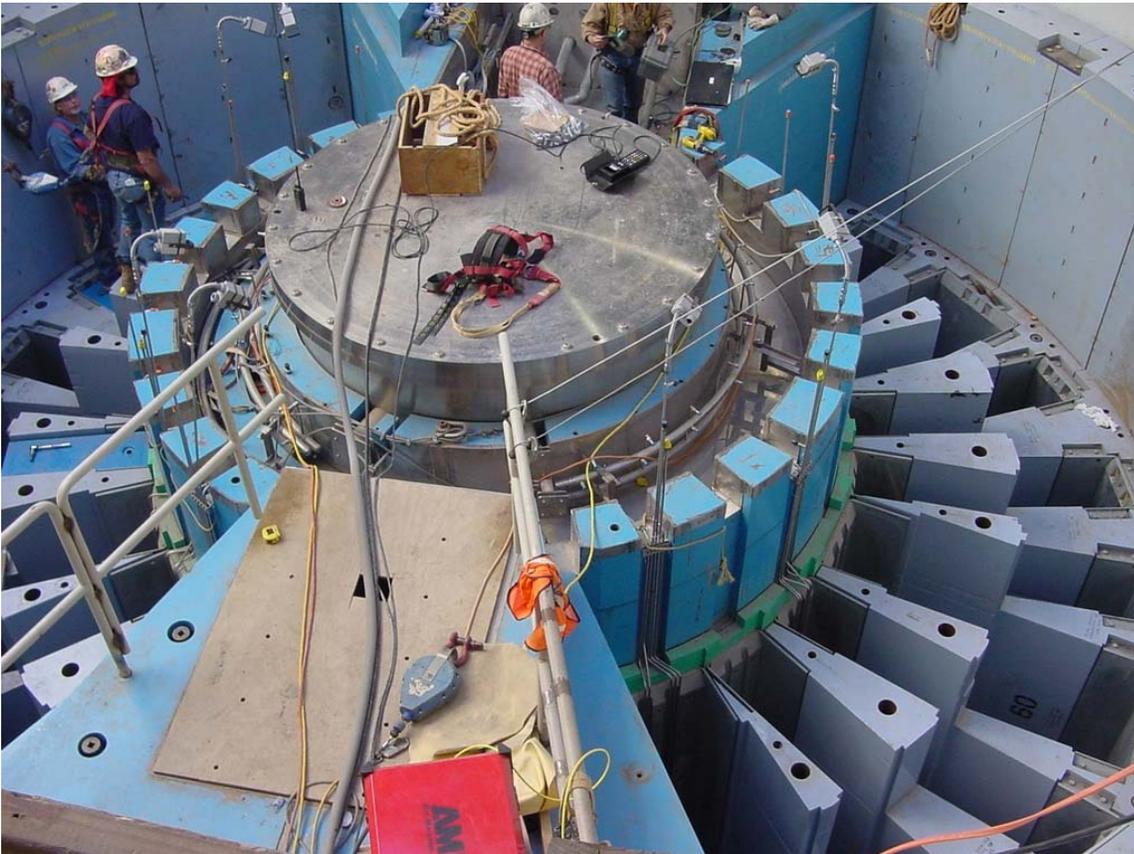


# The Spallation Neutron Source Monthly Report

## September 2004



SNS 102010000-TR0049-R00



A U.S. Department of Energy Multilaboratory Project

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



## 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



CHL 2K Cold Box

<b>Technical Assessment:</b>	Satisfactory
<b>Cost Assessment:</b>	Satisfactory
<b>Schedule Assessment:</b>	Satisfactory

  
 Carl N. Strawbridge  
 SNS Deputy Project Director  
 11/3/04  
 Date

### Highlights and Issues:

- Good project performance continues with minor cumulative cost and schedule variances of 0.3% and -1.0% respectively against the March 2006 early finish schedule. Through the end of September, 86.5% of the project is complete. Completion percentages by area are:
  - ◇ 99 % of R&D
  - ◇ 96 % of design
  - ◇ 85% of technical hardware (including procurement and fabrication)
  - ◇ 94 % of conventional construction
  - ◇ 66 % of installation
- Management focus continues on executing/managing the critical path work of target installation, prioritizing FY05 activities to optimize the BA usage and planning/organizing for the transition to operations. As a result of re-planning to optimize FY05 BA, the project early finish date is now April 2006. The change to the performance measurement baseline is underway. This acceptable float reduction does not impact the Level 0 baseline for the June 2006 finish date or the TPC.
- Contingency continues to be tight and is being closely managed. The available contingency balance of \$24.4M will be reduced to \$18M once the changes identified in the Estimate at Completion are incorporated into the baseline. The undistributed budget in pre-ops is approximately \$13M.
- Strong safety performance continues. Through September 25, 2004, the project has worked in excess of 5.6 million hours with 79 recordable injuries and 1 lost work day (away) case. Recent focused attention to new employee orientation and enhanced job planning has resulted in a decrease in the rate of recordable injuries. A recent corporate review of the construction workforce indicated excellent compliance with safety and health requirements.
- Design of the 5 SNS instruments is now complete.

### Assessment:

**Accelerator Systems Division (ASD):** The warm linac commissioning is progressing well. The beam has been accelerated to full energy through CCL Module 3 and time-of-flight measurements have been performed at various stages along the linac, verifying that the proper beam energy to this point has been achieved. The longitudinal tuneup of the linac RF setpoints has been accomplished. Verification of the transverse beam parameters is in progress. Cryomodule production is on track and nearing completion. The H-7 cryomodule was shipped to ORNL. H-8 and H-9 cryomodule assembly continues on schedule. All cavities for the H-11 string have been qualified. Installation of SCL-ME4 is complete and installation of SCL-ME5 has begun. SCL-ME1 was operated successfully at 69 kV. ASD reviewed remaining work at BNL and an updated delivery schedule for all remaining mechanical equipment has been developed. The first warm section beam tube, magnets, and wire scanner box has been assembled and aligned. A vacuum leak is being repaired and the unit will be re-cleaned.

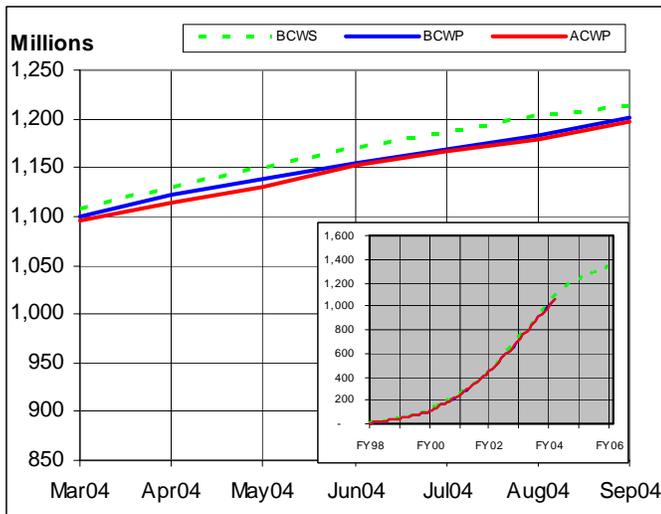
**Experimental Systems Division (XFD):** The Experimental Facilities Advisory Committee Review was held October 4-6, 2004. The committee was impressed with the division's technical progress and responsiveness to issues raised in prior reviews. No serious concerns were raised. Target installation continues on plan. Activities associated with assembly of the mercury piping in the Target Service Bay (TSB) and welding of both split plates at the inner reflector plug are complete. Both split plates for the inner reflector plug have successfully passed vacuum and pressure testing. Large circumferential welds, as well as welds around the moderator cavities are complete. The outer reflector plug lower section has been placed in the core vessel and the second helium/nitrogen gas distribution panel has been delivered. Eighteen top

blocks and the mobile manipulator have been delivered and all the concrete shutter plugs for the single channel shutter cavities have been installed. The remote handling control room floor, servomanipulator master station and monitor frame have been set in place. The Magnetic Shielding report for the Beamline 3 and 4 has been drafted. The Instrument Safety Committee has reviewed the Beamline shielding for all five SNS instruments. A detailed procurement schedule for the remaining instrument procurements that supports the installation plan has been developed and baselined.

**Conventional Facilities (CF):** Trucks continue to haul soil from the stockpile to the ORNL Environmental Restoration Projects. At no cost to SNS, a new haul road was constructed that will support the removal of approximately 60,000 to 80,000 cubic yards of screened soil. Reseeding of many areas throughout the site has begun. Installation of air blown fiber has begun, allowing installation of copper cabling in the Target Building to begin the first week of November. Testing of the upper intercell door for the TSB has begun and the Hydrogen Utility Room is nearly complete. Electrical and mechanical work continues throughout the Target building. The activated cooling water system piping installation in the Ring injection dump and the mercury system in the TSB are nearly 100% complete. Work in the CLO continues in the atrium and first floor conference room. Concrete work continues in both the west and south plazas. Work continues on the B1 (ground), 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> floors in the front office wing. The contractor appears to be 2-4 weeks behind schedule. A corrective action plan has been requested.



**Project Overview and Assessment (con't)**



Total Project	Sep04	Cum-to-Date
BCWS	9,854	1,212,465
BCWP	16,952	1,200,455
ACWP	17,467	1,197,258
CV	-515	3,197
SV	7,098	-12,010
<hr/>		
CPI	0.97	1.00
SPI	1.72	0.99
<hr/>		
<b>Budget at Complete</b>		1,387,340
<hr/>		
<b>Contingency</b>		24,360
<hr/>		
<b>Total Project Cost</b>		1,411,700

<b>Total Project Cost (TPC)</b>	<b>\$1,411.7 M</b>
Percent planned (cumulative)	87.4%
Percent complete (cumulative)	86.5%
<b>Total Estimated Cost (TEC)</b>	<b>\$1,192.7 M</b>
Cost and Commitments through 9/30/04	\$1,071M
Outstanding Phase Funded Awards	\$15.4M
Budget to Complete	\$97.5M
Contingency	\$24.4M
Estimate at Completion	\$1,174.7M

**Critical Path:**

No activities in the revised baseline project schedule with the early finish date of April 2006 have negative float. The project critical path remains through activities leading to instrument installation and Target commissioning. A new controlling work-path, also with zero float, exists in ASD commissioning of the HEBT and Ring.

	<b>This Month</b>	<b>Last Month</b>
Remaining Contingency Based on EAC	\$18.0M (20.3%)	\$18.1M (18.5%)
Undistributed Pre-Ops Budget	\$13.3M	\$13.4M
Total Available	\$31.3M	\$31.4M

**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	Apr-06



## Linac Systems– Los Alamos National Lab



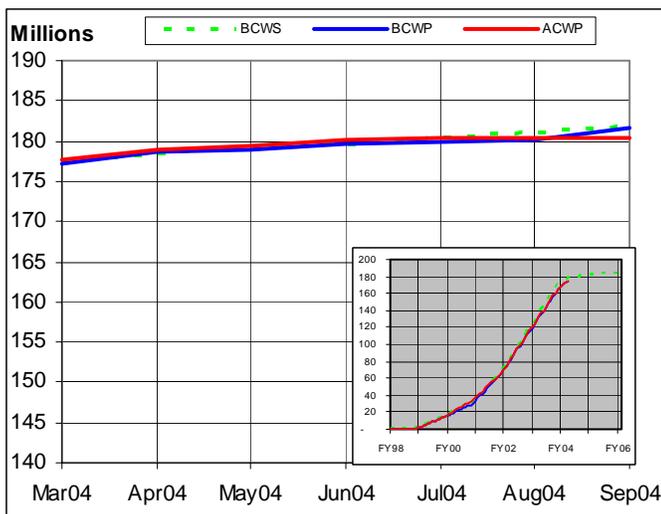
### Highlights:

- Some technical work at LANL remained on hold through the end of FY04 due to LANL's safety standdown. Effective the September report, LANL performance will be combined in the ASD reporting.

Installed klystrons

**Assessment/ Issues:** All SNS tasks are expected to resume in October.

### Performance and Milestones:



	Sep04	Cum-to-Date
BCWS	654	181,776
BCWP	1,336	181,511
ACWP	-46	180,289
CV	1,382	1,223
SV	683	-264
<b>CPI</b>		
CPI	-29.15	1.01
<b>SPI</b>		
SPI	2.04	1.00
<b>Budget at Complete</b>		183,231
<b>Planned % Complete</b>		99.2%
<b>Actual % Complete</b>		99.1%

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

### Cost Performance:

*Cause and Impact:* The current period cost variance is due to cost corrections performed at LANL as well as implementation of one of two baseline changes for the contract novation of the klystron contract. This had the effect of erroneously increasing earned value.  
*Corrective Action:* None required. These activities were moved to ASD after the September reporting period in a subsequent baseline change and this earned value has been returned to zero.

### Schedule Performance :

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



Completed Cryomodule H-7

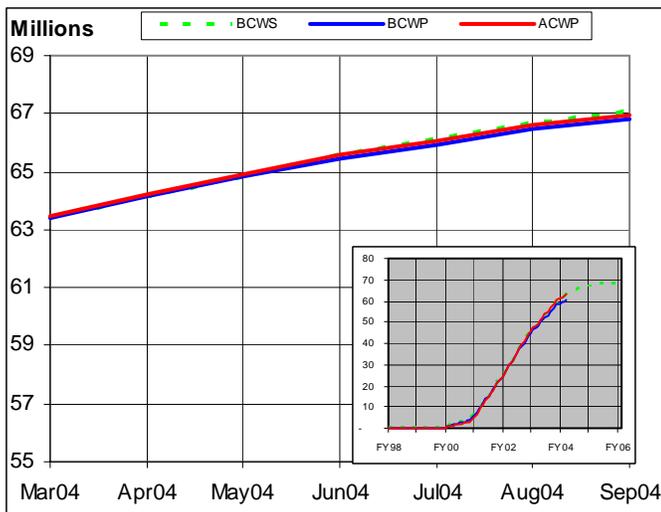
**Highlights:**

- Four additional High-β cavities were qualified.
- The string assembly for cryomodule H-9 was completed.
- The leak in cryomodule H-3 was located and repaired.
- Assembly of cryomodule H-7 was completed and assembly of cryomodules H-8 and H-9 has begun.
- Testing of cryomodule H-5 is complete.

**Assessment/Issues:**

There are no current outstanding issues and all activities are on track for the March 2005 completion.

**Performance and Milestones:**



	Sep04	Cum-to-Date
BCWS	470	67,118
BCWP	370	66,821
ACWP	332	66,921
CV	39	-99
SV	-100	-297
<hr/>		
CPI	1.12	1.00
SPI	0.79	1.00
<hr/>		
<b>Budget at Complete</b>		68,358
<hr/>		
<b>Planned % Complete</b>		98.2%
<b>Actual % Complete</b>		97.8%

**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:* The current period schedule variance is due to cavity component deliveries that did not occur as planned.

*Corrective Action:* None required. Cavity assembly is on track.



## Ring and Transfer Line Systems– Brookhaven National Lab



Injection string mockup

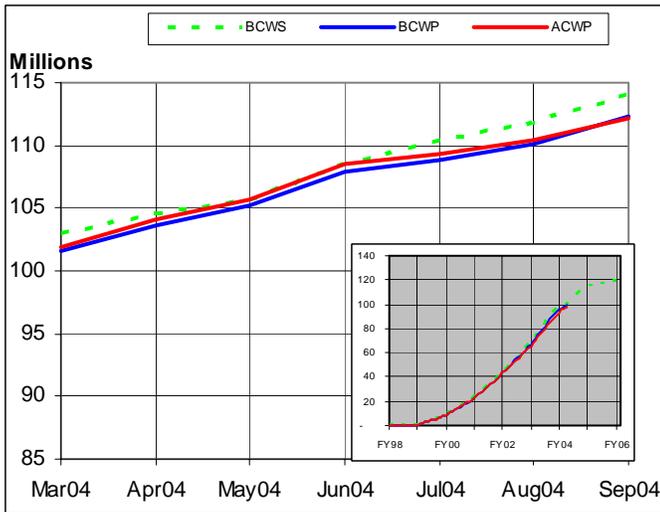
### Highlights:

- The Diagnostic Production Plan has been revised and is being circulated for review. This plan includes a revised delivery schedule for beam-line vacuum hardware and related electronics.
- The injection line design is being finalized.
- The steel contract for the ring doublet lifting fixtures has been awarded.
- Thirteen of fourteen Pulse Forming Networks (PFN) have been tested and accepted.
- Magnetic measurements of Chicane #1 are complete and the magnet has been moved into the injection string.
- Two 1<sup>st</sup> article power supplies are ready for acceptance testing at the vendor.
- The first set of doublet magnets is being assembled to their bases and the second set is in the pre-survey phase.

### Assessment/Issues:

Ring activities are on track for the March 2005 completion.

### Performance and Milestones:



	Sep04	Cum-to-Date
BCWS	2,216	114,098
BCWP	2,261	112,393
ACWP	1,777	112,212
CV	483	181
SV	45	-1,705
<b>CPI</b>		
	1.27	1.00
<b>SPI</b>		
	1.02	0.99
<b>Budget at Complete</b>		
		118,815
<b>Planned % Complete</b>		
		96.0%
<b>Actual % Complete</b>		
		94.6%

### Cost Performance :

*Cause and Impact:* Not required.

*Corrective Action:* None required.

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

### Schedule Performance :

*Cause and Impact:* The cumulative schedule variance is due to delays in delivery of injection power supplies, ring scrapers and extraction magnet coils.

*Corrective Action:* None required. The magnets will be completed by December 2004.



## Target Systems– Oak Ridge National Lab



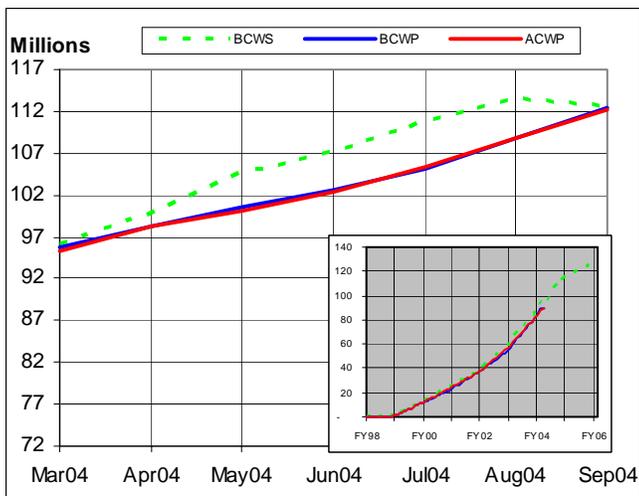
Ion exchange column in utility cart

- The shutter drive system hardware and the hydraulic pump unit have been received.
- The ninth and last single channel shutter gate was received. Two multi-channel gates are being fabricated.
- The last interstitial block was received and installed. This completes the “permanent” shielding in the monolith.
- Assembly of the target carriage in the Target Service Bay was completed.
- Phase 1 commissioning of the helium refrigeration system has begun.
- The responses to the I&C Installation package revisions, relative to the quote, have been received and evaluation is in progress.
- Installation of the remote handling control room floor has begun with the completion of conventional facilities preparations and the assembly of the video monitor wall.
- The drive system for the cart assembly has been installed and successfully tested in the maintenance cell.

### Assessment/ Issues:

Hardware deliveries and the installation schedule continue to be monitored closely. Critical deliveries are monitored weekly at the division level. Execution of the integrated schedule for completing the Target building and Target systems installation activities is going well.

### Performance and Milestones:



	Sep04	Cum-to-Date
BCWS	-908	112,756
BCWP	3,652	112,368
ACWP	3,476	112,307
CV	176	61
SV	4,560	-388
<b>CPI</b>		
	1.05	1.00
<b>SPI</b>		
	-4.02	1.00
<b>Budget at Complete</b>		
		130,038
<b>Planned % Complete</b>		
		86.7%
<b>Actual % Complete</b>		
		86.4%

### Cost Performance:

*Cause and Impact:* Not required.

*Corrective Action:* None required.

### Schedule Performance:

*Cause and Impact:* The current period schedule variance reflects the implementation of a baseline change that incorporated the detailed installation activities and modified equipment receipt activities to reflect current delivery schedules.

*Corrective Action:* None required.

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	Apr-06



## Instrument Systems– Argonne and Oak Ridge National Labs



Powder Diffractometer shielding

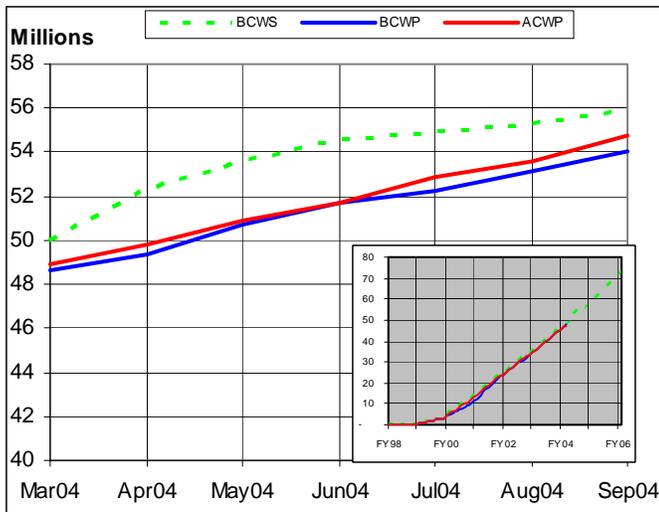
### Highlights:

- A successful final design review for all 5 SNS Project instruments was held from September 28-October 1, 2004.
- The backscattering spectrometer neutron guide vendor successfully completed the first installation of guide at the SNS site with installation of 4 sections of glass guide (supermirror and natural nickel) into the shutter insert sleeve.
- Installation of the evacuated final flight path for the backscattering spectrometer has been completed. Both the vacuum pump and the crane have been connected to the utility lines. Additionally, the poured-in-place shielding was completed.
- 96 linear position sensitive detectors for the Backscattering instrument have been received and inspected.
- The detector specifications for the Powder Diffractometer instrument have been completed.
- The SNS detector test station has been commissioned on the HB-2DS beam line at HFIR.
- Standards for instrument vacuum systems are being developed, consistent with applicable ASD standards.
- Training on the Research Safety Summary (RSS) and Job Hazard Analysis (JHA) processes has been completed and development of the applicable documents necessary for the Instrument Systems CLO labs has begun.

### Assessment/ Issues:

Evaluation of remaining procurements relative to an April 2006 finish date has been completed and project requirements will be met.

### Performance and Milestones:



	Sep04	Cum-to-Date
<b>BCWS</b>	605	55,905
<b>BCWP</b>	924	54,068
<b>ACWP</b>	1,132	54,740
<b>CV</b>	-207	-672
<b>SV</b>	320	-1,837
<b>CPI</b>		
	0.82	0.99
<b>SPI</b>		
	1.53	0.97
<b>Budget at Complete</b>		
		78,121
<b>Planned % Complete</b>		
		71.6%
<b>Actual % Complete</b>		
		69.2%

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	Apr-06

### Cost Performance:

*Cause and Impact:* The current period cost variance is largely due to receipt of shutter inserts for which the actual costs exceeded the baseline plan. Of the cumulative cost variance, approximately 400K is expected to be recovered through a further detailing of activities that will permit more accurate earned value reporting. However, approximately \$200K is known to be non-recoverable.

*Corrective Action:* None required.

### Schedule Performance:

*Cause and Impact:* The cumulative schedule variance is due to behind schedule deliveries in the goniometers and shielding for several instruments.

*Corrective Action:* The contract for one of the two goniometers is in the process of being re-awarded to a different vendor. second will be complete in FY05. These delays do not impact the project's completion date and the revised delivery dates have been incorporated in the performance baseline effective the October reporting period.



## Conventional Facilities– Oak Ridge National Lab



CLO Construction

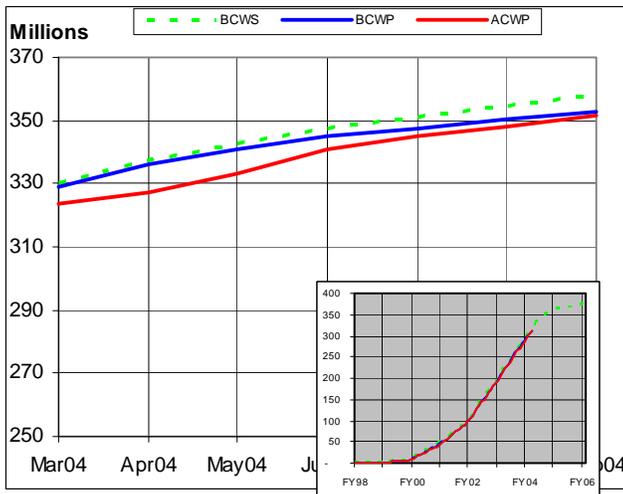
### Highlights:

- Installation of the stairs in the Target building is complete. Fabrication of T-Beam and Z-Beam pre-casting continues. Only the cask docking beam remains. Piping, HVAC duct insulation and HVAC piping is continuing. The Compressor Building is substantially complete and the punch list is being generated. The electrical substation TA-SS4 has been energized and is providing power to the compressor.
- The CLO general contractor completed turnover of the basement and ASD has initiated personnel and equipment moves into the area. Placement of sidewalks on the north side of the building and South Plaza concrete continued.
- Inside the CLO building, stud wall framing, drywall installation and finishing continues throughout the building with emphasis being placed on completing the atrium wall.
- Hot water loop, ductwork and plumbing piping work continues throughout. Electrical installation continued with completion of the high lobby rough-in work and lighting can installation. Conduit, cable tray and cable pulls are ongoing.

### Assessment/ Issues:

Focus continues on coordinating Target Building construction and Target Systems component installation to achieve required milestones.

### Performance and Milestones:



	Sep04	Cum-to-Date
<b>BCWS</b>	3,492	358,042
<b>BCWP</b>	2,541	353,040
<b>ACWP</b>	3,544	351,297
<b>CV</b>	-1,002	1,742
<b>SV</b>	-951	-5,002
<b>CPI</b>	0.72	1.00
<b>SPI</b>	0.73	0.99
<b>Budget at Complete</b>		378,912
<b>Planned % Complete</b>		94.5%
<b>Actual % Complete</b>		93.2%

### Cost Performance:

**Cause and Impact:** The current period negative cost variance is due to erroneous earned value reporting that has also resulted in a current period schedule variance. The cumulative positive cost variance is dominated by the fact that earned value is reported according to work accomplished while the invoices are reduced by a small retention value.  
**Corrective Action:** None required. October performance will be reported correctly.

### Schedule Performance:

**Cause and Impact:** The negative schedule variance is primarily in the CLO (\$2.6M) and the Target Building (\$1.8M). Nearly half of the Target Building variance is due to an error that resulted in understated earned value.  
**Corrective Action:** None required. This work does not impact the critical path or project end date.

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



## Integrated Control Systems– Oak Ridge National Lab



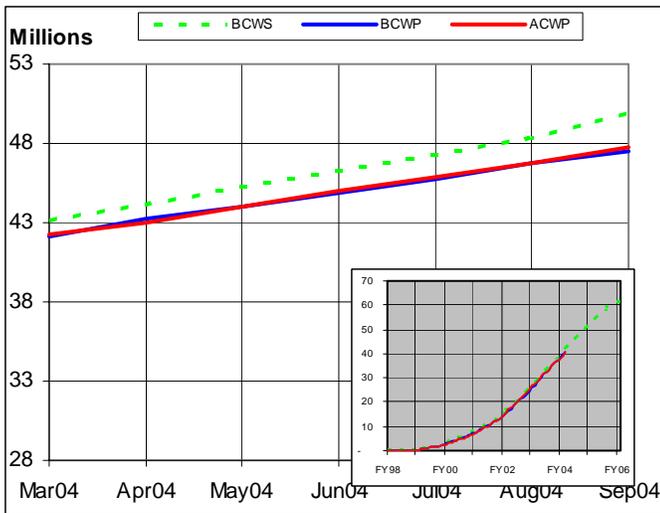
Artist's concept of the Central Control Room

### Highlights:

- September's warm linac run represented the final acceptance and success of the work of the SNS controls team at LANL.
- Considerable effort has been focused on design of the main CLO control room in anticipation of a move in early 2005. A console design contract was awarded and a detailed move-in plan is being developed.
- Electromagnetic interference continues to be a problem and a noise mitigation campaign is ongoing. Rogue 402.5MHz noise was found in the region of DTL6 that has been identified as the cause of numerous problems with the LLRF and vacuum systems. Mitigation has reduced the problem to workable levels, but the source has not yet been identified and more work is required. Meanwhile, noise mitigation work at the Ion Source reduced the interference by a factor of two.
- The controls team assisted in the factory acceptance test for Collimator Cooling Water Skids (CCWS) for the HEBT and Momentum dump. The team also supported the first tests of cryomodule MB03, culminating in the successful introduction of rf power into three cavities together.
- As commissioning activities continue, refinements to the controls systems are being implemented that reflect user input.

**Assessment/Issues:** No issues at this time.

### Performance and Milestones:



	Sep04	Cum-to-Date
<b>BCWS</b>	1,504	49,869
<b>BCWP</b>	767	47,551
<b>ACWP</b>	1,042	47,766
<b>CV</b>	-275	-215
<b>SV</b>	-736	-2,318
<b>CPI</b>	0.74	1.00
<b>SPI</b>	0.51	0.95
<b>Budget at Complete</b>		61,455
<b>Planned % Complete</b>		81.1%
<b>Actual % Complete</b>		77.4%

#### Cost Performance:

*Cause and Impact:* The current period cost variance is largely due to higher than anticipated costs for the month of September. As the last month in the fiscal year, September included 6 weeks of labor while the plan included only 4 weeks.

*Corrective Action:* None required. The cost variance will be recovered.

#### Schedule Performance:

*Cause and Impact:* The schedule variance is due to activities that have been deliberately delayed for the purpose of conserving BA. *Corrective Action:* The FY05 work packages will resolve these variances and prioritize work consistent with FY05 BA constraints. There is no impact to the project completion.

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



HEBT Collimator cooling

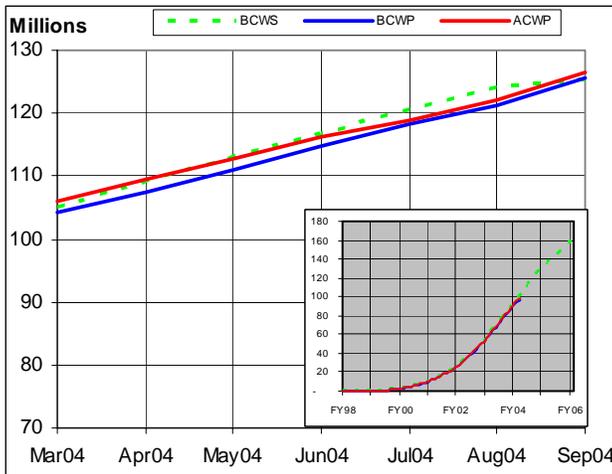
**Highlights:**

- The 11 prestart action items from the ARR were closed out on Friday September 3, 2004 and beam commissioning activities began on September 7<sup>th</sup>. Field gradients at the full pulse length were achieved and beam was accelerated by the full DTL and drifted through the CCL to the beam stop by September 9<sup>th</sup>. First beam to the beam stop was achieved on September 17<sup>th</sup>. Beam energy has been measured at the expected values through CCL-2 and beam commissioning continues.
- The systems integration test of the first cryomodule has been completed and the 4K cryosystem commissioned. Cryomodule medium-beta #4 was cooled down to 4.2 K.
- The 2K cold box feedthrough issue has been successfully resolved and the system is being prepared for commissioning.
- The Cryogenics Advisory Committee has been established and meetings have begun to review the progress and plans of the cryo group.
- Linac RF installation is on track with completion of four SCL modulator systems, each supporting 12 klystrons; 79 of the 81 SCL klystrons are in position. Ring installation is also proceeding well. All half-cells have been installed, magnet cable pulling has been completed, the test assembly at BNL of the injection straight is almost completed, and 3 of 4 RF systems are in the tunnel.

**Assessment/ Issues:**

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

**Performance and Milestones:**



	Sep04	Cum-to-Date
BCWS	1,144	125,372
BCWP	4,423	125,591
ACWP	4,564	126,523
CV	-141	-933
SV	3,279	219
<hr/>		
CPI	0.97	0.99
SPI	3.87	1.00
<hr/>		
<b>Budget at Complete</b>		172,544
<hr/>		
<b>Planned % Complete</b>		72.7%
<b>Actual % Complete</b>		72.8%

**Cost Performance:**

*Cause and Impact:* The cumulative cost variance is due to over-runs in installation activities.

*Corrective Action:* This cost variance has been reported in the EAC and was included in the baseline change that was implemented in the baseline effective for the October reporting period.

**Schedule Performance:**

*Cause and Impact:* The current period schedule variance reflects incorporation of klystron contract novation changes into the baseline. At this time, deliveries were scheduled consistent with current information, resulting in BCWS being transferred out of the current month and into a future month. This shift reduces the current month plan and creates a large positive earned value amount.

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	Aug-05
HEBT& Ring Beam Available to RTBT and Target	Feb-06	Mar-06



## Project Support– Oak Ridge National Lab



CLO atrium

### Highlights:

- Progress on the CLO continues as additional spaces are opened up for general use. Several internal moves of staff will occur once the CLO is completed.
- Efforts focused on detailed coordination of transition and integration issues between SNS and ORNL to support the start of operations have stepped up.

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

### External Review Data:

Two action items were closed in September.

Review	Recommendations	Closed This Month	Open Actions
DOE SC Review (5/04)	22	0	20
Integrated Installation Review (8/04)	16	2	14

### Life of Project Market Experience:

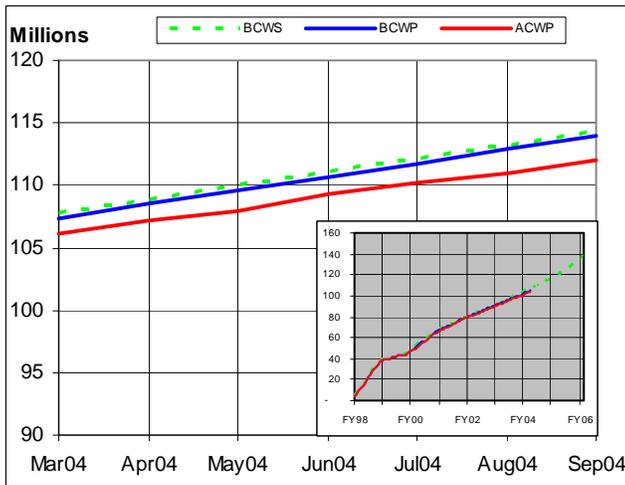
Major Awards (\$M)	Baseline Estimate (\$M)	Baseline Savings (\$M)	Percent savings over baseline
553.2	517.3	-35.9	-6.9%

Through September 30, 2004: 98% of the major procurements have been awarded.



Project Support– Oak Ridge National Lab (con't)

**Performance:**



	Sep04	Cum-to-Date
BCWS	1,090	114,367
BCWP	1,089	113,950
ACWP	1,051	112,041
CV	38	1,909
SV	-1	-417
<hr/>		
CPI	1.04	1.02
SPI	1.00	1.00
<hr/>		
BAC (1.2)		75,636
BAC (1.10.3, 1.1.13, 1.10.5)		71,284
<hr/>		
Planned % Complete		77.8%
Actual % Complete		77.6%

**Cost Performance:**

*Cause and Impact:* The cost variance is largely due to increased efficiencies and move costs that have not yet been paid.

*Corrective Action:* None required.

**Schedule Performance:**

*Cause and Impact:* The cumulative schedule variance is due to utility costs which were in the baseline plan in FY03 yet have not been required.

*Corrective Action:* A baseline change is being incorporated that reflects more appropriate utility cost planning.

**Milestones:**

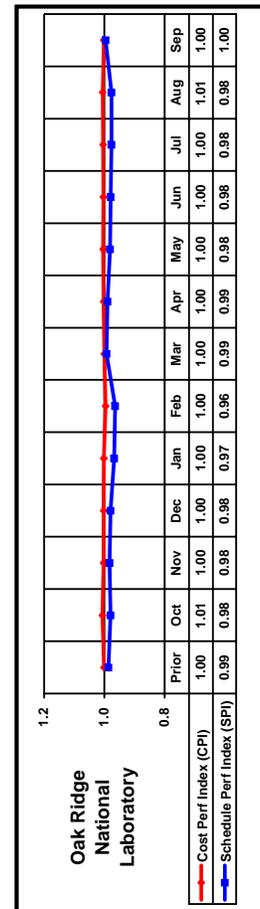
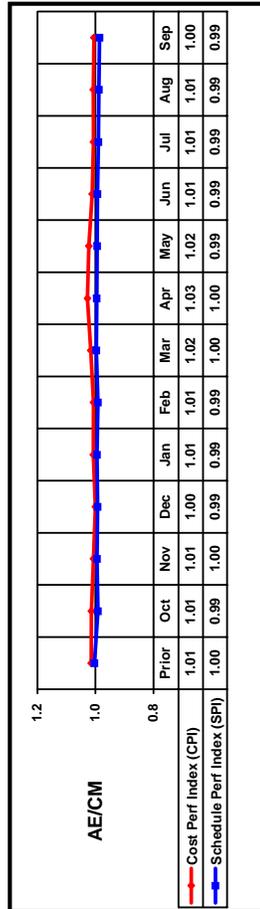
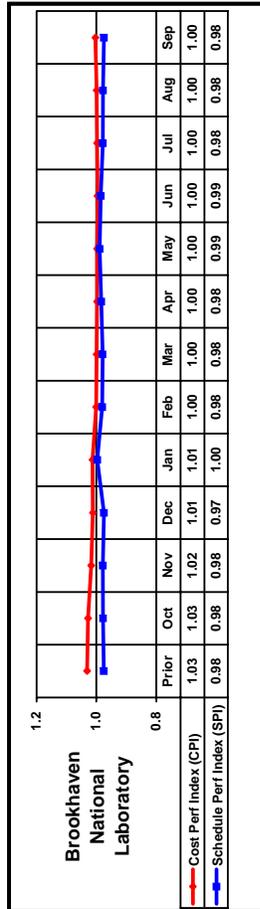
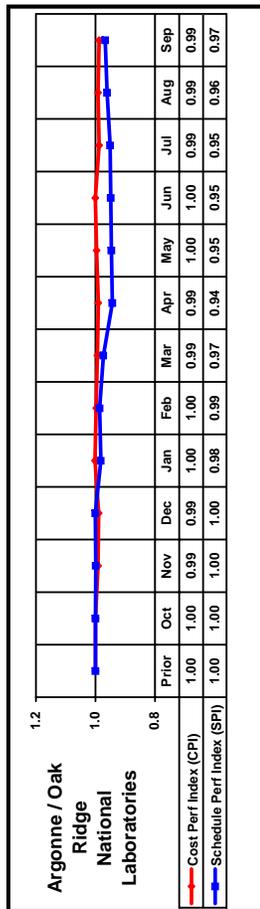
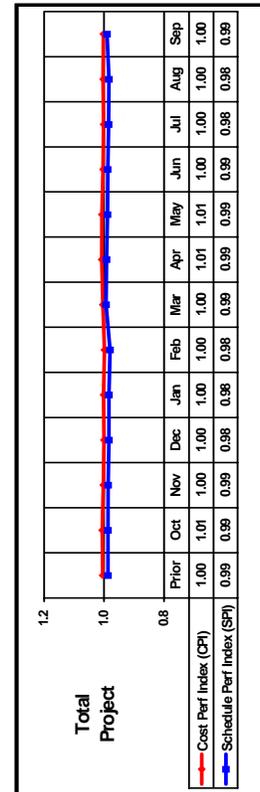
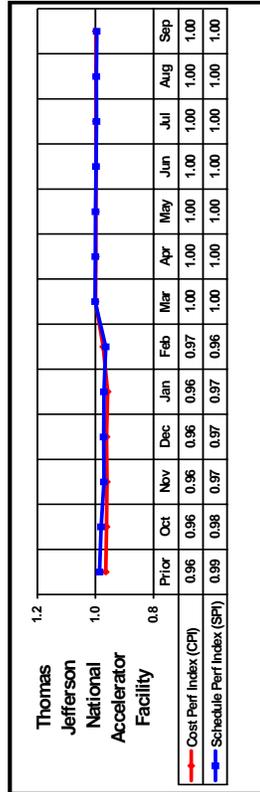
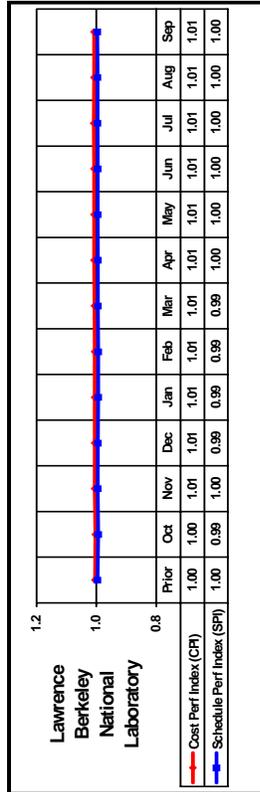
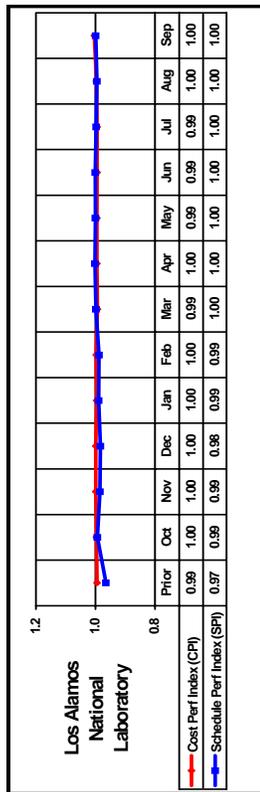
Description	Milestone Date	Forecast Date
EIS ROD	Jun-99	Jun-99 ✓
PSAR Issued for Approval	Dec-99	Dec-99 ✓
Submit PSAR to DOE for Approval	Dec-99	Dec-99 ✓
PSAD issued for Information	Sep-00	Sep-00 ✓
Issue FSAD for approval (Front End and Linac)	Sep-02	Aug-02 ✓
Issue FSAD for approval (Ring and Transfer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

CLO Basement Magnet Shop

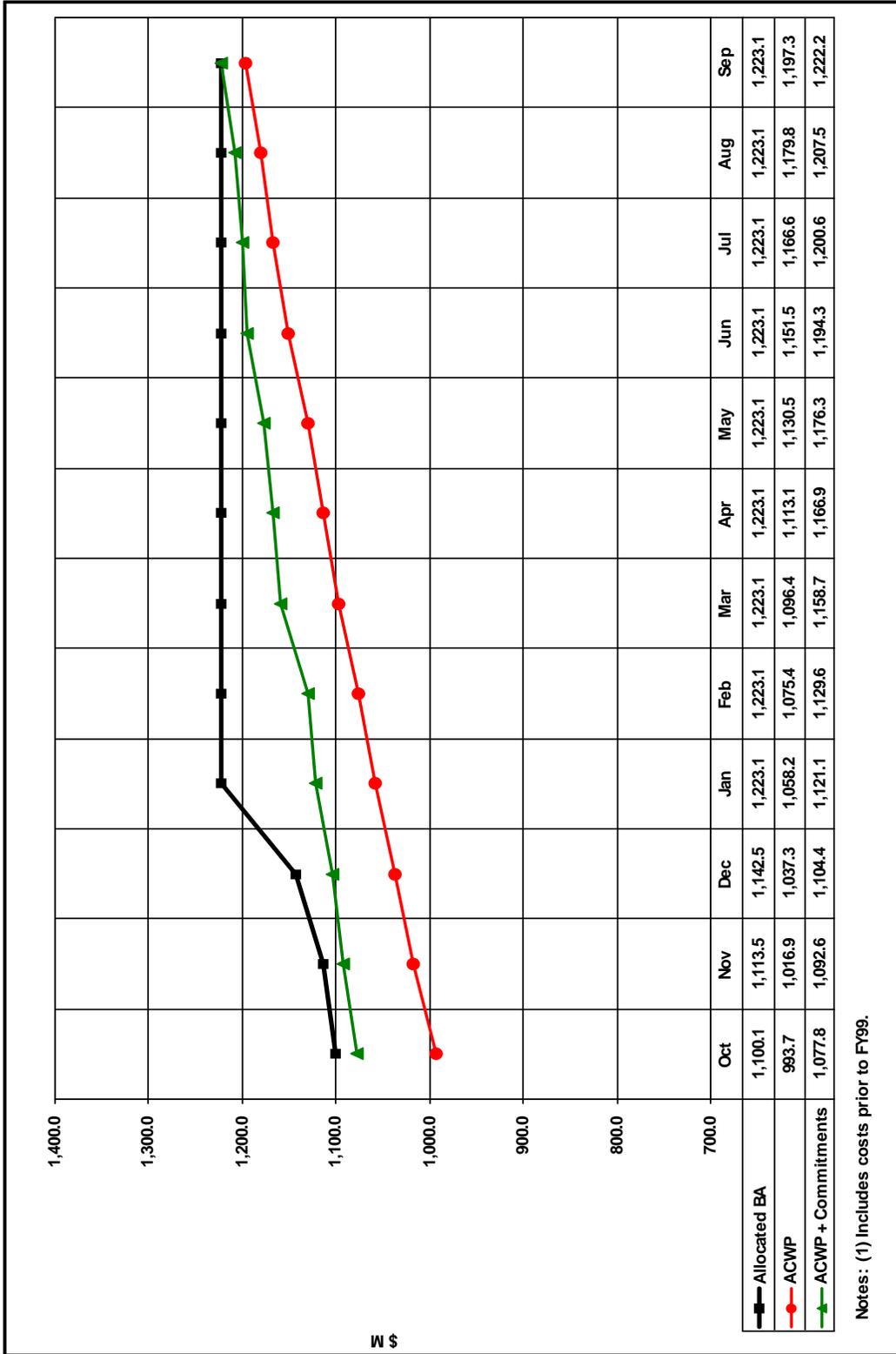




# Overall Project Performance is stable



TPC Obligation Profile against BA



Phase funded procurements at the end of September could obligate an additional \$15.4M, raising the total obligation potential to \$1,238M.



PROJECT TITLE:	REPORTING PERIOD:												PROJECT NUMBER:	
	September 01, 2004 through September 30, 2004												99-E-334	
	BCWS PLAN DATE: Sep-04												START DATE: October 1998	
PARTICIPANT NAME AND ADDRESS:												COMPLETION DATE: June 2006		
Oak Ridge National Laboratory Oak Ridge, TN														
ITEM	CURRENT PERIOD						CUMULATIVE TO DATE						AT COMPLETION	
	BUDGETED COST			VARIANCE			BUDGETED COST			ACTUAL COST			VARIANCE	
	WORK SCHED	WORK PERF	ACTUAL COST	WORK SCHED	WORK PERF	COST	WORK SCHED	WORK PERF	ACTUAL COST	WORK SCHED	WORK PERF	COST	BUDGET (BAC)	ESTIMATE (EAC)
1.02 Project Support	760.7	760.7	197.5	0.0	563.2	0.0	68,192.9	68,192.9	65,844.6	(0.0)	2,348.4	75,066	75,066	
1.03 Front End Systems	0.0	0.0	0.0	0.0	0.0	0.0	20,832.0	20,832.0	20,907.7	(75.7)	20,832	20,832		
1.04 Linac Systems	774.2	4,471.6	2,611.9	3,697.4	1,859.7	303,374.9	303,738.3	303,058.6	(363.4)	316.3	315,969	317,258		
1.05 Ring & Transfer System	2,833.2	2,947.6	2,560.6	114.4	387.0	125,388.0	127,071.8	125,155.8	(1,683.8)	232.2	142,079	142,740		
1.06 Target Systems	(907.8)	3,651.8	3,476.2	4,559.6	175.6	94,600.8	94,600.8	94,152.5	(387.9)	60.4	111,883	111,883		
1.07 Instrument Systems	545.9	846.8	1,089.1	300.9	(242.3)	39,926.6	41,675.1	40,335.6	(1,748.5)	(408.9)	63,277	63,498		
1.08 Conventional Facilities	3,491.9	2,541.2	3,543.5	(950.7)	(1,002.3)	353,039.7	358,042.0	351,297.5	1,742.2	378,912	383,628	383,628		
1.09 Integrated Control Systems	1,503.6	767.3	1,042.3	(736.3)	(274.9)	45,846.7	48,165.1	46,061.9	(2,104.2)	(215.2)	59,751	59,751		
<b>LINE ITEM SUBTOTAL</b>	9,001.6	15,987.0	14,521.1	6,985.4	1,465.9	1,062,318.0	1,062,318.0	1,046,814.1	(11,504.3)	3,999.6	1,168,340	1,174,656		
<b>CONTINGENCY</b>											24,360	18,044		
<b>TOTAL LINE ITEM</b>	9,001.6	15,987.0	14,521.1	6,985.4	1,465.9	1,062,318.0	1,062,318.0	1,046,814.1	(11,504.3)	3,999.6	1,192,700	1,192,700		
1.01 Research & Development	58.9	77.6	42.4	18.7	35.2	99,636.0	99,297.1	99,636.0	(88.8)	(338.8)	100,000	100,000		
1.10 Operations	793.5	792.9	2,903.0	(0.6)	(2,110.1)	50,760.7	50,344.1	50,807.6	(463.4)	(463.4)	119,000	119,000		
<b>OTHER PROJECT COSTS SUBTOTAL</b>	852.4	870.5	2,945.4	18.1	(2,074.9)	150,146.7	149,641.3	150,443.5	(502.3)	(602.3)	219,000	219,000		
<b>TOTAL PROJECT COST</b>	9,854.0	16,857.5	17,466.5	7,003.5	(609.0)	1,212,464.7	1,200,455.0	1,197,257.6	(12,009.7)	3,197.4	1,411,700	1,411,700		
<b>RECONCILIATION TO CONTRACT BUDGET BASE</b>														
<b>DOLLARS EXPRESSED IN: Thousands</b>												<b>DATE: October 20, 2004</b>		



PROJECT TITLE	REPORTING PERIOD:										PROJECT NUMBER:		
	September 01, 2004 through September 30, 2004										99-E-334		
	BC/MS PLAN DATE										START DATE		
PARTICIPANT NAME AND ADDRESS:	Sep-04										October 1998		
	Oak Ridge National Laboratory										COMPLETION DATE		
	Oak Ridge, TN										June 2006		
ITEM	CURRENT PERIOD					CUMULATIVE TO DATE					AT COMPLETION		
	BUDGETED COST		ACTUAL COST		VARIANCE	BUDGETED COST		ACTUAL COST		VARIANCE		BUDGET	ESTIMATE (EAG)
	WORK SCHED	WORK PERF	WORK SCHED	WORK PERF	SCHED COST	WORK SCHED	WORK PERF	WORK SCHED	WORK PERF	SO-FED	COST	BUDGET	ESTIMATE (EAG)
AE/OM	3,491.9	2,541.2	3,543.5	(950.7)	(1,002.3)	368,042.0	363,069.7	361,297.5	(5,002.3)	1,742.2	378,912.0	383,628	
Argonne National Laboratory / ORNL	604.8	924.5	1,131.6	319.7	(207.1)	55,924.6	54,087.4	54,759.4	(1,837.2)	(672.0)	78,140.3	78,361	
Brookhaven National Laboratory	2,790.6	2,323.5	2,003.2	(467.1)	320.3	123,313.1	120,248.5	119,865.1	(3,064.6)	383.4	129,108.2	129,383	
Thomas Jefferson Laboratory	470.1	370.3	331.7	(99.9)	38.6	67,118.2	66,821.1	66,920.6	(297.1)	(99.5)	68,368.1	68,368	
Los Alamos National Laboratory	804.4	1,424.9	(14.0)	620.5	1,488.9	192,286.3	192,066.2	191,290.5	(200.1)	795.7	194,710.5	194,711	
Lawrence Berkeley National Laboratory	34.5	65.8	56.0	31.3	9.8	29,045.2	28,977.2	28,743.6	(68.1)	233.6	29,675.7	29,676	
Oak Ridge National Laboratory	1,657.8	9,207.4	10,414.5	7,549.6	(1,207.1)	386,735.4	385,194.9	384,381.0	(1,540.5)	813.9	508,456.2	509,529	
<b>WBS SUBTOTAL</b>	9,854.0	16,857.5	17,466.5	7,003.5	(609.0)	1,212,464.7	1,200,455.0	1,197,257.6	(12,009.7)	3,197.4	1,387,340	1,383,666	
<b>CONTINGENCY</b>											24,360	18,044	
<b>TOTAL PROJECT COST</b>	9,854.0	16,857.5	17,466.5	7,003.5	(609.0)	1,212,464.7	1,200,455.0	1,197,257.6	(12,009.7)	3,197.4	1,411,700	1,411,700	
<b>RECONCILIATION TO CONTRACT BUDGET BASE</b>													
<b>DOLLARS EXPRESSED IN Thousands</b>										<b>DATE October 20, 2004</b>			



PROJECT TITLE:	REPORTING PERIOD:												PROJECT NUMBER:			
	Spallation Neutron Source Project September 01, 2004 through September 30, 2004												99-E-334			
PARTICIPANT NAME AND ADDRESS:	BCWS PLAN DATE:												START DATE:			
	Oak Ridge National Laboratory Oak Ridge, TN												October 1998			
COMPLETION DATE:																
June 2006																
BUDGETED COST FOR WORK SCHEDULED (NON - CUMULATIVE)																
ITEM	BCWS CUM TO DATE	FISCAL YEAR												Out Years	Budget at Completion	
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep			FY Total
<b>PM BASELINE (BEGINNING OF PERIOD)</b>	862,169	17,125	19,307	18,982	21,567	17,640	9,985	21,434	18,880	16,783	15,534	13,911	14,398	205,546	96,841	1,164,556
1.02 Project Support		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.03 Front End Systems		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.04 Linac Systems		-	-	-	-	-	-	-	-	-	-	-	(2,357)	(2,357)	2,357	-
1.05 Ring & Transfer System		-	-	-	-	-	-	-	-	-	-	-	(1)	(1)	79	78
1.06 Target Systems		-	-	-	-	-	-	-	-	-	-	-	(3,039)	(3,039)	6,739	3,700
1.07 Instrument Systems		-	-	-	-	-	-	-	-	-	-	-	-	-	(0)	(0)
1.08 Conventional Facilities		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.09 Integrated Control Systems		-	-	-	-	-	-	-	-	-	-	-	-	-	6	6
<b>TOTAL AUTHORIZED CHANGES</b>													(5,397)	(5,397)	9,181	3,784
<b>PM BASELINE (END OF PERIOD)</b>	862,169	17,125	19,307	18,982	21,567	17,640	9,985	21,434	18,880	16,783	15,534	13,911	9,002	200,149	106,022	1,168,340

DATE: October 20, 2004

RECONCILIATION TO CONTRACT BUDGET BASE

DOLLARS EXPRESSED IN: Thousands

Seven Project Change Requests were implemented in September:

Revision	PCR Number	Description	Impact (Cost/Sched/Tech)	Actual Cost Impact (Total \$)
R505	RI-04-011	Transfer of BCM Scope	Scope/Cost	-
R506	RI-04-013	36Q85 Magnet Measurement	Scope/Cost	36
R507	RI-04-014	Ceramic Breaks	Cost	26
R508	RI-04-015	Chain Saw Foil Mechanism	Cost	16
R509	RI-04-016	Spare Ion Chambers	Cost	6
R510	AS-04-011	Replan Klystron Procurements	Schedule	
R511	TG-04-008	Implement ETC per Integrated Installation	Cost/Schedule	3,700



**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)**— $TEC + OPC$