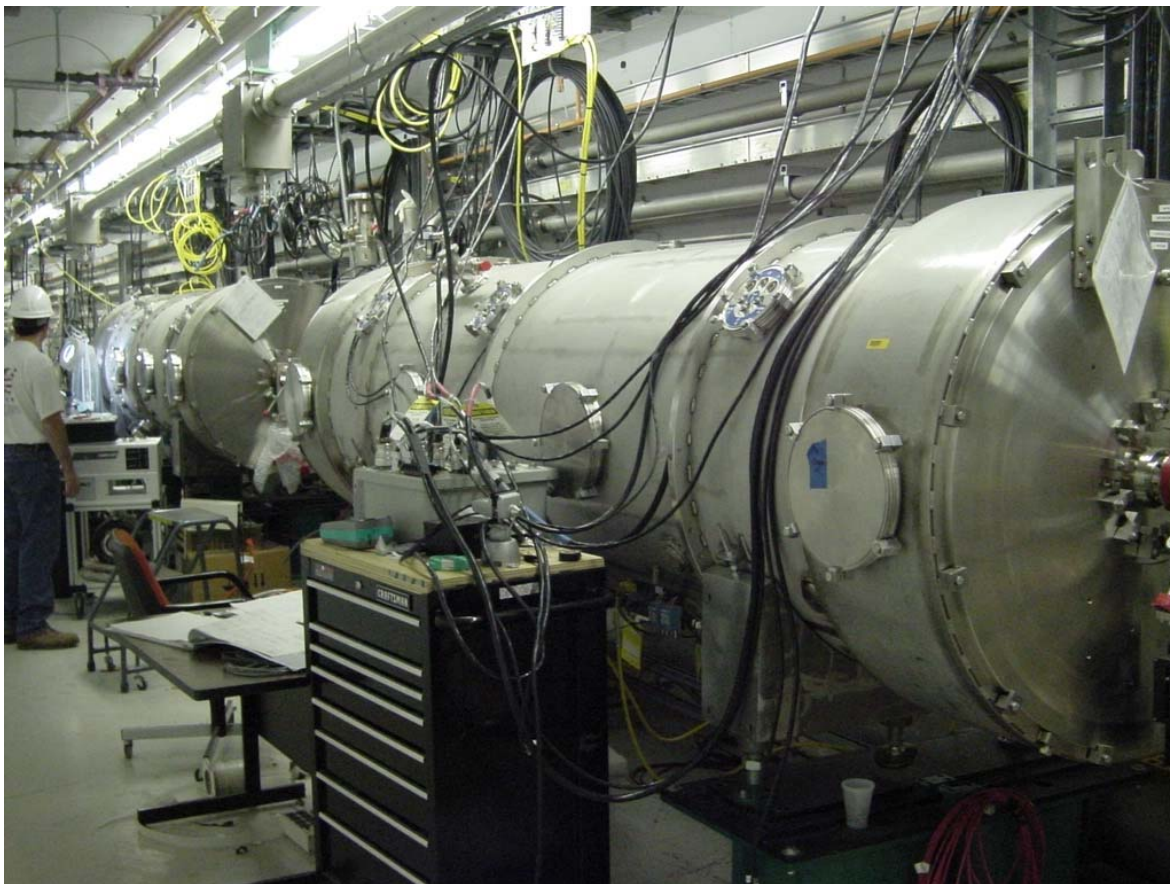


The Spallation Neutron Source Monthly Report

June 2004



SNS 102010000-TR0046-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



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Project Overview and Assessment



Compressor skid for the Target building arrives on site

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

Carl N. Sawbridge
 Carl N. Sawbridge
 SNS Deputy Project Director
 8/16/04
 Date

Highlights and Issues:

- Good project performance continues with minor cumulative cost and schedule variances of 0.3% and -1.2% respectively against the March 2006 early finish schedule. Through the end of June, 83.5% of the project is complete. Completion percentages are:
 - ◊ 99 % of R&D
 - ◊ 95 % of design
 - ◊ 81 % of technical hardware (including procurement and fabrication)
 - ◊ 91 % of conventional construction
 - ◊ 58 % of installation
- Contingency continues to be tight. The available contingency balance of \$28.1M will be reduced to \$22.8M once the changes identified in the Estimate at Completion are incorporated into the base-

line. Approximately \$6M of undistributed pre-operations budget is also available.

- Good safety performance continues. Through 25 June 2004, the total Project has worked in excess of 5.5 million hours with 73 recordable injuries (an increase of 4 from last month) and 1 lost work day (away) case. Injuries and trends have been evaluated and methods to improve safety performance have been discussed with all contractors and staff.
- 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 LANL stand-down, which began 16 July 2004, will create a negative variance and is exacerbating the already tight FY04 end of year BA constraint.

Assessment:

Accelerator Systems Division (ASD): Good progress has been made hiring experienced accelerator operators that will be needed for the SCL beam commissioning. Three new operators will report by the end of this fiscal year and three more will report in FY05. The August warm linac beam commissioning remains solidly on schedule. DTL final alignment is complete and all RF windows are loaded. All DTL RCCS are operating and flowing water, allowing the Magnet Group to begin their final testing of the DTL EMD drift tubes. The DTL vacuum system cable connections and pump installation is progressing rapidly. CCL-2 vacuum terminations were completed and CCL-3 cooling manifold installation is complete. CCL-4 bridge coupler vacuum leak testing and water orbital welding is complete. The 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. The production of medium-beta cavities has been completed. A preliminary list of slot locations for these cryomodules has been made by the Physics Group. Medium-beta 10 has been shipped to ORNL and Medium-beta 11 will be placed in storage. If time permits, the latter will be tested later this year. A previously measured JLAB medium-beta cavity will be the first cryomodule tested at ORNL. 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.

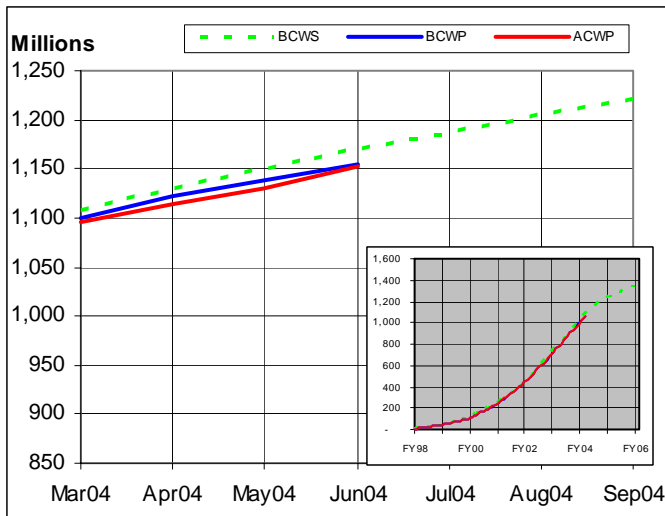
leak tested. Fabrication and testing of the mercury loop off-gas valve panel is complete and buffer tank and helium compressor and oil removal skids have been received and are being installed. Preliminary results from the study of compensated high-field magnets indicate that use of such magnets will provide considerable help in minimizing magnetic interference effects between instruments. The motors and encoders for the magnetism reflectometer sample stage have been successfully inspected at the vendor. Good progress is also being made on the development of an automation scheme for a Liquid Helium Cryo-Furnace. The various control hardware systems have been interfaced and testing has begun.

Experimental Systems Division (XFD): Development of a detailed installation schedule to integrate remaining installation efforts for XFD is well underway. Interfaces with Conventional Facilities and Accelerator Systems are being reviewed and resource requirements have been re-estimated. The final product will be reviewed by an independent committee in August. Installation and vendor fabrication of Target Systems equipment is proceeding well. Ten of twenty upper interstitial blocks as well as the hot cell spill collection basin and the hot cell bridge crane have all been installed. Five core vessel inserts have been installed and

Conventional Facilities (CF): Erosion control and flooding in the CLO and the Target building continue to be a problem due to the intermittent heavy rainfall. The long term plan is to regrade the area to divert the water away from the buildings. An estimate for the final site work effort is being prepared. The final layer of topsoil has been placed on the RTBT Tunnel. The RTBT Tunnel cracks will then be evaluated and an assessment of required repairs will be developed. Proposals for the Central Exhaust Building stack and blowers have been received and are being evaluated. The 2TU instrument building was turned over to XFD for storage of material on 23 July and the poured concrete "T's" over the RTBT have been installed. A sample of the shaft wall has been installed over the hot cell. This is intended to minimize interference with the operation of the 50 ton crane while the wall is being constructed. While work on the CLO continues, the SNS staff has transitioned effectively into this new facility. Testing and balancing of the HVAC system is ongoing, although proving difficult because the building is not yet enclosed completely and floors isolated.



Project Overview and Assessment (con't)



Total Project	Jun04	Cum-to-Date
BCWS	18,436	1,169,839
BCWP	17,010	1,155,243
ACWP	21,063	1,151,548
CV	-4,052	3,695
SV	-1,425	-14,596
CPI	0.81	1.00
SPI	0.92	0.99
Budget at Complete		1,383,555
Contingency		28,145
Total Project Cost		1,411,700

Total Project Cost (TPC)	\$1,411.7 M
Percent planned (cumulative)	84.6%
Percent complete (cumulative)	83.5%
Total Estimated Cost (TEC)	\$1,192.7 M
Cost and Commitments through 5/31/04	\$1,049M
Outstanding Phase Funded Awards	\$17.3M
Budget to Complete	\$115.7M
Contingency	\$28.1M
Estimate at Completion	\$1,164.6M
Remaining Contingency Based on EAC (21.8%)	\$ 22.8M

Critical Path:

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

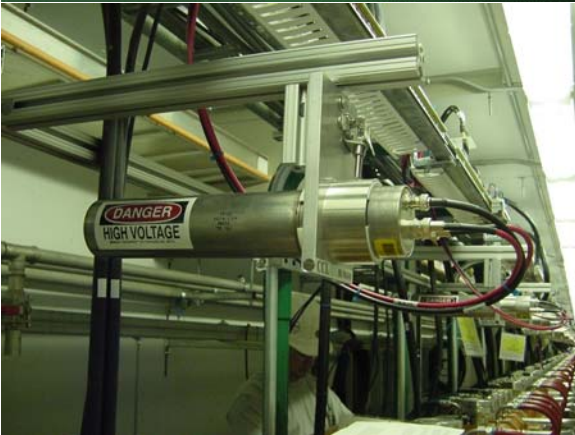
The project's longest path remains unchanged and is associated with the Target System's Hot Cell installation sequence. Currently, 22 days of positive float exist in this installation and integrated testing sequence. The schedule is being monitored closely to ensure that there are no delays in the loading 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



Linac CCL4 Neutron Detectors

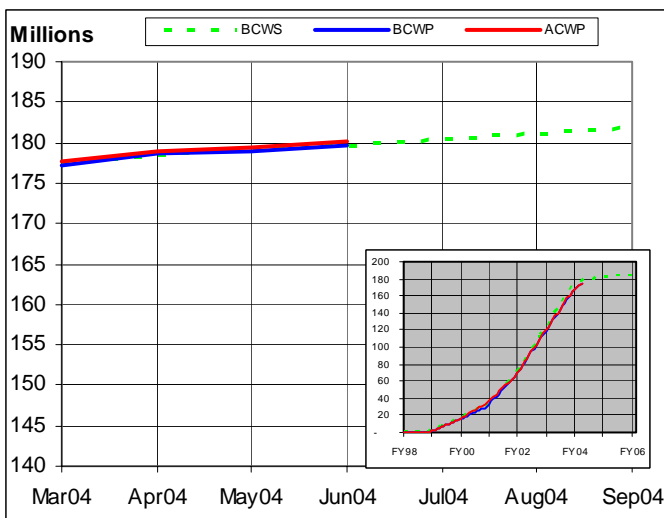
Highlights:

- A 5-MW klystron that has not been site tested as well as two 550-kW Thales klystrons that have been site tested were shipped to ORNL. A pair of CCL windows that were site tested and conditioned have also been shipped.
- Eight RTBT harp high-voltage planes have been completed. This is enough for one harp assembly and one spare.
- Installation and commissioning support to ORNL continued.

Assessment/ Issues:

- Project management for the remaining LANL effort has been transitioned to ASD-ORNL.
- The recent work stoppage at LANL is being evaluated for cost/schedule impact.

Performance and Milestones:



	Jun04	Cum-to-Date
BCWS	515	179,716
BCWP	684	179,666
ACWP	717	180,122
CV	-33	-456
SV	168	-50
CPI		
CPI	0.95	1.00
SPI		
SPI	1.33	1.00
Budget at Complete		183,448
Planned % Complete		98.0%
Actual % Complete		97.9%

Cost Performance:

Cause and Impact: The cost variance is due primarily to overruns in HV power conditioners.

Corrective Action: Possible reductions in other LANL workscope are being considered to offset this variance.

Schedule Performance :

Cause and Impact: Not required

Corrective Action: None required.

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



Highlights:

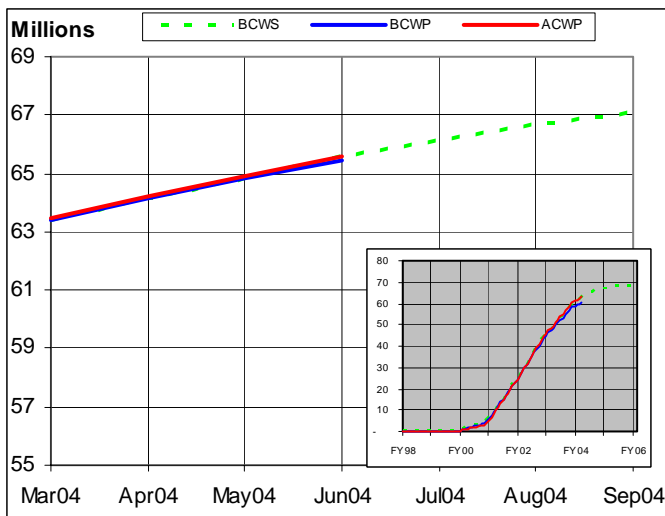
- Five additional High-β cavities were qualified this month.
- String Assembly for cryomodules H-5 and H-6 was completed.
- Assembly of cryomodules H-3 and H-4 were completed and assembly of Cryomodule H-5 has begun.
- Testing of cryomodule H-1 continued. The failure of two piezos limited some data collection, however the standard tests were performed on all 4 cavities which met or exceeded specifications.

Cryomodule H-5 String Assembly

Assessment/ Issues:

- Maintaining the cryomodule fabrication schedule (on track for March 2005 finish)

Performance and Milestones:



	Jun04	Cum-to-Date
BCWS	689	65,555
BCWP	590	65,448
ACWP	656	65,573
CV	-66	-125
SV	-99	-107
CPI		
CPI	0.90	1.00
SPI		
SPI	0.86	1.00
Budget at Complete		
Budget at Complete		68,358
Planned % Complete		
Planned % Complete		95.9%
Actual % Complete		
Actual % Complete		95.7%

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.



Magnetic Measurements of the first rad-hard corrector magnet

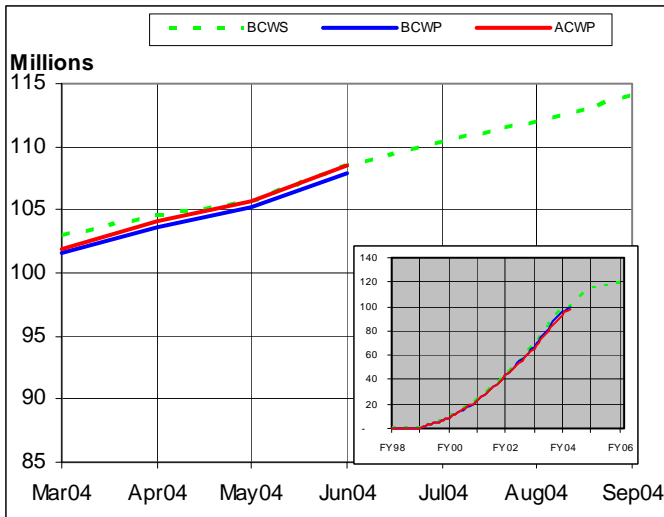
Highlights:

- A pre-production review of the Beam Position Monitor diagnostics board was held with ORNL. The production will begin in July 2004 in accordance with the diagnostics production plan.
- The problems encountered by the vacuum group have been resolved on the TiN coating of beam-line components. Problems with the ring primary collimators were traced to a substandard o-ring used to seal the end flange. The vacuum chamber was successfully coated and then crated for air freight back to the vendor for final assembly. Plans for the coating of the ferrite surface of the extraction kicker module were finalized.
- Work continued on injection straight section trial-assembly at BNL and two vacuum chambers are being modified to provide necessary assembly clearance. Modeling of the beam trajectories for the injection dump septum magnet has been completed. The upstream bellows on the downstream drift tube will be enlarged to provide additional clearance between the beam and inside wall of the chamber. The last remaining issue is the vendor's non-conformance (bend geometry) of the vacuum chamber for the dump septum magnet.
- Two CCL VME crates have been assembled, tested and shipped to ORNL to support linac commissioning.
- As part of the electron-cloud mitigation plan, the solenoid winding for the drift pipe in the collimation region (downstream of QB12-13 doublet) was successfully completed.
- Ring arc half-cells #29 and 30 were shipped to ORNL. Also delivered were the second RF cavity, power supply, and amplifier assembly.
- Vendor acceptance testing of the Ring dipole power supply has been completed and non-conformance problems with the power supply interface module are being worked with the vendor.

Assessment/Issues:

Purchase requisitions are being approved based on immediate schedule need only due to FY04 BA constraints.

Performance and Milestones:



	Jun04	Cum-to-Date
BCWS	2,984	108,590
BCWP	2,592	107,820
ACWP	2,784	108,477
CV	-192	-657
SV	-392	-771
CPI		
	0.93	0.99
SPI		
	0.87	0.99
Budget at Complete		
		118,925
Planned % Complete		
		91.3%
Actual % Complete		
		90.7%

Cost Performance :


Cause and Impact: None required.

Corrective Action: None required.

Schedule Performance :

Cause and Impact: The current period schedule variance is due to delays with Beam Position Monitors and RTBT power supply deliveries.

Corrective Action: None required. These deliveries will be complete by the end of the FY.

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



Target Systems– Oak Ridge National Lab



Fabrication of the Mercury Water Heat Exchanger

Highlights:

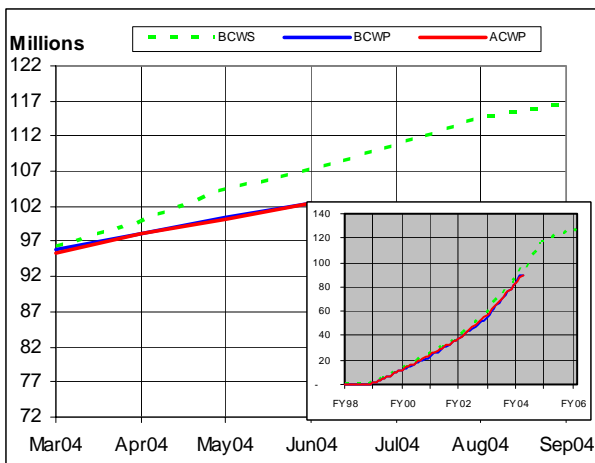
- The PBW seals are being shipped to the vendor where they will be welded on the PBW assembly. The seals will be tested again in an identical configuration to SNS prior to shipping. Testing of the mercury loop isolation valve at the vendor was successful. The valve was shipped and has been received.
- The water hydraulic power and control system used to drive the target carriage has been assembled and successfully tested. It is currently being packaged for shipment to the carriage vendor where it will be included in the carriage acceptance tests to be conducted at the vendor's facility. The flexible metal hoses used for hot cell wall feed-through and connectors in the target utility systems have been received.
- The carriage rails located in the tunnel between the vacuum vessel and hot cell have been installed and aligned. The E-4 PC-3 seismic support bracket has been installed.
- The Hydrogen DVTM Final Design Review was completed. The remaining components of the helium refrigeration system were delivered in July.
- The machining of the upper and lower split plates for the inner reflector plug has begun.
- Ten of a total of twenty upper interstitial blocks have been received. Six of the nine single channel gates are now on site and the first pour for the Concrete Shutter Plugs has been completed. The last two large shield blocks at the top of the shielding stack adjacent to the proton beam window have also been installed.
- The five cooling loop fill pumps were delivered and fabrication details for the pump stands were provided to the General Contractor. The 3-inch and 6-inch cooling loop check valves were delivered and will be turned over to the General Contractor after receipt and approval of the final documentation package.

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:

	Jun04	Cum-to-Date
BCWS	2,733	107,287
BCWP	2,072	102,532
ACWP	2,311	102,360
CV	-240	172
SV	-661	-4,755
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CPI	0.90	1.00
SPI	0.76	0.96
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Budget at Complete		126,338
<hr/>		
Planned % Complete		84.9%
Actual % Complete		81.2%



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 a reflection of the correction of the positive cost variance reported last month.

Corrective Action: None required

Schedule Performance:

Cause and Impact: The current schedule variance is due to late hardware deliveries in the target module carriage assembly and shutter drive deliveries as well as delayed installation efforts. The schedule variance is dominated by delays in the target utilities installation package. However, delays in other areas (shutter drives, cryogenics and the target moderator) are also substantial. Many of the variances will be resolved by August.

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



Instrument Systems– Argonne and Oak Ridge National Labs



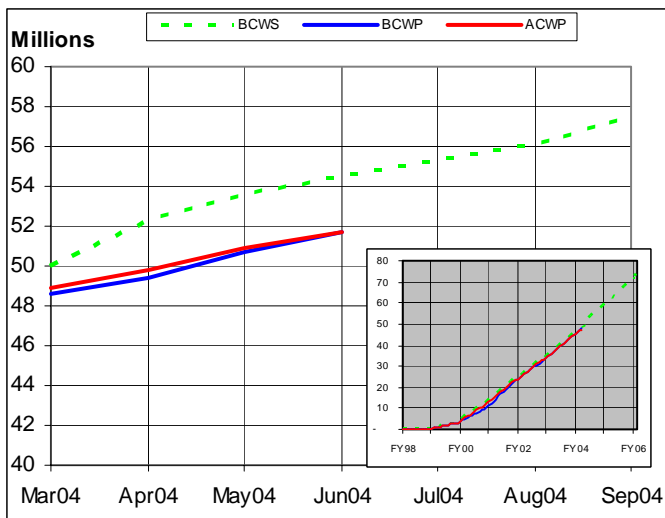
Installation of flight tube supports for the Backscattering spectrometer

Highlights:

- The guide mechanical components and alignment fixtures for the Backscattering Spectrometer have been received at the RATS II facility.
- Possible prototype development projects utilizing robotics in SNS sample environments are being researched.
- Plans for the use of graphite foam as a rapid heat exchange medium in sample environment components are being developed.
- Several paths towards development of compensated high-field magnets for neutron scattering research at SNS are being pursued. These include discussion of a 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.
- Discussions were held with the vendor on the neutron guide manufacturing and the guide/shielding interface for the magnetism and liquids reflectometers.
- The safety review for the high-rate detector test facility at HFIR was completed.
- The core vessel inserts for beamlines 3, 7, 17, and 18 have been received
- Several new ideas and possibilities for collaborations relevant to SNS came out of the Workshop on Neutron Sample Environment, held at Abingdon, United Kingdom at the end of June.
- The requisition for the analyzer crystal mounting/alignment system has been submitted for procurement.

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

Performance and Milestones:



	Jun04	Cum-to-Date
BCWS	976	54,550
BCWP	1,067	51,744
ACWP	830	51,685
CV	237	58
SV	90	-2,806
CPI		
	1.29	1.00
SPI		
	1.09	0.95
Budget at Complete		
		78,121
Planned % Complete		
		69.8%
Actual % Complete		
		66.2%

Cost Performance:

Cause and Impact: The current period variances are largely due to the erroneous status of one activity that inflated earned value by 300K.

Corrective Action: This will be corrected in July's report.

Schedule Performance:

Cause and Impact: The cumulative schedule variance is dominated by two instruments in which the BCWS for several large procurements was based-lined 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



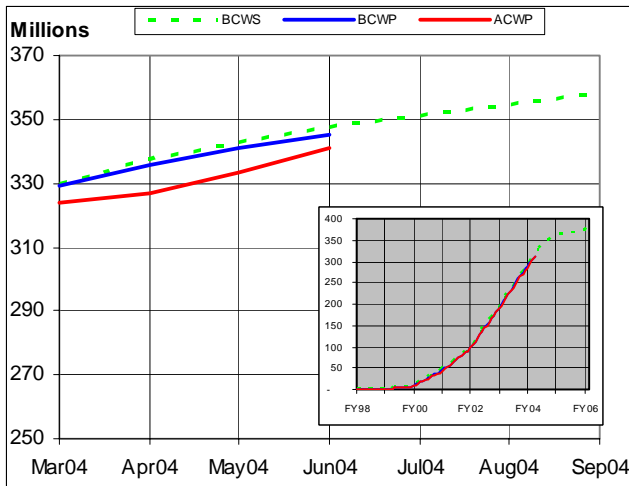
CLO Entry

Highlights:

- RTBT Tunnel backfill and liner installation operations are complete.
- Siding installation has been completed on the north side of the Target Building and window installation nearing completion on the north and east end. Tee Beam and Zee Beam pre-casting continues in the south side laydown area, and precast covers for the RTBT tunnel roof openings are complete. Conventional Facilities piping and painting in the basement continues. Fire protection piping along with insulation of HVAC duct has begun above the instrument floor. Electrical work continues through the building with pads for electrical substations SS1, SS4 and future SS2 constructed and substations SS1 and SS4 set. XFD Package 6 Utilities installation is progressing. XFD Package 2a installation is approximately 63% complete and is being re-sequenced to mitigate the impact of late deliveries of interstitial blocks
- CLO General Construction continued with final detailing of the “move-in” areas to support movement of furniture and personnel. Outside the “move-in” areas, work continued for mechanical and electrical rough-in work, particularly the DI loops, compressed air system, process waste system, and hot water loops, as well as fire protection piping, and drywall installation. The Pedestrian bridge structural steel has been completed. Work continued on the P1/P2 passenger elevators in Sector 62, and should be complete in August. Work commenced on the CLO East Plaza concrete retaining walls. PA System and Fire Alarm installation continued throughout the building.

Assessment/ Issues:

Performance and Milestones:



	Jun04	Cum-to-Date
BCWS	4,358	347,296
BCWP	4,083	344,938
ACWP	7,715	341,078
CV	-3,631	3,859
SV	-275	-2,359
CPI		
	0.53	1.01
SPI		
	0.94	0.99
Budget at Complete		378,912
Planned % Complete		91.7%
Actual % Complete		91.0%

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

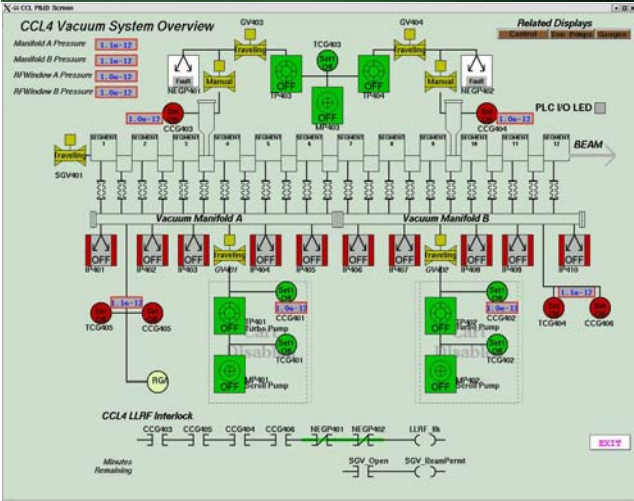
Cost Performance:

Cause and Impact: The current period positive cost variance is the result of accruals for 75% of the retention earned to date in CLO General Construction and the Target Building. Approximately \$1.1M 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 (-\$1.6M), the Target Building (-300K) and CF Local Controls, which has been deferred until FY05 (-\$670K).



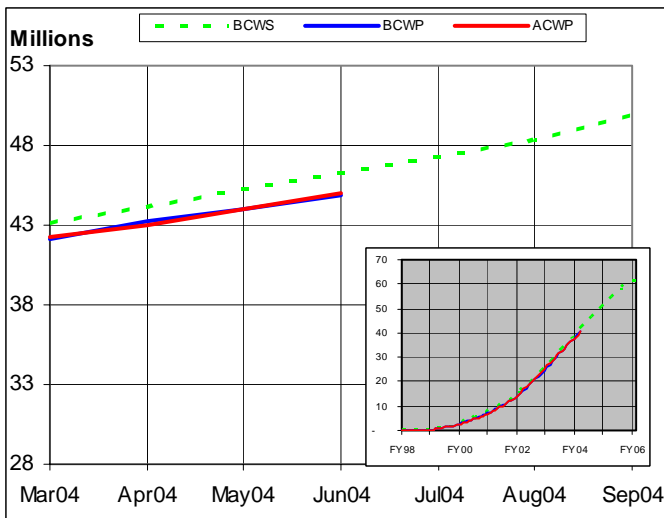
CCL 4 vacuum control screen

Highlights:

- The PPS was certified for RF processing (Phase 1.1), test plans were prepared for all subsystems, and new installation and continuity checking proceeded on DTL modules 4 – 6 and CCL modules 1 – 4. Work also proceeded on preparations for the planned August RF test of Cryo-module MB3. (Medium Beta 3).
- Installation of the LINAC ODH system is 95% complete. All of the field wiring, as well as the field and control room PLC racks have been installed.
- EPICS-based tuning of RF power on the Hot Spare Stand was implemented thus permitting safe tuning of the RF to 52 kW, producing a peak current of 51 mA and average current of 40 mA.
- High-level operational screens were developed that make use of embedded windows to use valuable screen space more efficiently.
- The Controls and Personnel Protection Systems (PPS) Laboratories and five controls servers were moved from 701 Scarborough Road to the CLO. Coinciding with the move, nearly fifty controls servers were converted from Red Hat Linux to the “Enterprise” version.
- A LabView program was developed at BNL to automate acceptance testing of BLM-to-MPS interface modules designed by the Diagnostic group.

Assessment/Issues: No issues at this time.

Performance and Milestones:



	Jun04	Cum-to-Date
BCWS	1,065	46,254
BCWP	863	44,829
ACWP	962	44,949
CV	-99	-120
SV	-203	-1,425
<hr/>		
CPI	0.90	1.00
SPI	0.81	0.97
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Budget at Complete		61,449
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Planned % Complete		75.3%
Actual % Complete		73.0%

Cost Performance:

Cause and Impact: The current period cost variance is due to LANL mischarges.

Corrective Action: The charges will be corrected.

Schedule Performance:

Cause and Impact: The current and cumulative schedule variances are largely due to activities in the Ring diagnostics, PPS 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. The PPS is delayed due to BA issues. Since these are not long lead items, the procurements have been delayed. None of these delays impact commissioning activities.

Corrective Action: None required.

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



Klystron Building Magnet test area

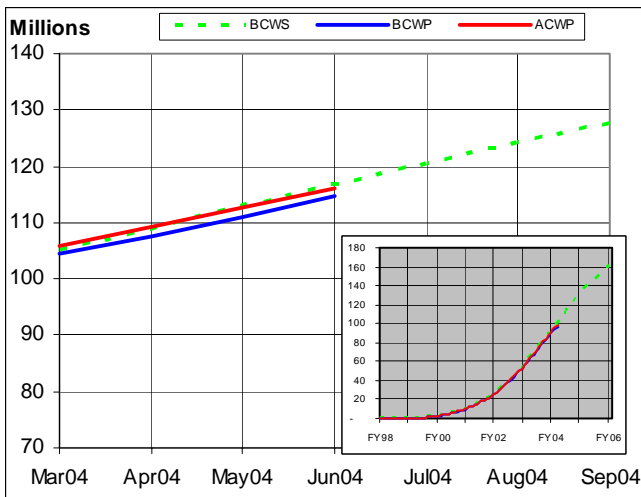
Highlights:

- Work for the August warm linac beam commissioning remains solidly on schedule. DTL final alignment is complete and all RF windows are loaded. All DTL RCCS 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 were completed. CCL-3 cooling manifold installation is complete. CCL-4 bridge coupler vacuum leak testing and water orbital welding is complete. The CCL-3 RF system is almost ready for testing.
- The production of medium-beta cavities has been completed. A preliminary list of slot locations for these cryomodules has been made by the Physics Group. Medium-beta 10 will be shipped immediately from JLAB and medium-beta 11 will be placed in storage and possibly tested later in the year, if time permits. It has been decided that a previously measured JLAB medium-beta cavity will be the first cryomodule tested at ORNL.
- 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.
- 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 scheduled for March.
- Good progress has been made hiring experienced accelerator operators that will be needed for the SCL beam commissioning. One operator from LANL has reported to work. Two other experienced operators will report to work in FY04. Three additional offers have been accepted, with report to work dates pending, some of which will be in FY05.

Assessment/ Issues:

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

Performance and Milestones:



	Jun04	Cum-to-Date
BCWS	3,660	116,710
BCWP	3,755	114,804
ACWP	3,478	116,129
CV	277	-1,326
SV	94	-1,907
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CPI	1.08	0.99
SPI	1.03	0.98
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Budget at Complete		172,139
<hr/>		
Planned % Complete		67.8%
Actual % Complete		66.7%

Cost Performance:

Cause and Impact: The current period cost variance is due to the transfer of the SCL Magnet Supply procurement from LANL to ORNL. The costs had already been incurred but the BCWP could not be earned until the work had been moved. 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 but a draw from contingency may be required. An ETC is underway.

Schedule Performance:

Cause and Impact: The cumulative schedule variance is due to delays in CHL installation and klystron spares procurements. The current period variance is due to the LANL transfer mentioned above. *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



CLO front

Highlights:

- The move from the leased office space at 701 Scarboro to the CLO on site was completed on 30 June 2004.

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 June.

Review	Recommendations	Closed This Month	Open Actions
DOE SC Review (11/03)	25	0	1
DOE SC Review (5/04)	22	0	22

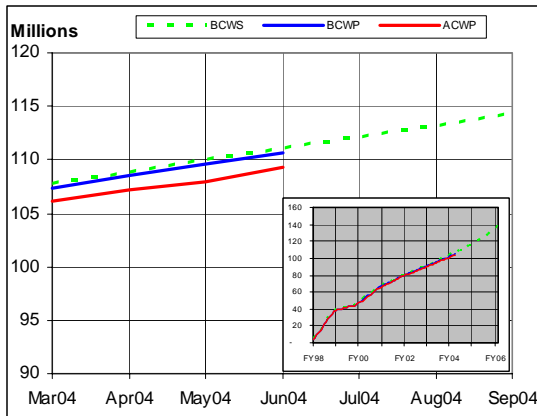
Life of Project Market Experience:

Major Awards (\$M)	Baseline Estimate (\$M)	Baseline Savings (\$M)	Percent savings over baseline
548.2	512.0	-36.2	-7.1%

Through July 26, 2004: 98% of the major procurements are already awarded.



Performance:



	Jun04	Cum-to-Date
BCWS	1,095	111,084
BCWP	1,094	110,668
ACWP	1,274	109,287
CV	-179	1,380
SV	-1	-416
<hr/>		
CPI	0.86	1.01
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		75.6%
Actual % Complete		75.3%

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. The impact of the move costs can be seen in the current period cost variance and the positive cumulative variance will be depleted as the remaining costs are processed.

Corrective Action: None required.

Schedule Performance:

Cause and Impact: None required.

Corrective Action: None required.

Milestones:

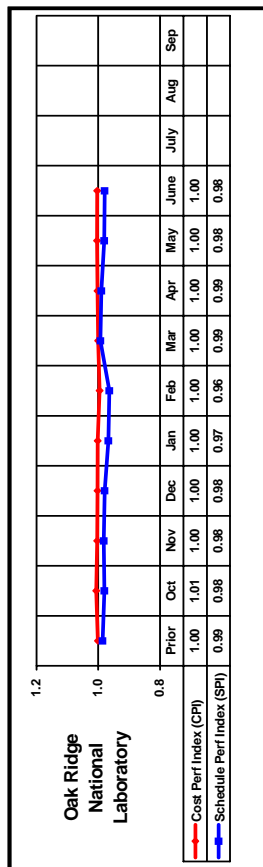
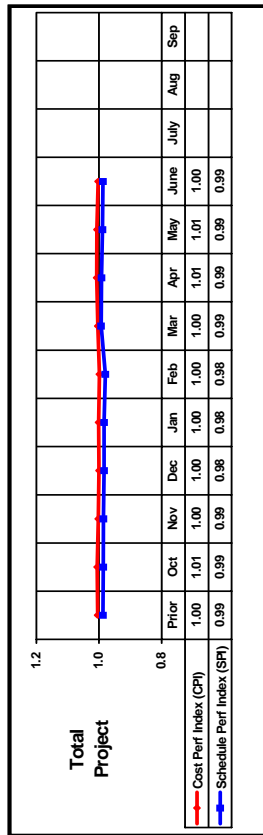
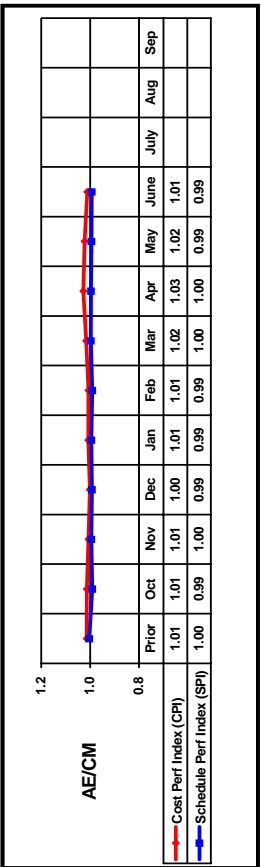
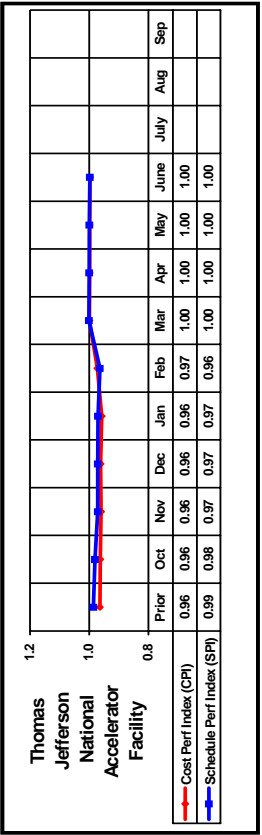
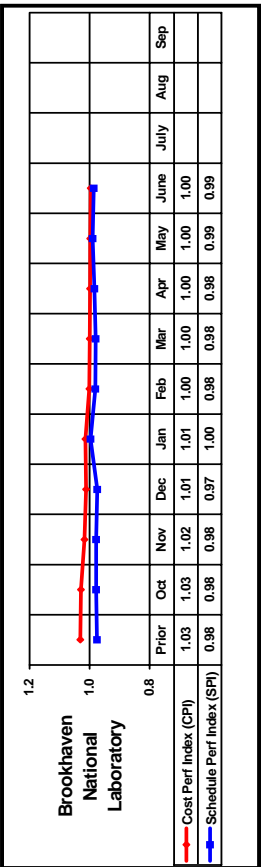
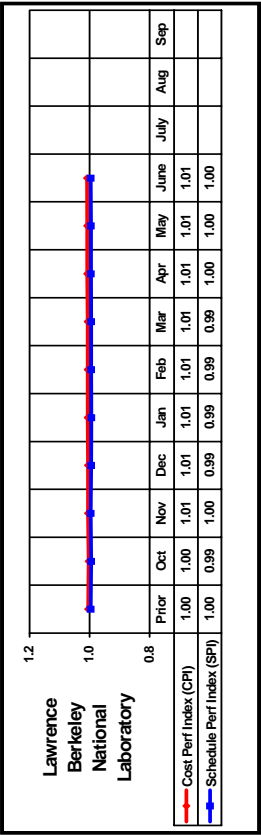
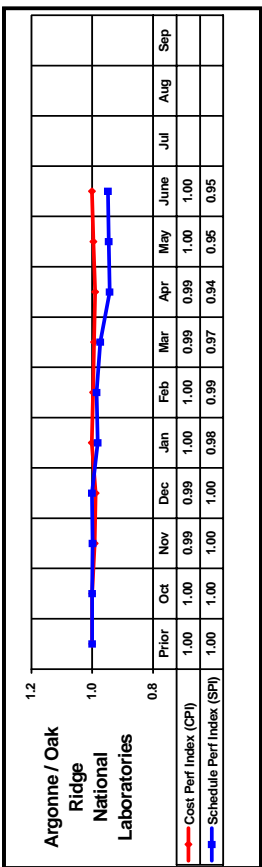
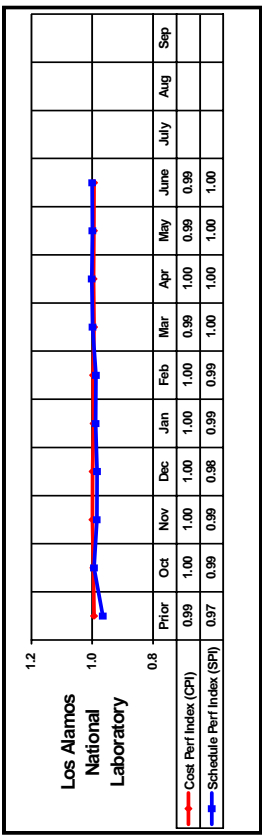
Description	Milestone Date	Forecast Date
EIS ROD	Jun-99	Jun-99 ✓
PSAR Issued for Approval	Dec-99	Dec-99 ✓
Submit PSAR to DOE for Approval	Dec-99	Dec-99 ✓
PSAD issued for Information	Sep-00	Sep-00 ✓
Issue FSAD for approval (Front End and Linac)	Sep-02	Aug-02 ✓
Issue FSAD for approval (Ring and Transfer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

Site view from the CLO

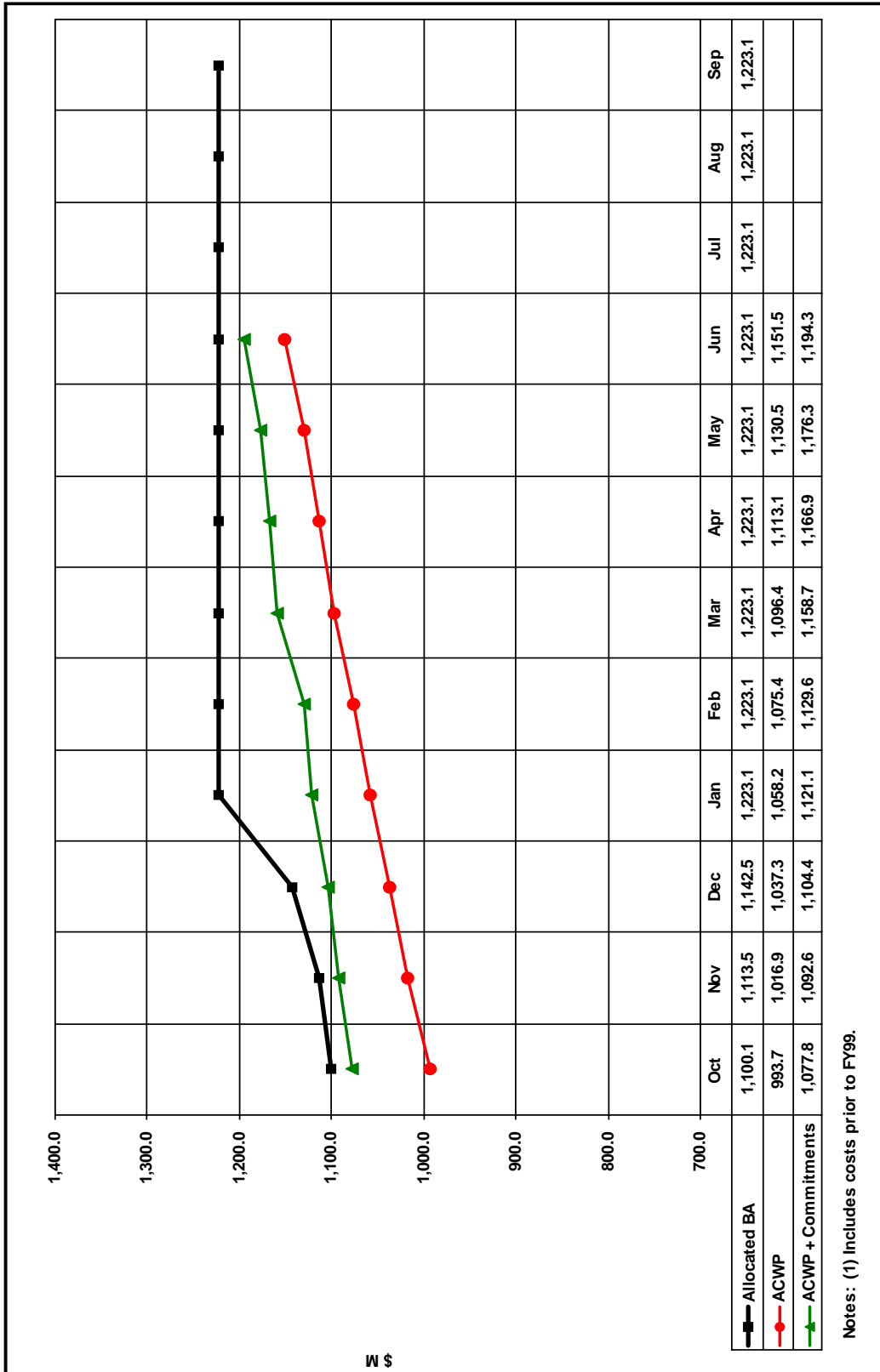




Overall Project Performance is stable



TPC Obligation Profile against BA



Phase funded procurements at the end of June could obligate an additional \$17.3M, raising the total obligation potential to \$1,212M.



PROJECT TITLE:	REPORTING PERIOD:										PROJECT NUMBER:										
	June 01, 2004 through June 31, 2004										99-E-334										
	BCWS PLAN DATE:										START DATE:	COMPLETION DATE:									
Oak Ridge National Laboratory Oak Ridge, TN										June 04										October 1998 June 2006	
ITEM	CURRENT PERIOD				VARIANCE				CUMULATIVE TO DATE				AT COMPLETION								
	BUDGETED COST		ACTUAL COST		SCHED		COST		BUDGETED COST		ACTUAL COST		VARIANCE		BUDGET (BAC)	ESTIMATE (EAC)					
	WORK SCHED	WORK PERF	WORK SCHED	WORK PERF	WORK SCHED	WORK PERF	WORK SCHED	WORK PERF	WORK SCHED	WORK PERF	WORK SCHED	WORK PERF	SCHED	COST							
1.02 Project Support	766.0	766.0	1,040.1	0.0	0.0	0.0	(274.1)	65,910.9	65,910.9	20,832.0	20,907.7	64,926.8	(0.0)	984.1	75,636	75,268					
1.03 Front End Systems	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20,832.0	20,832.0	20,832.0	20,907.7	20,907.7	0.0	(75.7)	20,832	20,832					
1.04 Linac Systems	3,489.8	3,658.0	3,213.3	168.2	3,489.8	3,658.0	444.6	293,644.3	293,644.3	293,644.3	295,621.3	295,621.3	(2,271.9)	(1,977.0)	315,969	316,880					
1.05 Ring & Transfer System	3,460.7	3,063.6	3,192.3	(397.1)	3,460.7	3,063.6	(128.8)	119,732.3	119,170.5	119,732.3	119,864.8	119,864.8	(561.8)	(694.3)	142,001	142,646					
1.06 Target Systems	2,732.7	2,071.6	2,311.1	(661.1)	2,732.7	2,071.6	(239.6)	89,132.0	84,377.0	89,132.0	84,205.3	84,205.3	(4,755.0)	171.6	108,183	109,811					
1.07 Instrument Systems	910.2	977.4	715.4	67.2	910.2	977.4	261.9	40,501.8	37,844.4	40,501.8	37,588.3	37,588.3	(2,657.4)	256.1	63,277	63,498					
1.08 Conventional Facilities	4,358.1	4,083.4	7,714.7	(274.7)	4,358.1	4,083.4	(3,631.3)	347,296.4	344,937.6	347,296.4	341,078.4	341,078.4	(2,358.8)	3,859.2	378,912	381,077					
1.09 Integrated Control Systems	1,065.3	862.7	962.2	(202.6)	1,065.3	862.7	(99.5)	44,549.5	43,124.3	44,549.5	43,244.8	43,244.8	(1,425.2)	(120.5)	59,745	59,845					
LINE ITEM SUBTOTAL	16,782.8	15,482.7	19,149.3	(1,300.1)	16,782.8	15,482.7	(3,666.6)	1,023,871.2	1,009,841.0	1,023,871.2	1,007,437.4	1,007,437.4	(14,030.1)	2,403.6	1,164,556	1,169,858					
CONTINGENCY															28,145	22,843					
TOTAL LINE ITEM	16,782.8	15,482.7	19,149.3	(1,300.1)	16,782.8	15,482.7	(3,666.6)	1,023,871.2	1,009,841.0	1,023,871.2	1,007,437.4	1,007,437.4	(14,030.1)	2,403.6	1,192,700	1,192,700					
1.01 Research & Development	66.3	89.2	114.4	22.9	66.3	89.2	(25.2)	99,204.2	99,055.1	99,204.2	99,328.6	99,328.6	(149.1)	(273.4)	100,000	100,000					
1.10 Operations	1,586.8	1,438.7	1,799.1	(148.2)	1,586.8	1,438.7	(360.5)	46,763.4	46,347.1	46,763.4	44,782.1	44,782.1	(416.3)	1,565.0	119,000	119,000					
OTHER PROJECT COSTS SUBTOTAL	1,653.1	1,527.8	1,913.5	(125.3)	1,653.1	1,527.8	(385.7)	145,967.7	145,402.3	145,967.7	144,110.7	144,110.7	(565.4)	1,291.6	219,000	219,000					
TOTAL PROJECT COST	18,435.9	17,010.5	21,062.8	(1,425.4)	18,435.9	17,010.5	(4,052.3)	1,169,838.8	1,155,243.3	1,169,838.8	1,151,548.0	1,151,548.0	(14,595.5)	3,695.3	1,411,700	1,411,700					
RECONCILIATION TO CONTRACT BUDGET BASE																					
DOLLARS EXPRESSED IN: Thousands																					
DATE: July 21, 2004																					



PROJECT TITLE:	REPORTING PERIOD:										PROJECT NUMBER:			
	June 01, 2004 through June 31, 2004										99-E-334			
	Oak Ridge National Laboratory Oak Ridge, TN										October 1998			
PARTICIPANT NAME AND ADDRESS:	BOWS PLAN DATE:										START DATE:		COMPLETION DATE:	
	Jun-04										June 2006		June 2006	
	ITEM	CURRENT PERIOD				VARIANCE				CUMULATIVE TO DATE				AT COMPLETION
BUDGETED COST		ACTUAL COST		SCHED	COST	BUDGETED COST		ACTUAL COST		SCHED	COST	BUDGET	ESTIMATE (EAC)	
	WORK SCHED	WORK PERF	WORK SCHED	WORK PERF			WORK SCHED	WORK PERF	WORK SCHED	WORK PERF				
AE/CM	4,358.1	4,083.4	7,714.7	(274.7)	(3,631.3)	347,296.4	344,937.6	341,078.4	(2,358.8)	3,859.2	378,912	381,077		
Argonne National Laboratory / ORNL	976.5	1,066.5	829.8	90.0	236.7	54,569.5	51,763.2	51,704.7	(2,806.3)	58.5	78,140	78,361		
Brookhaven National Laboratory	3,202.4	2,726.3	2,918.2	(476.1)	(191.9)	116,802.2	115,141.2	115,584.0	(1,661.0)	(442.8)	129,212	129,497		
Thomas Jefferson Laboratory	689.2	589.9	655.9	(99.4)	(66.0)	65,555.1	65,448.1	65,572.7	(107.0)	(124.6)	68,358	68,413		
Los Alamos National Laboratory	671.3	811.3	963.5	140.0	(152.2)	189,769.4	189,891.6	191,004.9	122.2	(1,113.3)	194,711	194,711		
Lawrence Berkeley National Laboratory	65.7	77.6	67.1	11.9	10.5	28,898.2	28,777.2	28,544.5	(121.0)	232.7	29,676	29,676		
Oak Ridge National Laboratory	8,472.6	7,655.4	7,913.6	(817.2)	(258.2)	366,947.9	359,284.2	358,058.8	(7,663.7)	1,225.5	504,547	507,123		
WBS SUBTOTAL	18,435.9	17,010.5	21,062.8	(1,425.4)	(4,052.3)	1,169,838.8	1,155,243.3	1,151,548.0	(14,595.5)	3,695.3	1,383,556	1,388,858		
CONTINGENCY											28,145	22,843		
TOTAL PROJECT COST	18,435.9	17,010.5	21,062.8	(1,425.4)	(4,052.3)	1,169,838.8	1,155,243.3	1,151,548.0	(14,595.5)	3,695.3	1,411,700	1,411,700		
RECONCILIATION TO CONTRACT BUDGET BASE														
DOLLARS EXPRESSED IN: Thousands														
DATE: July 21, 2004														



PROJECT TITLE:	REPORTING PERIOD:												PROJECT NUMBER:			
	June 01, 2004 through June 31, 2004												99-E-334			
PARTICIPANT NAME AND ADDRESS:	BCWS PLAN DATE:												START DATE:			
	Oak Ridge National Laboratory Oak Ridge, TN												October 1998			
BUDGETED COST FOR WORK SCHEDULED (NON - CUMULATIVE)													COMPLETION DATE:			
FISCAL YEAR													June 2006			
ITEM	BCWS CUM TO DATE	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	FY Total	Out Years	Budget at Completion
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	93,164	1,164,527
1.02 Project Support		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.03 Front End Systems		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.04 Linac Systems		-	-	-	-	-	-	-	-	(217)	-	-	217	-	-	-
1.05 Ring & Transfer System		-	-	-	-	-	-	-	-	(1,650)	-	-	503	(1,147)	1,147	-
1.06 Target Systems		-	-	-	-	-	-	-	-	-	-	-	-	-	29	29
1.07 Instrument Systems		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.08 Conventional Facilities		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.09 Integrated Control Systems		-	-	-	-	-	-	-	-	-	-	-	-	-	0	0
TOTAL AUTHORIZED CHANGES		-	-	-	-	-	-	-	-	(1,867)	-	-	720	(1,147)	1,175	29
PM BASELINE (END OF PERIOD)	862,169	17,125	19,307	18,982	21,567	17,640	9,985	21,434	18,880	16,783	15,948	15,217	15,180	208,047	94,340	1,164,556

RECONCILIATION TO CONTRACT BUDGET BASE

DATE: July 21, 2004

DOLLARS EXPRESSED IN: Thousands

Project Change Requests implemented in June are as follows:

PCR Number	Description	Impact (Cost/Sched/Tech)	Actual Cost Impact (Total \$)
TG-04-006	Replacement of Esc Cost for Resource ORSC	Cost	29
LI-04-015	PO Transfer fro Milhous Contract	Cost	-
RI-04-010	Better Delivery Info	Schedule	-



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)— $TEC + OPC$