

NCSX Work Approval Form (WAF)

WBS Number: 43

WBS Title: DC Systems

Job Number: 4301

Job Title: DC Systems

Job Manager: Raki Ramkrishnan

Description:

This WBS element consists of refurbishment, as needed, of cabling and other DC components required to feed the NCSX machine from the existing C Site rectifiers.

Schedule:

Approvals:

Job Manager

Date

Responsible Line Manager

Date

Project Manager

Date

Engineering Department Head

Date

**NCSX June 2007 ETC
TABLE I - DESIGN LABOR**

WBS Number: 43									
WBS Title: DC Systems									
Job Number: 4301									
Job Title: DC Systems									
Job Manager: Raki Ramkrishnan									
Description: This is a LOE effort for design intergration, interface definition, and oversight of diagnostic systems design, fabrication, and installation									
Task Description	Activity	K\$		Labor Hours					Basis of Estimate (See Notes on Basis of Estimate Below)
		M&S	Travel	EASM	ECEM	EEEM	EESM	EETB	
Condition/spare parts inventory	431-200					8	6		
Organize & verify documentation	431-210			10		16	3		
Document status	431-215					16			
Reactivate DF & PEI units	431-225	\$8K				40	8	40	
Dummy Load test	431-230	\$1K				32	8	40	
Simulate each of 6 pwr loops in PSCAD	431-240					104			
c-site dc sys dsn documentation	431-250			240		180			
Redo power loop design	431-261			240		128			
Fabricate bus components	431-265	\$45K		40		16	40	120	
Power cabling & Installation	431-275	\$140K		240		40	240	520	
Maint of C-site rectifiers	431-276	\$5K					40	120	
Totals		\$199K	\$0K	770	0	580	345	840	
Notes on the Basis of Estimate									
(1) Design and Fabrication/Installation									
Estimate based on estensive experience of engineer performing similar tasks at PPPL and EBASCO - e.g. recent experience on NSTX. This is basically a job modifying existing PPPL systems and re-installing for NCSX. Design and engineering estimates developed based on assessments of the number of drawings needed (new or modified), the effort to reconfigure existing designs, interfaces with other systems, supervision of on-site contractors, and all necessary re-activation and pre-operational testing needed.									
(2) M&S									
M&S estimated based on similar recent procurements and needed interfaces with installation contractors - this will be Davis-Bacon covered, except tor those activities within the Test Cell.									

NCSX June 2007 ETC
TABLE II - Materials and Subcontracts

WBS Number: 43									
WBS Title: DC Systems									
Job Number: 4301									
Job Title: DC Systems									
Job Manager: Raki Ramkrishnan									
Materials and Subcontracts (M&S)							Basis of Estimate		
Material					Labor				
Description - included in Table I									

NCSX June 2007 ETC
TABLE III - Fabrication/Assembly Installation

WBS Number: 43																	
WBS Title: DC Systems																	
Job Number: 4301																	
Job Title: DC Systems																	
Job Manager: Raki Ramkrishnan																	
In-house Fabrication and Assembly and Installation																	
Included in Table I																	

NCSX June 2007 ETC

TABLE IV - Uncertainty of Estimate and Residual Risk Assessment

WBS Number: 43
WBS Title: DC Systems
Job Number: 4301
Job Title: DC Systems
Job Manager: Raki Ramkrishnan

<u>Uncertainty of the Estimate</u>					
	<u>High</u>	<u>Medium</u>	<u>Low</u>	<u>Uncertainty of Estimate (%)</u>	<u>Comments/Other Considerations</u>
Design Maturity	X			-5%/+10%	Existing PPPL infrastructure and standard electrical design (requirements near final)
Design Complexity			X		Standard electrical design and fabrication
Other comments:					Robicon is okay, but PEI supply has not been used for a long time - could experience issues as we re-activate

Note: High/Medium/Low uncertainty assessment from Job Manager. Uncertainty range based on ACEI recommended practice 18R-97 as amended for NCSX.

<u>Residual Impacts</u>								
Job	Risk Description	Likelihood of Occurring	Mitigation Plan	Basis of estimate	Cost Impact		Schedule Impact	
					Low	High	Low	High
NONE								

Notes:

- [1] Low cost and schedule impacts are considered the minimum (0-percentile) impacts should the event occur. High cost and schedule impacts are considered the maximum (100-percentile) impacts should the event occur
- [2] Cost impacts should be entered as man-hours (by demographic) and M&S direct cost under basis of estimate. Cost impacts should NOT include standing army costs which are separately calculated from the schedule impact. Project control is responsible for quantifying the low and high cost impacts based on the labor hours and M&S identified
- [3] The schedule impacts should be entered as the min and max impacts on the critical path. If there is no critical path impact then the schedule entries should be zero.
- [4] Likelihood of occurrence should be entered consistent with our risk classification methodology, i.e. VL= Very Likely (P>80%), L=Likely (80%>P>40%), U=Unlikely (40%>P>10%), VU=Very Unlikely (P<10%), NC=Non-credible (P<1%)