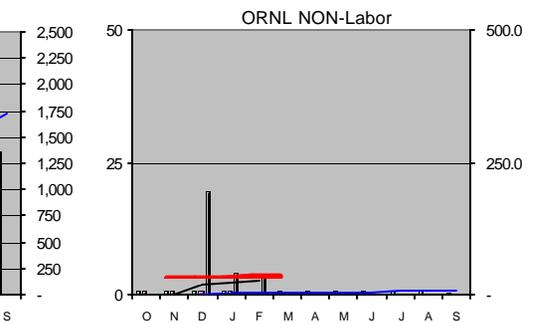
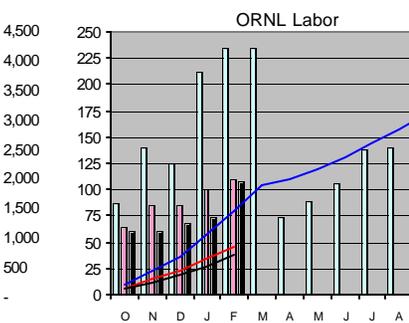
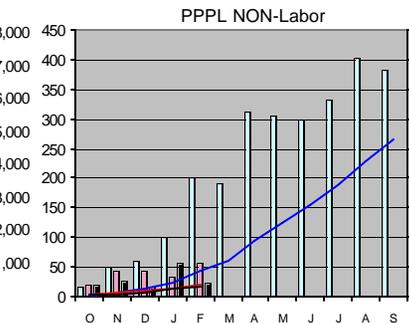
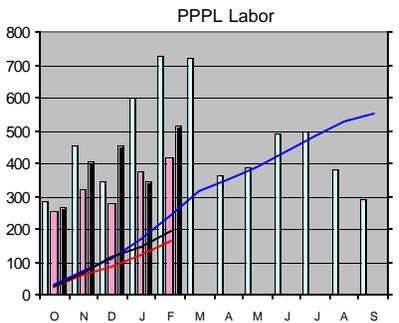
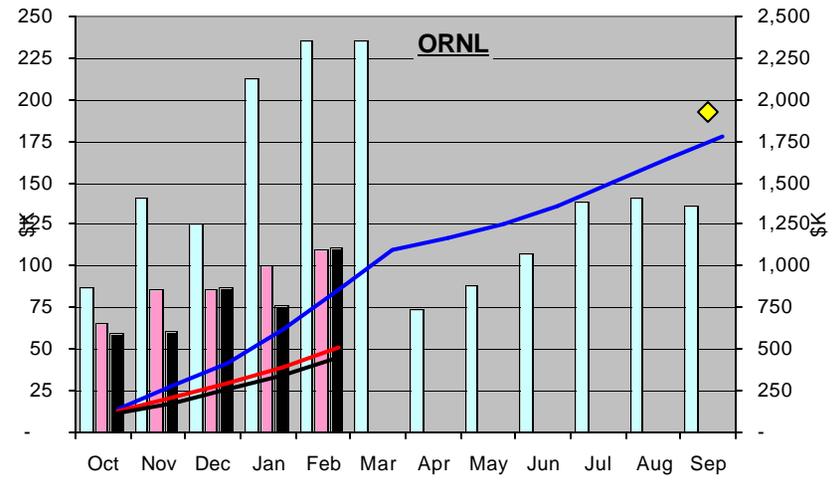
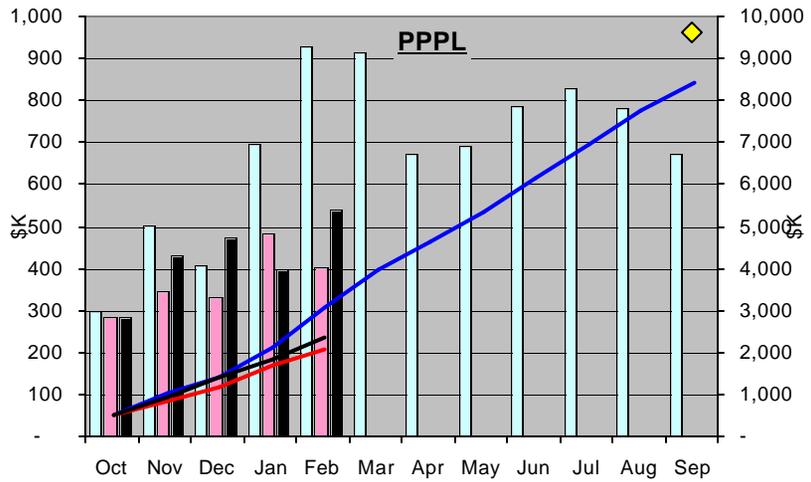
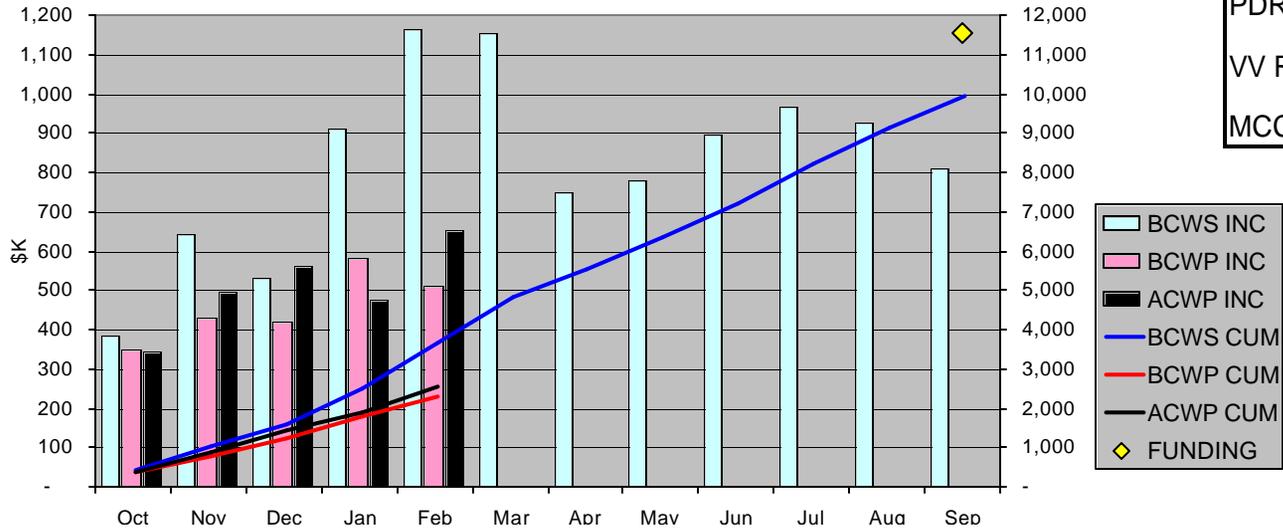


NCSX PPPL/ORNL MIE FY 2003 Cost Performance

	<u>Baseline</u>	<u>Forecast</u>
PDR	May 6	Jun 23
VV R&D Award	Feb 3	Mar 24
MCC R&D Award	Jan 22	Mar 17



NCSX MIE Project Budget Status March 1st, 2003

	<u>\$k</u>				<u>Comments</u>
	Budget	YTD Feb	EAC	variance	
<u>TOTAL PROJECT</u>					
MIE/ACD	\$9,911	\$2,532	\$10,457	+ \$546	
Management Reserve	\$1,636	\$0	\$1,090	- \$546	
subtotal	<u>\$11,547</u>	<u>\$2,532</u>	<u>\$11,547</u>		
<u>PPPL</u>					
MIE/ACD	\$8,187	\$2,135	\$8,955	+ \$768	+\$726 VV R&D contracts (loaded) -\$67 MCC R&D contracts +\$83 Proj Engr +\$125 Project Physics -\$139 Winding R&D (PPPL)
Management Reserve	\$1,439		\$671	- \$768	Accelerate \$734k Labor Intensive work from FY04 into 03. (This approximates 1 engr, 7 techs, 1 designer)
subtotal	<u>\$9,626</u>	<u>\$2,135</u>	<u>\$9,626</u>		<u>PROPOSAL</u> a) Removal of shield blocks in PBX TC (ACTION: ERIK TO ESTIMATE) b) electrical engr/dsn (ACTION: RAKI/WAYNE TO ITEMIZE AND PRIORITIZE TASKS) c) Spend \$30k for materials and fabricate turning fixtures (\$250k worth of labor!) ACTION: Hutch/Wayne
<u>ORNL</u>					
MIE/ACD	\$1,724	\$397	\$1,502	- \$222	-\$164k VV engr/design -\$123k MCC engr/design +\$79k WBS 19
Management Reserve	\$197		\$419	+ \$222	
subtotal	<u>\$1,921</u>	<u>\$397</u>	<u>\$1,921</u>		

Cost and Schedule Estimate Update

- Estimate from April 1st forward
- MIE and Research Prep
- Format: Markup existing CDR material
- http://www.pppl.gov/ncsx/Project_Control/project_control.html
- WBS cross reference
- Explain increases/decreases
- Due April 11, 2003
- Return all sheets! Mark "*no changes*" if applicable
- Include schedule

**NCSX Conceptual Design Cost Estimate Summary Form
(Attachment 1a)**

SUMMARY DESCRIPTION

WBS Number: 171

Title: Modular Coil Windings & Coil Assemblies

Originator: Brad Nelson

Description

This WBS element consists of the design and fabrication of the modular coil windings and coil assembly. The modular coil set consists of three field periods with 6 coils per period, for a total of 18 coils. Due to symmetry, only three different coil shapes are needed to make up the complete coil set. Within the modular coil envelope is a 19 mm thick web that supports two multi-turn winding packs. The design concept uses flexible, copper cable conductor that has been compacted into a rectangular cross-section and wrapped with kapton and glass tape insulation. The conductor is wound in a double pancake on each side of the structural web. Chill plates consisting of copper sheet with cooling tubes for liquid nitrogen coolant are provided on either side of the winding packs. After winding is complete, the final geometry is verified and the assembly is vacuum pressure impregnated with epoxy to complete the insulation system. The epoxy fills the voids within the cable conductor so the winding pack becomes a monolithic copper-glass-epoxy composite. Auxiliary clamping brackets are then installed. This element includes the conductor, insulation, winding, epoxy impregnation, clamp brackets, inspection and electrical testing.

Description of Existing Equipment/Facilities to be Reused: None

Description of Major Modifications Required to Existing Equipment/Facilities: None

WBS 171 Modular Coil Windings and Coil Assembly

Labor

Activity Title	Manhours	FY2002 \$\$	Labor Type	Start Date Month/Yr	End Date Month/Yr	Comments
Preliminary Design (Title I)						
(50% of design schedule)	60		EAEM	Oct-02	Mar-03	PPPL Engineer
	0		EADM	Oct-02	Mar-03	PPPL Designer
	3621		ORNL Eng	Oct-02	Mar-03	Composite of ORNL Engineer / Designer
	161		ORNL Phys.	Oct-02	Mar-03	Composite of ORNL Physics / scientific
	0		PPPL Phys.	Oct-02	Mar-03	PPPL Physics/scientific
Final Design (Title II)						
(50% of design schedule)	60		EAEM	Mar-03	Aug-03	PPPL Engineer
	0		EADM	Mar-03	Aug-03	PPPL Designer
	3573		ORNL Eng	Mar-03	Aug-03	Composite of ORNL Engineer / Designer
	159		ORNL Phys.	Mar-03	Aug-03	Composite of ORNL Physicist
	0		PPPL Phys.	Mar-03	Aug-03	PPPL Physics/scientific
Lab R&D labor						
	2589		EAEM	Oct-02	Mar-03	PPPL Engineer
	1726		EADM	Oct-02	Mar-03	PPPL Designer
	835		ORNL Eng	Oct-02	Mar-03	Composite of ORNL Engineer / Designer
	5683		EASM	Oct-02	Mar-03	PPPL monthly support
	8592		EMTB	Oct-02	Mar-03	PPPL Technician
Lab Fab/Assembly/Installation (Title III)						
	5447		EAEM	Jul-04	Oct-06	PPPL Engineer
	1000		EADM	Jul-04	Oct-06	PPPL Designer
	2524		ORNL Eng	Jul-04	Oct-06	Composite of ORNL Engineer / Designer
	10051		EASM	Jul-04	Oct-06	PPPL monthly support
	23192		EMTB	Jul-04	Oct-06	PPPL Technician

WBS 171 Modular Coil Windings and Coil Assembly

Engineering, Title I, II and III

Description:

This effort covers all Title I, II, and III engineering for the modular coil winding and individual coil assembly. The coil forms are designed as part of WBS 172. The coils will be wound in-house by PPPL. All installation oversight will be performed as part of WBS 7.

	Labor category														
	multiplier	unit	no.	hours	total	EAEM		EADM		ORNL Eng		ORNL Physics		PPPL Physics	
					fraction	fract.	hrs	fract.	hrs	fract.	hrs	fract.	hrs	fract.	hrs
Title I, II design															
Pro-E models (avg)	8	hrs/model	150	1200	1.00	0.00	0	0.00	0	1.00	1200	0.00	0	0.00	0
assy dwgs	40	hrs/dwg	21	840	1.00	0.00	0	0.00	0	1.00	840	0.00	0	0.00	0
Detail drawings	20	hrs/dwg	168	3360	1.00	0.00	0	0.00	0	1.00	3360	0.00	0	0.00	0
installation dwg	40	hrs/dwg	3	120	1.00	0.00	0	0.00	0	1.00	120	0.00	0	0.00	0
cooling schematic	20	hrs/dwg	3	60	1.00	0.00	0	0.00	0	1.00	60	0.00	0	0.00	0
electrical schematic	20	hrs/dwg	3	60	1.00	0.00	0	0.00	0	1.00	60	0.00	0	0.00	0
I&C schematic	20	hrs/dwg	3	60	1.00	0.00	0	0.00	0	1.00	60	0.00	0	0.00	0
stress analysis	40	hrs/calc	9	360	1.00	0.00	0	0.00	0	1.00	360	0.00	0	0.00	0
thermal analysis	40	hrs/calc	6	240	1.00	0.00	0	0.00	0	1.00	240	0.00	0	0.00	0
special analysis (electromagnetics)	160	hrs/calc	2	320	1.00	0.00	0	0.00	0	0.00	0	1.00	320	0.00	0
procurement/fab specifications	160	hrs/spec	1	160	1.00	0.75	120	0.00	0	0.25	40	0.00	0	0.00	0
preliminary and final design reviews	80	hrs/rev	2	160	1.00	0.00	0	0.00	0	1.00	160	0.00	0	0.00	0
meetings/reporting/presentations	10%	% of tot	6940	694	1.00	0.00	0	0.00	0	1.00	694	0.00	0	0.00	0
<i>subtotal</i>				7634			120		0		7194		320		0

Contingency Specification Rationale Worksheet

WBS Level 3 Identifier: 171		Title: Modular coil assembly		
Originator: B. Nelson		Date: April 18, 2002		
	Technical	Schedule	Cost	Total
Risk Factor (Table 2-1):	8	8	4	
Weighting Factor (Table 2-2):	3%	1%	2%	
Percent	24%	8%	8%	40%

Recommended Contingency Allowance (%):

40%

Rationale for Selection of Contingency Allowance:

Technical

The modular coil assembly consists of the conductor, insulation, winding, vacuum impregnation, and testing of the modular coils as well as the associated R&D required for these operations. The technical issues include the winding processes, coil winding accuracy, and the impregnation process.

Schedule

The modular coil assembly is on the critical path.

Cost

This estimate is based on engineering judgment, prior experience, and input from manufacturing studies performed during the conceptual design activities