

NCSX Project Review

December 7, 2004

Cost and Schedule Report

Ron Strykowski

NCSX actions in support of cost, schedule & technical baselines

- **Budget**
 - Re-estimated most WBS elements
 - TEC = \$86.3M
 - Contingency re-evaluated = \$13.1M (25%)
 - BA funding levels assessed
- **Schedule**
 - Project schedules re-estimated
 - VVSA & MCWF folded into plans.
 - Total float 5 months
- **Staffing needs defined**
- **October 30th performance SPI= 1.01 CPI = 1.00**

Budget Status



Changes approved since CD-3

WBS	ECP-14 (CD-3 Sept 04)	Change	ECP 18 (Dec 04)	<u>Changes</u>
	BAC		BAC	
12 Vacuum Vessel	\$8,531	\$206	\$8,737	VVSA contract oversight & Field weld joint full size sample
13 Conventional Coils	\$4,304	\$137	\$4,441	Simplification of trim coil -\$200k; Re-estimated TF design & fab +337k
14 Modular Coils	\$25,055	\$1,145	\$26,200	Winding facility+515; MCWF prototype +230; MC design & oversight +400
15 Structures	\$1,448	-\$67	\$1,381	Re-estimate & re-allocate design labor
16 Coil Services	\$1,037	-\$1	\$1,036	Rates, escalation etc.
17 Cryostat & Base Sprt Struct	\$1,301	\$20	\$1,321	Rates, escalation etc.
18 Field Period Assembly	\$5,066	\$52	\$5,118	Re-estimate & re-allocate design labor
19 Stellarator Core Mngmt/Integr	<u>\$2,652</u>	<u>-\$230</u>	<u>\$2,421</u>	Re-estimated oversight
1 Stellarator Core Systems	\$49,393	\$1,263	\$50,656	
2 Heating, Fueling & Vac Sys	\$837	-\$57	\$780	Simplified fueling system
3 Diagnostics	\$1,161	-\$44	\$1,117	Rates, escalation etc.
4 Electrical Power Systems	\$3,707	-\$492	\$3,216	D-site pwr supplies transferred to a non-MIE account (-439)
5 Central I&C Systems	\$2,189	-\$272	\$1,917	Re-estimated design & programming labor
6 Facility Systems	\$1,143	-\$318	\$825	NB and bakeout water cooling system scope reduction.
7 Test Cell Prep/ Machine Assy	\$4,274	-\$67	\$4,208	Reduced FY06 oversight & planning; Reduced platform estimate.
8 Project Oversight/Support	<u>\$10,186</u>	<u>\$393</u>	<u>\$10,579</u>	Project design integration and Indirect allocations
subtotal	\$72,891	\$405	\$73,296	
Contingency	13,455	-\$402	13,053	
TEC =	\$86,346		\$86,349	
<i>Contingency</i>				
<i>VVSA and MCWF</i>		<i>10%</i>	<i>1,269</i>	
<i>Balance of project</i>		<i>30%</i>	<i>11,784</i>	
		<i>25%</i>	<i>13,053</i>	

Contingency Status



Contingency supported by updated risk assessment

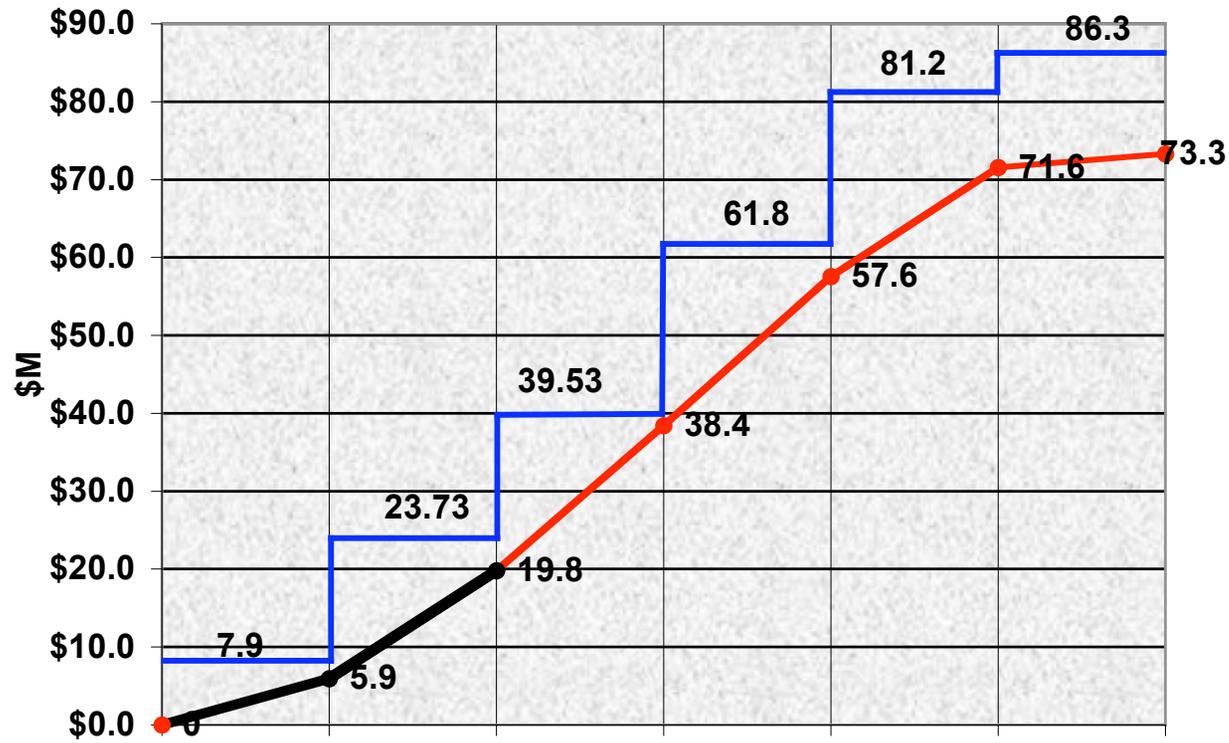
	ECP18 Budget (\$K)	BCWR (\$K)	Contingency Assessment			
			CD-2 %	Updated Risk %	TOTAL (\$K)	
12 Vacuum Vessel Systems	\$4,005	\$1,128	35%	35%	\$398	
VVSA	\$4,732	\$4,593	10%	10%	\$459	
13 Conventional Coils	\$4,441	\$3,985	25%	32%	\$1,281	• <i>WBS 13 -increased fabrication risk from 24% to 36% due to tolerance requirements & quality</i>
14 Mod Coils	\$17,992	\$8,002	39%	44%	\$3,558	
MCWF	\$8,208	\$8,097	10%	10%	\$810	
15 Coil Support Structures	\$1,381	\$1,327	32%	32%	\$423	
16 Coil Services	\$1,035	\$1,035	25%	25%	\$257	• <i>WBS 14 -analysis & documentation plus shift differential if more 2nd shift req'd</i>
17 Cryostat & Base Support Structure	\$1,322	\$1,158	29%	29%	\$340	
18 Field Period Assembly	\$5,118	\$4,504	37%	46%	\$2,094	• <i>WBS 18 -fixture and tooling 40% to 100% based on pre-PDR unknowns. Plus, Metrology hardware, training, & software</i>
19 Stellarator Core Mgmt & Integration	\$2,421	\$1,423	10%	10%	\$136	
1 Stellarator Core Systems	\$50,655	\$35,251	24%	28%	\$9,757	• <i>WBS 82 - for taking magnetic measurements to determine optimal coil positions</i>
2 Plasma Heating Fueling & Vac Sys	\$780	\$411	14%	14%	\$57	
3 Diagnostics	\$1,117	\$878	31%	31%	\$271	
4 Electrical Power Systems	\$3,216	\$2,880	19%	19%	\$557	
5 Central I&C Systems	\$1,917	\$1,891	10%	10%	\$193	
6 Facility Systems	\$825	\$784	20%	20%	\$157	
7 Test Cell Preparation & Machine Assy	\$4,208	\$3,795	21%	21%	\$788	
8 Project Oversight & Support	\$10,579	\$6,574	18%	19%	\$1,273	
	\$73,296	\$52,464		25%	\$13,053	
VVSA & MCWF	\$12,940	\$12,690		10%	\$1,269	
Balance of Project	\$60,356	\$39,774		30%	\$11,784	

Funding



BA Funding supports schedule with adequate contingency

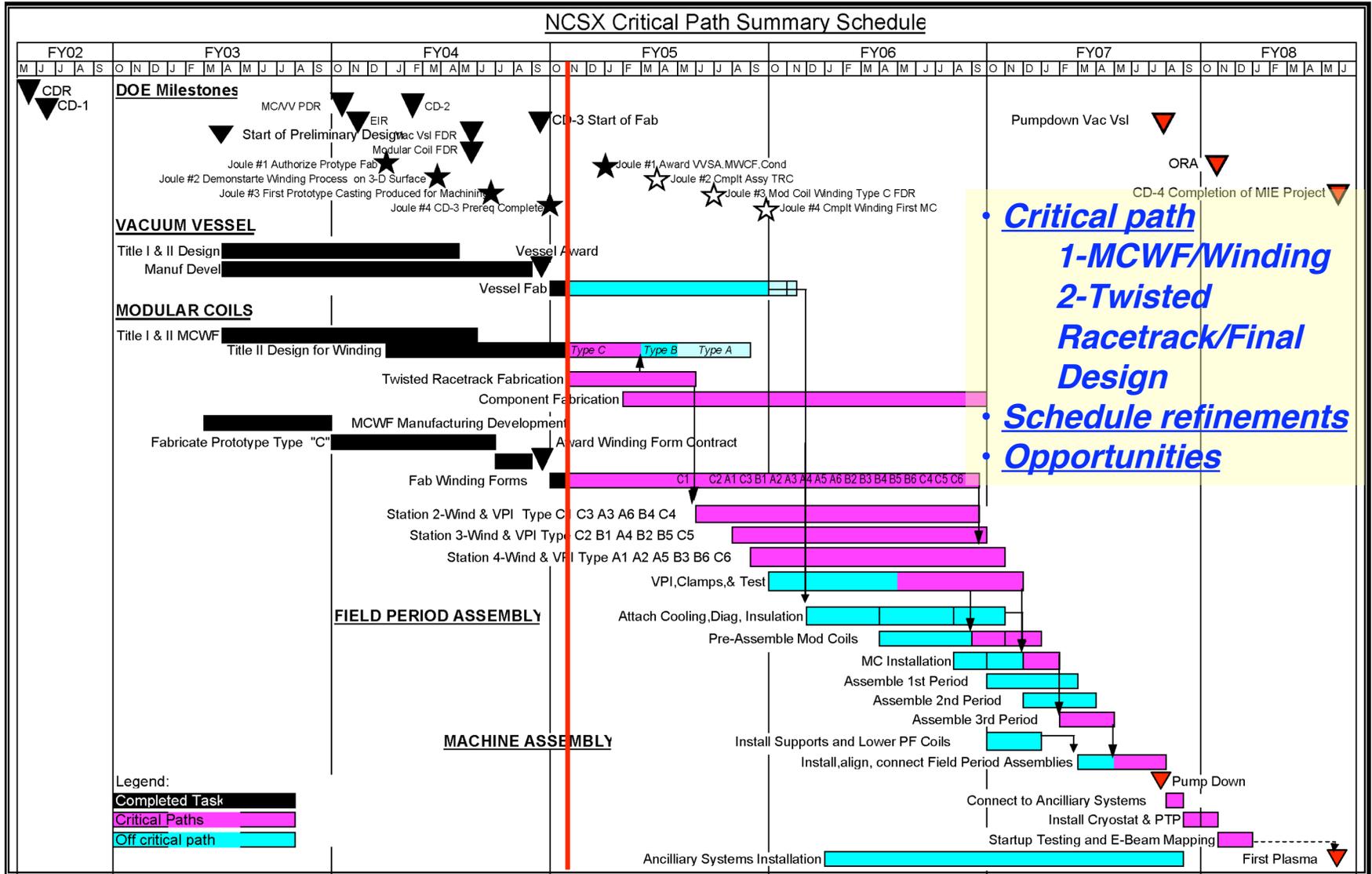
BA/BO Profile



	FY03	FY04	FY05	FY06	FY07	FY08	Total
BA Funding	7.9	15.83	15.8	22.1	19.4	5.1	86.125
BO Plan wo/ cont	5.9	13.9	18.6	19.2	14.0	1.7	73.3
Contingency			1.2	2.9	5.4	3.5	13.1
BO Plan with cont	5.9	13.9	19.8	22.1	19.4	5.2	86.3

- ***Phase funding of VVSA and MCWF ; 38 payment milestones planned***

Project Schedule



Project Milestones



NCSX Milestone Status

• **Level I, II and Joule Milestones on track**

• **Mitigation plans included for all identified risks**

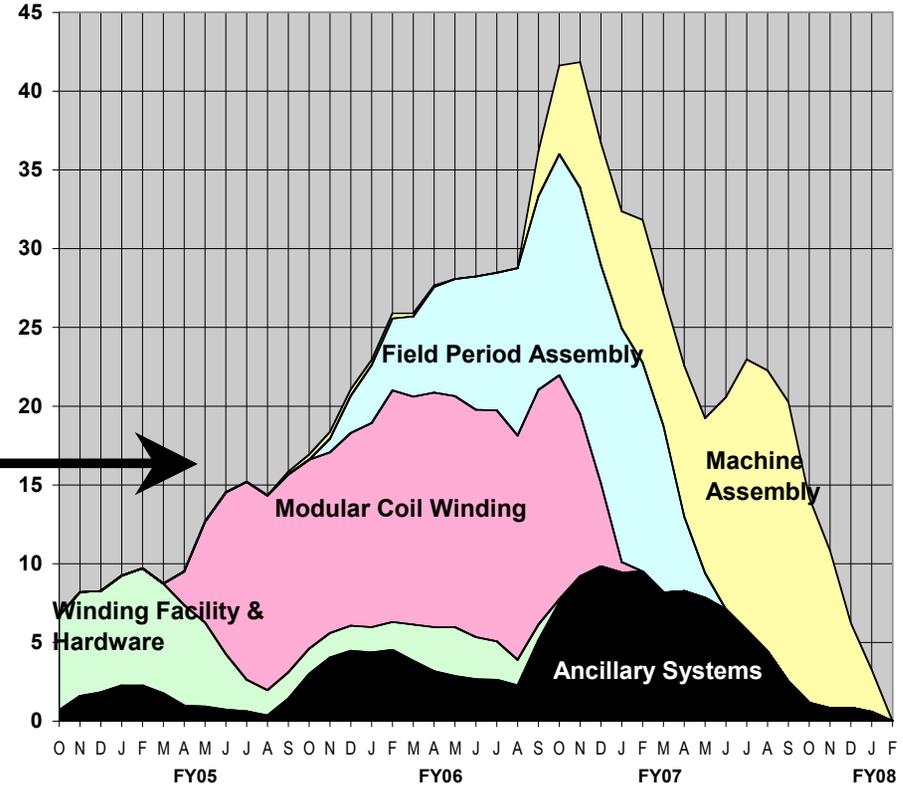
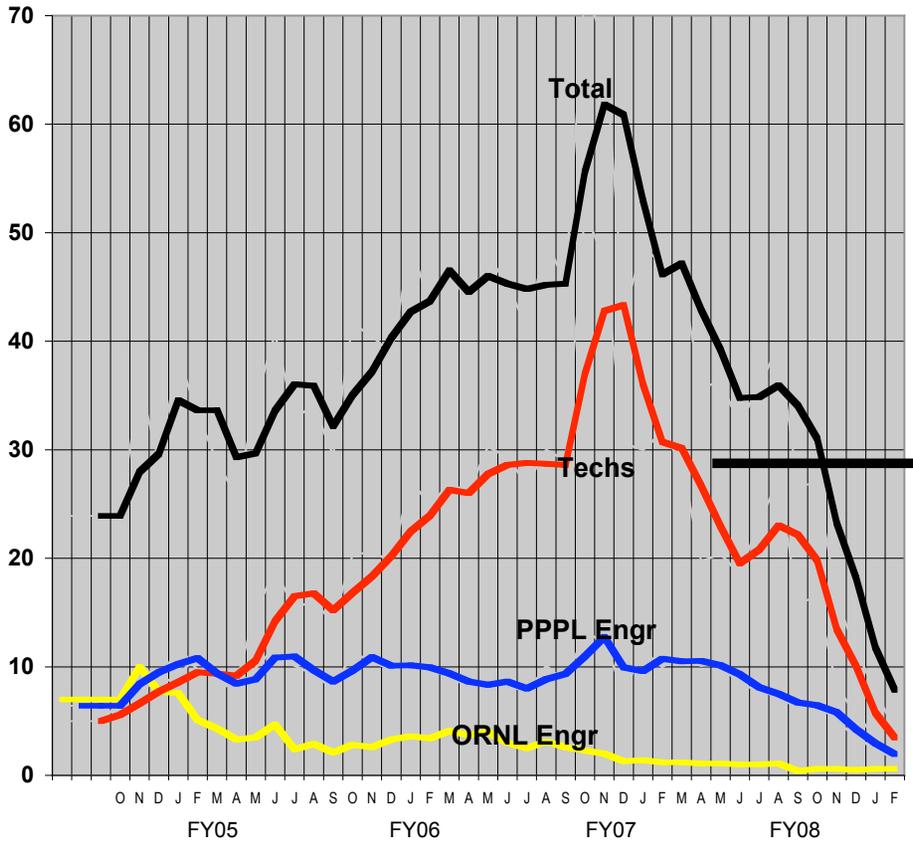
		CD-3	ECP18	
		<u>Baseline</u>	<u>Forecast</u>	<u>Actual</u>
<u>Level I</u>	CD-1	May-2003		May-2003
	CD-2	Feb-2004		Feb-2004
	CD-3	Sep-2004		Oct-2004
	CD-4	May-2008	Jan-2008	
<u>Level II</u>	Vacuum Vessel & Modular Coil Prel Dsn Rvw	Oct-2003		Oct-2003
	Performance Baseline Review	Nov-2003		Nov-2003
	Conduct VVSA FDR	Jul-2004		May-2004
	Mod Coil Winding Form Final Design Review	Jul-2004		May-2004
	Award MC Conductor Contract	Dec-2004		Oct-2004
	Award VV Production Vendor	Oct-2004		Sep-2004
	Award MCWF Mfg Contract	Oct-2004		Sep-2004
	First MCWF Delivered	Jul-2005	May-2005	
	TF Coils Awarded	Jul-2005	Jun-2005	
	Complete First Mod Coil Fabrication	Feb-2006	Jan-2006	
	Vacuum Vessel Delivered	Feb-2006	Nov-2005	
	PF Coils Awarded	Jan-2007	Sep-2006	
	Last MCWF Delivered	Dec-2006	Sep-2006	
	Begin Assembly of First Field Period	Mar-2007	May-2006	
	All TF Coils Delivered	May-2007	Jan-2007	
	Last Field Period Assembled	Sep-2007	Apr-2007	
	Begin Vac Vsl Pumpdown	Nov-2007	Jul-2007	
	Begin Cryostat Installation	Jan-2008	Aug-2007	
	Operational Readiness	Mar-2008	Oct-2007	
Begin Start-up Testing	Mar-2008	Nov-2007		
<u>Joule</u>	FY04 JOULE #1-Authorize Prototype Fab	Dec-2003		Oct-2003
	FY04 JOULE #2-Begin winding on 3D surface	Mar-2004		Jan-2004
	FY04 JOULE #3-Prototype Casting Ready for Machining	Jun-2004		May-2004
	FY04 JOULE #4 - CD-3 Readiness	Sep-2004		Sep-2004
	FY05 JOULE #1- VVSA, MCWF and MC Copper Conductor	Dec-2004		Oct-2004
	FY05 JOULE #2- Cmplt Assy of twisted racetrack	Mar-2005	Mar-2005	
	FY05 JOULE #3- Mod Coil Winding Type C FDR	Jun-2005	Feb-2005	
	FY05 JOULE #4- Complete Winding First MC	Sep-2005	Aug-2005	

Staffing-Project



Total Project Staffing

Technician Staffing



- Technician manpower ramp-up reflects increasing fabrication and assembly operations
- Current staffing needs being met
- Need to load level out-year non critical path work

Conclusion



- **Project remains on schedule**
 - VVSA & MCWF contracts support the project schedule.
 - Total float remains at 5 months – (unchanged since last review)
 - Level I & II & Joule milestones on track
 - Project plans updated for FY05
- **Project within budget**
 - Project performance within cost.
 - Nominal contingency draw. Work scope optimized for CD-4 requirements.
 - Project contingency balance re-evaluated and is adequate to manage risks
- **Project is being adequately staffed**