NCSX Work Approval Form (WAF) WBS Number: 142

WBS Number: 142 WBS Title: Windings and Assembly Job Numbers: 1408, 1451, & 1459 Job Title: Modular Coil Winding Supplies (1408) Job Title: Modular Coil Winding Operations (1451) Job Title: Modular Coil Punch List Items (1459) Job Manager: Jim Chrzanowski

Description:

Job 1408 consists of all the procured components for the modular coil windings, and includes the cable conductor, kapton and glass insulation, epoxy, coil clamps, cooling lines, lead blocks, fillers, etc. Job 1451 consists of all the labor required to wind conductor, vacuum bag, vacuum impregnate with epoxy, connect cooling lines, and inspect the modular coils. This WBS element consists of all punch list items need to finalize the fabrication of each modular coil.

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 Number: 142																				
WBS Title: Windings an	nd Assembly																			
Job Numbers: 1408, 14	51, & 1459																			
Job Title: Modular Coil	Winding Supplies (1408)																			
Job Title: Modular Coil	Winding Operations (1451)																			
Job Title: Modular Coil	Punch List Items (1459)																			
Job Manager: Jim Chrza	anowski																			
1	1		1 1															1		
Description:																				
Title I and II Engineering for PF Coils a	and Title III Support of Fabrication Effort.	_																		
			<u>FY07\$K</u>							H	IOURS	5								
Task ID	Comments	41MS	48MS 37STK	35TRVL	310T	ORNL DSN	EMEM	EMSM	EMSB	EMTB	EAEM	EASB	EEEM	EESM	EETB	ECEM	ECTB	RM2	RM3	Basis of Estimate
1				1	Î	l			1	1			1	1	1					
No Design Work Associated with	th This Job																			
									T										1	
							-						_			_				

NCSX June 2007 ETC TABLE II - Materials and Subcontracts

WBS Number: 142			
WBS Title: Windings and Assembly			
Job Numbers: 1408, 1451, & 1459			
Job Title: Modular Coil Winding Supplies (1408)			
Job Title: Modular Coil Winding Operations (1451)			
Job Title: Modular Coil Punch List Items (1459)			
Job Manager: Jim Chrzanowski			
			
Materials and Supplies			
All M&S included in Table III			

M/BS Number 1/2			1			-			
WDS Nulliber. 142									
WBS Title: Windings and Assembly									
Job Numbers: 1408, 1451, & 1459									
Job Title: Modular Coil Winding Supplies (1408)									
Job Title: Modular Coll Winding Operations (1451)									
Job Title: Modular Coil Punch List Items (1459)									
Joh Managori, Jim Chrzanowski									
Fabrication and Assembly									
Conditions and Basis for Estimate									
1) All estimates are based on work performed from May 1, 2007 through the end of modular co	il fabrication pro	ogram							
2) Estimates are based on actual in-field times as well as consultation with metrology personne	and technicial	ns							
3) M&S based upon actual contracts and monthly M&S supporting winding activities on first nin	ne coils - see sp	pecifics in	M&S below						
		EAEM	EAEM	EMSM	EMEM				
TASK DESCRIPTION		Chrz.	Raft.	Meighan	Languish				
		hours	hours	hours	hours				
Engineering and Oversight		70%	40%	70%	40%				
			70 hr/month						
		1	through						
		120	completion						
LOE	9450-1***-1451	hr/month	of winding	120 hr/month	70 hr/month				
nominal hours for 14mo. Production		1680	980	1680	980				
Casting Preparation		Total	No. of	Coil Tech	Coil Tech	Tech Shop	No. of	Total	
TACK DESCRIPTION	Job Number	Shifts	Coil tech	[hours per	[hours per	Support	coils	Manhrs	COILS
IASK DESCRIPTION			per shift	shiftj	COIL	[hours]			
RESA building Acumues	9450-1***-1459	0.5	0	0	0	12	5	60	B5 & B6: 45 & 46: C6
Inspect casting (surfaces, magnetic permeability)	9450-1***-1451	0.5	1	9	4.5	0	5	22.5	B5 & B6: A5 & A6: C6
	54001 1401	0.0	·	5	4.0	Ű	0	22.0	Do a Do, no a no, oc
Winding form modifications [grinding, welding, deburring, etc.]	9450-1***-1459	3	0	0	0	48	5	240	B5 & B6' A5 & A6' C6
Station 1a/4 Activities		-	-			-	-		
Desition 9 mount WE to support ring									
Position & mount we to support ring	9450-1***-1451	2	3	9	54	32	6	516	B4 thru B6; A5 thru A6; C6
Install coil in station 4 turning fixture	9450-1***-1451 9450-1***-1451	2 1	3 3	9 9	54 27	32 16	6 6	516 258	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6
Install coli in station 4 turning fixture Install weights and balance casting and ring assembly	9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1	3 3 2	9 9 10	54 27 20	32 16 0	6 6 6	516 258 120	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6
Install coli in station 4 turning fixture Install weights and balance casting and ring assembly Weld monuments, stud adapters & lead nuts	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5	3 3 2 1	9 9 10 9	54 27 20 22.5	32 16 0 16	6 6 6 7	516 258 120 269.5	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6
Install coil in station 4 turning fixture Install coil in station 4 turning fixture Install weights and balance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install extended for under a classes	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2	3 3 2 1 2	9 9 10 9 8	54 27 20 22.5 32	32 16 0 16 0	6 6 6 7 5 7	516 258 120 269.5 160	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B5 thru B6; A5 thru A6; C6
Install coil in station 4 turning fixture Install coil in station 4 turning fixture Install weights and balance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studs for winding clamps Electrical test poloidal break	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451		3 3 2 1 2 3	9 9 10 9 8 9 9	54 27 20 22.5 32 54	32 16 0 16 0 0	6 6 7 5 7 7	516 258 120 269.5 160 378 315	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B5 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6
Install coll in station 4 furning fixture Install weights and balance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studs for winding clamps Electrical test poloidal break Clean casting linspect and clean all holes]	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 2.5 2 2 0.5 1	3 3 2 1 2 3 1 2 3 1 2	9 9 10 9 8 9 9 9 9	54 27 20 22.5 32 54 4.5 18	32 16 0 16 0 0 0	6 6 7 5 7 7 7 7	516 258 120 269.5 160 378 31.5 126	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6
Install coli in station 4 turning fixture Install coli in station 4 turning fixture Install weights and balance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studs for winding clamps Electrical test poloidal break Clean casting [Inspect and clean all holes] Install Kapton edging and mold release winding surface	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 2.5 2 0.5 1 2	3 3 2 1 2 3 1 2 3 1 2 2 2	9 9 10 9 8 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36	32 16 0 16 0 0 0 0 0 0	6 6 7 5 7 7 7 7 7 7 7	516 258 120 269.5 160 378 31.5 126 252	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B5 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6
Install coli in station 4 turning fixture Install coli in station 4 turning fixture Install weights and balance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studs for winding clamps Electrical test poloidal break Clean casting [Inspect and clean all holes] Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks]	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 2.5 2 0.5 1 2 1	3 3 2 1 2 3 1 2 2 2 2	9 9 10 9 8 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36 18	32 16 0 16 0 0 0 0 0 0	6 6 7 5 7 7 7 7 7 7 7 7	516 258 120 269.5 160 378 31.5 126 252 126	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B5 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6
Install colin is station 4 turning fixture Install colin is station 4 turning fixture Install station 4 turning fixture Measure casting wings using metrology equipment Install studs for winding clamps Electrical test poloidal break Clean casting [Inspect and clean all holes] Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity]	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 0.5 1 2 0.5 1 7	3 3 2 1 2 3 1 2 2 2 2 1	9 9 10 9 8 9 9 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36 18 63	32 16 0 16 0 0 0 0 0 0 0 0 0	6 6 7 5 7 7 7 7 7 7 7 7 6	516 258 120 269.5 160 378 31.5 126 252 126 378	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6
Install coli in station 4 turning fixture Install coli in station 4 turning fixture Install coli in station 4 turning fixture Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studs for winding clamps Electrical test poloidal break Clean casting [Inspect and clean all holes] Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install inner cladding plates and cooling Tubes	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 2 0.5 1 2 0.5 1 2 1 7 5	3 3 2 1 2 3 3 1 2 2 2 1 3 3	9 9 10 9 8 9 9 9 9 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36 18 63 135 63	32 16 0 16 0 0 0 0 0 0 0 0 0 0	6 6 7 5 7 7 7 7 7 7 7 6 7	516 258 120 269.5 160 378 31.5 126 252 252 126 378 945	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6
Install colin is station 4 turning fixture Install colin is station 4 turning fixture Install weights and balance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studs for winding clamps Electrical test poloidal break Clean casting [Inspect and clean all holes] Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install linner cladding plates and cooling Tubes	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 2 0.5 1 2 1 7 5 27	3 3 2 1 2 3 1 2 2 2 2 2 1 3	9 9 10 9 8 9 9 9 9 9 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5	32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0 124	6 6 7 5 7 7 7 7 7 7 7 7 7 6 7 7	516 258 120 269.5 160 378 31.5 126 252 126 252 126 378 945	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B5 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6
Install coli in station 4 turning fixture Install coli in station 4 turning fixture Install substance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studs for winding clamps Electrical test poloidal break Clean casting [Inspect and clean all holes] Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install inner cladding plates and cooling Tubes	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 2 0.5 1 2 2 1 2 1 7 5 27	3 3 2 1 2 3 1 2 2 2 2 1 3 3	9 9 10 9 9 9 9 9 9 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5	32 16 0 16 0 0 0 0 0 0 0 0 0 124	6 6 7 5 7 7 7 7 7 7 7 6 6 7	516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B5 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6
Install coli in station 4 turning fixture Install coli in station 4 turning fixture Install coli in station 4 turning fixture Install substance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studs for winding clamps Electrical test poloidal break Clean casting [Inspect and clean all holes] Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install inner cladding plates and cooling Tubes Coil Winding Station 2 and 3	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 2 0.5 1 2 2 1 1 7 5 27 7 7 0 1	3 3 2 1 2 3 3 1 2 2 2 2 2 1 3 3	9 9 10 9 9 9 9 9 9 9 9 9 9 9 0 2 0 17 ccil Tech	54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech	32 16 0 16 0 0 0 0 0 0 0 0 124 Tech Shop Support	6 6 7 5 7 7 7 7 7 7 6 7 6 7	516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B3 thru A6; C6 B3 thru A6; C6 B3 thru A6; C6 B3 thru B6; A5 thru A6; C6 B3
Taskall coling and balance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studs for winding clamps Electrical test poloidal break Clean casting [Inspect and clean all holes] Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install inner cladding plates and cooling Tubes Coil Winding Station 2 and 3 TASK DESCRIPTION	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 2.5 2 2 0.5 1 2 2 1 7 5 27 27 7 5 5 27	3 3 2 1 2 3 1 2 2 2 2 1 3 3 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0	9 9 10 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech [hours per coil]	32 16 0 16 0 0 0 0 0 0 0 0 0 124 Tech Shop Support hoursi	6 6 7 5 7 7 7 7 7 7 6 7 6 7 8 7	516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6
Tostill coll in station 4 furning fixture Install coll in station 4 furning fixture Install coll in station 4 furning fixture Install stude adapters & lead nuts Measure casting wings using metrology equipment Install stude for winding clamps Electrical test poloidal break Clean casting linspect and clean all holes] Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install inner cladding plates and cooling Tubes Coil Winding Station 2 and 3 TASK DESCRIPTION Prep for Winding	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 2 0.5 1 2 2 1 2 7 5 27 5 27 7 5 7 7 7 5	3 3 2 1 2 3 1 2 2 2 2 1 3 3 Vo. of Coil tech per shift	9 9 10 9 9 9 9 9 9 9 9 9 9 9 9 9 9 5 Coil Tech [hours per shift]	54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech [hours per coil]	32 16 0 16 0 0 0 0 0 0 0 0 0 0 124 Tech Shop Support [hours]	6 6 7 5 7 7 7 7 7 7 6 6 7	516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B5 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6
Taskall colin a mount wer to support mig Install colin in station 4 turning fixture Install weights and balance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studs for winding clamps Electrical test poloidal break Clean casting [Inspect and clean all holes] Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install inner cladding plates and cooling Tubes Coil Winding Station 2 and 3 TASK DESCRIPTION Prepare coil for transfer	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 2 0.5 1 2 2 1 7 5 27 Total Shifts	3 3 2 1 2 3 1 2 2 2 2 1 3 3 Vo. of Coil tech per shift	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36 18 63 135 135 488.5 Coil Tech [hours per coil] 9	32 16 0 16 0 0 0 0 0 0 0 0 0 0 124 Tech Shop Support [hours] 0	6 6 7 5 7 7 7 7 7 7 7 7 6 6 7 7 7 7 7 7	516 258 120 269.5 160 378 31.5 126 252 126 252 126 378 945 3882.5 Total Manhrs Revised 63	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B5 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6
Tostill coll in station 4 turning fixture Install coll in station 4 turning fixture Install coll in station 4 turning fixture Install station	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 0.5 1 2 1 2 1 7 5 27 Total Shifts 0.5 1	3 3 2 1 2 3 1 2 2 2 2 2 1 3 3 No. of Coil tech per shift 2 3	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36 18 63 135 135 488.5 Coil Tech [hours per coil] 9 9 24.0	32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 124 Tech Shop Support [hours] 0 16.0	6 6 7 5 7 7 7 7 7 7 6 7 6 7 7 6 7 7 7 7	516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6
Position & mount with a support ring Install colin is station 4 turning fixture Install colin is station 4 turning fixture Install weights and balance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studs for winding clamps Electrical test poloidal break Clean casting linspect and clean all holes] Install final clean & Kapton (Parallel activity) Install inner cladding plates and cooling Tubes Coil Winding Station 2 and 3 TASK DESCRIPTION Prepare coil for transfer Install winding form in turning fixture Install winding form in turning fixture Install winding form in turning fixture	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 0.5 1 2 1 7 5 27 Total Shifts 0.5 1 27 1 27 1 27 1 27 27 27 27 27 27 27 27 27 27	3 3 2 1 2 2 3 1 2 2 2 2 1 3 3 No. of Coil tech per shift 2 3 3 2	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 5 (hours per shift) 9 8 8 9 9	54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech [hours per coil] 9 9 24.0 36.0	32 16 0 16 0 0 0 0 0 0 0 0 0 124 Tech Shop Support [hours] 0 16.0 0.0	6 6 7 5 7 7 7 7 7 6 7 6 7 7 8 7 7 7 7 7 7 7 7 7	516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6
Tostill coll in station 4 furning fixture Install coll in station 4 turning fixture Install coll in station 4 turning fixture Install studies and balance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studies for winding clamps Electrical test poloidal break Clean casting [Inspect and clean all holes] Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install inner cladding plates and cooling Tubes Coil Winding Station 2 and 3 Prepare coil for transfer Install winding form in turning fixture Install winding clamps A Install Winding clamps A Install Vise Tee for coil clamps Install Vise A Install Vise Tee for coil clamps Install Vise A Install Vise Clamps as the molecule Install Vise A Install Vise Clamps as the molecule Install Vise Clamps Install Vise Clamps Install Vi	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 2 0.5 1 2 2 1 7 7 5 27 27 27 7 5 27 7 7 5 27 7 7 5 1 27 27 27 27 27 27 27 27 27 2 2 1 2 2 1 2 2 2 2	3 3 2 1 2 3 1 2 2 2 2 1 3 3 No. of Coil tech per shift 2 3 3 2 2 3 3	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech [hours per coil] 9 24.0 36.0 108.0	32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0	6 6 7 5 7 7 7 7 7 6 7 7 6 7 7 7 7 7 7 7	516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252 756	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6
Toshion a mount win to support mig Install coli in station 4 turning fixture Install coli in station 4 turning fixture Install studes for winding clamps Electrical test poloidal break Clean casting inspect and clean all holes] Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install inner cladding plates and cooling Tubes Coil Winding Station 2 and 3 Coil Winding Prepare coil for transfer Install winding form in turning fixture Install winding form in turning fixture Install upper Tee for coil clamps Install eductivity Prepare under the state of the s	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 2 0.5 1 2 2 1 7 5 27 5 27 7 5 27 7 5 27 7 5 27 7 5 27 1 27 4 6 6	3 3 2 1 2 3 1 2 2 2 2 1 1 3 3 No. of Coil tech per shift 2 3 3 2 3 3 1 2	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech [hours per coil] 9 24.0 36.0 108.0 54.0	32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 124 Tech Shop Support [hours] 0 16.0 0.0 0 0 0 0 0 0 0 0 0 0 0 0 0	6 6 7 5 7 7 7 7 7 7 7 6 6 7 7 7 7 7 7 7	516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252 756 378	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6
Toskil of a mount with a support mig Install coli in station 4 turning fixture Install weights and balance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studs for winding clamps Electrical test poloidal break Clean casting [Inspect and clean all holes] Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install niner cladding plates and cooling Tubes Coil Winding Station 2 and 3 Coil Winding Station 2 and 3 Prepare coil for transfer Install winding form in turning fixture Install upper Tee for coil clamps Install upper Tee for coil clamps Prepare coil coil clamps side bars A & B Prep groundwrap insulation [Parallel activity] Re-install C-11 lead blocks A & B Preping Coil winding compared winding form (cides A & P)	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 0.5 1 2 1 7 5 27 7 5 27 7 5 27 0.5 1 27 0.5 1 2 4 6 1 7 7 5 27 27 27 27 27 27 27 27 27 27	3 3 2 1 2 3 1 2 2 2 2 2 2 1 3 3 No. of Coil tech per shift 2 3 2 2 3 3 2 2 3 1 2 2 3 3 2 2 3 3 2 2 3 3 2 3 3 2 3	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36 18 63 135 135 488.5 Coil Tech [hours per coil] 9 24.0 36.0 108.0 54.0 126.0	32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0	6 6 7 5 7 7 7 7 7 7 6 7 6 7 7 6 7 7 7 7	516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252 756 378 144	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B5 thru B6; A5 thru A6; C6 B3 thru B6; A4 thru A6; C6
Position & mount wir to support mig Install coil in station 4 turning fixture Install coil in station 4 turning fixture Install weights and balance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studs for winding clamps Electrical test poloidal break Clean casting (Inspect and clean all holes] Install final clean & Kapton (Parallel activity) Install inner cladding plates and cooling Tubes Coil Winding Station 2 and 3 TASK DESCRIPTION Prep for Winding Prepare coil for transfer Install winding clamps side bars A & B Prep groundwrap insulation [Parallel activity] Install Winding clamps side bars A & B Prep groundwrap insulation [Parallel activity] Re-install locing clamps side bars A & B Prep groundwrap insulation (Parallel activity] Re-install set winding clamps side bars A & B Prep groundwrap insulation not winding form (sides A & B) Position inner GW insulation onto winding form (sides A & B)	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 0.5 1 2 1 7 5 27 Total Shifts 0.5 0.5 1 1 7 0.5 1 1 7 5 27 1 1 7 5 27 1 1 7 5 27 27 1 1 7 5 27 27 1 7 5 27 27 1 7 5 27 27 1 7 5 27 27 1 7 5 27 27 1 7 5 27 27 1 7 5 27 27 27 27 5 27 27 5 27 27 5 27 7 7 7 7 7 7 7 7 7 7 7 7 7	3 3 2 1 2 2 3 1 2 2 2 2 1 1 3 3 No. of Coil tech per shift 2 2 3 2 2 3 3 1 2 2 3 1 2 2 3 3 2 2 3 3 2 2 3 3 3 2 2 3 3 3 3	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 5 8 (hours per shift) 9 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech [hours per coil] 9 24.0 36.0 108.0 54.0 18.0 126.0 26.0 26.0 26.0 27.5	32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0	6 6 6 7 5 7 7 7 7 7 6 6 7 7 6 7 7 7 7 7	516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252 756 378 144 1008 288	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A4 thru A6; C6 B3 thru B6; A4 thru A6; C6
Position & mount with oscipport mig Install colin is station 4 turning fixture Install colin is station 4 turning fixture Install colin is station 4 turning fixture Install studies for winding clamps Electrical test poloidal break Clean casting (Inspect and clean all holes) Install studies for winding clamps Electrical test poloidal break Clean casting (Inspect and clean all holes) Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals (Remove lead blocks) Cladding final clean & Kapton (Parallel activity) Install inner cladding plates and cooling Tubes Coil Winding Station 2 and 3 TASK DESCRIPTION Prep for Winding Prepare coil for transfer Install winding form in turning fixture Install winding clamps side bars A & B Prep groundwrap insulation (Parallel activity) Re-install Cokes- sides A & B Position inner GW insulation onto winding form (sides A & B) Position inner GW insulation onto winding form (sides A & B) Position lacing strips sides A & B	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 0.5 1 2 1 7 5 27 7 5 27 7 5 27 7 5 27 1 7 5 27 27 1 7 5 27 27 27 27 27 27 27 27 27 27	3 3 2 1 2 3 1 2 2 2 2 1 1 3 3 No. of Coil tech per shift 2 2 3 3 2 2 3 3 1 2 2 3 3 2 2 3 3 2 2 3 3 2 2 3 3 2 2 3 3 3 2 2 3	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 5 8 (hours per shift] 9 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech [hours per coil] 9 24.0 36.0 108.0 54.0 18.0 126.0 36.0	32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0	6 6 7 5 7 7 7 7 7 6 7 7 6 7 7 7 7 7 7 7	516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252 756 378 144 1008 288	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A4 thru A6; C6
rosition a mount wir to support mg install coli in station 4 turning fixture install weights and balance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studs for winding clamps Electrical test poloidal break Clean casting linspect and clean all holes] Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install Inner cladding plates and cooling Tubes Coil Winding Station 2 and 3	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 2 0.5 1 2 7 5 27 27 5 27 27 5 27 5 27 5 27 27 5 27 27 27 27 27 27 27 27 27 27 27 27 27	3 3 2 1 2 2 3 1 2 2 2 2 1 3 3 2 2 3 3 2 2 3 3 1 2 2 2 2	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 5 Coil Tech [hours per shift] 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech [hours per coil] 9 24.0 36.0 108.0 54.0 18.0 18.0 36.0	32 16 0 0 0 0 0 0 0 0 0 0 0 0 0	6 6 7 5 7 7 7 7 7 7 6 7 7 8 7 7 7 7 7 7 7 7 8 8 8	516 258 120 269.5 160 378 31.5 252 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 280 252 756 378 144 1008 288	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A4 thru A6; C6
Toshion a mount with a support mig Install coli in station 4 turning fixture Install weights and balance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studs for winding clamps Electrical test poloidal break Clean casting [Inspect and clean all holes] Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install studing Station 2 and 3 Coil Winding Station 2 and 3 Coil Winding form in turning fixture Install winding form in turning fixture Install winding form in turning fixture Install winding form in station [Parallel activity] Re-install Query Teo for coil clamps Install vinding form in turning fixture Install upper Tee for coil clamps Prep groundwrap insulation (Parallel activity] Re-install G-11 lead blocks A & B Prosition lacing strips sides A & B Wind Side "A" Braze & secure 1st. coil lead set [inc. brazing] Position leads & Wind side A	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 0.5 1 2 1 7 5 27 7 5 27 7 0.5 1 0.5 1 7 5 1 27 7 5 1 27 7 5 1 27 27 27 27 27 27 27 27 27 27	3 3 2 1 2 3 1 2 2 2 2 2 1 3 3 No. of Coil tech per shift 2 3 2 2 3 1 2 2 2 3 1 2 2 2 2 2 2 2 2 2	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech [howrs per coil] 9 24.0 36.0 108.0 54.0 126.0 36.0 300.0	32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0	6 6 7 5 7 7 7 7 7 7 6 7 7 6 7 7 6 7 7 7 7	516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252 756 378 144 1008 288 288 2400	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A4 thru A6; C6
Position & Induit Wir to Support Ting Install coil in station 4 turning fixture Install coil in station 4 turning fixture Install studies for winding clamps Electrical test poloidal break Clean casting wings using metrology equipment Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install inner cladding plates and cooling Tubes Coil Winding Station 2 and 3 TASK DESCRIPTION Prep for Winding Prepare coil for transfer Install upper Tee for coil clamps Install upper Tee for coil clamps Install winding form in turning fixture Install winding form in turning fixture Install upper Tee for coil clamps Install winding clamps side bars A & B Prep groutwrap insulation [Parallel activity] Re-install G-11 lead blocks- sides A & B Position inner GW insulation provide lead clivity] Re-install G-11 lead blocks - sides A & B Position indicing strips sides A & B Position inter GW insulation onto winding form (sides A & B) Position leads & Wind side A Reposition leads & Kind A <td>9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451</td> <td>2 1 1 2.5 2 0.5 1 2 1 7 5 27 Total Shifts 0.5 1 27 O 5 27 O 5 27 O 5 27 O 5 27 O 5 27 27 5 27 27 5 27 27 5 27 27 5 27 27 5 27 27 5 27 27 5 27 27 5 27 27 5 27 27 5 27 27 5 2 7 2 2 2 2 2 2 2 2 2 2 2 2 2</td> <td>3 3 2 1 2 2 3 1 2 2 2 2 1 3 3 2 2 3 3 2 2 3 3 2 2 2 2</td> <td>9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9</td> <td>54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech [hours per coil] 9 24.0 36.0 108.0 126.0 36.0 300.0 24.0</td> <td>32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0</td> <td>6 6 7 5 7 7 7 7 7 6 7 6 7 7 6 7 7 7 7 7</td> <td>516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252 756 378 144 1008 288 2400 320</td> <td>B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A4 thru A6; C6</td>	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 0.5 1 2 1 7 5 27 Total Shifts 0.5 1 27 O 5 27 O 5 27 O 5 27 O 5 27 O 5 27 27 5 27 27 5 27 27 5 27 27 5 27 27 5 27 27 5 27 27 5 27 27 5 27 27 5 27 27 5 27 27 5 2 7 2 2 2 2 2 2 2 2 2 2 2 2 2	3 3 2 1 2 2 3 1 2 2 2 2 1 3 3 2 2 3 3 2 2 3 3 2 2 2 2	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech [hours per coil] 9 24.0 36.0 108.0 126.0 36.0 300.0 24.0	32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0	6 6 7 5 7 7 7 7 7 6 7 6 7 7 6 7 7 7 7 7	516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252 756 378 144 1008 288 2400 320	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A4 thru A6; C6
Position & induit ver to support ring Install colin is station 4 turning fixture Install colin is station 4 turning fixture Install colin is station 4 turning fixture Install studies for winding clamps Electrical test poloidal break Clean casting (Inspect and clean all holes) Install colin is fation 4 kepton (Parallel activity) Install final clean & Kapton (Parallel activity) Install inner cladding plates and cooling Tubes Coil Winding Station 2 and 3 TASK DESCRIPTION Prep for Winding Prepare coli for transfer Install winding clamps ald backs & B Prep groundwrap insulation (Parallel activity) Install Vision (Station 2 and 3 Coil Winding Station 2 and 3 Prep for Winding Prepare coil for transfer Install winding form in turning fixture Install Vision (Station 2 and 3 Coil Winding Station 2 and 3 Prep for Winding Prep groundwrap insulation [Parallel activity] Reinstall Colex - sides A & B Prog tion inner GW insulation onto winding form (sides A & B) Position inner GW insulation onto winding form (sides A & B) Position lacing strips sides	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 2 0.5 1 2 2 1 7 5 27 7 5 27 7 5 27 7 5 27 7 5 27 27 27 27 27 27 27 27 27 27	3 3 2 1 2 3 3 1 2 2 2 2 1 3 3 2 2 3 3 2 2 3 3 2 2 3 3 1 2 2 2 2	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech [hours per coil] 9 9 24.0 36.0 108.0 54.0 18.0 126.0 37.0 37.	32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0	6 6 7 5 7 7 7 7 7 6 7 7 6 7 7 7 7 7 7 7	516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252 756 378 144 1008 288 2400 320	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A4 thru A
rosition a mount wir to support mg install colin is station 4 turning fixture install colin is station 4 turning fixture install studies and balance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studies for winding clamps Electrical test poloidal break Clean casting linspect and clean all holes] Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install Inner cladding plates and cooling Tubes Coil Winding Station 2 and 3 Coil Winding Station 2 and 3 Prep for Winding Prepare coil for transfer Install winding form in turning fixture Install winding clamps side bars A & B Prep groundwrap insulation [Parallel activity] Install colin Lead blocks- sides A & B Position inner GW insulation onto winding form (sides A & B) Position inner GW insulation not winding form (sides A & B) Position inner GW insulation onto winding form (sides A & B) Position lacing strips sides A & B Wind Side "A" Braze & secure 1st. coil lead set [inc. brazing]	9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 2 0.5 1 2 1 7 5 27 27 5 27 7 5 27 27 27 27 27 27 27 27 27 27	3 3 2 1 2 2 3 1 2 2 2 1 3 3 2 2 3 3 2 2 3 3 1 2 2 2 2	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 5 Coil Tech [hours per shift] 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	54 27 20 22.5 32 54 4.5 18 63 135 488.5 Coil Tech [hours per coil] 9 24.0 36.0 108.0 54.0 18.0 126.0 36.0 300.0 24.0	32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 124 Tech Shop Support [hours] 0 16.0 0.0 0.0 0.0 0 0 0 0 0 0 0 0 0 0 0 0 0	6 6 6 7 7 5 7 7 7 7 7 7 6 7 7 7 7 7 7 7	516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252 756 378 288 2400 320 288 2400 320 288 2400 320 288	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A4 thru A
rosition a mount with a support mig Install coli in station 4 turning fixture Install weights and balance casting and ring assembly Weld monuments, stud adapters & lead nuts Measure casting wings using metrology equipment Install studs for winding clamps Electrical test poloidal break Clean casting [Inspect and clean all holes] Install Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install inner cladding plates and cooling Tubes Coil Winding Station 2 and 3 Coil Winding Station 2 and 3 Coil Winding Station 2 and 3 Prep for Winding Prepare coil for transfer Install winding form in turning fixture Install winding form in turning fixture Install winding form in turning fixture Install winding clamps side bars A & B Prep groundwrap insulation (Parallel activity] Re-install Gentes Sides A & B Prep groundwrap insulation (Parallel activity] Re-install Gentes Sides A & B Prep groundwrap insulation onto winding form (sides A & B) Position iner GW insulation onto winding form (sides A & B) Position lacing strips side A & B Mind Side "A" Braze & secure 1st. coil lead set [inc. brazing] Position leads & Wind side A Reposition coil from side A to side B Wind Side "B" Position leads & Wind side B Wind Side "B"	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 1 1 2.5 2 0.5 1 2 1 7 5 27 7 5 27 7 5 27 7 6 1 2 1 7 5 27 7 27 7 5 27 27 27 27 27 27 27 27 27 27	3 3 2 1 2 3 1 2 2 2 2 2 1 3 3 2 2 3 3 2 2 3 3 1 2 2 3 3 1 2 2 3 3 1 2 2 3 3 1 2 2 3 3 1 2 2 3 3 2 2 3 3 2 2 3 3 3 3	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 8 8 9 9 9 9 8 8 9	54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech [howrs per coil] 9 24.0 36.0 108.0 54.0 18.0 36.0 36.0 300.0 24.0	32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0	6 6 7 5 7 7 7 7 7 6 7 7 6 7 7 7 7 7 7 7	516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Aanhrs Revised 63 280 252 756 378 144 1008 288 2400 320 288 2400 320	B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A4 thru A

WBS Number: 142									
WBS Litle: Windings and Assembly									
Job Numbers: 1408 1451 & 1459									
Job Title: Modular Coll Winding Supplies (1408)									
Job Title: Modular Coil Winding Operations (1451)									
Job Title: Modular Coil Punch List Items (1459)									
Joh Managar: Jim Chrzanowski									
	1	1	1	1	1	1		1	
	1	1				1		1	
Eabrication and Assembly									
		-							
Conditions and Resis for Estimate		-							
Conditions and Basis for Estimate									
1) All estimates are based on work performed from May 1, 2007 through the end of modular coi	I fabrication pro	ogram							
2) Estimates are based on actual in-field times as well as consultation with metrology personne	I and techniciar	าร							
3) M&S based upon actual contracts and monthly M&S supporting winding activities on first nir	ne coils - see sp	ecifics in I	M&S below						
Measure reposition & re-measure coil hundle (sides A & B)	9450-1***-1451	8	3	Q	216.0	0.0	8	1728	B3 thru B6: A4 thru A6: C6
Secure Lacing	9450-1***-1451	2	2	9	36.0	0.0	8	288	B3 thru B6: A4 thru A6: C6
Complete groundwrap installation	9450-1***-1451	6	2	9	108.0	0.0	8	864	B3 thru B6: A4 thru A6: C6
Unanticinated Delays/Rework Activities	3400 1 1401	0	-	5	100.0	0.0	ů.	004	Bo and Bo, / (+ and / 10, 00
Tasks TBD	9450-1***-1451	3	3	9	81.0	0	8	648	
		35.75	-	~	1548	32	, v	12393	TOTALS hours
		00.10			1580	52		12000	. C.ALO HOURS
L Final Coil prep & Mold Application (Stations 2 & 3)		Total	No. of	Coil Tech	Coil Tech	Tech Shor	No. of	Total	
	Job Number	Chiffe	No. of	Con rech	Con rech	Support	NO. OI	Manhra	601 8
TASK DESCRIPTION	JOD NUMBER	Shins	Coll tech	[nours per	[nours per	Support	colls	Revised	COILS
Final Optil Dana			per snift	sniftj	colij	[nours]	remaining	Revised	
Final Con Frep	0450 4*** 4454				00			000	Online A.4. AG: DO DO and OC
	9450-1	4	1	9	36	0	8	288	Colls A4-A6; B3-B6 and C6
	9450-1 -1451	12	2.5	9	270	0	8	2160	Colls A4-A6; B3-B6 and C6
Cut, braze, silverplate and position 2nd. coll lead set [side A]	9450-1^^-1451	3	2	9	54	0.0	8	432	Colls A4-A6; B3-B6 and C6
Cut, braze, silverplate and position 2nd. Coll lead set [side B]	9450-1 -1451	3	2	9	54	0.0	8	432	Colls A4-A6; B3-B6 and C6
Soft solder and clean all lead joints	9450-1^^-1451	2	1	9	18	0.0	8	144	Colls A4-A6; B3-B6 and C6
Install Outer co-wound Diagnostic loops	9450-1 -1451	2	2	9	36	0	8	288	Colls A4-A6; B3-B6 and C6
Measure position of co-wound diagnostic loops	9450-1^^-1451	1	2	9	18	0	8	144	Colls A4-A6; B3-B6 and C6
Perform pre-vPi elect. & pressure tests	0450 4*** 4454	4	0	0	40	0	0	444	
Pressure test cryo innes	9450-1 -1451	1	2	9	18	0	8	144	Colls A4-A6; B3-B6 and C6
Perform preliminary (pre-vpi) electrical tests	9450-1 - 1451	0.5	2	10	10	0	8	80	Colls A4-A6; B3-B6 and C6
Install bag mold around modular coll	0450 4*** 4454	4	4	0	0	0		70	Online A.4. AG: DO DO and OC
Prep sprue sub-assemblies [Parallel activity]	9450-1	1	1	9	9	0	8	12	Colls A4-A6; B3-B6 and C6
Prepiedo Sprue Sub-assembnes [Paraliei activity]	9450-1 -1451	0.5	1	9	4.5	0	8	30	Colls A4-A6, B3-B6 and C6
Install G-11 final clamp pads & sprue bases	9450-1*** 1451	1	2	9	18	0	8	144	Colls A4-A6; B3-B6 and C6
	9450-1 -1451	1	1	9	9	0	8	12	Colls A4-A6, B3-B6 and C6
Install glass roving and sheet over chill plates	9450-1 -1451	1	2	9	18	0	8	144	Colls A4-A6; B3-B6 and C6
install sincone bag & sprues	9450-1 -1451	5	2	9	90	0	8	120	Colls A4-A6, B3-B6 and C6
vacuum pumpuomin kiiv overcoat a leak repair	9450-1 -1451	2.5	3	9	54 67.5	0	9	400	Colls A4-A6, B2-B6 and C6
	9430-1 -1431	2.5	3	9	79.4	0	9	6202 5	Colls A4-A0, B2-B0 and C0
		21.23			/ 64	U		0393.5	TOTALS HOURS
VPI Activities (Station 5)		Total	No of	Coil Tech	Coil Tech	Toch Shor	No. of	Total	
	Job Number	Shifte	Coil tech	Con Tech	Con Tech	Support	NU. OF	Maphro	CO!! 5
	JOD Number	Shins	con tech	chiffi		Thours	cons	Widnins	COILS
			per sinit	aniitj	colij	[nours]	remaining		
rillal VFI Fiep	0450 1*** 4454	0.5	2	0	0	0	0	04	Colle A4 A6: P2 P6 and C6
r repare mo ior u dalister Transformendular o oli to Autoplavo	9450-1*** 4454	0.0 4	2	9	3	16	9	01	Colle A4 A6: P2 P6 and C6
Transier moutiai Coli to Autociave	9450-1*** 4454		3	Ő	<u></u>	01		500	Colle A4 A6: P2 P6 and C6
Prepare MC for VFr (Connect III INPS & IC; leak Check)	9450-1*** 1451	3	3	8 10	12	0	9	540	Colls A4-A6; B2-B6 and C6
	9450-1 - 1451	2	3	10	60	0	9	540	Colls A4-A6; B2-B6 and C6
	0450 1*** 4454	4	A	10	40	0	0	420	Colle A4 A6: P2 P6 and C6
	9450-1 -1451	-	4	12	40	U		432	
Temperature rampup and Cure	9450-1*** 4454	3	2	12	12	0	9	048	Colle A4 A6: P1 P6 and C6
remperature rampup and rost cure	9450-1 -1451	2	2	12	48	0	10	480	Colla A4-A0, D1-B0 and C0
remperature rampdown	9450-1*** 4454			10	10	0	10	100	Colle A4 A6: P1 P6 and C6
Ureanup & reauy attroctave for coll removal Rabuild manifolds and prep attroctave for next VPI	9450-1^**-1451	2 F	3	10	6U 1E0	0	10	600	Colls A4-A6; B1-B6 and C6
	9450-1-1451	o ar	3	10	100	U	IU	1500	
		20.5			553	16		5389	TOTALS nours
					569	T 1 C			
Post VPI Activities (Station 1)		Total	No. of	Coil Tech	Coil Tech	fech Shop	No. of	Total	
TASK DECODERTION	Job Number	Shifts	Coll tech	[hours per	[hours per	Support	coils	Manhrs	COILS
IASK DESCRIPTION	0.450 4.000	0.5	per shift	sniftj	coil]	[nours]	remaining		
Prepare control transfer	9450-1***-1451	0.5	2	9	9	0	10	90	Colls A4-A6; B1-B6 and C6
Iranster modular coil from Autocave to Station #1	9450-1***-1451	1	3	8	24	16	10	400	Colls A4-A6; B1-B6 and C6
Remove studs, structural shell & sprues	9450-1***-1451	8	2	9	144	0	11	1584	Colls A3-A6; B1-B6 and C6

		1	r			1		1	
WBS Number: 142									
WBS Title: Windings and Assembly									
JOD Numbers: 1408, 1451, & 1459									
Job Title: Modular Coil Winding Supplies (1408)									
Job Title: Modular Coll Winding Operations (1451)									
Job Title: Modular Coil Punch List Items (1459)									
Joh Managori, Jim Chrzanowski									
Fabrication and Assembly									
Conditions and Basis for Estimate									
1) All estimates are based on work performed from May 1, 2007 through the end of modular coi	I fabrication pro	ogram							
2) Estimates are based on actual in-field times as well as consultation with metrology personne	l and techniciar	าร์							
3) M&S based upon actual contracts and monthly M&S supporting winding activities on first nin	e coils - see sn	ecifics in	M&S below						
Install final coil clamps	9450-1***-1451	3	2	9	54	0	11	594	Coils A3-A6: B1-B6 and C6
Perform (room temperature) electrical & Pressure Tests	9450-1***-1451	1	2	9	18	0	11	198	Coils A3-A6; B1-B6 and C6
Remove coil from ring assembly	9450-1***-1451	1	3	10	30	16	11	506	Coils A3-A6; B1-B6 and C6
		14.5			279	32		3372	TOTALS hours
					311				
Punch List Items		Total	No. of	Coil Tech	Coil Tech	Tech Shop	No. of	Total	
	Job Number	Shifts	Coil tech	[hours per	[hours per	Support	coils	Manhrs	COILS
TASK DESCRIPTION			per shift	shift]	coil]	[hours]	remaining		
Mount diagnostic boxes	9450-1***-1459	0.5	2	9	9	0	18	162	All coils
Route and secure diagnostic wires to box	9450-1***-1459	0.5	2	9	9	0	18	162	All coils
Install final clamps [colls previously finished]	9450-1***-1459	3	2	9	54	0	6	324	Coils A1; C1 thru C5
rmaize cooling tubes	9450-1 -1459	2	2	9	10	0	10	324	Coils A2 and A4
Install Rogowski cons	9450-1 -1459	2	2	9	30	134	1	12	[134 strain gauges/ 600 TC]
Test thermocouples a shall be mocouples [2 brs/SG or TC]	9450-1***-1459	0	1	0	41	0	18	738	[134 strain gauges/ 600 TC]
Measure final coil clamp surfaces	9450-1***-1459	1.5	2	9	27	0	18	486	All coils
Install Thermal Insulation over coil	9450-1***-1459	3	2	9	54	0	18	972	All coils
Replace co-wound loop on C4	9450-1***-1459	1	2	9	18	0	1	18	Coil C4
Install additional flange holes [12 per type "C" winding form]	9450-1***-1459	0	0	0	0	192	6	1152	[16 hr/hole]
Measure as built coils as required	9450-1***-1459	2	2	9	36	0	18	648	
Ground Poloidal Break Hardware	9450-1***-1459	0	0	0	0	2	18	36	All coils
Ground lead jumper studs	9450-1***-1459	0.2	1	8	1.6	0	18	28.8	All coils
	0.150 (1888 (1.150				2				[60] holes@ 2hr ea.&[20] holes
Grind tiange pockets for nardware	9450-1*** 1459	0	0	0	0	440	1	440	@ 16hr ea.
Grind winding form wings/creatances	9450-1 -1459	0	0	0	0	24	10	432	All colls
moorropan						200		6328.8	TOTAL Shours
								0320.0	
			Coil Tech	Coil Tech	Tech Shop	No. of	TOTAL	M&S	
MATERIAL & SUPPLIES	Job Number		[hours per	[hours per	Support	coils	Tech	w/o G&A	COILS
			shift]	coil]	[hours]	remaining	Hours		
Coil Supplies									
1) Insulation	9450-1***-1408			0	0	9		\$8,000.00	
2) Epoxy- CTD-101 [\$4500.00 per coil @ assume 9 injections]	9450-1***-1408			0	0	9		\$45,000.00	Coils A4-A6; B2-B6 and C6
3) Miscellaneous and safety supplies [@ \$7000/month]	9450-1***-1408			0	0	9		\$63, 000 .00	
4) Strain gages and thermocouples	9450-1***-1459						/	\$90,000.00	1C.\$80each x600 =\$48k; SG
							(\$290 each x 62=\$10k FB 3G
									\$217eachx72=\$20K,111SC \$4K
5) Cutting hardware for flange bolts	9450-1***-1459							\$3,000.00	
vri Supplies 1) Enovy/glass for mold shell [Hysol]	9450-1*** 1409			0	0	0	*	\$13,000,00	
2) VPI clean manifold contract [\$1100 00 per VPI]	9450-1 -1408			0	0	9		\$10,000.00	
Tech Shop Support-	3430-1 -1400			0	0	3		\$10,000.00	
Miscellaneous activities- TBD	9450-1***-1408			0	80	8	640		Coils A4-A6; B3-B6 and C6
	9450-1***-1459				50				
			1					\$232,000.00	TOTALS
	\$/ Gallon	Gal/coil	per coil	No. coils					
Hysol 2039 Resin	\$82.00	4.5	\$369.00	9	\$3,321.00				
Hysol 3561 Hardener	\$211.00	1.5	\$316.50	9	\$2,848.50				
	\$/Box	Bx/coil	per coil	No. coils					
Glass	\$350.00	2	\$700.00	9	\$6,300.00	1			

WBS Number: 142							
WBS Title: Windings and Assembly							
Job Numbers: 1408, 1451, & 1459							
Job Title: Modular Coil Winding Supplies (1408)							
Job Title: Modular Coil Winding Operations (1451)							
Job Title: Modular Coil Punch List Items (1459)							
Job Manager: Jim Chrzanowski							
Fabrication and Assembly							
Conditions and Basis for Estimate							
1) All estimates are based on work performed from May 1, 2007 through the end of modular coil	fabrication pro	gram					
2) Estimates are based on actual in-field times as well as consultation with metrology personnel	and techniciar	IS					
3) M&S based upon actual contracts and monthly M&S supporting winding activities on first nin	e coils - see sp	ecifics in M	//&S below				
				•	\$12,469.50		
						1	

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

WBS Number: 142 WBS Title: Windings and Assembly Job Numbers: 1408, 1451, & 1459 Job Title: Modular Coil Winding Supplies (1408) Job Title: Modular Coil Winding Operations (1451) Job Title: Modular Coil Punch List Items (1459) Job Manager: Jim Chrzanowski

Uncertainty of the Estir	nate				
	High	Medium	Low	<u>Uncertainty</u> Range (%)	Comments/Other Considerations
<u>Job 1408</u>				-15%/+25%	
Design Maturity			х		Unknowns of equipment reliability
Design Complexity			Y		Mostly off-the-shelf items
Design complexity			^		
Job 1451 Design Maturity Design Complexity	X X			-15%/+25%	Known and proven procedures and processes Have built 12 coils and have proven processes even with tight metrology and tolerances.
Job 1459 Design Maturity Design Complexity		x	x	-10%/+15%	Still uncertainty on number of field changes (e.g., number of holes, etc.) Standard field work.

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

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

Residual Impacts

					Cost In	npact	Schedule I	npact
Job	Risk Description	Likelihood of Occurring	Mitigation Plan	Basis of estimate	Low	High	Low	High
1408	3 - NONE							
1451	I Damage or loss of modular coil during VPI or testing requiring the conductor to be stripped off and re- wound	U	Continue to use same rigorous process used for first 12 coils during which there were no fabrication mihaps requiring re- winding a coil	~\$35K in materials; ~\$380K in labor. 7.5 months to do work with the potential for a 2 month impact on the critical path.	+ \$400	+ \$450	+ 0.00	+ 2.00
	Failure of major piece of winding equipment (e.g., motor, gear box, etc.) resulting in extended downtime in a winding station	U	Use three remaining winding stations to continue MC fabrication while fourth station is being repaired	~\$10K for equipment plus repair costs	+ \$10	+ \$30	+ 0.00	+ 0.00

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%)</p>

Assumptions

Cost: Would need ~\$4.5K of Expoxy + ~\$3K of insulation + \$1.5K of shell + ~\$5K of other misc components/materials + cost of new lead blocks of ~\$15K => round off to ~\$35K. Labor ~\$380K assuming ~4.5 months to rework and redo coil.

<u>Schedule:</u> To redo the coil: Need 138 shifts x 3 men/shift x 8 hours/shift => 3 months + To rework of ~65 shifts x 3 men/shift x 8 hours/shift => 1.5 months. Need an additional ~3 months to order lead blocks if needed. Anticipate ~3 months to re-order and obtain new lead blocks. If Type B coil is the one to fail, could add 1-2 months to critcal path at an added "standing army" cost of ~\$260K/months or ~\$520K.

WBS Number: 142 WBS Title: Windings and Assembly Job Numbers: 1408, 1451, & 1459 Job Title: Modular Coil Winding Supplies (1408) Job Title: Modular Coil Winding Operations (1451) Job Title: Modular Coil Punch List Items (1459) Job Manager: Jim Chrzanowski

Thereas and the	Pri	nceton	Plas	ma Phy	ysics Labor	atory Proc	urement (Card Syst	em
Home	Reconc	iliation						Net ID	: tmeig
P-Card L Requestor:	og # : TM Eugene	I -11629 FKeams	2 Sta	1/8 atus: New	and 1/4 Dia. fi	ber glass rope Cardholder:	e tmeighan	Created: 5	/7/2007
-Card Lo	g Line Iter <u>s</u> Signatu	m re Authorit	<u>ty 01</u>	ther Requir	ements <u>Reviews</u>	Attachments	Change Del	ivery/Requesto	r Info
Line	Quant	tity U	OM	Unit Price	Extended	Receipt Date	Receipt Comm	nent	1
1	1125	0 F	т 📄	\$.11	\$1237.50	8/3/2004			
2	5100	F	ग 📃	\$.13	\$663.00	8/3/2004			
Enter Comp 789- 50-4	lete Descripti 1720 GLR188	on - include HD AMI Gl	e make, r saa rope	model, item e 3/16" dia	s specifications, etc. 2,550 FT/CS				
Enter Comp 789- 50-4 Cost Center Cost Ctr	lete Descripti 1720 GLR188 Distributio Wrk Pkg	on - include HD AMI Gl n Accoun Job Pkg	a make, r saa rope ts for tt Exp	model, item e 3/16" dia his Line Ite	s specifications, etc. 2,550 FT/CS em			Dollar	Delete
Enter Comp 789- 50-4 Cost Center Cost Ctr 9450	Distribution Wrk Pkg	on - include HD AMI Gl n Accoun Job Pkg 1408	ts for the Exp cl d301	model, item e 3/16" dia his Line Ite pense lass MATERIAI	s specifications, etc. 2,550 FT/CS em LS & SERVICES			Dollar Amount \$1,900.50	Delete
Enter Comp 789- 50-4 ost Center 9450 Add 0 I Jendor Nam	Distribution Distribution Wrk Pkg 1*** Line Items ne: G. Co. 1-800.	on - indude HD AMI Gl n Accoun Job Pkg 1408	a make, r saa rope ts for ti Exp Ci 4301 Add 0	model, item e 3/16" dia his Line Ite oense lass - MATERIAI	s specifications, etc. 2,550 FT/CS em LS & SERVICES Centers Dat 5/7	Add Lines	Date E	Dollar Amount \$1,900.50 Expected:	Delete
Enter Comp 789- 50-4 cost Center Cost Ctr 9450 Add 0 I Jendor Nam Auburn MF4	Pete Descripti 720 GLR188 Distributio Wrk Pkg 1*** Line Items ne: G. Co 1-800	on - indude HD AMI GI Job Pkg 1408	a make, r saa rope tts for tt Exp Cl 4301 Add 0	model, item e 3/16" dia his Line It bense lass -MATERIAI Cost C	s specifications, etc. 2,550 FT/CS em LS & SERVICES Centers Dat	Add Lines	Date E	Dollar Amount \$1,900.50 Expected:	Delete
Enter Comp 789- 50-4 Cost Center Oost Ctr 9450 Add 0 I Vendor Nam Auburn MF4 Purchased I Shipping/H	lete Descripti 720 GLR188 Pistributk Wrk Pkg 1*** Line Items G. Co 1-800 Arnount: andling:	on - included HD AMI GI Job Pkg 1408	e make, r saa rope tts for tt Exp Cl 4301 Add 0	model, item e 3/16" dia his Line Itu bense lass - MATERIAI	s specific ations, etc. 2,550 FT/CS em LS & SERVICES Centers 5/7 \$1900.51 \$1900.51	Add Lines) e Ordered: /2007 Other Charges	Date 5	Dollar Amount \$1,900.50 Expected:	Delete
Enter Comp 789- 50-4 cost Center Cost Ctr 9450 Add 0 I Vendor Nam Aubum MF4 Purchased J Shipping/H Sales Tax: Other Chan	lete Descripti 720 GLR188 • Distributica wrk Pkg 1*** Line Items 	on - indude HD AMI GI Job Pkg 1408	a make, r saa rope tts for tt Exp Cl 4301 Add 0	model, item e 3/16" dia his Line It pense lass - MATERIAI Cost C	s specific ations, etc. 2,550 FT/CS em Dat Senters Dat \$/2 \$1900.51 \$0.00 \$0.00 \$0.00	Add Lines e Ordered: /2007	Date f	Dollar Amount \$1,900.50	Delete

· Prevint internet	Pri	nceton	Plas	ma Phy	sics Labor	atory Proc	urement C	ard Syst	em
Home	Recond	iliation						Net ID	: tmeig
-Card I	Log # : TM	1-11607	7	RE 20	39 Hysol Epo	xy and HD 356	51 Hardner		
equestor:	Eugene	F Kearns	Sta	tus: Approv	ed	Cardholder:	tmeighan	Oreated: 3/	21/2007
-Card Lo	og Line Ite	m							
ine Iten	ns <u>Signatu</u>	ire Authorit	<u>o</u> <u>o</u>	ther Requirer	ments <u>Review</u>	<u>s</u> <u>Attachments</u>	Change Deliv	/ery/Requesto	r Info
ne	Quan	tity U	ом	Unit Price	Extended	Receipt Date	Receipt Comme	ent	
	8	E	A 📄	\$80.77	\$646.16	1/4/2007			
nter Com RE 2039 I	plete Descripti Hysol Resin	ion - include	a make,	model, items :	specifications, etc	a -			
	8	E	A	\$210.89	\$1687.12	1/4/2007			
nter Com HD-3561	plete Descripti Hysol Hardne	ion - include r	e make,	model, items :	specifications, etc				
	2	E	A	\$5.00	\$10.00	1/4/2007			
nter Com Certificate	plete Descripti a of Complian	ce for RE-2	ts for ti	model, items : 0 and HD356 his Line Iter	n			Dellar	
ost Cente	r Distributio	In Account	Eve	and the second second					Delete
o st Cente Cost Ctr	Wrk Pkg	Job Pkg	Exp C	ense lass				Amount	
o st Cente Cost Otr 450	Wrk Pkg	Job Pkg 1408	Exp C 4301	ense lass -MATERIALS	& SERVICES			Amount \$2,386.62	
st Cente Cost Or 450	Wrk Pkg	Job Pkg 1408	Exp C 4301 Add 0	ense lass -MATERIALS Cost Ce	& SERVICES	Add Lines		Amount \$2,386.62	
ost Cente Cost Ctr 450 dd 0 andor Nar	Er Distributik Wrk Pkg 1*** Line Items me: son Co. 401-2	Job Pkg 1408 295-3100	Exp C 4301 Add 0	ense lass -MATERIALS Cost Ce	s & SERVICES nters Dat	Add Lines	Date Ex	Amount \$2,386.62	
st Cente Cost Or 450 dd 0 andor Nar	Er Distributk Wrk Pkg 1*** Line Items me: son Co. 401-2	Job Pkg 1408 295-3100	Exp C 4301 Add 0	ense -MATERIALS Cost Ce	6 & SERVICES nters Da 3/	Add Lines	Date Ex	Amount \$2,386.62	
st Cente Cost Ctr 450 dd 0 endor Nar .S. Morris	Line Items me: Amount:	Job Pkg 1408 295-3100	Exp C 4301 Add 0	ense -MATERIALS Cost Ce	\$ & SERVICES nters 2/ \$2343.2	Add Lines) te Ordered: 21/2007	Date E	4mount \$2,386.62	
st Cente Cost Or 450 dd 0 andor Nar .S. Morris urchased hipping/F	r Distributic Wrk Pkg 1*** Line Items son Co. 401-2 Amount: Handling:	n Accoun Job Pkg 1408 295-3100	Exp C 4301 Add 0	ense -MATERIALS Cost Ce	5 & SERVICES nters	Add Lines) te Ordered: 21/2007	Date E	Amount \$2,386.62	
st Cente Cost Ctr 450 dd 0 endor Nar endor Nar s.S. Morris urchased hipping/h ales Tax:	r Distributic Wrk Pkg 1*** Line Items me: son Co. 401-2 Amount: fandling:	300 Account 300 Pkg 1408 295-3100	Exp C 4301 Add 0	ense -MATERIALS Cost Ce	5 & SERVICES nters 3/ \$2343.2 \$43.3 \$0.	Add Lines) te Ordered: 21/2007 4 Cther Charges	Date E	Amount \$2,386.62	
est Cente Cost Or 450 dd 0 endor Nar S. Morris urchased hipping/F ales Tax: ther Cha	r Distributic Wrk Pkg 1*** Line Items son Co. 401-2 Amount: Handing: rges:	300 Account 300 Pkg 1408 295-3100	Add 0	ense ess -MATERIALS Cost Ce	5 & SERVICES nters 2343.2 \$43.3 \$0.0 \$0.0	Add Lines) te Ordered: 21/2007 Cther Charges	Date Ex	Amount \$2,386.62	
st Cente Cost Ctr 450 andor Nara andor Nara s.S. Morris urchased hipping/H ales Tax: ther Char otal Char	r Distributic Wrk Pkg 1*** Line Rems me: son Co. 401-2 Amount: tandling: rges:	300 Pkg 1408	Add 0	-MATERIALS Cost Ce	5 & SERVICES nters 2343.2 \$43.3 \$0.00 \$0.00 \$2386.6	Add Lines Add Lines 21/2007	Date Ex	Amount \$2,386.62 rpected:	

https://bones.pppl.gov/ppplPcard/PCard.asp?action=2&Page=7

5/10/2007

https://bones.pppl.gov/ppplPcard/PCard.asp?action=0&Page=7&txtPCDNo=TM-116077 5/10/2007

WBS Number: 142 WBS Title: Windings and Assembly Job Numbers: 1408, 1451, & 1459 Job Title: Modular Coil Winding Supplies (1408) Job Title: Modular Coil Winding Operations (1451) Job Title: Modular Coil Punch List Items (1459) Job Manager: Jim Chrzanowski



<u>Mod Coil Test Flange</u> Assuming A-B joints with 18 inch centers => 6 holes per joint vs. assumed 2-3 estimated by Task Force.