

NCSX Work Breakdown Structure (WBS)

WBS	Description	Responsibility	Comment
1	Stellarator Core Systems	Heitzenroeder Goranson	
11	In-Vessel Components		
111	Limiters		<i>Not in MIE Project</i>
112	Internal Liner		<i>Not in MIE Project</i>
113	Internal Trim Coils		<i>Not in MIE Project</i>
114	Local I&C		<i>Not in MIE Project</i>
12	Vacuum Vessel Systems	Goranson	
121	Assembly		<i>Collapsed into WBS Level 2</i>
1211	Vacuum Vessel Design and In-House R&D		<i>Collapsed into WBS Level 2</i>
1212	Vacuum Vessel Procurement and Fabrication		<i>Collapsed into WBS Level 2</i>
122	Thermal Insulation		<i>Collapsed into WBS Level 2</i>
123	Heating and Cooling Distribution System		<i>Collapsed into WBS Level 2</i>
124	Supports		<i>Collapsed into WBS Level 2</i>
125	Local I&C		<i>Collapsed into WBS Level 2</i>
13	Conventional Coils		
131	TF Coils	Kalish	
132	PF Coils	Chrzanowski	
1321	Central Solenoid		<i>Collapsed into WBS 132</i>
1322	PF Ring Coils		<i>Collapsed into WBS 132</i>
133	External Trim Coils	Kalish	
134	Local I&C	Cole	
135	Central Solenoid Support Structure		<i>Collapsed in WBS 15</i>
14	Modular Coils	Cole	
141	Winding Forms		
142	Windings and Assembly		
1421	Modular Coil Windings and Assembly Design and R&D		<i>Collapsed into WBS 142</i>
1422	Modular Coil Winding Components		<i>Collapsed into WBS 142</i>
1423	Modular Coil Winding Labor		<i>Collapsed into WBS 142</i>
1424	Modular Coil Testing		<i>Collapsed into WBS 142</i>
143	Local I&C		
144	Modular Coil Fabrication Facility		
145	Modular Coil Interfaces		<i>Added by Rev 4 to this listing</i>
15	Coil Support Structures	Dahlgren	<i>Combination of old WBS 151 & 153</i>
16	Coil Services	Goranson	
161	LN2 Distribution System		<i>Collapsed into WBS 16</i>
162	Electrical Leads		<i>Collapsed into WBS 16</i>
163	Coil Protection System Interfaces		<i>Collapsed into WBS 16</i>
17	Cryostat and Base Support Structure		
171	Cryostat	Raftopoulos	
172	Base Support Structure	Dahlgren	
18	Field Period Assembly		
181	Planning and Oversight	Cole	
182	Field Period Assembly Area Preparation		<i>Completed</i>
183	Receipt, Inspection, and Testing of Conventional Coils		<i>Closed - moved to WBS 13</i>
184	Receipt, Inspection, and Testing of Vacuum Vessel		<i>Completed</i>
185	Field Period Assembly Operations	Viola	
186	Tooling Design and Fabrication	Brown	
187	Measurement Systems		<i>Completed</i>
19	Stellarator Core Management and Integration	Cole	
191	Stellarator Core Management and Integration		<i>Collapsed into WBS 19</i>
192	Stellarator Core Systems Global Analyses		<i>Collapsed into WBS 19</i>
2	Auxiliary Systems	Dudek Blanchard	
21	Fueling Systems		
211	Gas Fueling Systems		
212	Pellet Injection Fueling Systems		<i>Not in MIE Project</i>
22	Torus Vacuum Pumping System	Blanchard	
23	Wall Conditioning Systems	Blanchard	<i>Not in MIE Project</i>
231	Glow Discharge Cleaning System		
232	Boranization System		
233	Lithiumization System		
24	ICH System	NA	<i>Not in MIE Project</i>
25	Neutral Beam Injection System	Stevenson	<i>Completed</i>
26	ECH System	NA	<i>Not in MIE Project</i>
3	Diagnostics	Stratton	
31	Magnetic Diagnostics		
32	Fast Particle Diagnostics		<i>Not in MIE Project</i>
33	Impurity Diagnostics		<i>Not in MIE Project</i>
34	MHD Diagnostics		<i>Not in MIE Project</i>
35	Profile Diagnostics		<i>Not in MIE Project</i>
36	Edge and Divertor Diagnostics		
37	Turbulence Diagnostics		<i>Not in MIE Project</i>
38	Electron Beam (EB) Mapping		
39	Diagnostics Integration		

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4	Electrical Power Systems	Ramakrishnan	
41	AC Power		
411	Auxiliary AC Power Systems		
412	Experimental AC Power Systems		
42	AC/DC Converters		<i>Not in MIE Project</i>
421	C-Site AC/DC Converters		
422	D-Site AC/DC Converters		
43	DC Systems		
431	C-Site DC Systems		
432	D-to-C Site DC Systems		<i>No Longer in Project - was in CDR</i>
433	D Site DC Systems		<i>No Longer in Project - was in CDR</i>
44	Control and Protection Systems		
441	Electrical Interlock Systems		
442	Kirk Key Interlocks		
443	Real Time Control Systems		
444	Instrumentation Systems		
445	Coil Protection Systems		
446	Ground Fault Monitoring Systems		<i>No Longer in Project - was in CDR</i>
45	Power System Design and Integration		
451	System Design and Interfaces		
452	Electrical Systems Support		
453	System Testing (PTPs)		
46	FCPC Building Modifications		<i>No Longer in Project - was in CDR</i>
5	Central Controls and Computing	Sichta	
51	<i>Network and Fiber Optic Infrastructure</i>		
52	<i>Central Instrumentation and Control</i>		
53	<i>Data Acquisition & Facility Computing</i>		
54	<i>Facility Timing and Synchronization</i>		
55	<i>Real Time Plasma and Power Supply Control</i>		
56	<i>Central Safety Interlock Systems</i>		
57	<i>Control Room Facility</i>		
58	<i>Management and Integration</i>		
6	Facility Systems		
61	Water Cooling Systems	Dudek	
611	C-Site Cooling Systems		<i>Not in MIE Project</i>
612	Neutral Beam Water Cooling System		<i>Not in MIE Project</i>
613	Vacuum Pumping Water Cooling System		
614	Bakeout Water System		<i>Not in MIE Project</i>
615	Diagnostic Water Cooling System		<i>Not in MIE Project</i>
62	Cryogenic Systems	Raftopoulos	
621	LN2-LHe Supply Systems		
622	LN2 Coil Cooling Supply System		
623	GN2 Cryostat Cooling System		
63	Utility Systems	Dudek	
64	PFC/VV Heating and Cooling	Kalish	
65	Facility Systems Integration	NA	<i>No Longer in Project - was in CDR</i>
7	Test Cell Preparation and Machine Assembly	Perry	
71	<i>Shield Wall Reconfiguration</i>		<i>Completed as Infrastructure project</i>
72	<i>Control Room Refurbishment</i>		<i>Now Infrastructure Project</i>
73	<i>Platform Design and Fabrication</i>		
74	<i>Machine Assembly Planning and Oversight</i>		
75	<i>Test Cell and Basement Assembly Operations</i>		
76	<i>Tooling Design and Fabrication</i>		
77	Measurement Systems		<i>No longer used</i>
8	Project Oversight and Support		
81	Project Management and Control	Neilson/Harris	
82	Project Engineering		
821	Engineering Management	Heitzenroeder	
822	Systems Engineering	Heitzenroeder	
823	Design Integration	Brown	
824	Systems Analysis and Technical Assurance	Brooks	
825	Dimensional Control Coordination	Ellis	
826	Plant Design	Perry	
83	Environmental and Safety/QA Management	Levine & Malsbury	<i>Overhead Cost</i>
84	Project Physics	Zarnstorf	<i>Completed</i>
85	Integrated Systems Testing	Gentile	
89	PPPL Allocations	Strykowski	
CC	Contingency		

Record of Revisions:

Rev. 0	9/8/2003	Deleted NCSX from the title of WBS 73 Changed WBS 71 to Shield Wall Reconfiguration Added WBS 144 - Modular Coil Winding Facility Moved Integrated Systems Testing from WBS 76 to WBS 85
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	WBS	Description	Responsibility	Comment
Rev 1	1/20/2004	Combined WBS 153 with WBS 151 Combined WBS 152 with WBS 132 Removed old WBS 65 Facility Integration - folded into individual elements. Split out WBS 62 into its component elements		
Rev 2	8/25/2004	Eliminated WBS1213 Expanded WBS 142 Changed Title of WBS 64		
Rev 3	4/10/2006	Revised WBS 4 - what is in or not in MIE Project		
Rev 4	8/3/2007	Updated to reflect 2007 ETC scope. Collapsed WBS Level 4 in to higher WBS Levels (i.e., 1211 & 1212 into WBS 12, 1321 & 1322 in to WBS 132, and 1421, 1422, 1423, & 1424 into WBS 142)		
Rev 5	3/10/2008	Updated for Lehman Review - minor changes only		