrence Berkeley National Laboratory	63.9	74.6	72.4	72.4	10.7	2.2	28,832.5	28,699.6	28,477.4	28,477.4	28,477.4	(132.9)	222.2	29,676	29,676
Oak Ridge National Laboratory	10,661.1	7,320.3	6,632.5	6,632.5	(3,340.9)	687.8	358,475.2	351,628.8	350,145.2	350,145.2	350,145.2	(6,846.4)	1,483.6	504,302	506,068
WBS SUBTOTAL	20,454.4	16,762.6	17,420.5	17,420.5	(3,691.8)	(657.9)	1,151,402.9	1,138,232.8	1,130,485.3	1,130,485.3	1,130,485.3	(13,170.1)	7,747.5	1,383,526	1,387,582
CONTINGENCY														28,174	24,118
TOTAL PROJECT COST	20,454.4	16,762.6	17,420.5	17,420.5	(3,691.8)	(657.9)	1,151,402.9	1,138,232.8	1,130,485.3	1,130,485.3	1,130,485.3	(13,170.1)	7,747.5	1,411,700	1,411,700
RECONCILIATION TO CONTRACT BUDGET BASE															
DOLLARS EXPRESSED IN: Thousands															
DATE: June 21, 2004															



PROJECT TITLE: Spallation Neutron Source Project	REPORTING PERIOD: May 01, 2004 through May 31, 2004												PROJECT NUMBER: 99-E-334			
PARTICIPANT NAME AND ADDRESS: Oak Ridge National Laboratory Oak Ridge, TN	BCWS PLAN DATE: May-04												START DATE: October 1998		COMPLETION DATE: June 2006	
BUDGETED COST FOR WORK SCHEDULED (NON - CUMULATIVE)																
ITEM	BCWS CUM TO DATE	FISCAL YEAR												FY Total	Out Years	Budget at Completion
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep			
PM BASELINE (BEGINNING OF PERIOD)	862,169	17,125	19,307	18,982	21,567	17,640	9,985	21,434	18,880	18,649	15,948	15,217	14,460	209,193	94,135	1,165,497
1.02 Project Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.03 Front End Systems	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.04 Linac Systems	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.05 Ring & Transfer System	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.06 Target Systems	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.07 Instrument Systems	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.08 Conventional Facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.09 Integrated Control Systems	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL AUTHORIZED CHANGES																
PM BASELINE (END OF PERIOD)	862,169	17,125	19,307	18,982	21,567	17,640	9,985	21,434	18,880	18,649	15,948	15,217	14,460	209,193	94,135	1,165,497
RECONCILIATION TO CONTRACT BUDGET BASE																
DOLLARS EXPRESSED IN: Thousands																
DATE: June 21, 2004																

Project Change Requests implemented in May are as follows:

Revision	PCR Number	Description	Impact (Cost/Sched/Tech)	Actual Cost Impact (Total \$)
R496	SN-04-006	Parameter List Update	Tech	-
R497	AS-04-008	Ring Activity Correction	Cost	-



Actual Cost of Work Performed (ACWP)—Actual cost incurred as reported through laboratory cost accounting systems plus any accruals.

Allocated Budget Authority (BA)—Cumulative funds currently allocated and authorized by the Department of Energy that may be committed and spent by the contractor for project activities.

Budget at Completion (BAC)—The sum of all budgets allocated to the project excluding contingency

Budget to Complete (BTC)—The sum of all budgets allocated to the project less commitments and cumulative actual costs.

Budgeted Cost of Work Performed (BCWP)—Value of the planned scope of work physically accomplished.

Budgeted Cost of Work Scheduled (BCWS)—Cost plan based on the budgeted value of a scope of work, time-phased based on the schedule for the scope of work.

Commitments—Funds allocated to subcontractors where the work has been authorized but not yet expensed.

Cost Performance Index—The ratio of the value of the work performed to actual cost; $CPI = BCWP/ACWP$. Values less than 1.0 represent “cost overrun” condition, and values greater than 1.0 represent “cost underrun” condition.

Cost Variance (CV)—Difference between the value of the physical work performed and the actual cost expended. $CV = BCWP - ACWP$. A negative result is unfavorable and indicates the potential for a cost overrun.

Estimate at Completion (EAC)—Forecast final cost of a scope of work based on the current ACWP plus a management assessment of the cost to complete the remaining scope of work.

Estimate to Complete (ETC)—Resource requirements necessary to complete the remaining scope of work.

Forecast Budget Authority—Future time-phased plan of how the project expects remaining BA to be allocated to the project by DOE. Through the current reporting period Forecast BA will equal Allocated BA.

Line Item (LI)—Fund “type” for design, procurement, construction, fabrication, installation, and pre-operational testing of a capital facility.

Obligation Plan—Time-phased plan of how each laboratory plans to commit their Allocated BA. Labor and

materials and supplies are typically time-phased as expended, while procurements are typically time-phased at award of contract plus award of any contract options.

Other Project Cost (OPC)—Fund “types” (Operating Expense and Capital Equipment) supporting, but not directly contributing to a LI construction project, generally include research and development and pre-operation activities.

Percent Complete—The ratio of the Earned value to the Budget at Completion. $\% \text{ Complete} = BCWP/BAC$

Percent Contingency remaining—The ratio of remaining contingency dollars to remaining work calculated as follows. The numerator is equal to the contingency available after consideration of the EAC. The denominator is the EAC less ACWP less commitments (excluding commitment to the AECM that has not been passed through to subcontractors) and outstanding phase funded procurements.

Percent Planned—The ratio of the current plan to the budget at completion. $\% \text{ Planned} = BCWS/BAC$

Schedule Performance Index—The ratio of the value of the work performed to work scheduled; $SPI = BCWP/BCWS$. Values less than 1.0 represent “behind schedule” condition, and values greater than 1.0 represent “ahead of schedule” condition.

Schedule Variance (SV)—Difference between the value of the physical work performed and the value of the work planned (scheduled). $SV = BCWP - BCWS$. A negative result is unfavorable and indicates a behind schedule condition.

Total Estimated Cost (TEC)—The TEC represents the total capital funds authorized for the project including contingency funds.

Total Project Cost (TPC)— $TEC + OPC$