

**PrincetonUniversity Plasma Physics Laboratory  
PPPL COST PERFORMANCE REPORT WORKBREAKDOWN STRUCTURE**

**NCSX**

**2006**

\*\*\*\* Cumulative to date FY03, FY04 , FY05 & FY06\*\*\*\*

**MARCH 2006**

	CURRENT MONTH							CUMULATIVE TO DATE (from 4/1/03) (k)							ECP 43	Variance Explanation			
	BCWS	BCWP	ACWP	SV	SPI	CV	CPI	Budgeted Cost			VARIANCES					Budget Thru FY06	OVER BUDGET	Schedule	Cost
								BCWS	BCWP	ACWP	Sch Var	SPI	Cst Var	CPI					
<b>1 - Stellarator Core Systems</b>	<b>1,655</b>	<b>1,358</b>	<b>1,548</b>	<b>-297</b>	<b>0.82</b>	<b>-190</b>	<b>0.88</b>	<b>38,137</b>	<b>36,378</b>	<b>37,548</b>	<b>-1,759</b>	<b>.95</b>	<b>-1,170</b>	<b>.97</b>	<b>44,349</b>				
<b>12 Vacuum Vessel Systems</b>	<b>580</b>	<b>130</b>	<b>174</b>	<b>-450</b>	<b>0.22</b>	<b>-44</b>	<b>0.74</b>	<b>8,983</b>	<b>7,828</b>	<b>8,040</b>	<b>-1,155</b>	<b>.87</b>	<b>-212</b>	<b>.97</b>	<b>9,159</b>				
CLOSED 1201 - Vacuum Vessel Prelim Dsn		0	0	0	0	0		424	424	424	0	1.00	0	1.00	424				
CLOSED 1202 - Vacuum Vessel R&D		0	0	0	0	0		1,770	1,770	1,771	0	1.00	0	1.00	1,770				
1203 - Vacuum Vessel Final Dsn	-1	-5	10	-5		-15	-0.55	1,098	1,028	1,119	-70	.94	-92	.92	1,098	(21)	Final assy requirements & assy drawings. BUDGET EXCEEDED		
1204-VV Sys Procurements (non VVSA)	3	1	7	-2		-6		68	33	95	-35	.49	-62	.34	193		Vsl supports and htg/clng flanges		
CLOSED 1206 - VV Field Weld Joint R&D	-1			1				16	16	16	1	1.03	0	1.00	16				
1250 - Vacuum Vessel Fabrication	578	133	158	-445	0.23	-24	0.85	5,608	4,557	4,614 (1)	-1,051	.81	-57	.99	5,658		VVSA Behind original plan. First sector delivery forecast May 06 (9 months off critical path), 2nd sector forecast June06 (12 months off critical path) and last sector forecast August 06 (12 months off critical path and 1 month ahead of Level II milestone. HOWEVER, DELAYED DELIVERY IMPACTING PLANNED START OF STAGE 1 FP ASSY		
Title III and vendor oversight cost to analyze NCR impact.																			
<b>13 Conventional Coils</b>	<b>134</b>	<b>65</b>	<b>90</b>	<b>-69</b>	<b>0.49</b>	<b>-25</b>	<b>0.73</b>	<b>2,274</b>	<b>1,930</b>	<b>2,098</b>	<b>-344</b>	<b>.85</b>	<b>-168</b>	<b>.92</b>	<b>2,765</b>				
1301 - TF Design								946	945	964	-1	1.00	-19	.98	946	(18)			
1302 - PF Design		9	2	9		7		11	9	2	-2	.85	7	3.96	11				
1303 - Central Solenoid Support Design		44	48	44		-4			72	81	72		-10	.88					
1350 - TF Coil Fabr Prep	12			-12			#####	743	501	545	-243	.67	-45	.92	743		All fabrication hardware placed on hold. Work to be outsourced and schedule to be revised.		
1351 - TF Coil Fabr Supplies	97	3	27	-93	0.03	-24	0.12	489	360	424	-129	.74	-64	.85	811		Copper lead fabrication and insulation procurement behind. Other procurements are now included as part of the TF contract to be placed . Schedule to be revised to reflect outsourcing of work scope.		
1361 - TF Fabrication	26	9	12	-17		-4	0.69	85	43	81	-42	.51	-37	.54	254		Work to be outsourced and schedule to be revised. TF procurement process engr oversight		
<b>14 Modular Coils</b>	<b>823</b>	<b>1,039</b>	<b>1,082</b>	<b>216</b>	<b>1.26</b>	<b>-43</b>	<b>0.96</b>	<b>22,888</b>	<b>22,731</b>	<b>23,387</b>	<b>-157</b>	<b>.99</b>	<b>-657</b>	<b>.97</b>	<b>27,311</b>				
CLOSED 1401 - Mod Coil Prel.Dsn		0	0	0	0	0		304	304	304	0	1.00	0	1.00	304				
CLOSED 1402 - Mod.Coil Analyses		0	0	0	0	0		239	239	239	0	1.00	0	1.00	239				

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	Budgeted Cost			VARIANCES				Budget Thru FY06	OVER BUDGET	Schedule	Cost						
	BCWS	BCWP	ACWP	Sch Var	SPI	Cst Var	CPI										
1403 - Modular Coil Final Design (includes job 1421 coil interface hw dsn)	9	3	23	-6	0.36	-19	0.15	3,278	3,198	3,432	-80	.98		3,339		Final assy dwgs and analysis forecast for May. Fabrication of coils progressing with preliminary drawings.	Cost variance of type C, A&B combined =-23k cpi=.99. Apparent mischarging by individuals. No significant cost impact.
1416 - Mod Coil Type A&B Final Design	83	118	57	35	1.42	61	2.06	689	420	209	-269	.61	-233 212	.93 2.02	756	Type B lead assy, chill plate and cladding now forecast for May completion. Should support procurement of hardware for mid August delivery of B 1.	
CLOSED 1404-MCWF R&D & 1st Prod Casting			0	0		0		2,544	2,544	2,544	0	1.00	0	1.00	2,544		
CLOSED 1405-Mod Coil Winding R&D Prep			0	0		0		168	168	168	0	1.00	0	1.00	168		
CLOSED 1406 - Mod. Coil Winding Facility			0	0		0		2,247	2,247	2,264	0	1.00	-17	.99	2,247		Overtime reconciliation
CLOSED 1407 -Mod Coil Winding Facility			0	0		0		2,546	2,546	2,571	0	1.00	-25	.99	2,546		Overtime reconciliation
1408-Mod Coil Winding Supplies	83	132	99	48	1.58	32	1.32	1,051	1,135	1,156	85	1.08	-21	.98	1,638		
CLOSED 1409 - Mod. Coil Test Stand			0	-54		0	54	916	916	862	0	1.00	54	1.06	916		
CLOSED 1410 MC Twisted Racetrack Fabr			0	0		0		1,050	1,050	1,050	0	1.00	0	1.00	1,050		
1411-MCWF Fabrication S005242	483	580	609	97	1.20	-29	0.95	5,998	6,173	6,165 (2)	175	1.03	8	1.00	8,098		
CLOSED 1412 - Complete Winding Facilities			0	0		0		537	537	541	0	1.00	-4	.99	537		Overtime reconciliation
CLOSED 1413 - Mod Coil Fracture Analysis			0	0		0		28	28	28	0	1.01	0	1.01	28		
1414 - Coil Testing	9	7	36	-2		-28		232	216	346	-16	.93	-130	.62	276	(70)	Extent of effort required to fabricate the coil test facility has exceeded expectations. Only one modular coil to be tested to minimize cost variance.
CLOSED 1415 - Dimensional Control Testing			0	0		0		24	24	24	0	.99	0	.99	24		
CLOSED 1419 - Winding Facility Modification				1		-1		48	48	55		1.00	-7	.87	48		
1451 - Mod Coil Winding	155	200	282	44	1.28	-83	0.71	990	938	1,328	-52	.95	-390	.71	2,553	C-2 and C-3 experienced metrology related delays. C 2 forecast completion 5/11 (1 week late) and C-2 forecast to finish 6/23 on schedule.	Unplanned work accounts for 22% of cost. Learning curve beginning to be seen on C2 and C3 (SEE ATTACHED DETAILED ANALYSIS)
1459 - MC Unplanned rework				29		-29				102			-102				
<b>15 Structures</b>	<b>22</b>			<b>-22</b>				<b>119</b>	<b>80</b>	<b>82</b>	<b>-39</b>	<b>.67</b>	<b>-2</b>	<b>.97</b>	<b>208</b>		
1501 - Structures Design	22			-22				119	80	82	-39	.67	-2	.97	208	PDR delayed to late May . 10 months off critical path.	
<b>16 16 - Coil Services</b>			<b>3</b>			<b>-3</b>				<b>3</b>			<b>-3</b>				
<b>17 Cryostat and Base</b>			<b>6</b>			<b>-6</b>		<b>377</b>	<b>368</b>	<b>415</b>	<b>-9</b>	<b>.98</b>	<b>-47</b>	<b>.89</b>	<b>377</b>		
1701-Cryostat&Base Sprt Strct Dsn			6			-6		377	368	415	-9	.98	-47	.89	377		Unplanned updates to the cryostat design.
<b>18 Field Period Assembly</b>	<b>49</b>	<b>77</b>	<b>127</b>	<b>28</b>	<b>1.58</b>	<b>-50</b>	<b>0.60</b>	<b>1,753</b>	<b>1,697</b>	<b>1,776</b>	<b>-56</b>	<b>.97</b>	<b>-79</b>	<b>.96</b>	<b>2,526</b>		
CLOSED 1801-Field Period Assy			4			-4		61	61	65		1.00	-4	.94	61		
1802 - FP Assy Oversight&Support	36	36	34	0	1.00	2	1.07	519	519	505	0	1.00	14	1.03	718		
1803- FP Assy Tooling/Constructability	49	31	45	-18	0.64	-14	0.69	722	658	664	-64	.91	-6	.99	933	Structural analysis of half period assy and MC turning fixture behind. 5 months off critical path.	

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								BCWS	BCWP	ACWP	Sch Var	SPI	Cst Var	CPI					
1804-FP Assy Measurement			35			-35		442	450	532	8	1.02	-83	.84	452			Unbudgeted purchase of 3rd Romer arm as well as repair to an existing arm.	
1810 - Field Period Assembly	-36	10	10	46	-0.27	0		10	10	10	0	1.00	0	.96	362				
<b>19 1901 - Stellarator Core Mngt&amp;Integr</b>	<b>47</b>	<b>47</b>	<b>66</b>	<b>0</b>	<b>1.00</b>	<b>-19</b>	<b>0.71</b>	<b>1,742</b>	<b>1,744</b>	<b>1,746</b>	<b>2</b>	<b>1.00</b>	<b>-3</b>	<b>1.00</b>	<b>2,003</b>				
<b>2 - Plasma Heating, Fueling &amp; Vac Sys</b>			<b>1</b>			<b>-1</b>		<b>349</b>	<b>349</b>	<b>348</b>		<b>1.00</b>	<b>1</b>	<b>1.00</b>	<b>349</b>				
CLOSED 2001-VPS Gas& Cond Sys Oversight								64	64	63		1.00	1	1.02	64				
CLOSED 2501 - Neutral Beam Refurbishment			1			-1		285	285	285		1.00	0	1.00	285				
<b>3 - Diagnostics</b>	<b>11</b>	<b>13</b>	<b>37</b>	<b>3</b>	<b>1.23</b>	<b>-24</b>	<b>0.36</b>	<b>601</b>	<b>609</b>	<b>679</b>	<b>7</b>	<b>1.01</b>	<b>-70</b>	<b>.90</b>	<b>770</b>				
31 3101 Magnetic Diagnostics	4	7	33	3	1.61	-26	0.21	292	299	376	7	1.02	-76	.80	425			Engineering time 7 times greater than estimated	
39 3901 - Diagnostics sys Integration	7	6	4	0	0.99	2	1.52	309	309	303	0	1.00	7	1.02	345				
<b>4 - Electrical Power Systems</b>	<b>21</b>	<b>1</b>	<b>10</b>	<b>-20</b>	<b>0.06</b>	<b>-9</b>	<b>0.12</b>	<b>703</b>	<b>572</b>	<b>713</b>	<b>-131</b>	<b>.81</b>	<b>-141</b>	<b>.80</b>	<b>742</b>				
41 4101 - AC Power		1		1		1		107	108	107	1	1.01	0	1.00	107				
43 4301 - DC Systems	16	0	7	-15	0.03	-6	0.07	308	272	385	-36	.88	-113	.71	314			Unbudgeted redesign of C-site power systems	
44 4401 - Control & Protection	-1		3	1		-3		55	59	82	4	1.08	-23	.72	55				
45 4501 - Power Sys Dsn & Integr	6			-6				233	133	138	-100	.57	-5	.96	265			C-site cabling design behind. Planning FDR on	
46 4601 - FCPC Bldg Mods								1	1	1	0	1.30		1.00	1				
<b>5 - Central I&amp;C Systems</b>								<b>33</b>	<b>33</b>	<b>33</b>		<b>1.00</b>	<b>0</b>	<b>1.00</b>	<b>33</b>				
58 5801 -Central I&C Integr								33	33	33		1.00	0	1.00	33				
<b>6 - Facility Systems</b>								<b>24</b>	<b>24</b>	<b>24</b>		<b>1.00</b>	<b>0</b>	<b>.99</b>	<b>24</b>				
6163 - Facility Systems Support FY04								15	15	15		1.00	0	1.01	15				
62 - Cryogenic Systems																			
63 - Utility Systems																			
CLOSED 6501 - Facility Systems Integration								9	9	9		1.00	0	.96	9				
<b>7 - Test Cell Prep &amp; Machine Assy</b>			<b>0</b>			<b>0</b>		<b>897</b>	<b>905</b>	<b>942</b>	<b>8</b>	<b>1.01</b>	<b>-37</b>	<b>.96</b>	<b>915</b>				
CLOSED 7101 - Shield Wall Modif								32	32	33		1.00	-1	.98	32				
7201 - Control Room Walls&Floors								71	72	76	1	1.01	-4	.95	71				
7301 - Platform Design &								794	801	833	7	1.01	-32	.96	812				
7401 - TC Prep & Mach Assy Planning			0			0													
<b>8 - Project Oversight &amp; Support</b>	<b>213</b>	<b>213</b>	<b>263</b>	<b>0</b>	<b>1.00</b>	<b>-50</b>	<b>0.81</b>	<b>7,479</b>	<b>7,480</b>	<b>7,746</b>	<b>1</b>	<b>1.00</b>	<b>-266</b>	<b>.97</b>	<b>8,665</b>				
<b>81 Project Management and Control</b>	<b>105</b>	<b>105</b>	<b>114</b>	<b>0</b>	<b>1.00</b>	<b>-10</b>	<b>0.91</b>	<b>3,544</b>	<b>3,543</b>	<b>3,627</b>	<b>0</b>	<b>1.00</b>	<b>-83</b>	<b>.98</b>	<b>4,126</b>				
8101 - Project Management & Control	58	58	59	0	1.00	-1	0.98	2,263	2,263	2,293	0	1.00	-29	.99	2,588				
8102 - NCSX MIE Management ORNL	16	16	19	0	1.00	-3	0.84	340	340	346	0	1.00	-6	.98	429				
8998 - Allocations	30	30	36	0	1.00	-6	0.84	941	940	988	0	1.00	-48	.95	1,109				
<b>82 Project Engineering</b>	<b>109</b>	<b>109</b>	<b>149</b>	<b>0</b>	<b>1.00</b>	<b>-40</b>	<b>0.73</b>	<b>3,466</b>	<b>3,466</b>	<b>3,649</b>	<b>1</b>	<b>1.00</b>	<b>-183</b>	<b>.95</b>	<b>4,069</b>				
8202 - Engr Mgmt & Sys Eng Support	58	58	58	0	1.00	0	1.00	1,921	1,921	1,965	0	1.00	-44	.98	2,241				
8203 - Design Integration	13	13	18	0	1.00	-5	0.70	755	755	751	0	1.00	4	1.01	826				
8204 - Systems Analysis	21	21	56	0	1.00	-36	0.37	609	609	751	0	1.00	-142	.81	724			Unplanned integrated structural analysis of MC inboard connection and machine support locations.	
8205 - Dimensional Control Coord.	17	17	16	0	1.00	1	1.06	182	182	182	0	1.00	0	1.00	278				
<b>84 Project Physics</b>								<b>470</b>	<b>470</b>	<b>470</b>		<b>1.00</b>	<b>0</b>	<b>1.00</b>	<b>470</b>				
CLOSED 8401 - Project Physics								324	324	324		1.00	0	1.00	324				
CLOSED 8402 - Project Physics MIE ORNL								146	146	146		1.00	0	1.00	146				
<b>Subtotal</b>	<b>1,900</b>	<b>1,586</b>	<b>1,860</b>	<b>-314</b>	<b>0.83</b>	<b>-274</b>	<b>0.85</b>	<b>48,223</b>	<b>46,350</b>	<b>48,032</b>	<b>-1,874</b>	<b>.96</b>	<b>-1,682</b>	<b>.96</b>	<b>55,848</b>				
<b>Contingency/Management Reserve</b>				<b>-567</b>		<b>-241</b>									<b>1,295</b>				

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**Variance Explanation**

	BCWS	BCWP	ACWP	SV	SPI	CV	CPI	Budgeted Cost				VARIANCES				Budget	OVER	Schedule	Cost
								BCWS	BCWP	ACWP	Sch Var	SPI	Cst Var	CPI	Thru FY06	BUDGET			
																	BCWS		
<b>Incremental Funding</b>																1,291			
<b>1% hold back on FY06 BA</b>																(172)			
<b>DCMA QA Inspection services</b>																75			
<b>TOTAL PROJECT</b>																58,337			
(1) Reflects accrual increase of \$216 k based on MTM's earned value report																			
(2) Reflects accrual increase of \$ 246.9 k based on EIO's earned value report																			
Thru FY2004								20,640	19,652	19,744	-988	0.95	-92	1.00					
Thru Oct								20,637	20,832	20,917	195	1.01	-85	1.00					
Thru NOVEMBER								21,812	21,906	22,158	94	1.00	-252	0.99					
Thru DECEMBER								23,813	23,042	23,434	-771	0.97	-392	0.98					
Thru JANUARY (ecp-21)								25,866	24,310	24,639	-1556	0.94	-329	0.99					
Thru Feb (ecp-24)								26,637	25,856	26,285	-781	0.97	-429	0.98					
Thru Mar (ecp-29)								28,440	27,282	28,004	-1158	0.96	-722	0.97					
Thru Apr (ecp-30)								29,588	28,736	29,416	-852	0.97	-680	0.98					
Thru May (ecp-30)								31,301	29,903	30,889	-1398	0.96	-986	0.97					
Thru June (ecp-30)								32,740	31,362	32,719	-1378	0.96	-1357	0.96					
Thru July (ecp-36)								35,206	33,682	34,276	-1524	0.96	-594	0.98					
Thru Aug (ecp-36)								36,914	35,480	36,416	-1434	0.96	-936	0.97					
Thru Sep (ecp-36)								38,562	36,721	38,314	-1841	0.95	-1593	0.96	BCWR		contingency remaining		
<i>PARS for OCT</i>								1,710	3,061	1,485	-90	0.94	-17	0.98	for October only				
Thru Oct (ecp-39)								40,272	39,782	39,799	-490	0.99	-17	1.00	43,018		9600	22.3%	
<i>PARS for NOV</i>								1,673	1,060	1,394	-613	0.63	-334	0.76				22.3%	
Thru NOV (ecp-39)								41,945	40,842	41,193	-1103	0.97	-351	0.99	41,958		9600	22.9%	
<i>PARS for DEC</i>								1,274	896	1,331	-378	0.70	-435	0.67				22.0%	
Thru DEC (ecp-39)								43,219	41,738	42,524	-1481	0.97	-786	0.98	41,062		9600	23.4%	
<i>PARS for JAN</i>								1,633	1,594	1,647	-39	0.98	-53	0.97				21.5%	
Thru JAN (ecp-39)								44,852	43,332	44,171	-1520	0.97	-839	0.98	39,468		9600	24.3%	
<i>PARS for FEB</i>								1,471	1,431	2,001	-40	0.97	-570	0.72				22.2%	
Thru FEB (ecp-39)								46,323	44,763	46,172	-1560	0.97	-1409	0.97	38,037		9600	25.2%	
<i>PARS for MAR</i>								1,900	1,587	1,860	-314	0.83	-273	0.85				21.5%	
Thru MAR (ecp-043)								48,223	46,350	48,032	-1874	0.96	-1682	0.96	37,330		8720	23.4%	
								FY06 subtotal=	9662	8036	9718	-1626	0.83	-1682	0.83				18.9%