

NCSX PROJECT TRAINING MATRICES

Based on the NCSX Training Plan (NCSX-PLAN-01)

Approved: _____

Table -1 NCSX Position Descriptions

Positions	Description
Project Management Team	Typically involved in overall project and engineering management (WBS8, with the exception of QA/QC personnel and construction safety engineers – see below).
Design Engineers/Scientists	Typically involved in the design of systems and associated hardware for the Stellarator Core Systems (WBS 1), Auxiliary Systems (WBS 2), Diagnostic Systems (WBS 3), Power Systems (WBS 4), Central I&C Systems (WBS 5), Facilities Systems (WBS 6), and Machine Assembly Systems (WBS 7). These engineers and scientists may be from ORNL or PPPL.
Manufacturing Facility Engineers (MF Eng) and Technicians (MF Tech)	Typically involved in the work involving coil assembly and field period assembly in the NCSX Manufacturing Facility
Construction Engineer (Const Eng) and Construction Technicians	Typically involved in Test Cell Preparation and Machine Assembly covered by WBS 7
Quality Assurance Engineers (QA Eng) and Quality Control Inspectors (QC Insp)	All QA and QC work is performed under the scope of WBS 83. QA Engineers perform quality functions for the project, s.a., oversight of NCSX Procurements or development of NCSX systems and QC Inspectors perform quality oversight of NCSX field work. The general training requirements for this position are defined in Q-005, available at: http://www-local/qa/QAIntPol_Proc/Pol&ProcIndex.shtml .
NCSX Construction Safety Engineer (Constr. Safety Eng)	NCSX Construction Safety Engineer (Constr. Safety Eng) – Performs construction safety oversight of NCSX field work under WBS 83. The general training requirements for this position are available at: http://www-local.pppl.gov/esh/index.shtml The only additional training requirement is the four-day course on OSHA 510: Occupational Safety and Health Standards for the Construction Industry.

Table -2 NCSX Management Plans and Processes Training Requirements

NCSX Project Training	Project Mgmt	Design Eng	Manuf. Facility Engineer	Manuf. Facility Technician	Const. Eng	Const. Tech	QA Eng	QC Inspector	Const Safety Eng
Overview of Web-Based Project Engineering System	X	X	X		X		X		X
NCSX Systems Engineering Management Plan (SEMP)	X	X					X		
NCSX Quality Assurance Plan	X	X	X		X		X		X
NCSX Glossary (PROC-001)	X	X	X		X		X		X
NCSX Configuration Management <ul style="list-style-type: none"> • Configuration Management Plan (CMP) • Configuration Control (PROC-002) 	X	X	X		X		X	X	X
NCSX Data and Records Management <ul style="list-style-type: none"> • Data Management Plan (DMP) • Document and Records Management (DOC) 	X	X	X		X		X	X	X
NCSX Interface Control Management <ul style="list-style-type: none"> • Interface Control Management Plan (ICMP) • Interface Control (PROC-003) 	X	X	X		X		X	X	
NCSX Risk Management Plan (RMP)	X	X					X		
NCSX Reliability, Availability, and Maintainability (RAM) Plan	X	X							
NCSX Test and Evaluation Plan (TEP)	X ¹	X ¹					X		
NCSX Work Planning Process (PROC-004)	X	X	X		X	X	X		X
NCSX Electronic Signatures (PROC-005)	X	X	X		X		X		
NCSX Supplier Site Postings (PROC-006)	X	X			X		X		
NCSX Structural and Cryogenic Design Criteria (GUID-CRYO)	X	X							
Procurement Technical Representative (PTR)	X	X							
NCSX Engineering Web ²	X	X	X	X	X	X	X	X	X

Notes: ¹Training in TEP delayed until later in Project

²Specific NCSX Engineering Web Training Module Requirement shown in later table.

Table -2 NCSX Management Plans and Processes Training Requirements (continued)

NCSX Project Training	Project Mgmt	Design Eng	Manuf. Facility Engineer	Manuf. Facility Technician	Const. Eng	Const. Tech	QA Eng	QC Insp	Const Safety Eng
NCSX Engineering Conventions, as available	X	X	X	S	X		X	R	
INTRALINK System <ul style="list-style-type: none"> • Pro/INTRALINK Users Guide (GUID-PRO) • Release and Approval of Fabrication Drawings (PROC-007) 	R	X					R	R	

Table 3 Technical Procedures and Processes Training Requirements¹

NCSX Project Training	Project Mgmt	Design Eng	Manuf. Facility Engineer	Manuf. Facility Technician	Const. Eng	Const. Tech	QA Eng	QC Insp	Const Safety Eng
NCSX Specialized Tooling	S	X	S				X	R	
Metrology Systems <ul style="list-style-type: none"> • FARO Arm • Roemer Laser Tracker 	R	S	S	S			R	X	R
NCSX Winding Facility <ul style="list-style-type: none"> • Coil Winding Facility • Autoclave 	R	S	X	X			R	X	X
NCSX Coil Test Facility	R	S	X	X			R	X	X

Note: ¹Specific training for Modular Coil Winding and Field Period Assembly contained in Tables 7 and 8

Table 4 Minimum PPPL Procedures Training Requirements

NCSX Project Training	Project Mgmt	Design Eng	Manuf. Facility Engineer	Manuf. Facility Technician	Const. Eng	Const. Tech	QA Eng	QC Insp	Const Safety Eng
General Employee Training (GET)	X	X	X	X	X	X	X	X	X
Hazard Awareness	X	X	X	X	X	X	X	X	X
NEPA review System (ESH-014)	X	X	X		X		X		
Review and Approval of Specifications, and Statements of Work (ENG-006)	X	X			X		X		
Failure Modes and Effects Analysis (ENG-008)	X	X					X		
Control of Drawings, Software, and Firmware (ENG-010)	X	X					X		
Hoisting and Rigging Program (ENG-021)				X	X	X		X (classroom only)	X
Technical Definitions and Acronymns (ENG-029)	X	X	X				X	X	
PPPL Technical Procedures for Experimental Facilities (ENG-030)	X	X					X	X	
Work Planning (ENG-032)	X	X	X		X		X		X
Design Verification (ENG-033)	X	X			X		X		
Control of Nonconformances (QA-005)	X	X	X		X				X
Corrective Action Requests (QA-012)	X	X							X

Table 5 Minimum Safety Training Requirements

NCSX Project Training	Project Mgmt	Design Eng	Manuf. Facility Engineer	Manuf. Facility Technician	Const. Eng	Const. Tech	QA Eng	QC Insp	Const Safety Eng
Radiation Training*	X	X	X	X	X	X	X	X	X
CPR			X	X		X			X
Confined Space (prior to entering a confined space)					X	X	X	X	X
Fire Extinguisher/Fire Watch			X	X	X	X			X
Compressed Gases/Cryo Liquids			X	X	X	X			X
Aerial Boom Lift			X	X		X			X
Fall Protection				X	X	X			X
Forklift				X		X			X
Scissor Lifts			X	X		X			X
Ladder Safety			X	X	X	X		X	X
Penetration Drilling & Sealing (ENG-024, ENG-027, ENG-028)				X	X	S		X	X
Electrical Utilization				X	X	S		X	X
Construction Safety (OSHA 510)					X				

Table 6 NCSX Engineering Web training Requirements

	Mgmt	Admin	RLM	Job Mgr	PTR	Engr, QA, or ES&H	Field Supvr, Tech or Designer	Physicist	DOE & Other	PQA or Procmnt
Mod 1 – NCSX Web Overview	X	X	X	X	X	X	X	X	N/A	X
Mod 2A – NCSX Engineering Web Part I	X	X	X	X	X	X	X	X	N/A	X
Mod 2B – NCSX Engineering Web Part II	X	X	X	X	X	X	X	X	N/A	X
Mod 3 – Specifications/SOWs/Design Reviews			X	X	X	X	X			X
Mod 4 – Work Authorization Processes			X	X	X	X	X			
Mod 5 – Design Review Processes			X	X	X	X	X			X
Mod 6 – Electronic Drawings & Models			X	X	X	X	X			X
Mod 7 – Configuration Control Processes			X	X	X	X	X			
Mod 8 – Interface Control (TBD)			X	X	X					
Mod 9 – WBS Dictionary & NCSX Mgmt Plans			X	X	X					
Mod 10 – ES&H, QA, and Other			X	X	X	X	X			
Mod 11 – The Manufacturing, Procurement & Supplier Web Sites			X	X	X					X
Mod 12 – Administrative Processes	X	X	X	X	X	X	X	X		
Mod 13 – Procurement Technical Representative Responsibilities			X	X	X					X

