	NCSX Work Approva	al Form	(WAF)	
WBS Nu	Imber: 142			
WBS Tit	le: Windings and Assemb	ly		
Job Nur	nber: 1416			
Job Title	e: Type A/B Coil Final Desi	ign		
Job Mar	nager:David Williamson			
Description:				
	Job 1416 consists of the effort to complete Modular Coils.	e the final de	esign for the Type A an	id Type B
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 Nu	Imber: 142												
	le: Windings and Assembly					\vdash			-	1			
	nber: 1416												
										ļ			
Job Title	e: Design of Modular Coil Interfaces												
Job Mar	nager:David Williamson									1			
										1			
Descriptio	n:								1				
Title I and II	Engineering for design of the modular coil interfaces. Title	Ill for these components is included in Job 1802.									()		
		[1			F	Y07\$K					
									5				
						¥	7	1		~	_		
				IWS	WS	ST	¥	6		MTB	AEM	SB	
Task ID	Description		Comments	41	48	37	35	31	5 🖬	Ц Ш	Ш	Ш	Basis of Estimate
				1					1	1	1 1		
Clamp Hardy	vare Modifications								i0				Added 40 ORNL hours based on experience to date.
1416-204.1	Modify Type-B clamps for stud attagchments												
	mal Insulation							(Added 40 ORNL hours based on experience to date.
1416-304	Revise assembly drawings			ļļ						ļ	10		Added 20 ORNL hours based on experience to date.
1416-305	Review and approve insulation concept							4	0		8		Added 40 ORNL hours based on experience to date.
1416-33198	Report results			++						+			
FY07 Rebase	line												
ecp53rbx04									8	1			
	sembly Drawings									ļ			
1416-501 1416-502	Complete models/drawings of coolant line routing Check layout of flux loop terminations and revise								0				Complete Complete
1416-502	Complete models/drawings of power cable connections							12	0				Work remaining - modify leads per analysis
1416-504	Complete models/drawings of protective covers							12					Work remaining - assume covers are different for reach coil
1416-505	Drawing callouts for interface hdw (prelim model)								0	1			Task deleted
1416-507	Update, review, %& approve coil assembly spec								0				
1416-508	Complete drawing rev to leades, terminals asm (ECN)								0				Work remaining - drawing in checking cycle
1416-506	Check and promote top-level models/drawings								0	ļ			Added 20 ORNL hours based on experience to date.
Analysis and	I coseout documentation			++						+			
1416-601	Prepare EM and structural analysis of loads	1		\$60k					0 10	1	192		ORNL Contract w/ Myatt
1416-602	Design memo for KF structueal analysis	1							6	1			Added 16 ORNL hours based on experience to date.
1416-603	Update, review and approve FEMEC								<mark>0</mark>	1			
1416-604	Finalize drdaft documents - materials, eddy currents, etc.								0	l			
1416-605 1416-606	Prepare Type ABC coselout FDR Resolve FDR comments								'2 '2				Added 32 ORNL hours based on experience to date. Added 32 ORNL hours based on experience to date.
1410-000									2				Audeu 32 OKINE hours based on experience to date.
Type C Desig	an Closeout												
1403-47C	Perform cool-down/warmup analysis			1						1	40		
										1			
	TOTALS			\$60k				10	88 0	0 0	250	0	
1													

NCSX June 2007 ETC TABLE II - Materials and Subcontracts

WBS Number: 142					
WBS Title: Windings and Assembly					
Job Number: 1416					
Job Title: Design of Modular Coil Interfaces	S				
Job Manager:David Williamson					
	- I	1		<u> </u>	
Materials and Supplies	Resp Org.		Basis of	Estimate	
Included in Table I					

NCSX June 2007 ETC TABLE III - Fabrication and Assembly

WBS Number: 142				
WBS Title: Windings and Assembly				
Job Number: 1416				
Job Title: Design of Modular Coil Interfaces				
Job Manager:David Williamson				
			I	
NONE				

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

WBS Number: 142 WBS Title: Windings and Assembly Job Number: 1416 Job Title: Design of Modular Coil Interfaces Job Manager:David Williamson

Uncertainty of the Estimate High Medium Low Range (%) Comments/Other Considerations Design Maturity X Major issue is continuous iteration of design Design Complexity X Major uncertainty is C-C access for bolting at machine assembly

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

Residual Impacts					Cost	mpact	Schedule	Impact	
Job	Risk Description	Likelihood of Occurring	Mitigation Plan	Basis of estimate	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 reponsible 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	MILE-	Activity	Duration	Baseline	Baseline	Shifts	Total	%	Proposed													
ID	stones (level 2	Description	(work days	Start	Finish		Float	cmplt	Budgeted	FY07	7 FY08			FY09			FY10			Y11	 FY1	/1 T
	`& 3)																Ш	Ш				
lob: 1416 - I	Mod Co	il Type AB Fnl Dsn-WILLIAMSON																				
Clamp hardw	are mod	ifications																				
1416-204.1		Modify Type-B clamps for stud attachment	9	02JUL07*	13JUL07		62		7,786.00	OF		1 =50ł	nr;									
Blanket thern	nal insul	ation	·	•																		
1416-304		Revise assembly models/drawings	5	01JUN07*	07JUN07		79		9,343.20	lori		=60hr										
1416-305		Review and approve insulation concept	5	08JUN07*	14JUN07		79		6,413.90					′FМ =	10hr ·							
1416-3198		Report Results & Issue Dwgs	10	15JUN07	28JUN07		79		7,622.64						,							
Top level ass	v model								.,			0, 04	,									+
1416-503		Complete models/drawings of power cable connect	80	01AUG07*	21NOV07		79		19,030.68		OR	NLEN	l =120	hr ;								
1416-504		Complete models/drawings of protective covers	80	01AUG07*	21NOV07		79		19,030.68		OR	NLEN	l =120	hr ;								
1416-507		Update, review and approve coil asm spec	21	31OCT07*	28NOV07		137		12,940.80		OR	NLEN	1 =80h	r;								
1416-508		Complete drawing rev to leads, terminal asm (ECN	21	01MAY07	30MAY07		202		12,457.60	ORN	LEM	=80hr	;									
1416-506	3	Check and promote top-level models/drawings	80	01AUG07	21NOV07		79		12,687.12		OR	NLEN	l =80h	r ;								
Analysis and	closeou	t documentation																				
1416-601	3	Prepare EM and structural analysis of leads	27	01OCT07*	06NOV07		65		110,106.72		EA//	'EM =	192hr)	ORN	IL41=I	50k (n	nyatt)					
1416-602		Design memo KF structural analysis	15	07NOV07	27NOV07		65		15,528.96) 1 =96h									
1416-603		Update, review and approve FMECA	5	28NOV07	06DEC07		65		9,705.60				1 =960 ∕l =60⊧	1								
1416-604		Finalize draft documents - materials, eddy curre	5	07DEC07	13DEC07		65		6,470.40				/i =60r ∕i =40ł									
1416-605	3	Prepare Type-ABC closeout FDR	15	14DEC07	14JAN08		65		11,646.72				M =40r M =72	,								
1416-606	3	Resolve FDR comments	15	14DEC07	04FEB08		65		11,646.72				EM =7									
Type C Desig	n Close		15	13341400			05		11,040.72					2111,								+
Type o Desig	11 010360	Jul																				
1403-47C		Perform cool-down/warmup analysis	26	01OCT07*	05NOV07		445		7,430.40		∎ea//	EM =	40hr ;									
Subtotal			188	01MAY07	04FEB08		389		279,848.14													

Run Date	18JUL07 07:31	E	TCZ	NCSX Project	Sheet 11 of 99	
Null Dale	1030207 07.31			Resource Loaded Schedule		
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