NCSX Work Approval Form (WAF) WBS Number: 134 **WBS Title: Conventional Coils I&C** Job Number: 1355 Job Title: Conventional Coils I&C Job Manager: Mike Kalish Description: This WBS element provides the manufacturing design and fabrication of the local I&C components required by the WBS elements under Conventional Coils (WBS 13). Local I&C requirements will be determined in the design of these WBS elements, and may include strain gages, RTDs, and voltage taps. 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

In Table II																			
Task ID	41MS	48MS	35TRVL	310T	ORNL EM	ORNL DSN	EMEM	EMSM	EMSB	EMTB	EAEM	EASB	EEEM	EESM	EETB	ECSB	ECTB	RM2	Basis of Estimate
Title I and II Engineering for PF Coils and Tit	le III Suppo	ort of Fabrio		ort.							HOURS				J				
Description:																			
Job Manager: Mike Kalish																			
Job Title: Conventional Co	ils I&C																		
Job Number: 1355																			
WBS Title: Conventional Co	ils I&C	:																	
WBS Number: 134																			

NCSX June 2007 ETC TABLE II - Material and Subcontracts

WBS Number: 134																
WBS Title: Conventional Coils I&C	;															
Job Number: 1355																
Job Title: Conventional Coils I&C																
Job Manager: Mike Kalish																
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Materials and Subcontracts (M&S)																
Description:	·	FY07	\$K		•				·	HOUR	S					
	(0	(0	¥	2	_	٦	_	Σ	Σ	В	М	5	Ð	5	>	
	41MS	48MS	7STK	STRV -	5	ORNL	SN	EMEM	EMSM	EMSB	EMTB	AEM	ASB	EEM	ESM	D 1 (F () (
	4	84	37	36 L	3	ΘÜ	ōä	ū	ū	ū	ū	Ш	Ш Ш	ü	Ш	Basis of Estimate
Procrurement & Fabrication																
1000																
I&C Design and Installation Procure Thermocouples TF	£4.000											_				CAO and TE Canada and
	\$4.320											2				\$40 per TE 6 per coil - based on Omega Catalogue
Procure Thermocouples PF4	\$0.480											2				\$40 per TE 6 per coil - based on Omega Catalogue
Procure Thermocouples PF5	\$0.480											2				\$40 per TE 6 per coil - based on Omega Catalogue
Procure Thermocouples PF6	\$0.480 \$0.240											2				\$40 per TE 6 per coil - based on Omega Catalogue
Procure Thermocouples PF1a	*											2				\$40 per TE3 per coil - based on Omega Catalogue
Thermcocouple Wire	\$4.000											2				500ft per TE - based on Omega Catalogue
Design and Review												60				Design-based on previous experience on similar projects
Installation Procedures - Review and Approval												20				Installation Procedures + Review and Approval - based on previous experience (e.g., NSTX)
Design Review												8				Design Review - based on previous exprerience
I*+&C Title III Engineering																
Support of Installation											396	40				Two hours per TE - basis on previous experience (e.g., NSTX)
Subtotal Job 1355	\$10	\$0	\$0	\$0	\$0	0	0	0	0	0	396	140	0	0	0	
		•		•	•											

NCSX June 2007 ETC TABLE III - Fabrication/Assembly Installation

	T T	1												
In-house Fabrication and	n-house Fabrication and Assembly and Installation													
Description: Incl in M&S Table II														
Worksheets														
												1		

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

WBS Number: 134

WBS Title: Conventional Coils I&C

Job Number: 1355

Job Title: Conventional Coils I&C

Job Manager: Mike Kalish

Uncertainty of the Estimate

				Uncertainty	
	<u>High</u>	Medium	Low	Range (%)	Comments/Other Cionsiderations
Design Maturity		Х			Requirements in early development, but relatively simple design based on previous experience.
				-10%/+15%	
Design Comlexity			Х		Simple off-the-shelf thermocouples attached to coil

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

Residual Impacts

Risk Likelihood of <u>Mitigation Strategies</u> <u>Consequence if Occurs</u>

Occurring Cost Schedule

NONE

Activity ID	MILE- stones	Activity Description	Duration (work	Baseline Start	Baseline Finish	Shifts	Total Float	% cmplt	Proposed Budgeted	FY07	FY08		FY09	n	FY10	FY11	FY12
	(level 2 & 3)		days												111111111		
Job: 1355 - \	WBS 13	I&C Proc and Coil Assy-KALISH	·														
TF/PF Loacl I	&C																
1355-101		Design, and Review	60	01FEB08*	24APR08		86		11,145.60		■F.	4//EM =	-60hr ·				
1355-103		Prepare Installation Procedures	20	25APR08	22MAY08		86		3,715.20			A//EM					
1355-105		FDR	1	23MAY08	23MAY08		86		1,486.08		le	A//EM	=08hr	r;			
1355-107		Prep req,bid,award T/C and wire	20	27MAY08	23JUN08		86		2,229.12			ea//em	=12				
1355-109		Deliver of T/C and wire	40	24JUN08	19AUG08		86		13,080.00			3 41=1	10\$k ;				
1355-111		Installation on PF4,5,6 Coils upon delivery	20	15JAN09	11FEB09		15		9,745.80				■ EA	//EM	=10hr ; EM//	ΓB =95hr ;	
1355-112		Installation on TF Coils upon delivery	45	01OCT08*	04DEC08		57		29,046.19				EA//EI	M =2	9hr ; EM//TB	=285hr ;	
1355-113		Installation on PF1a Coils upon delivery	3	15MAR10	17MAR10		101		1,561.87						lea//e	EM =1hr ; EM	//TB =16hr ;
Subtotal			529	01FEB08	17MAR10		101		72,009.86					Ш			