

NCSX Work Approval Form (WAF)

WBS Number: 61

WBS Title: Water Cooling Systems

Job Number: 6101

Job Title: Water Cooling Systems

Job Manager: Larry Dudek

Description:

This WBS element includes all the effort required to add cooling loops to the existing C-site (CS) and HVAC Water Systems as required for NCSX subsystems.

Schedule:

See Attached

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: 61
WBS Title: Water Cooling Systems
Job Number: 6101
Job Title: Water Cooling Systems
Job Manager: Larry Dudek

TASK DESCRIPTION	FY07\$K																	7780.468	Basis of Estimate
	HOURS																		
	41MS	48MS	37STK	35TRV L	31OT	ORNLE M	ORNLD SN	EMEM	EMSM	EMSB	EMTB	EAE M	EASB	EBEM	EESM	EESB	EETB		
Design																			
Final Design (Field Run)							20						80					Based on engineering judgement from experience on NSTX	
Procurement & Fabrication/Installation																			
Procurement lead time and award							20												
3/4" Cu Pipe x 50 ft	\$250										8							Based on Means	
Solder Joints (25)											16							Based on Means	
Valves	\$100										8							Based on Means	
Elbows	\$10										8							Based on Means	
Tees	\$10										8							Based on Means	
New Instrumentation	\$1,500						20				80							Based on Means	
Backflow preventer	\$500						8				16							Based on Means	
Heat Exchanger	\$500						8				16							Based on Means	
Pump	\$100						8				8							Based on Means	
PTP Testing																			
Test							8				40								
TOTALS	\$2,970	0	0	0	0	0	0	0	92	0	0	208	0	80	0	0	0		

NCSX June 2007 ETC
TABLE II - Materials and Subcontracts

WBS Number: 61									
WBS Title: Water Cooling Systems									
Job Number: 6101									
Job Title: Water Cooling Systems									
Job Manager: Larry Dudek									
Materials and Subcontracts (M&S)									Basis of Estimate
M&S in Table I									

NCSX June 2007 ETC
TABLE III - Fabrication/Assembly Installation

In-house Fabrication and Assembly and Installation															
Fabrication & Installation in Table I															

NCSX June 2007 ETC
TABLE IV - Uncertainty of Estimate and Residual Risk Assessment

WBS Number: 61
WBS Title: Water Cooling Systems
Job Number: 6101
Job Title: Water Cooling Systems
Job Manager: Larry Dudek

Uncertainty of the Estimate

	<u>High</u>	<u>Medium</u>	<u>Low</u>	<u>Uncertainty Range (%)</u>	<u>Comments/Other Considerations</u>
Design Maturity		X		-10%/15%	Design not complicated, but still in a conceptual stage.
Design Complexity			X		Standard piping -- off-the-shelf components

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

Residual Impacts

<u>Job</u>	<u>Risk Description</u>	<u>Likelihood of Occurring</u>	<u>Mitigation Plan</u>	<u>Basis of estimate</u>	<u>Cost Impact</u>		<u>Schedule Impact</u>	
					<u>Low</u>	<u>High</u>	<u>Low</u>	<u>High</u>
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=Unlikley (40%>P>10%), VU=Very Unlikely (P<10%), NC=Non-credible (P<1%)

Activity ID	MILE-stones (level 2 & 3)	Activity Description	Duration (work days)	Baseline Start	Baseline Finish	Shifts	Total Float	% cmplt	Proposed Budgeted						
										FY07	FY08	FY09	FY10	FY11	FY12
61 - Water Systems															
Job: 6101 - Water Systems-DUDEK															
613 - Vacuum Pumping System															
6101-100		Design Vac Pmp water sys	20	01OCT08*	28OCT08		258		13,183.60	EM//EM =20hr ; EA//SB =80hr ;					
6101-105		Procure Hardware and materials Vac Pmp water sys	90	29OCT08	16MAR09		258		7,459.09	EM//EM =20hr ; 41=03\$K ;					
6101-110		Fabricate and Install Vac Pmp water sys	40	20APR09*	15JUN09		234		21,135.28	EM//EM =44hr ; EM//TB =168hr ;					
6101-115		Test Vac Pmp water sys	22	16JUN09	16JUL09		234		4,622.40	EM//EM =08hr ; EM//TB =40hr ;					
Subtotal			196	01OCT08	16JUL09		234		46,400.37						