## **NCSX Work Approval Form (WAF)** WBS Number: 76 WBS Title: Tooling Design & Fabrication Job Number: 7601 Job Title: Tooling Design & Fabrication Job Manager: Erik Perry Description: This WBS element consists of the activities associated with the design and fabrication of tooling required to assemble the NCSX device. The work scope includes the design and fabrication of special fixtures and tooling which will be required during final assembly of the NCSX machine components in the C-site NCSX test cell. To the extent feasible, special tooling utilized in the preassembly of the field periods in the TFTR test cell will be utilized. Schedule: See Attached Approvals: Job Manager Date Responsible Line Manager Date **Project Manager** Date

Date

**Engineering Department Head** 

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

WBS Number: 76																	
WBS Title: Tooling Design 8	Fabr	icatio	n														
Job Number: 7601																	
Job Title: Tooling Design &	Fabri	cation															
Job Manager: Erik Perry																	
Description:				l													
Title I and II Engineering for PF Coils and Tit	tle III Sup	port of Fa	abrication	Effort.											<u> </u>		
		FY07	/ <u>\$K</u>							HO	URS	<u> </u>					
Task	1MS	8MS	37STK 35TRVL	10Т	OR NL EM	ORNL DSN	EMSM	EMSB	EMTB	EAEM	EASB	EESM	ETB	CEM	ECTB RM2	M3	Paris of Fallman
ID	4	4	ю 6	Ŕ	0	0 1	Ш	Ш	Ш	ш	ш	и ш	ШШ	шш	ш c	Y	Basis of Estimate
None - this is an assembly operation																	
None - this is an assembly operation																	
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# NCSX June 2007 ETC TABLE II - Materials and Subcontracts

WBS Number: 76					
WBS Title: Tooling Design & Fabric	ation				
Job Number: 7601					
Job Title: Tooling Design & Fabrica	tion				
Job Title: Tooling Design & Fabrica Job Manager: Erik Perry					
	Weldments &	Assy H/w			
Materials and Order autocate (MOO)					
Materials and Subcontracts (M&S)			Bas	is of Estimate	
Description:			Bas	is of Estimate	
Description:			Bas	is of Estimate	
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Description:			Bas	is of Estimate	
Description:			Bas	is of Estimate	
Description:			Bas	is of Estimate	
Description:			Bas	is of Estimate	

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

WBS Number: 76											
WBS Title: Tooling Design & Fal	orication	1									
Job Number: 7601											
Job Title: Tooling Design & Fabr	rication										
Job Manager: Erik Perry											
In-house Fabrication and Assembly	and Insta	llation									
Job 7601 - Tooling Design & Fabrica	tion										Basis of Estimate
		K\$			Hours			Duration in	Persons	Assumptions	Estimates are based on similar assembly, installation
								Shifts	per Shift		for TFTR and NSTX
Description of Task	ACT	M&S	EAEM	Metrology	EMEM	EMSM	EMTB				
Lab Fab/Assy/Installation	713.020				80	42	140				
Tooling,assy fixtures,misc equipt	713.030	\$60K									
General procurements	713.040	\$45K									
Welding tools, materials & equipt	713.050	\$80K									
Torque wrenches and multipliers		\$80K			40						
Subtotal Job 7301		\$265K	0	0	120	42	140				

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

W/D	S Number: 76											
	S Title: Tooling Design & Fabrication	on										
	Number: 7601											
Job	Title: Tooling Design & Fabricatio	n										
	Manager: Erik Perry											
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<u>Unce</u>	rtainty of the Estimate											
				Uncertainty								
	<u>High</u>	<u>Medium</u>	<u>Low</u>	Range (%)					ther Consi			
	Design Maturity		Χ	450/4 050/	Have exte	nsive experience building	and usin	g special t	ooling for f	abrication	and decon	nmissionir
	Pasing Commission		v	-15%/+25%	Nathia a	tia antiainatad						
	Design Complexity		Х		Nothing e	xotic anticipated.						
Noto:	High/Medium/Low uncertainty assessment from Job M	anager Un	cortainty ran	age based on A	ACEI recor	nmonded practice 18P-07	ac amono	lad for NCS	S.Y			
Note.	Thigh/Median/Low uncertainty assessment from 300 M	anayen. On	certainty rai	ige based on A	ACLITECUI	intended practice for-97	as amend	led for NO	JA.			
				1								
		1		1								
Residu	ual Impacts											
Residu	ual Impacts								Cost I	mpact	Schedule	mpact
Residu				Likelihood of					Cost I	mpact	Schedule	Impact
Residu Job	Risk Description			Likelihood of Occurring	Mitig	ation Plan Bas	sis of estir	nate	Cost I	mpact High	Schedule Low	mpact High
Job	Risk Description				Mitig	ation Plan Bas	sis of estir	nate		•		•
-	Risk Description				Mitig	ation Plan Bas	sis of estir	nate		•		•
Job	Risk Description				Mitig	ation Plan Bas	sis of estir	nate		•		•
Job	Risk Description				Mitig	ation Plan Bas	sis of estir	nate		•		•
Job NONE	Risk Description				Mitig	ation Plan Bas	sis of estir	nate		•		•
Job NONE Notes:	Risk Description	nimum (0-r	percentile) in	Occurring			sis of estir	nate		•		•
Job NONE	Risk Description  Low cost and schedule impacts are considered the mi			Occurring  pacts should t	he event o	ccur.	sis of estir	nate		•		•
Job NONE Notes:	Risk Description	aximum (10	00-percentile	Occurring  pacts should to impacts should to impact should to imp	he event o	ccur.	sis of estir	nate		•		•
Job  NONE  Notes:	Risk Description  Low cost and schedule impacts are considered the mi	aximum (10 nographic)	00-percentile	Occurring  npacts should to impacts should to impacts should to impacts should to rect cost under	he event o	ccur. It occur	sis of estir	nate		•		•
Job  NONE  Notes:	Risk Description  Low cost and schedule impacts are considered the mi High cost and schedule impacts are considered the m Cost impacts should be entered as man-hours (by der Cost impacts should NOT include standing army cost: Project control is reponsible for quantifying the low at	aximum (10 nographic) s which are nd high cos	00-percentile and M&S di separately of t impacts ba	occurring  npacts should to impacts should to impacts should rect cost under calculated from a sed on the laborated should be sed on the laborated from the laborated should be sed on the laborated from the laborated should be sed on the laborated from the laborated should be sed on the laborated from the laborated should be sed on the laborated from the laborated should be sed on the laborated from the laborated should be sed on the laborated from the laborated should be sed on the laborated from the laborated should be sed on the laborated from the laborated should be sed on the la	he event o ld the ever basis of es the sched	ccur. It occur stimate. ule impact	sis of estir	nate		•		•
Job  NONE  Notes:	Risk Description  Low cost and schedule impacts are considered the middle High cost and schedule impacts are considered the middle Cost impacts should be entered as man-hours (by der Cost impacts should NOT include standing army cost Project control is reponsible for quantifying the low at The schedule impacts should be entered as the min at	aximum (10 nographic) s which are nd high cos nd max imp	00-percentile and M&S dir separately of t impacts baracts on the	occurring  npacts should to impacts should to impacts should rect cost under calculated from a sed on the laborated should be sed on the laborated from the sed on the laborated impacts and the sed on the laborated from th	he event o ld the ever basis of es the sched	ccur. It occur stimate. ule impact	sis of estir	nate		•		•
Job NONE Notes: [1] [2]	Risk Description  Low cost and schedule impacts are considered the mi High cost and schedule impacts are considered the m Cost impacts should be entered as man-hours (by der Cost impacts should NOT include standing army cost: Project control is reponsible for quantifying the low at The schedule impacts should be entered as the min at If there is no critical path impact then the schedule en	aximum (10 nographic) s which are nd high cos nd max imp tries should	00-percentile and M&S did separately of timpacts bacts on the did be zero.	npacts should to impacts should to impacts should rect cost under calculated from a sed on the laboritical path.	he event o ld the ever basis of es the sched or hours ar	ccur. It occur stimate. ule impact	sis of estir	nate		•		•
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Job NONE Notes: [1] [2]	Risk Description  Low cost and schedule impacts are considered the mi High cost and schedule impacts are considered the m Cost impacts should be entered as man-hours (by der Cost impacts should NOT include standing army cost: Project control is reponsible for quantifying the low an The schedule impacts should be entered as the min an If there is no critical path impact then the schedule en Likelihood of occurrence should be entered consistent	aximum (10 nographic) s which are nd high cos nd max imp tries should t with our r	On-percentile and M&S did separately of timpacts baracts on the did be zero.	npacts should to pimpacts should to pimpacts should to pimpacts should to pimpacts should to pimpact cost under calculated from a sed on the laboritical path.	he event o ld the ever basis of es the sched or hours ar	ccur. it occur stimate. ule impact id M&S identified		nate		•		•