

ECP-04-011 Details

Work Breakdown Structure (WBS)	ECP 9 Baseline (K\$)	Delta (K\$)	ECP 11 Baseline (K\$)
WBS 11 - Plasma Facing Components			
111 - Limiters	\$0.1K	\$0.0K	\$0.1K
<i>Subtotal WBS 11</i>	<i>\$0.1K</i>	<i>\$0.0K</i>	<i>\$0.1K</i>
WBS 12 - Vacuum Vessel			
121 - Vacuum Vessel Assembly	\$6,648.1K	\$0.0K	\$6,648.1K
122 - Vacuum Vessel Thermal Insulation	\$174.9K	\$0.0K	\$174.9K
123 - Vacuum Vessel Heating and Cooling Distrib	\$375.8K	\$0.0K	\$375.8K
124 - Vacuum Vessel Supports	\$62.6K	\$0.0K	\$62.6K
125 - Vacuum Vessel Local I&C	\$26.7K	\$0.0K	\$26.7K
<i>Subtotal WBS 12</i>	<i>\$7,288.1K</i>	<i>\$0.0K</i>	<i>\$7,288.1K</i>
WBS 13 - Conventional Coils			
130 - Conventional Coils	\$462.1K	\$0.0K	\$462.1K
131 - TF Coils	\$1,546.3K	\$0.0K	\$1,546.3K
132 - PF Coils	\$1,747.4K	\$0.0K	\$1,747.4K
133 - External Trim Coils	\$372.0K	\$0.0K	\$372.0K
134 - Conventional Coil Local	\$85.5K	\$0.0K	\$85.5K
<i>Subtotal WBS 13</i>	<i>\$4,213.3K</i>	<i>\$0.0K</i>	<i>\$4,213.3K</i>
WBS 14 - Modular Coils			
141 - Modular Coil Winding Form	\$9,368.2K	\$709.4K	\$10,077.6K
142 - Modular Coil Windings and Assembly	\$8,769.3K	\$570.1K	\$9,339.4K
143 - Modular Coil Local I&C	\$121.2K	\$0.0K	\$121.2K
144 - Modular Coil Winding Facility & Fixtures	\$2,501.7K	\$205.6K	\$2,707.3K
<i>Subtotal WBS 14</i>	<i>\$20,760.4K</i>	<i>\$1,485.1K</i>	<i>\$22,245.5K</i>
WBS 15 - Coil Support Structure			
151 - Structures and Base	\$1,441.1K	\$0.0K	\$1,441.1K
<i>Subtotal WBS 15</i>	<i>\$1,441.1K</i>	<i>\$0.0K</i>	<i>\$1,441.1K</i>
WBS 16 - Coil Services			
161 - LN2 Distribution	\$337.5K	\$0.0K	\$337.5K
162 - Electrical Leads	\$621.3K	\$0.0K	\$621.3K
163 - Coil Protection System	\$78.1K	\$0.0K	\$78.1K
<i>Subtotal WBS 16</i>	<i>\$1,036.9K</i>	<i>\$0.0K</i>	<i>\$1,036.9K</i>
WBS 17 - Cryostat and Base Support Structure			
171 -Cryostat	\$858.5K	\$0.0K	\$858.5K
172 - Base Support Structure	\$438.2K	\$0.0K	\$438.2K
<i>Subtotal WBS 17</i>	<i>\$1,296.7K</i>	<i>\$0.0K</i>	<i>\$1,296.7K</i>
WBS 18 - Field Period Assembly			
181 - Field Period Assembly Planning/Oversight	\$1,379.3K	\$0.0K	\$1,379.3K
182 - TFTR Test Cell Area preparations	\$92.9K	\$0.0K	\$92.9K
183 - Receive Inspect and Test Coils	\$77.4K	\$0.0K	\$77.4K
184 - Receive Inspect and Test VV	\$326.3K	\$0.0K	\$326.3K
185 - Assemble Field Periods	\$1,433.8K	\$0.0K	\$1,433.8K
186 - Tooling Design and Fabrication	\$1,175.9K	\$0.0K	\$1,175.9K
187 - Measurement Systems	\$591.6K	\$0.0K	\$591.6K
<i>Subtotal WBS 18</i>	<i>\$5,077.2K</i>	<i>\$0.0K</i>	<i>\$5,077.2K</i>
WBS 19 - Stellarator Core Management and Integration			
191 - Stellarator Core Management & Oversight	\$1,083.0K	\$0.0K	\$1,083.0K
192 - Stellarator Core Integration & Analysis	\$1,579.0K	\$0.0K	\$1,579.0K
<i>Subtotal WBS 19</i>	<i>\$2,662.0K</i>	<i>\$0.0K</i>	<i>\$2,662.0K</i>
WBS 21 - Fueling Systems			
210 - Fueling Systems	\$140.0K	\$0.0K	\$140.0K
<i>Subtotal WBS 21</i>	<i>\$140.0K</i>	<i>\$0.0K</i>	<i>\$140.0K</i>
WBS 22 - Torus Vacuum Pumping Systems			
220 - Torus Vacuum Pumping Systems	\$384.2K	\$0.0K	\$384.2K
<i>Subtotal WBS 22</i>	<i>\$384.2K</i>	<i>\$0.0K</i>	<i>\$384.2K</i>
WBS 25 - Neutral Beam Injection systems			
250 - Neutral Beam Injection System	\$1,169.1K	\$0.0K	\$1,169.1K
<i>Subtotal WBS 25</i>	<i>\$1,169.1K</i>	<i>\$0.0K</i>	<i>\$1,169.1K</i>
WBS 31 - Magnetic Diagnostic Systems			
310 - Magnetic Diagnostics	\$454.1K	\$0.0K	\$454.1K
<i>Subtotal WBS 31</i>	<i>\$454.1K</i>	<i>\$0.0K</i>	<i>\$454.1K</i>
WBS 36 - Edge and Divertor Diagnostics Systems			
360 - Edge and Divertor Diagnostics	\$99.3K	\$0.0K	\$99.3K
<i>Subtotal WBS 36</i>	<i>\$99.3K</i>	<i>\$0.0K</i>	<i>\$99.3K</i>

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WBS 38 - Electron Beam Mapping Systems			
380 - Electron Beam (EB) Mapping	\$292.1K	\$0.0K	\$292.1K
<i>Subtotal WBS 38</i>	<i>\$292.1K</i>	<i>\$0.0K</i>	<i>\$292.1K</i>
WBS 39 - Diagnostic Integration			
390 - Diagnostics Integration	\$847.2K	\$0.0K	\$847.2K
<i>Subtotal WBS 39</i>	<i>\$847.2K</i>	<i>\$0.0K</i>	<i>\$847.2K</i>
WBS 41 - AC Power Systems			
411 - Auxliary AC Power Systems	\$569.3K	\$0.0K	\$569.3K
412 - Experimental AC Power Systems	\$42.8K	\$0.0K	\$42.8K
<i>Subtotal WBS 41</i>	<i>\$612.1K</i>	<i>\$0.0K</i>	<i>\$612.1K</i>
WBS 42 - AC/DC Convertors			
422 - D-Site AC/DC Converters	\$23.5K	\$0.0K	\$23.5K
<i>Subtotal WBS 42</i>	<i>\$23.5K</i>	<i>\$0.0K</i>	<i>\$23.5K</i>
WBS 43 - DC Systemrs			
431 - C-Site DC Systems	\$326.7K	\$0.0K	\$326.7K
432 - D-to-C Site DC Systems	\$1,328.7K	\$0.0K	\$1,328.7K
433 - D-Site DC Systems	\$487.9K	\$0.0K	\$487.9K
<i>Subtotal WBS 43</i>	<i>\$2,143.3K</i>	<i>\$0.0K</i>	<i>\$2,143.3K</i>
WBS 44 - Control and Protection Systems			
441 - Electrical Interlocks	\$578.6K	\$0.0K	\$578.6K
442 - Kirk Key Interlocks	\$98.0K	\$0.0K	\$98.0K
443 - Real Time Control Systems	\$38.4K	\$0.0K	\$38.4K
444 - Instrument Systems	\$433.2K	\$0.0K	\$433.2K
445 - Coil protection Systems	\$283.4K	\$0.0K	\$283.4K
446 - Ground Fault Monitoring	\$167.0K	\$0.0K	\$167.0K
<i>Subtotal WBS 44</i>	<i>\$1,598.6K</i>	<i>\$0.0K</i>	<i>\$1,598.6K</i>
WBS 45 - Power Systems Design and Integration			
451 - System Design and Interfaces	\$591.4K	\$0.0K	\$591.4K
452 - Electrical Systems Support	\$91.4K	\$0.0K	\$91.4K
453 - System Testing (PTP's)	\$192.0K	\$0.0K	\$192.0K
<i>Subtotal WBS 45</i>	<i>\$874.8K</i>	<i>\$0.0K</i>	<i>\$874.8K</i>
WBS 46 - FCPC Building Modifications			
460 - FCPC Building Modifications	\$78.6K	\$0.0K	\$78.6K
<i>Subtotal WBS 46</i>	<i>\$78.6K</i>	<i>\$0.0K</i>	<i>\$78.6K</i>
WBS 51 - TCP/IP Infrastructure Systems			
510 - TCP/IP Infrastructure Systems	\$429.0K	\$0.0K	\$429.0K
<i>Subtotal WBS 51</i>	<i>\$429.0K</i>	<i>\$0.0K</i>	<i>\$429.0K</i>
WBS 52 - Central Instrumentation & Control			
520 - Central Instrumentation & Control	\$578.0K	\$0.0K	\$578.0K
<i>Subtotal WBS 52</i>	<i>\$578.0K</i>	<i>\$0.0K</i>	<i>\$578.0K</i>
WBS 53 - Data Acquisition & Facility Computing			
530 - Data Acquisition & Facility Computing	\$407.8K	\$0.0K	\$407.8K
<i>Subtotal WBS 53</i>	<i>\$407.8K</i>	<i>\$0.0K</i>	<i>\$407.8K</i>
WBS 54 - Facility Timing & Synchronization			
540 - Facility Timing & Synchronization	\$352.0K	\$0.0K	\$352.0K
<i>Subtotal WBS 54</i>	<i>\$352.0K</i>	<i>\$0.0K</i>	<i>\$352.0K</i>
WBS 55 - Real Time Plasma & Power Supply Control Systems			
550 - Real Time Plasma & Power Supply Control Systems	\$293.3K	\$0.0K	\$293.3K
<i>Subtotal WBS 55</i>	<i>\$293.3K</i>	<i>\$0.0K</i>	<i>\$293.3K</i>
WBS 56 - Central Safety Interlock Systems			
560 - Central Safety Interlock Systems	\$399.9K	\$0.0K	\$399.9K
<i>Subtotal WBS 56</i>	<i>\$399.9K</i>	<i>\$0.0K</i>	<i>\$399.9K</i>
WBS 57 - Control Room Facility			
570 - Control Room Facility	\$119.7K	\$0.0K	\$119.7K
<i>Subtotal WBS 57</i>	<i>\$119.7K</i>	<i>\$0.0K</i>	<i>\$119.7K</i>
WBS 61 - Water Cooling Systems			
611 - C-Site Cooling System	\$153.3K	\$0.0K	\$153.3K
612 - NB Water Cooling Systems	\$239.9K	\$0.0K	\$239.9K
613 - Vacuum Pumping System	\$100.0K	\$0.0K	\$100.0K
614 - Bakeout Water System	\$38.5K	\$0.0K	\$38.5K

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<i>Subtotal WBS 61</i>	\$531.7K	\$0.0K	\$531.7K
WBS 62 - Cryogenic Systems			
621 - LN2-LHe Supply System	\$252.9K	\$0.0K	\$252.9K
622 - LN2 Coil Cooling Supply	\$274.4K	\$0.0K	\$274.4K
623 - GN2 Cryostat Cooling System	\$220.2K	\$0.0K	\$220.2K
<i>Subtotal WBS 62</i>	\$747.5K	\$0.0K	\$747.5K
WBS 63 - Utility Systems			
630 - Utility Systems	\$120.9K	\$0.0K	\$120.9K
<i>Subtotal WBS 63</i>	\$120.9K	\$0.0K	\$120.9K
WBS 64 - PFC/VV Heating & Cooling Systems			
640 - PFC/VV Heating & Cooling	\$628.9K	\$0.0K	\$628.9K
<i>Subtotal WBS 64</i>	\$628.9K	\$0.0K	\$628.9K
WBS 65 - Facility Systems Integration			
650 - Facility Systems Integration	\$41.6K	\$0.0K	\$41.6K
<i>Subtotal WBS 65</i>	\$41.6K	\$0.0K	\$41.6K
WBS 71 - Shield Wall Modifications			
710 - Shield Wall Seismic Modifications	\$32.2K	\$0.0K	\$32.2K
<i>Subtotal WBS 71</i>	\$32.2K	\$0.0K	\$32.2K
WBS 72 - Control Room Refurbishment			
720 - Control Room Refurbishment	\$47.6K	\$0.0K	\$47.6K
<i>Subtotal WBS 72</i>	\$47.6K	\$0.0K	\$47.6K
WBS 73 - Platform Design & Fabrication			
730 - Platform Design & Fabrication	\$70.0K	\$0.0K	\$70.0K
731 - Platform Design & Fabrication	\$89.6K	\$0.0K	\$89.6K
<i>Subtotal WBS 73</i>	\$159.6K	\$0.0K	\$159.6K
WBS 74 - Machine Assembly Planning & Oversight			
740 - Machine Assembly Planning and Oversight	\$147.8K	\$0.0K	\$147.8K
741 - Planning Prior to Machine Assembly	\$281.6K	\$0.0K	\$281.6K
742 - Construction Management	\$1,184.8K	\$0.0K	\$1,184.8K
<i>Subtotal WBS 74</i>	\$1,614.2K	\$0.0K	\$1,614.2K
WBS 75 - Test Cell & Baasement Assembly Operations			
750 - Test Cell & Basement Assembly Operations	\$2,160.0K	\$0.0K	\$2,160.0K
<i>Subtotal WBS 75</i>	\$2,160.0K	\$0.0K	\$2,160.0K
WBS 76 - Tooling Design & Fabrication			
76 - 76 - Tooling Design & Fabrication	\$223.7K	\$0.0K	\$223.7K
<i>Subtotal WBS 76</i>	\$223.7K	\$0.0K	\$223.7K
WBS 81 - Project Management & Control			
810 - Project Management & Control	\$3,354.3K	\$0.0K	\$3,354.3K
<i>Subtotal WBS 81</i>	\$3,354.3K	\$0.0K	\$3,354.3K
WBS 82 - Project Engineering			
820 - Project Engineering	\$4,723.1K	\$0.0K	\$4,723.1K
<i>Subtotal WBS 82</i>	\$4,723.1K	\$0.0K	\$4,723.1K
WBS 84 - Project Physics			
840 - Project Physics	\$507.7K	\$0.0K	\$507.7K
<i>Subtotal WBS 84</i>	\$507.7K	\$0.0K	\$507.7K
WBS 85 - Integrated Systems Testing			
850 - Integrated Systems Testing	\$1,225.0K	\$0.0K	\$1,225.0K
<i>Subtotal WBS 85</i>	\$1,225.0K	\$0.0K	\$1,225.0K
AA - PPPL Allocations			
AA - PPPL Allocations	\$983.3K	\$0.0K	\$983.3K
<i>Subtotal PPPL Allocations</i>	\$983.3K	\$0.0K	\$983.3K
NCSX Performance Baseline	\$72,173.7K	\$1,485K	\$73,658.8K
CC - Contingency	\$14,180.0K	(\$1,485K)	\$12,695.0K
NCSX TEC	\$86.3M		\$86.3M