

## 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**

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TASK DESCRIPTION	FY07\$K																7780.468	Basis of Estimate				
	HOURS																					
	41MS	48MS	37STK	35TRV L	31OT	ORNL M	ORNL SN	EMEM	EMSM	EMSB	EMTB	EAEM	EASB	EBEM	EESM	EESB			EETB			
<b>Design</b>																						
Final Design (Field Run)								20						80								Based on engineering judgement from experience on NSTX
<b>Procurement &amp; Fabrication/Installation</b>																						
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
<b>PTP Testing</b>																						
Test								8				40										
<b>TOTALS</b>	<b>\$2,970</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>92</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>208</b>	<b>0</b>	<b>80</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	

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**TABLE II - Materials and Subcontracts**

<b>WBS Number: 61</b>									
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<b>Job Manager: Larry Dudek</b>									
<b>Materials and Subcontracts (M&amp;S)</b>									<b>Basis of Estimate</b>
<b>M&amp;S in Table I</b>									

**NCSX June 2007 ETC**  
**TABLE III - Fabrication/Assembly Installation**

<b>In-house Fabrication and Assembly and Installation</b>															
<b>Fabrication &amp; Installation in Table I</b>															

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**TABLE IV - Uncertainty of Estimate and Residual Risk Assessment**

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**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%)