

NCSX PROJECT TRAINING MATRICES

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

Revision 2

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Record of Changes

Revision	Date	Description of Changes
0	2004	Initial NCSX Training Matrix for CD-1
1	2/16/2006	Annual Review and Revision
2	3/9/2006	Reformatted and consolidated training matrices

NCSX Project Training Matrices

Overall Training Philosophy:

The following tables provide guidelines the minimum training in technical procedures and processes training requirements. NCSX, as a matrixed organization, where everyone assigned to the NCSX Project has a home line organization, assumes that those personnel will have been appropriately trained on the PPPL plans and procedures and that training is properly documented by the respective home line organizations. As stated in PPPL Policy P-008 (Staff Training and Development):

“Line management has the overall responsibility to ensure that all their personnel are trained, qualified or certified to perform their specific jobs. Line management is also responsible for ensuring that employees have completed required training in ES&H prior to performing affected work duties. In a case where a staff member from a Department is assigned (“matrixed”) to a Project, the Project’s management is responsible for including that individual in the Project organization and ensuring that any additional Project-specific training requirements are established and fulfilled.”

However, for NCSX-specific processes and procedures, the NCSX Project is responsible for ensuring that the specific NCSX training is accomplished and properly documented.

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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.

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Table -2 NCSX Plans and Processes Training Requirements¹

	Mgmt	Admin	RLM	Job Mgr	PTR	Engr, QA, or ES&H Rep	Field Supvr, Tech or Designer	Physicist	DOE & Other ²	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 <ul style="list-style-type: none"> o Work Planning and Design Processes (Annex 4-1) 			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, including the following annexes: <ul style="list-style-type: none"> o Systems Engineering Processes (Annex 9-1) o Configuration Management Processes (Annex 9-2) 			X	X	X					
Mod 10 – ES&H, QA, and Other <ul style="list-style-type: none"> o Quality Assurance Processes (Annex 10-1) o NEPA and Hazard Analysis Processes (Annex 10-2) 			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

Notes: ¹Each module represents a major section on the NCSX Engineering Web. As needed Annexes to each module will be developed to provide a greater level of detail in the plans, procedures, and processes.

²DOE and other non-NCSX Project personnel may be trained as deemed necessary.

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Table 3 Minimum Technical and Safety Training Requirements Guidelines¹

NCSX Project Training	Project Mgmt	Design Eng	Manuf. Facility Engineer	Manuf. Facility Technician	Const. Eng	Const. Tech	Metrology Personnel	QA Eng/QC Insp. ²	Const Safety Eng
Radiation Training ³	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
Fire Extinguisher/Fire Watch – prior to being assigned			X	X	X	X			X
Compressed Gases/Cryo Liquids			X	X	X	X			X
Aerial Boom Lift – as involved			X	X		X			X ⁴
Forklift – as involved				X		X			X ⁴
Scissor Lifts – as involved			X	X		X			X ⁴
Fall Protection – as involved				X	X	X ⁵			X ⁵
Ladder Safety			X	X	X	X			X
Penetration Drilling & Sealing (ENG-024 & ENG-027) – prior to working on seals				X	X	X			X
Electrical Utilization - As required by ES&HD 5008, Sec. 2, Table 3.3				X	X	X			X
Construction Safety (OSHA 510)					X				X
Metrology Systems (FARO Arm & Roemer Laser Tracker) qualification – if involved		X	X				X		X
NCSX Specialized Tooling		X	X						X

Note: ¹Training may be accomplished in small group meetings in which the applicable plan or procedure is read and discussed, non-PPPL training programs, or PPPL training programs sponsored by Human Resources (e.g., fire extinguishers). In all instances, training records are maintained and forwarded to Human Resources. With the exception of the NCSX Project Metrology Systems and the Specialized Tooling Systems, the respective training shall be accomplished and documented by the PPPL home line organization.

² QA Engineers and QA Inspectors are trained in accordance with requirements specified in the PPPL QA Division Training Manual.

³Radiation Training required for unescorted access to TFTR Test Cell and Basement (access currently linked although TFTR Basement is not a radiation area).

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Table 4 Coil Winding Facility Training Requirements¹

	Winding Form Prep	Coil Winding	Mold Prep	VPI / Autoclave	MC Test Facility	Riggers & Crane Operators	Field Supvrs	QC Represent
Confined Space			X	X	X		X	X
General Employee (GET)	X	X	X	X	X	X	X	X
Radiation Safety	X	X	X	X	X	X	X	X
Hazard Communications	X	X	X	X	X		X	X
Hazard Awareness (JHA)	X	X	X	X	X	X	X	X
MC Mfg Facility Operations Plan	X	X	X	X	X		X	X
Lockout/Tagout	X	X	X	X	X		X	X
Basic Electrical	X	X	X	X	X		X	X
Ladder Safety	X	X	X	X			X	X
Fall Protection ³			X	X		X		
Coil Lead Brazing ²		X						
Welding ²	X							
Compressed Gas & cryogenic Safety			X	X	X			
Rigging &/or crane operator training						X		
Mechanical Arm training- Romer (operators only) ⁴	X	X						
Fire Extinguisher	X	X	X	X			X	
Emergency Response Procedure	X	X	X	X	X	X	X	X

Notes: ¹Training may be accomplished in small group meetings in which the applicable plan or procedure is read and discussed or PPPL training programs sponsored by Human Resources (e.g., fire extinguishers). In all instances, training records are maintained and forwarded to Human Resources. The respective training shall be accomplished and documented by the PPPL home line organization.

²All welding and brazing must be accomplished in accordance with PPPL Engineering Procedure 037, including qualification of weld procedures and welders.

³Only for those personnel who perform work involved with risk of falls.

⁴Performed by Metrology personnel trained as indicated in table 3.

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Table 5 Field Period Assembly Training Requirements¹

	Station V1 VVSA Prep	Station V2 MC Assy	Station V3 MC Install	Station V4 TF and Trim Coils Install	Station V5 Final Prep	Riggers & Crane Operators	Field Supvrs	QC Reps
Confined Space			X	X	X		X	X
General Employee (GET)	X	X	X	X	X	X	X	X
Radiation Safety	X	X	X	X	X	X	X	X
Hazard Communications	X	X	X	X	X		X	X
Hazard Awareness (JHA)	X	X	X	X	X	X	X	X
Mfg Facility Operations Plan	X	X	X	X	X		X	X
Lockout/Tagout	X	X	X	X	X		X	X
Basic Electrical	X	X	X	X	X		X	X
Ladder Safety	X	X	X	X			X	X
Fall Protection ³			X	X		X		
Welding ²	X							
Rigging &/or crane operator training						X		
Mechanical Arm training- Romer (operators only) ⁴	X	X						
Fire Extinguisher	X	X	X	X			X	
Emergency Response Procedure	X	X	X	X	X	X	X	X

Notes: ¹Training may be accomplished in small group meetings in which the applicable plan or procedure is read and discussed or it may be in special PPPL training programs (e.g., fire extinguishers). In all instances, training records are maintained and forwarded to Human Resources. With the exception of the NCSX Project MC Manufacturing Facility Operations Plan and the Emergency Response Procedure, the respective training shall be accomplished and documented by the PPPL home line organization.

²All welding and brazing must be accomplished in accordance with PPPL Engineering Procedure 037, including qualification of weld procedures and welders.

³Only for those personnel who perform work involved with risk of falls.

⁴Performed by Metrology personnel trained as indicated in table 3.

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