

NCSX Work Breakdown Structure (WBS)

WBS	Description	Responsibility
1	Stellarator Core Systems	Nelson
11	<i>Plasma Facing Components</i>	
111	First Wall Panels	
112	Support Ribs	
113	PFC Heating and Cooling Distribution System	
114	Divertor Plenum Baffles	
115	Divertor Plenum Pumping System	
116	PFC Local I&C	
12	<i>Vacuum Vessel Systems</i>	
121	Vacuum Vessel Assembly	
122	Vacuum Vessel Thermal Insulation	
123	Vacuum Vessel Heating and Cooling Distribution System	
124	Vacuum Vessel Supports	
125	Vacuum Vessel Local I&C	
13	<i>TF Coils</i>	
131	TF Windings	
132	TF Leads	
133	TF I&C	
14	<i>PF Coils</i>	
141	Central Solenoid Assembly (PF1, PF2, and CS Structure)	
142	PF3 Windings	
143	PF4 Windings	
144	PF5 Windings	
145	PF6 Windings	
146	PF Leads	
147	PF I&C	
15	<i>Cryostat</i>	
151	Cryostat Shell and Structure	
152	Cryostat Thermal Insulation	
153	VV /Cryostat Boots	
154	Cryostat Temperature Control/Heating Systems	
155	Cryostat Local I&C	
16	<i>Support Structure</i>	
161	Machine Base Assembly	
162	Coil Support Structure (includes shelves, crowns, PF6 support ring, and TF or	
163	Support Structure I&C	
17	<i>Modular Coils</i>	
171	Modular Coil Windings and Coil Assembly	
172	Modular Coil Winding Form/Structure	
173	Modular Coil Leads	
174	Modular Coil I&C	
18	<i>Trim Coils</i>	
181	External Trim Coils	
182	Internal Trim Coils	
183	Leads	
184	Local I&C	
19	<i>LN2 Distribution System (includes manifolds, piping, and cooling I&C)</i>	
191	Manifolds and Piping	
192	Flow Control	
193	Local I&C	
2	Auxiliary Systems	Kugel

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21	<i>Fueling Systems</i>	
211	Gas Fueling Systems	
212	Pellet Injection Fueling Systems	
22	<i>Torus Vacuum Pumping System</i>	
23	<i>Wall Conditioning Systems</i>	
231	Glow Discharge Cleaning System	
232	Boranization System	
233	Lithiumization System	
24	<i>ICH System</i>	
25	<i>Neutral Beam Injection System</i>	
251	NB Systems Recommissioning	
252	NB Installation and Testing	
3	Diagnostics	Johnson
31	<i>Magnetic Diagnostics</i>	
32	<i>Fast Particle Diagnostics</i>	
33	<i>Impurity Diagnostics</i>	
34	<i>MHD Diagnostics</i>	
35	<i>Profile Diagnostics</i>	
36	<i>Edge and Divertor Diagnostics</i>	
37	<i>Turbulence Diagnostics</i>	
38	<i>Electron Beam (EB) Mapping</i>	
39	<i>Diagnostics Integration</i>	
4	Electrical Power Systems	Ramakrishnan
41	<i>AC Power</i>	
411	Auxiliary AC Power Systems	
412	Experimental AC Power Systems	
42	<i>AC/DC Converters</i>	
421	C-Site AC/DC Converters	
422	D-Site AC/DC Converters	
43	<i>DC Systems</i>	
431	C-Site DC Systems	
432	D-to-C Site DC Systems	
433	D Site DC Systems	
44	<i>Control and Protection Systems</i>	
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	
45	<i>Power System Design and Integration</i>	
451	System Design and Interfaces	
452	Electrical Systems Support	
453	System Testing (PTPs)	
5	Central I&C Systems	Oliaro
51	<i>TCP/IP Infrastructure Systems</i>	
52	<i>Central Instrumentation and Control Systems</i>	

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WBS	Description	Responsibility
53	<i>Data Acquisition & Facility Computing Systems</i>	
54	<i>Facility Timing and Synchronization Systems</i>	
55	<i>Real Time Plasma and Power Supply Control Systems</i>	
56	<i>Central Safety Interlock Systems</i>	
57	<i>Control Room Facility</i>	
6	Site and Facilities	Dudek
61	<i>Facility Modifications and Test Cell Preparations</i>	
611	Facility Modifications Outside the Test Cell	
612	<i>Not used</i>	
613	Seismic Modifications to the Test Cell Walls	
62	<i>Water Cooling Systems</i>	
621	<i>Not used</i>	
622	Neutral Beam Water Cooling System	
623	Vacuum Pumping Water Cooling System	
624	Bakeout Water System	
625	Diagnostic Water Cooling System	
63	<i>Cryogenic Systems</i>	
631	LN2-LHe Supply System	
632	LN2 Coil Cooling Supply System	
633	GN2 Cryostat Cooling System	
64	<i>Utility Systems</i>	
65	<i>Helium Bakeout System</i>	
66	<i>Facility Systems Integration</i>	
7	Machine Assembly	Chrzanowski
71	<i>Assembly Planning and Oversight Operations</i>	
711	Planning Activities	
712	Construction Management	
713	Tooling Design & Fabrication	
714	Construction Management	
72	<i>On-Site Pre-Assembly Operations</i>	
721	Preparation of Pre-Assembly Area	
722	Receive, Inspect, and Test Coils	
723	<i>Not used</i>	
724	Receive, Inspect, and Test Vacuum Vessel	
725	Assemble Field Periods	
73	<i>Test Cell and Basement Assembly Operations</i>	
74	<i>Measurement Systems</i>	
75	<i>NCSX Platform Design and Fabrication</i>	
76	<i>Tooling Design and Fabrication</i>	
8	Project Management and Integration	
81	<i>Project Management and Control</i>	Simmons
82	<i>Project Engineering</i>	Reiersen
83	<i>Environmental and Safety/QA Management</i>	Levine
84	<i>Project Physics</i>	Zarnstorff
9	Preparations for Operations	
91	<i>Pre-Operational Planning and Operations Staff Buildup</i>	Neilson
92	<i>Pre-Operational and Integrated Systems Testing</i>	Chrzanowski

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93	<i>Operational Spares</i>	Neilson