		1	1		1		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									
	1				r I	1		1	1
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	I fabrication pro	ogram							
2) Estimates are based on actual in-field times as well as consultation with metrology personne	and technicial	าร							
3) M&S based upon actual contracts and monthly M&S supporting winding activities on first nir	ne coils - see sp	ecifics in	M&S below						
		EACM	EACH	EMON	EMEN				
TASK DESCRIPTION		EAEM Chrz.	EAEM Raft.	EMSM Meighan	EMEM Languish				
		hours	hours	hours	hours				
Engineering and Oversight		70%	40%	70%	40%				
			70 hr/month						
			through						
		120	completion						
LOE nominal hours for 14mo. Production	9450-1***-1451	hr/month 1680	of winding 980	120 hr/month 1680	70 hr/month 980	1			
		1000	960	1000	960				
Casting Preparation		Total	No. of	Coil Tech	Coil Tech	Tech Shop	No. of	Total	
TASK DESCRIPTION	Job Number	Shifts	Coil tech per shift	[hours per shift]	[hours per coil]	Support [hours]	coils	Manhrs	COILS
RESA Building Activities			per sinit	Shirtj	conj	[IIUUIS]			
Unload & unbox winding form	0450 4*** 4450	<u> </u>							
	9450-1***-1459	0.5	0	0	0	12	5	60	B5 & B6; A5 & A6; C6
Inspect casting [surfaces, magnetic permeability]	9450-1***-1459	0.5	0	0 9	0 4.5	12 0	5 5	60 22.5	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6
Inspect casting [surfaces, magnetic permeability]	9450-1***-1451	0.5	1	9	4.5	0	5	22.5	B5 & B6; A5 & A6; C6
			-	-					
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring	9450-1***-1451 9450-1***-1459 9450-1***-1451	0.5 3 2	1 0 3	9 0 9	4.5 0 54	0 48 32	5 5 6	22.5 240 516	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 B4 thru B6; A5 thru A6; C6
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring Install coil in station 4 turning fixture	9450-1***-1451 9450-1***-1459 9450-1***-1451 9450-1***-1451	0.5 3 2 1	1 0 3 3	9 0 9 9 9	4.5 0 54 27	0 48 32 16	5 5 6 6	22.5 240 516 258	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring Install coil in station 4 turning fixture Install weights and balance casting and ring assembly	9450-1***-1451 9450-1***-1459 9450-1***-1451	0.5 3 2	1 0 3	9 0 9	4.5 0 54	0 48 32	5 5 6	22.5 240 516	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 B4 thru B6; A5 thru A6; C6
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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	9450-1***-1451 9450-1***-1459 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	0.5 3 2 1 1	1 0 3 3	9 0 9 9 9 10	4.5 0 54 27 20 22.5 32	0 48 32 16 0	5 5 6 6 6	22.5 240 516 258 120 269.5 160	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 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
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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	9450-1***-1451 9450-1***-1459 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	0.5 3 2 1 2.5 2 2	1 0 3 3 2 1	9 0 9 9 10 9 8 9 9	4.5 0 54 27 20 22.5 32 54	0 48 32 16 0 16 0 0 0	5 5 6 6 6 7 5 7	22.5 240 516 258 120 269.5 160 378	85 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 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
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring Install exploits 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***-1459 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	0.5 3 2 1 2.5 2 2 0.5	1 0 3 2 1 2 3 1 1	9 0 9 9 9 9 10 9 8 9 9 9	4.5 0 54 27 20 22.5 32 54 4.5	0 48 32 16 0 16 0 0 0 0	5 5 6 6 6 7 5 7 7 7	22.5 240 516 258 120 269.5 160 378 31.5	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 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
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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	9450-1***-1451 9450-1***-1459 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	0.5 3 2 1 2.5 2 2	1 0 3 3 2 1 2	9 0 9 9 10 9 8 9 9	4.5 0 54 27 20 22.5 32 54	0 48 32 16 0 16 0 0 0	5 5 6 6 6 7 5 7	22.5 240 516 258 120 269.5 160 378	85 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 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
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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 set poloidal break 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***-1459 9450-1***-1459 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	0.5 3 2 1 1 2.5 2 2 0.5 1 2 2 1 2 1	1 0 3 2 1 2 3 1 2 2 3 1 2	9 0 9 9 9 9 9 9 9 9 9 9 9 9 9	4.5 0 54 27 20 22.5 32 54 4.5 18 36 18	0 48 32 16 0 16 0 0 0 0 0 0 0 0 0	5 5 6 6 6 7 7 7 7 7 7 7 7 7 7	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 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
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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 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 9450-1***-1451 9450-1***-1451	0.5 3 2 1 2.5 2 2 0.5 1 2 2 0.5 1 7	1 0 3 2 1 2 3 1 2 2 2 2 2 2 1	9 0 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4.5 0 54 27 20 22.5 32 54 4.5 18 36 18 63	0 48 32 16 0 16 0 0 0 0 0 0 0 0 0 0 0	5 5 6 6 7 5 7 7 7 7 7 7 7 7 7 6	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126 378	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 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
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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 set poloidal break 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***-1459 9450-1***-1459 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	0.5 3 2 1 2 2 2 0.5 1 2 2 0.5 1 2 2 1 7 5	1 0 3 2 1 2 3 1 2 2 2 2 2	9 0 9 9 9 9 9 9 9 9 9 9 9 9 9	4.5 0 27 20 22.5 32 54 4.5 18 36 18 63 135	0 48 32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 5 6 6 6 7 7 7 7 7 7 7 7 7 7	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 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
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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 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 9450-1***-1451	0.5 3 2 1 2.5 2 2 0.5 1 2 2 0.5 1 7	1 0 3 2 1 2 3 1 2 2 2 2 2 2 1	9 0 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4.5 0 54 27 20 22.5 32 54 4.5 18 36 18 63	0 48 32 16 0 16 0 0 0 0 0 0 0 0 0 0 0	5 5 6 6 7 5 7 7 7 7 7 7 7 7 7 6	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126 378	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 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
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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 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***-1459 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	0.5 3 2 1 1 2.5 2 0.5 1 2 1 7 5 27 Total	1 0 3 2 1 2 3 1 2 2 2 2 2 1 3 3 No. of	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4.5 0 54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech	0 48 32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 124 Tech Shop	5 5 6 6 7 5 7 7 7 7 7 7 7 6 7 7 8 0 7	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126 378 945 945 3882.5 Total	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 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
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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 subids for winding clamps Electrical test poloidal break Clean casting [Inspect and clean all holes] Install Katon 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	0.5 3 2 1 2.5 2 0.5 1 2 1 7 5 27	1 0 3 2 1 1 2 3 3 1 2 2 2 1 3 3 0 No. of Coil tech	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4.5 0 54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech [hours per	0 48 32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 124 Tech Shop Support	5 5 6 6 7 5 7 7 7 7 7 7 7 7 6 7	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126 378 945 945 3882.5 Total Manhrs	85 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 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
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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 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***-1459 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	0.5 3 2 1 1 2.5 2 0.5 1 2 1 7 5 27 Total	1 0 3 2 1 2 3 1 2 2 2 2 2 1 3 3 No. of	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4.5 0 54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech	0 48 32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 124 Tech Shop	5 5 6 6 7 5 7 7 7 7 7 7 7 6 7 7 8 0 7	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126 378 945 945 3882.5 Total	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 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
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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 Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install Kapton 2 and 3 Coil Winding Station 2 and 3 TASK DESCRIPTION Frep for Winding 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	0.5 3 2 1 1 2.5 2 0.5 1 2 1 7 5 27 Total	1 0 3 2 1 1 2 3 1 2 2 2 1 3 3 1 No. of Coil tech per shift	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4.5 0 54 27 20 22.5 32 54 4.5 18 36 135 488.5 Coil Tech [hours per coil] 9	0 48 32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126 378 945 945 3882.5 Total Manhrs Revised 63	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 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
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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 subjects and balance casting quipment Install subjects 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	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	0.5 3 2 1 1 2.5 2 0.5 1 2 0.5 1 7 5 27 Total Shifts 0.5 1	1 0 3 2 1 1 2 3 1 2 2 2 2 1 3 3 No. of Coil tech per shift 2 3	9 9 9 9 10 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4.5 0 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	0 48 32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 5 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	22.5 240 516 258 120 269.5 160 378 31.5 126 378 945 3882.5 Total Manhrs Revised 63 280	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 B3 thr
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring Install coil in station 4 turning fixture Install winding camps 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 funder 2 and 3 Coil Winding Station 2 and 3 Prepare coil for transfer Install winding form in turning fixture Install winding f	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	0.5 3 2 1 1 2.5 2 0.5 1 2 0.5 1 7 5 27 Total Shifts 0.5 1 2 1 2 1 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1 0 3 2 1 1 2 3 1 2 2 2 2 1 3 3 5 No. of Coil tech per shift 2 3 2 2	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4.5 0 54 27 20 22.5 32 54 4.5 18 36 13 63 135 488.5 Coil Tech [hours per coil] 9 9 24.0 36.0	0 48 32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 5 6 6 7 5 7 7 7 7 7 7 7 7 7 7 6 7 7 6 7 7 7 7	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 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
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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 subjects 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 subjects and clean all colling Tubes Coil Winding Station 2 and 3 TASK DESCRIPTION Prep for Winding Prepare coil for transfer 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 9450-1***-1451	0.5 3 2 1 1 2.5 2 0.5 1 2 0.5 1 7 5 27 Total Shifts 0.5 1	1 0 3 2 1 1 2 3 1 2 2 2 2 1 3 3 No. of Coil tech per shift 2 3	9 9 9 9 10 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4.5 0 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	0 48 32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 5 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	22.5 240 516 258 120 269.5 160 378 31.5 126 378 945 3882.5 Total Manhrs Revised 63 280	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru A6; C6 thru A
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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 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 clamps side bars A & B Prep groundwrap insulation [Parallel activity]	9450-1***-1451 9450-1***-1451 9450-1***-1459 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	0.5 3 2 1 1 2.5 2 2 0.5 1 2 1 7 5 27 Total Shifts 0.5 1 2 4 6 1 1	1 0 3 2 1 2 3 1 2 2 2 2 1 3 3 No. of Coil tech per shift 2 3 2 3 1 2 2 1 2 1 3 3 2 2 1 2 1 2 2 1 2 1	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4.5 0 54 27 20 22.5 32 54 4.5 18 36 13 63 135 488.5 Coil Tech [hours per coil] 9 24.0 36.0 108.0 54.0 18.0	0 48 32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 5 6 6 7 5 7 7 7 7 7 7 7 6 7 7 6 7 7 6 7 7 7 7	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252 756 378 144	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring Install velopts 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 read blocks and terminals [Remove lead blocks] Clading final clean & Kapton [Parallel activity] Install winding Station 2 and 3 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 winding form in turning fixture Install upper Tee for coil clamps Install electrical bars A & B Prep groundwrap insulation [Parallel activity] Re-install G-11 lead blocks- sides A & B Position inner GW insulation onto winding form (sides A & B)	9450-1***-1451 9450-1***-1451 9450-1***-1459 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	0.5 3 1 1 2.5 2 0.5 1 2 0.5 1 2 7 5 27 Total Shifts 0.5 1 4 6 1 7	1 0 3 2 1 1 2 3 1 2 2 2 1 1 3 3 No. of Coil tech per shift 2 2 3 3 1 2 2 3 1 2 2 2 3 3 2 2 2 2 3 3 1 2 2 2 1 1 2 3 3 1 2 2 1 1 2 2 3 3 1 2 2 1 1 2 2 3 3 1 2 2 1 1 2 2 3 3 1 2 2 1 1 2 2 3 3 1 2 2 1 3 1 2 2 2 1 1 2 2 2 2	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4.5 0 54 27 20 22.5 32 54 4.5 18 36 135 488.5 Coil Tech [hours per coil] 9 24.0 36.0 108.0 54.0 18.0 126.0	0 48 32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 5 6 6 6 7 7 7 7 7 7 7 7 7 6 6 7 7 7 7	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126 378 945 945 3882.5 Total Manhrs Revised 63 252 756 378 252 756 378	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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 weights and balance casting quipments Install weight and balance casting uning campas 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 studies and cooling Tubes 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 upper Tee for coil clamps Install very realiel activity] Re-install G-11 lead blocks A & B Position lacing strips sides A & B	9450-1***-1451 9450-1***-1451 9450-1***-1459 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	0.5 3 2 1 1 2.5 2 2 0.5 1 2 1 7 5 27 Total Shifts 0.5 1 2 4 6 1 1	1 0 3 2 1 2 3 1 2 2 2 2 1 3 3 No. of Coil tech per shift 2 3 2 3 1 2 2 1 2 1 3 3 2 2 1 2 1 2 2 1 2 1	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4.5 0 54 27 20 22.5 32 54 4.5 18 36 13 63 135 488.5 Coil Tech [hours per coil] 9 24.0 36.0 108.0 54.0 18.0	0 48 32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 5 6 6 7 5 7 7 7 7 7 7 7 6 7 7 6 7 7 6 7 7 7 7	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252 756 378 144	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring Install velopts 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 read blocks and terminals [Remove lead blocks] Clading final clean & Kapton [Parallel activity] Install winding Station 2 and 3 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 winding form in turning fixture Install upper Tee for coil clamps Install electrical bars A & B Prep groundwrap insulation [Parallel activity] Re-install G-11 lead blocks- sides A & B Position inner GW insulation onto winding form (sides A & B)	9450-1***-1451 9450-1***-1451 9450-1***-1459 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	0.5 3 1 1 2.5 2 0.5 1 2 0.5 1 2 7 5 27 Total Shifts 0.5 1 4 6 1 7	1 0 3 2 1 1 2 3 1 2 2 2 1 1 3 3 No. of Coil tech per shift 2 2 3 3 1 2 2 3 1 2 2 2 3 3 2 2 2 2 3 3 1 2 2 2 1 1 2 3 3 1 2 2 1 1 2 2 3 3 1 2 2 1 1 2 2 3 3 1 2 2 1 1 2 2 3 3 1 2 2 1 1 2 2 3 3 1 2 2 1 3 1 2 2 2 1 1 2 2 2 2	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4.5 0 54 27 20 22.5 32 54 4.5 18 36 135 488.5 Coil Tech [hours per coil] 9 24.0 36.0 108.0 54.0 18.0 126.0	0 48 32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 5 6 6 6 7 7 7 7 7 7 7 7 7 6 6 7 7 7 7	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126 378 945 945 3882.5 Total Manhrs Revised 63 252 756 378 252 756 378	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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 Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install funer 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 clamps side bars A & B Prep groundwrap insulation [Parallel activity] Position iner GW insulation onto winding form (sides A & B) Position iner GW insulation noto winding form (sides A & B) Position lacing strips sides A & B Position laci	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	0.5 3 2 1 1 2.5 2 0.5 1 2 0.5 1 7 5 27 Total Shifts 0.5 1 2 4 6 1 7 2 2 2 2 2 2 2 2 2 2 2 2 2	1 0 3 2 1 2 3 1 2 2 2 2 1 1 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4.5 0 54 27 20 22.5 32 54 4.5 18 36 18 63 135 488.5 Coil Tech [hours per coil] 9 24.0 36.0 108.0 108.0 126.0 36.0	0 48 32 16 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 5 6 6 7 7 7 7 7 7 7 6 7 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252 756 378 144 1008 288	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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 weights on whalance casting quipments Install veights and balance casting quipment 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 studies and cooling Tubes Coil Winding Station 2 and 3 Coil Winding Station 2 and 3 Frep for Winding Prepare coil for transfer Install winding form in turning fixture Install upper Tee for coil clamps Install veight and balance has & & B Prep groundwrap insulation [Parallel activity] Re-install 0-11 lead blocks - A & B Position lacing strips sides A & B Wind Side "A" Braze & secure 1st. coil lead set [inc. brazing] Position leads & Wind side A Reposition coil from side A to 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	0.5 3 1 1 2.5 2 0.5 1 2 2 0.5 1 2 7 5 27 Total Shifts 0.5 1 2 4 6 1 7 2 2 2 2 2 2 1 2 2 2 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1 0 3 2 1 2 3 1 2 2 2 1 3 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 9	4.5 0 54 27 20 22.5 32 54 4.5 18 36 135 488.5 Coil Tech [hours per coil] 9 9 24.0 36.0 108.0 54.0 126.0 36.0 126.0 36.0	0 48 32 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 5 6 6 6 7 7 7 7 7 7 7 7 7 6 6 7 7 7 7	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252 756 378 280 252 756 378 280 252 756 378 280 288	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A5 thru
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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 Kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install final clean & Kapton [Parallel activity] 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] Reinstall Coll clucks sides A & B Position inner GW insulation onto winding form (sides A & B) Position lacing strips sides A & B Position coil forms side A to 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 9450-1***-1451	0.5 3 1 1 2.5 2 0.5 1 2 2 1 2 2 1 2 7 5 27 Total Shifts 0.5 1 2 7 5 27 7 5 27 7 5 27 7 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 7 7 5 2 7 7 5 2 7 7 5 2 7 7 2 7 2 2 1 2 2 7 2 7 2 2 1 2 2 7 2 2 2 2 2 2 2 2 2 2 2 2 2	1 0 3 2 1 2 3 1 2 2 2 1 1 2 2 1 3 3 2 2 1 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	4.5 0 54 27 20 22.5 32 54 4.5 18 36 135 488.5 Coil Tech [hours per coil] 9 9 24.0 36.0 108.0 54.0 18.0 18.0 108.0 36.0 30.0 36.0 30.0	0 48 32 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 5 6 6 6 7 7 7 7 7 7 7 7 6 6 7 7 7 7 8 8 8 8	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252 756 378 280 252 756 378 280 252 756 378 280 280 288 288 288 288 2400 320	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A4 thru A6; C6 B3 thr
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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 coling Inspect and clean all holes] Install find clean & Kapton [Parallel activity] Install inner cladding plates and cooling Tubes Coil Winding Station 2 and 3 Coil Winding form in turning fixture Install upper Tee for coil clamps Install upper Tee for coil clamps Install upper Tee for coil clamps Install inter Glad bars A & B Prep groundwrap insulation [Parallel activity] Re-install Glate ad S & & B Position lacing strips sides A & B Wind Side "A" Braze & secure 1st. coil lead set [inc. brazing]	9450-1***-1451 9450-1***-1451 9450-1***-1459 9450-1***-1451	0.5 3 2 1 1 2.5 2 2 0.5 1 2 2 1 2 7 5 27 Total Shifts 0.5 1 2 7 5 27 Total Shifts 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 2 2 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1 0 3 2 1 1 2 3 1 2 2 2 1 1 3 2 2 2 1 3 3 2 2 3 3 1 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	4.5 0 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 18.0 18.0 36.0 36.0 36.0 36.0 36.0	0 48 32 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 5 6 6 6 7 7 7 7 7 7 7 7 7 6 7 7 7 7 6 7 7 7 7 7 7 7 7 8 8 8 8	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126 378 945 945 3882.5 Total Manhrs Revised 63 252 756 378 280 252 756 378 144 1008 288 288 2400 320	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A4 thru
Inspect casting [surfaces, magnetic permeability] Winding form modifications [grinding, welding, deburring, etc.] Station 1a/4 Activities Position & mount WF to support ring 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 kapton edging and mold release winding surface Fitup Lead blocks and terminals [Remove lead blocks] Cladding final clean & Kapton [Parallel activity] Install studs or minding clamps Electrical test poloidal break Coll Winding Station 2 and 3 Coll Winding Station 2 and 3 Coll Winding Station 2 and 3 Prep for Winding Prepare coil for transfer Install winding clamps side bars A & B Prep groundwrap insulation [Parallel activity] Reinstall C-11 lead blocks - S & B Position niner GW insulation onto winding form (sides A & B) Position lacing strips sides A & B Position lacing strips sides 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 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	0.5 3 1 1 2.5 2 0.5 1 2 2 1 2 2 1 2 7 5 27 Total Shifts 0.5 1 2 7 5 27 7 5 27 7 5 27 7 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 7 7 5 2 7 7 5 2 7 7 5 2 7 7 2 7 2 2 1 2 2 7 2 7 2 2 1 2 2 7 2 2 2 2 2 2 2 2 2 2 2 2 2	1 0 3 2 1 2 3 1 2 2 2 1 1 2 2 1 3 3 2 2 1 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	4.5 0 54 27 20 22.5 32 54 4.5 18 36 135 488.5 Coil Tech [hours per coil] 9 9 24.0 36.0 108.0 54.0 18.0 18.0 108.0 36.0 30.0 36.0 30.0	0 48 32 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 5 6 6 6 7 7 7 7 7 7 7 7 6 6 7 7 7 7 8 8 8 8	22.5 240 516 258 120 269.5 160 378 31.5 126 252 126 378 945 3882.5 Total Manhrs Revised 63 280 252 756 378 280 252 756 378 280 252 756 378 280 280 288 288 288 288 2400 320	B5 & B6; A5 & A6; C6 B5 & B6; A5 & A6; C6 B4 thru B6; A5 thru A6; C6 B4 thru B6; A5 thru A6; C6 B3 thru B6; A4 thru A6; C6 B3 thr

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									
			1	1	1	1		1	
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									
2) Estimates are based on actual in-field times as well as consultation with metrology personn									
3) M&S based upon actual contracts and monthly M&S supporting winding activities on first ni					040.0		<u> </u>	4700	
Measure, reposition & re-measure coil bundle [sides A & B] Secure Lacing	9450-1***-1451 9450-1***-1451		3	9 9	216.0 36.0	0.0	8	1728 288	B3 thru B6; A4 thru A6; C6 B3 thru B6; A4 thru A6; C6
Complete groundwrap installation	9450-1***-1451		2	9	108.0	0.0	8	864	B3 thru B6; A4 thru A6; C6
Unanticipated Delays/Rework Activities									· · ·
Tasks TBD	9450-1***-1451	3 35.75	3	9	81.0 1548	0 32	8	648 12393	TOTALS hours
	+	33.75			1548	32		12393	TOTALS HOURS
Final Coil prep & Mold Application [Stations 2 & 3]		Total	No. of	Coil Tech	Coil Tech	Tech Shop	No. of	Total	
TASK DESCRIPTION	Job Number	Shifts	Coil tech per shift	[hours per shift]	[hours per coil]	Support [hours]	coils remaining	Manhrs Revised	COILS
Final Coil Prep			per snift	snirtj	colij	[nours]	remaining	Revised	
Clean chill plates [Parallel activity]	9450-1***-1451	4	1	9	36	0	8	288	Coils A4-A6; B3-B6 and C6
Install chill plates & Tubing	9450-1***-1451	12	2.5	9	270	0	8	2160	Coils A4-A6; B3-B6 and C6
Cut, braze, silverplate and position 2nd. coil lead set [side A]	9450-1***-1451	3	2	9	54	0.0	8	432	Coils A4-A6; B3-B6 and C6
Cut, braze, silverplate and position 2nd. Coil lead set [side B]	9450-1***-1451	3	2	9	54	0.0	8	432	Coils A4-A6; B3-B6 and C6
Soft solder and clean all lead joints	9450-1***-1451 9450-1***-1451	2	1	9	18	0.0	8	144	Coils A4-A6; B3-B6 and C6
Install outer co-wound Diagnostic loops	9450-1***-1451	2	2	9	36 18	0	8	288 144	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6
Measure position of co-wound diagnostic loops Perform pre-VPI elect. & pressure tests	9450-1 -1451	<u> </u>	2	9	10	0	0	144	Colls A4-A6, B3-B6 and C6
Pressure test cryo lines	9450-1***-1451	1	2	9	18	0	8	144	Coils A4-A6; B3-B6 and C6
Perform preliminary [pre-vpi] electrical tests	9450-1***-1451	0.5	2	10	10	0	8	80	Coils A4-A6; B3-B6 and C6
Install bag mold around modular coil		4			-				
Prep sprue sub-assemblies [Parallel activity] Prep lead sprue sub-assemblies [Parallel activity]	9450-1***-1451 9450-1***-1451	0.5	1	9	9 4.5	0	8	72 36	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6
Install G-11 final clamp pads & sprue bases	9450-1 -1451	0.5	2	9	4.5	0	8	144	Coils A4-A6; B3-B6 and C6
Finalize and secure G-11 lead box	9450-1***-1451	1	1	9	9	0	8		Coils A4-A6; B3-B6 and C6
Install glass roving and sheet over chill plates	9450-1***-1451			-				72	
Install silicone bag & sprues		1	2	9	18	0	8	72 144	Coils A4-A6; B3-B6 and C6
	9450-1***-1451	1 5	2 2	9 9	18 90	0			
Vacuum pumpdown/ RTV overcoat & leak repair	9450-1***-1451 9450-1***-1451	2	2 3	9	90 54	0	8 8 9	144 720 486	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6
Vacuum pumpdown/ RTV overcoat & leak repair Install epoxy shell	9450-1***-1451	2 2.5	2	9	90 54 67.5	0 0 0	8	144 720 486 607.5	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6
	9450-1***-1451 9450-1***-1451	2	2 3	9	90 54	0	8 8 9	144 720 486	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6
	9450-1***-1451 9450-1***-1451 9450-1***-1451	2 2.5 21.25 Total	2 3 3 No. of	9 9 9 Coil Tech	90 54 67.5 784 Coil Tech	0 0 0 0 Tech Shop	8 8 9 9 9	144 720 486 607.5 6393.5 Total	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 TOTALS hours
Install epoxy shell VPI Activities (Station 5)	9450-1***-1451 9450-1***-1451	2 2.5 21.25	2 3 3 No. of Coil tech	9 9 9 Coil Tech [hours per	90 54 67.5 784 Coil Tech [hours per	0 0 0 Tech Shop Support	8 8 9 9 9 No. of coils	144 720 486 607.5 6393.5	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6
Install epoxy shell VPI Activities (Station 5) TASK DESCRIPTION	9450-1***-1451 9450-1***-1451 9450-1***-1451	2 2.5 21.25 Total	2 3 3 No. of	9 9 9 Coil Tech	90 54 67.5 784 Coil Tech	0 0 0 0 Tech Shop	8 8 9 9 9	144 720 486 607.5 6393.5 Total	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 TOTALS hours
Install epoxy shell VPI Activities (Station 5) TASK DESCRIPTION Final VPI Prep	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 Job Number	2 2.5 21.25 Total Shifts	2 3 3 No. of Coil tech per shift	9 9 9 Coil Tech [hours per shift]	90 54 67.5 784 Coil Tech [hours per coil]	0 0 0 Tech Shop Support [hours]	8 9 9 No. of coils remaining	144 720 486 607.5 6393.5 Total Manhrs	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 TOTALS hours COILS
Install epoxy shell VPI Activities (Station 5) TASK DESCRIPTION Final VPI Prep Prepare MC for transfer	9450-1***-1451 9450-1***-1451 9450-1***-1451 Job Number 9450-1***-1451	2 2.5 21.25 Total	2 3 3 No. of Coil tech per shift	9 9 9 Coil Tech [hours per shift] 9	90 54 67.5 784 Coil Tech [hours per coil] 9	0 0 0 Tech Shop Support [hours]	8 8 9 9 Vo. of coils remaining 9	144 720 486 607.5 6393.5 Total Manhrs 81	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 TOTALS hours Coils Coils A4-A6; B2-B6 and C6
Install epoxy shell VPI Activities (Station 5) TASK DESCRIPTION Final VPI Prep	9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 Job Number	2 2.5 21.25 Total Shifts	2 3 3 No. of Coil tech per shift	9 9 9 Coil Tech [hours per shift]	90 54 67.5 784 Coil Tech [hours per coil] 9 24	0 0 0 Tech Shop Support [hours]	8 9 9 No. of coils remaining	144 720 486 607.5 6393.5 Total Manhrs	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 TOTALS hours
Install epoxy shell VPI Activities (Station 5) Final VPI Prep Prepare MC for transfer Transfer modular coil to Autoclave Prepare MC for VPI [Connect fill lines & TC; leak check] Vacuum pumpdown & preheat mold and autoclave	9450-1***-1451 9450-1***-1451 9450-1***-1451 Job Number 9450-1***-1451 9450-1***-1451	2 2.5 21.25 Total Shifts 0.5 1	2 3 3 No. of Coil tech per shift 2 3	9 9 9 Coil Tech [hours per shift] 9 8	90 54 67.5 784 Coil Tech [hours per coil] 9	0 0 0 Tech Shop Support [hours] 0 16	8 8 9 9 9 Vo. of coils remaining 9 9 9	144 720 486 607.5 6393.5 Total Manhrs 81 360	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6
Install epoxy shell VPI Activities (Station 5) Final VPI Prep Prepare MC for transfer Transfer modular coil to Autoclave Prepare MC for VPI [Connect fill lines & TC; leak check] Vacuum pumpdown & preheat mold and autoclave VPI modular coil	9450-1***-1451 9450-1***-1451 9450-1***-1451 Job Number 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 2.5 21.25 Total Shifts 0.5 1 3 2	2 3 3 Coil tech per shift 2 3 3 3 3	9 9 9 Coil Tech [hours per shift] 9 8 8 10	90 54 67.5 784 Coil Tech [hours per coil] 9 24 72 60	0 0 0 Tech Shop Support [hours] 0 16 0 0	8 9 9 Vo. of coils remaining 9 9 9 9 9	144 720 486 607.5 6393.5 Total Manhrs 81 360 648 540	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 TOTALS hours Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6
Install epoxy shell VPI Activities (Station 5) TASK DESCRIPTION Final VPI Prep Prepare MC for transfer Transfer modular coil to Autoclave Prepare MC for VPI [Connect fill lines & TC; leak check] Vacuum pumpdown & preheat mold and autoclave VPI modular coil Epoxy mix and fill coil	9450-1***-1451 9450-1***-1451 9450-1***-1451 Job Number 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 2.5 21.25 Total Shifts 0.5 1 3 2 1	2 3 3 Coil tech per shift 2 3 3 3 4	9 9 Coil Tech [hours per shift] 9 8 8 8 10 12	90 54 67.5 784 Coil Tech [hours per coil] 9 24 72 60 48	0 0 0 Tech Shop Support [hours] 0 16 0 0 0	8 9 9 No. of coils remaining 9 9 9 9 9 9 9 9 9 9 9	144 720 486 607.5 6393.5 Total Manhrs 81 360 648 540 432	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 TOTALS hours Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6
Install epoxy shell VPI Activities (Station 5) TASK DESCRIPTION Final VPI Prep Prepare MC for transfer Transfer modular coil to Autoclave Prepare MC for VPI [Connect fill lines & TC; leak check] Vacuum pumpdown & preheat mold and autoclave VPI modular coil Epoxy mix and fill coil Temperature rampup and Cure	9450-1***-1451 9450-1***-1451 9450-1***-1451 Job Number 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 2.5 21.25 Total Shifts 0.5 1 3 2 1 3 3	2 3 3 Coil tech per shift 2 3 3 3 4 4 2	9 9 9 Coil Tech [hours per shift] 9 8 8 10 10 12 12	90 54 67.5 784 Coil Tech [hours per coil] 9 24 72 60 48 72	0 0 0 Tech Shop Support [hours] 0 16 0 0 0 0 0 0	8 8 9 9 9 No. of coils remaining 9 9 9 9 9 9 9 9 9 9	144 720 486 607.5 6393.5 Total Manhrs 81 360 648 540 432 648	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 TOTALS hours Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6
Install epoxy shell VPI Activities (Station 5) Final VPI Prep Prepare MC for transfer Transfer modular coil to Autoclave Prepare MC for VPI [Connect fill lines & TC; leak check] Vacuum pumpdown & preheat mold and autoclave VPI modular coil Epoxy mix and fill coil Temperature rampup and Cure Temperature rampup and Post cure	9450-1***-1451 9450-1***-1451 9450-1***-1451 Job Number 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 2.5 21.25 Total Shifts 0.5 1 3 2 1 3 2	2 3 3 Coil tech per shift 2 3 3 3 3 3 2 2 2	9 9 9 Coil Tech [hours per shift] 9 8 8 8 10 	90 54 67.5 784 Coil Tech [hours per coil] 9 24 72 60 48 72 48	0 0 0 Tech Shop Support [hours] 0 16 0 0 0 0	8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 10	144 720 486 607.5 6393.5 Total Manhrs 81 360 648 540 432 648 648 480	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 TOTALS hours Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6
Install epoxy shell VPI Activities (Station 5) TASK DESCRIPTION Final VPI Prep Prepare MC for transfer Transfer modular coil to Autoclave Prepare MC for VPI [Connect fill lines & TC; leak check] Vacuum pumpdown & preheat mold and autoclave VPI modular coil Epoxy mix and fill coil Temperature rampup and Post cure Temperature rampup and Post cure Temperature rampup and Post cure	9450-1***-1451 9450-1***-1451 9450-1***-1451 Job Number 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 2.5 21.25 7 total Shifts 0.5 1 1 3 2 1 3 2 1 1	2 3 3 Coil tech per shift 2 3 3 3 3 4 2 2 1	9 9 9 Coil Tech [hours per shift] 9 8 8 8 10 12 12 12 12 10	90 54 67.5 784 Coil Tech [hours per coil] 9 24 72 60 48 72 48 72 48 10	0 0 0 Tech Shop Support [hours] 0 16 0 0 0 0 0 0 0 0 0 0 0	8 8 9 9 9 No. of coils remaining 9 9 9 9 9 9 9 9 10 10	144 720 486 607.5 6393.5 Total Manhrs 81 360 648 540 432 648 480 100	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B1-B6 and C6
Install epoxy shell VPI Activities (Station 5) Final VPI Prep Prepare MC for transfer Transfer modular coil to Autoclave Prepare MC for VPI [Connect fill lines & TC; leak check] Vacuum pumpdown & preheat mold and autoclave VPI modular coil Epoxy mix and fill coil Temperature rampup and Cure Temperature rampup and Post cure	9450-1***-1451 9450-1***-1451 9450-1***-1451 Job Number 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451 9450-1***-1451	2 2.5 21.25 70tal Shifts 0.5 1 3 2 1 3 2 1 3 2 1 2 2	2 3 3 Coil tech per shift 2 3 3 3 3 3 2 2 2	9 9 9 Coil Tech [hours per shift] 9 8 8 8 10 	90 54 67.5 784 Coil Tech [hours per coil] 9 24 72 60 48 72 48	0 0 0 Tech Shop Support [hours] 0 16 0 0 0 0	8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 10	144 720 486 607.5 6393.5 Total Manhrs 81 360 648 540 432 648 480	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 TOTALS hours Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6
Install epoxy shell VPI Activities (Station 5) Final VPI Prep Prepare MC for transfer Transfer modular coil to Autoclave Prepare MC for VPI [Connect fill lines & TC; leak check] Vacuum pumpdown & preheat mold and autoclave VPI modular coil Epoxy mix and fill coil Temperature rampup and Cure Temperature rampup and Post cure Temperature rampudown Cleanup & ready autoclave for coil removal	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 2.5 21.25 70tal Shifts 0.5 1 3 2 1 3 2 1 3 2 1 2 2	2 3 3 Coil tech per shift 2 3 3 3 4 4 2 2 1 3 3	9 9 9 Coil Tech [hours per shift] 9 8 8 10 10 12 12 12 12 10 10	90 54 67.5 784 Coil Tech [hours per coil] 9 24 72 60 48 72 48 10 60	0 0 7 Tech Shop Support [hours] 0 16 0 0 0 0 0 0 0 0 0 0 0 0	8 8 9 9 9 No. of coils remaining 9 9 9 9 9 9 9 9 10 10	144 720 486 607.5 6393.5 Total Manhrs 81 360 648 540 432 648 480 100 600	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 TOTALS hours Coils A4-A6; B2-B6 and C6 Coils A4-A6; B1-B6 and C6 Coils A4-A6; B1-B6 and C6 Coils A4-A6; B1-B6 and C6
Install epoxy shell VPI Activities (Station 5) TASK DESCRIPTION Final VPI Prep Prepare MC for transfer Transfer modular coil to Autoclave Prepare MC for VPI [Connect fill lines & TC; leak check] Vacuum pumpdown & preheat mold and autoclave VPI modular coil Epoxy mix and fill coil Temperature rampup and Cure Temperature rampup and Cure Temperature rampup ond Post cure Temperature rampudown Cleanup & ready autoclave for next VPI Cleanup & ready autoclave for next VPI	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 2.5 21.25 7 total Shifts 0.5 1 1 3 2 2 1 2 5 5 20.5	2 3 3 Coil tech per shift 2 3 3 3 4 4 2 2 1 1 3 3 3	9 9 9 Coil Tech [hours per shift] 9 8 8 8 10 12 12 12 12 10 10 10	90 54 67.5 784 Coil Tech [hours per coil] 9 24 72 60 48 72 48 10 60 553 569	0 0 0 Tech Shop Support [hours] 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0	8 8 9 9 9 No. of coils remaining 9 9 9 9 9 9 9 10 10 10 10	144 720 486 607.5 6393.5 Total Manhrs 81 360 648 540 432 648 432 648 480 100 600 1500 5389	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 TOTALS hours Coils A4-A6; B2-B6 and C6 Coils A4-A6; B1-B6 and C6
Install epoxy shell VPI Activities (Station 5) Final VPI Prep Prepare MC for transfer Transfer modular coil to Autoclave Prepare MC for VPI [Connect fill lines & TC; leak check] Vacuum pumpdown & preheat mold and autoclave VPI modular coil Epoxy mix and fill coil Temperature rampup and Cure Temperature rampup and Post cure Temperature rampub and Post cure	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 2.5 21.25 Total Shifts 0.5 1 3 2 2 1 3 2 2 5 5 20.5 Total	2 3 3 Coil tech per shift 2 3 3 3 3 4 2 2 1 1 3 3 3 1 No. of	9 9 9 Coil Tech [hours per shift] 9 8 8 10 10 12 12 12 12 10 10 10 10 Coil Tech	90 54 67.5 784 Coil Tech [hours per coil] 9 24 72 60 48 72 60 48 72 48 10 60 150 553 569 Coil Tech	0 0 7 ech Shop Support [hours] 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	8 8 9 9 9 9 No. of coils remaining 9 9 9 9 9 9 9 9 9 10 10 10 10 10	144 720 486 607.5 6393.5 Total Manhrs 81 360 648 540 432 648 480 100 600 1500 5389 Total	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 TOTALS hours Coils A4-A6; B2-B6 and C6 Coils A4-A6; B1-B6 and C6
Install epoxy shell VPI Activities (Station 5) TASK DESCRIPTION Final VPI Prep Prepare MC for transfer Transfer modular coil to Autoclave Prepare MC for VPI [Connect fill lines & TC; leak check] Vacuum pumpdown & preheat mold and autoclave VPI modular coil Epoxy mix and fill coil Temperature rampup and Cure Temperature rampup and Post cure Temperature rampup and Post cure Temperature rampup own Cleanup & ready autoclave for coil removal Rebuild manifolds and prep autoclave for next VPI Post VPI Activities (Station 1)	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 2.5 21.25 7 total Shifts 0.5 1 1 3 2 2 1 2 5 5 20.5	2 3 3 Coil tech per shift 2 2 3 3 3 3 3 4 2 2 1 1 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	9 9 9 Coil Tech [hours per shift] 9 8 8 10 12 12 12 12 10 10 10 10 10	90 54 67.5 784 Coil Tech [hours per coil] 9 24 72 60 48 72 60 48 72 48 10 60 150 553 569 Coil Tech [hours per	0 0 0 Tech Shop Support [hours] 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	8 8 9 9 9 9 9 9 9 9 9 9 9 9 9	144 720 486 607.5 6393.5 Total Manhrs 81 360 648 540 432 648 432 648 480 100 600 1500 5389	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 TOTALS hours Coils A4-A6; B2-B6 and C6 Coils A4-A6; B1-B6 and C6
Install epoxy shell VPI Activities (Station 5) Final VPI Prep Prepare MC for transfer Transfer modular coil to Autoclave Prepare MC for VPI [Connect fill lines & TC; leak check] Vacuum pumpdown & preheat mold and autoclave VPI modular coil Epoxy mix and fill coil Temperature rampup and Cure Temperature rampup and Post cure Temperature rampudown Cleanup & ready autoclave for coil removal Rebuild manifolds and prep autoclave for next VPI	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 2.5 21.25 7 total Shifts 0.5 1 1 3 2 2 1 1 2 5 20.5 7 total Shifts	2 3 3 No. of Coil tech per shift 2 3 3 4 2 2 1 1 3 3 Vo. of Coil tech per shift	9 9 9 Coil Tech [hours per shift] 9 8 8 8 10 12 12 12 12 10 10 10 10 Coil Tech [hours per shift]	90 54 67.5 784 Coil Tech [hours per coil] 9 24 72 60 48 72 48 10 60 150 553 569 Coil Tech [hours per coil]	0 0 0 Tech Shop Support [hours]	8 8 9 9 9 No. of coils remaining 9 9 9 9 9 9 9 9 9 10 10 10 10 10 10 10 10 10 10	144 720 486 607.5 6393.5 Total Manhrs 81 360 648 540 432 648 480 100 600 1500 1500 5389 Total Manhrs	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B1-B6 and C6
Install epoxy shell VPI Activities (Station 5) TASK DESCRIPTION Final VPI Prep Prepare MC for transfer Transfer modular coil to Autoclave Prepare MC for VPI [Connect fill lines & TC; leak check] Vacuum pumpdown & preheat mold and autoclave VPI modular coil Epoxy mix and fill coil Temperature rampup and Cure Temperature rampup and Cure Temperature rampup and Post cure Temperature rampup and prest cure Temperature rampup and Post cure Temperature rampup and Post cure Temperature rampup and prest vPI Cleanup & ready autoclave for next VPI Post VPI Activities (Station 1) 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 2.5 21.25 7 total Shifts 0.5 1 1 3 2 2 1 1 2 5 20.5 7 total Shifts	2 3 3 Coil tech per shift 2 2 3 3 3 3 3 4 2 2 1 1 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	9 9 9 Coil Tech [hours per shift] 9 8 8 10 12 12 12 12 10 10 10 10 10	90 54 67.5 784 Coil Tech [hours per coil] 9 24 72 60 48 72 60 48 72 48 10 60 150 553 569 Coil Tech [hours per	0 0 0 Tech Shop Support [hours] 0 16 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	8 8 9 9 9 9 9 9 9 9 9 9 9 9 9	144 720 486 607.5 6393.5 Total Manhrs 81 360 648 540 432 648 480 100 600 1500 5389 Total	Coils A4-A6; B3-B6 and C6 Coils A4-A6; B3-B6 and C6 Coils A4-A6; B2-B6 and C6 Coils A4-A6; B2-B6 and C6 TOTALS hours Coils A4-A6; B2-B6 and C6 Coils A4-A6; B1-B6 and C6

WDO Neurolean 440	T	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									
		(
Febrication and Accombly									
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 pre	ogram							
2) Estimates are based on actual in-field times as well as consultation with metrology personne									
3) M&S based upon actual contracts and monthly M&S supporting winding activities on first ni	ne coils - see sp	ecifics in l	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 Remove coil from ring assembly	9450-1***-1451 9450-1***-1451		2	9 10	18 30	0 16	<u>11</u> 11	198 506	Coils A3-A6; B1-B6 and C6 Coils A3-A6; B1-B6 and C6
	3430-1 -1431	14.5	3	ιU	279	32	(1	3372	TOTALS hours
					311				
Duran Line Harris				0.11	0.11-	Task Of		T.C.	
Punch List Items	Job Number	Total Shifts	No. of Coil tech	Coil Tech [hours per	Coil Tech [hours per	Tech Shop Support	No. of coils	Total Manhrs	COILS
TASK DESCRIPTION	CCD Humber	0	per shift	shift]	coil]	[hours]	remaining	manning	C SILO
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 [coils previously finished] Finalize cooling tubes	9450-1***-1459 9450-1***-1459	3	2	9	54 18	0	<u>6</u> 18	324 324	Coils A1; C1 thru C5 All coils
Install Rogowski coils	9450-1***-1459	2	2	9	36	0	2	72	Coils A3 and A4
Test thermocouples & strain gages [15 min/unit]	9450-1***-1459	0	0	0	0	134	1	134	[134 strain gauges/ 600 TC]
Install strain gauges and thermocouples [2 hrs./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 Replace co-wound loop on C4	9450-1***-1459 9450-1***-1459	3	2	9	54 18	0	18	972 18	All coils Coil C4
Install additional flange holes [12 per type "C" winding form]	9450-1 -1459 9450-1***-1459	0	0	9	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 [60] holes@ 2hr ea.&[20] holes
Grind flange pockets for hardware	9450-1***-1459	0	0	0	0	440	1	440	@ 16hr ea.
Grind winding form wings/clearances	9450-1***-1459	-	-						
		0	0	0	0	24	18	432	All coils
insert repair		0	0	0	0	24 200	18	200	A1(2 holes) B2(8 holes)
insert repair			0	0	0		18		
Insert repair						200		200 6328.8	A1(2 holes) B2(8 holes)
Insert repair MATERIAL & SUPPLIES	Job Number		0 Coil Tech [hours per	0 Coil Tech [hours per	0 Tech Shop Support		18 TOTAL Tech	200	A1(2 holes) B2(8 holes)
MATERIAL & SUPPLIES			Coil Tech	Coil Tech	Tech Shop	200	TOTAL	200 6328.8 M&S	A1(2 holes) B2(8 holes) TOTALS hours
MATERIAL & SUPPLIES Coil Supplies	Job Number		Coil Tech [hours per	Coil Tech [hours per coil]	Tech Shop Support [hours]	No. of coils remaining	TOTAL Tech	200 6328.8 M&S w/o G&A	A1(2 holes) B2(8 holes) TOTALS hours
MATERIAL & SUPPLIES Coil Supplies 1) Insulation	Job Number 9450-1***-1408		Coil Tech [hours per	Coil Tech [hours per	Tech Shop Support	200 No. of coils remaining 9	TOTAL Tech	200 6328.8 M&S w/o G&A \$8,000.00	A1(2 holes) B2(8 holes) TOTALS hours COILS
MATERIAL & SUPPLIES Coil Supplies	Job Number		Coil Tech [hours per	Coil Tech [hours per coil] 0	Tech Shop Support [hours]	No. of coils remaining	TOTAL Tech	200 6328.8 M&S w/o G&A	A1(2 holes) B2(8 holes) TOTALS hours
MATERIAL & SUPPLIES Coil Supplies 1) Insulation 2) Epoxy - CTD-101 [\$4500.00 per coil @ assume 9 injections]	Job Number 9450-1***-1408 9450-1***-1408		Coil Tech [hours per	Coil Tech [hours per coil] 0 0	Tech Shop Support [hours] 0 0	200 No. of coils remaining 9 9	TOTAL Tech	200 6328.8 W/o G&A \$8,000.00 \$45,000.00	A1(2 holes) B2(8 holes) TOTALS hours COILS
MATERIAL & SUPPLIES Coil Supplies 1) Insulation 2) Epoxy - CTD-101 [\$4500.00 per coil @ assume 9 injections]	Job Number 9450-1***-1408 9450-1***-1408		Coil Tech [hours per	Coil Tech [hours per coil] 0 0	Tech Shop Support [hours] 0 0	200 No. of coils remaining 9 9	TOTAL Tech	200 6328.8 W/o G&A \$8,000.00 \$45,000.00	A1(2 holes) B2(8 holes) TOTALS hours COILS Coils A4-A6; B2-B6 and C6 TC.\$30each x600 =\$18k; SG
MATERIAL & SUPPLIES Coil Supplies 1) Insulation 2) Epoxy- CTD-101 [\$4500.00 per coil @ assume 9 injections] 3) Miscellaneous and safety supplies [@ \$7000/month]	Job Number 9450-1***-1408 9450-1***-1408 9450-1***-1408		Coil Tech [hours per	Coil Tech [hours per coil] 0 0	Tech Shop Support [hours] 0 0	200 No. of coils remaining 9 9	TOTAL Tech	200 6328.8 W/o G&A \$8,000.00 \$45,000.00 \$63,000.00	A1(2 holes) B2(8 holes) TOTALS hours COILS Coils A4-A6; B2-B6 and C6 TC.\$30each x600 =\$18k; SG \$290 each x 62=\$18k FB SG
MATERIAL & SUPPLIES Coil Supplies 1) Insulation 2) Epoxy- CTD-101 [\$4500.00 per coil @ assume 9 injections] 3) Miscellaneous and safety supplies [@ \$7000/month] 4) Strain gages and thermocouples	Job Number 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1459		Coil Tech [hours per	Coil Tech [hours per coil] 0 0	Tech Shop Support [hours] 0 0	200 No. of coils remaining 9 9	TOTAL Tech	200 6328.8 M&S w/o G&A \$8,000.00 \$45,000.00 \$63,000.00 \$60,000.00	A1(2 holes) B2(8 holes) TOTALS hours COILS Coils A4-A6; B2-B6 and C6 TC.\$30each x600 =\$18k; SG
MATERIAL & SUPPLIES Coil Supplies 1) Insulation 2) Epoxy- CTD-101 [\$4500.00 per coil @ assume 9 injections] 3) Miscellaneous and safety supplies [@ \$7000/month] 4) Strain gages and thermocouples 5) Cutting hardware for flange bolts	Job Number 9450-1***-1408 9450-1***-1408 9450-1***-1408		Coil Tech [hours per	Coil Tech [hours per coil] 0 0	Tech Shop Support [hours] 0 0	200 No. of coils remaining 9 9	TOTAL Tech	200 6328.8 W/o G&A \$8,000.00 \$45,000.00 \$63,000.00	A1(2 holes) B2(8 holes) TOTALS hours COILS Coils A4-A6; B2-B6 and C6 TC.\$30each x600 =\$18k; SG \$290 each x 62=\$18k FB SG
MATERIAL & SUPPLIES Coil Supplies 1) Insulation 2) Epoxy- CTD-101 [\$4500.00 per coil @ assume 9 injections] 3) Miscellaneous and safety supplies [@ \$7000/month] 4) Strain gages and thermocouples	Job Number 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1459		Coil Tech [hours per	Coil Tech [hours per coil] 0 0	Tech Shop Support [hours] 0 0	200 No. of coils remaining 9 9	TOTAL Tech	200 6328.8 M&S w/o G&A \$8,000.00 \$45,000.00 \$63,000.00 \$60,000.00	A1(2 holes) B2(8 holes) TOTALS hours COILS Coils A4-A6; B2-B6 and C6 TC.\$30each x600 =\$18k; SG \$290 each x 62=\$18k FB SG
MATERIAL & SUPPLIES Coil Supplies 1) Insulation 2) Epoxy- CTD-101 [\$4500.00 per coil @ assume 9 injections] 3) Miscellaneous and safety supplies [@ \$7000/month] 4) Strain gages and thermocouples 5) Cutting hardware for flange bolts VP/ Supplies 1) Epoxy/glass for mold shell [Hysol] 2) VPI clean manifold contract [\$100.00 per VPI]	Job Number 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1459		Coil Tech [hours per	Coil Tech [hours per coil] 0 0	Tech Shop Support [hours] 0 0 0	200 No. of coils remaining 9 9 9	TOTAL Tech	200 6328.8 W/o G&A \$8,000.00 \$45,000.00 \$63,000.00 \$60,000.00 \$3,000.00	A1(2 holes) B2(8 holes) TOTALS hours COILS Coils A4-A6; B2-B6 and C6 TC.\$30each x600 =\$18k; SG \$290 each x 62=\$18k FB SG
MATERIAL & SUPPLIES Coil Supplies 1) Insulation 2) Epoxy- CTD-101 [\$4500.00 per coil @ assume 9 injections] 3) Miscellaneous and safety supplies [@ \$7000/month] 4) Strain gages and thermocouples 5) Cutting hardware for flange bolts VPI Supplies 1) Epoxy/glass for mold shell [Hysol] 2) VPI clean manifold contract [\$1100.00 per VPI] Tech Shop Support-	Job Number 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1459 9450-1***-1459 9450-1***-1408 9450-1***-1408		Coil Tech [hours per	Coil Tech [hours per coil] 0 0 0	Tech Shop Support [hours] 0 0 0 0 0 0 0 0 0 0 0	200 No. of coils remaining 9 9 9 9	TOTAL Tech Hours	200 6328.8 M&S w/o G&A \$8,000.00 \$45,000.00 \$63,000.00 \$60,000.00 \$3,000.00 \$13,000.00	A1(2 holes) B2(8 holes) TOTALS hours COILS Coils A4-A6; B2-B6 and C6 TC.\$30each x600 =\$18k; SG \$290 each x 62=\$18k FB SG \$277eachx72=\$20k;misc \$4k
MATERIAL & SUPPLIES Coil Supplies 1) Insulation 2) Epoxy- CTD-101 [\$4500.00 per coil @ assume 9 injections] 3) Miscellaneous and safety supplies [@ \$7000/month] 4) Strain gages and thermocouples 5) Cutting hardware for flange bolts VP/ Supplies 1) Epoxy/glass for mold shell [Hysol] 2) VPI clean manifold contract [\$100.00 per VPI]	Job Number 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1459 9450-1***-1459 9450-1***-1408 9450-1***-1408		Coil Tech [hours per	Coil Tech [hours per coil] 0 0 0	Tech Shop Support [hours] 0 0 0 0	200 No. of coils remaining 9 9 9 9 9	TOTAL Tech	200 6328.8 M&S w/o G&A \$8,000.00 \$45,000.00 \$63,000.00 \$60,000.00 \$3,000.00 \$13,000.00	A1(2 holes) B2(8 holes) TOTALS hours COILS Coils A4-A6; B2-B6 and C6 TC.\$30each x600 =\$18k; SG \$290 each x 62=\$18k FB SG
MATERIAL & SUPPLIES Coil Supplies 1) Insulation 2) Epoxy- CTD-101 [\$4500.00 per coil @ assume 9 injections] 3) Miscellaneous and safety supplies [@ \$7000/month] 4) Strain gages and thermocouples 5) Cutting hardware for flange bolts VPI Supplies 1) Epoxy/glass for mold shell [Hysol] 2) VPI clean manifold contract [\$1100.00 per VPI] Tech Shop Support-	Job Number 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1459 9450-1***-1459 9450-1***-1408 9450-1***-1408		Coil Tech [hours per	Coil Tech [hours per coil] 0 0 0	Tech Shop Support [hours] 0 0 0 0 0 0 0 0 0 0 0	200 No. of coils remaining 9 9 9 9	TOTAL Tech Hours	200 6328.8 W/o G&A \$8,000.00 \$45,000.00 \$63,000.00 \$63,000.00 \$3,000.00 \$13,000.00	A1(2 holes) B2(8 holes) TOTALS hours COILS Coils A4-A6; B2-B6 and C6 TC.\$30each x600 =\$18k; SG \$290 each x 62=\$18k FB SG \$277eachx72=\$20k;misc \$4k Coils A4-A6; B3-B6 and C6
MATERIAL & SUPPLIES Coil Supplies 1) Insulation 2) Epoxy- CTD-101 [\$4500.00 per coil @ assume 9 injections] 3) Miscellaneous and safety supplies [@ \$7000/month] 4) Strain gages and thermocouples 5) Cutting hardware for flange bolts VPI Supplies 1) Epoxy/glass for mold shell [Hysol] 2) VPI clean manifold contract [\$1100.00 per VPI] Tech Shop Support-	Job Number 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1459 9450-1***-1459 9450-1***-1408 9450-1***-1408		Coil Tech [hours per	Coil Tech [hours per coil] 0 0 0	Tech Shop Support [hours] 0 0 0 0 0 0 0 0 0 0 0	200 No. of coils remaining 9 9 9 9	TOTAL Tech Hours	200 6328.8 M&S w/o G&A \$8,000.00 \$45,000.00 \$63,000.00 \$60,000.00 \$3,000.00 \$13,000.00	A1(2 holes) B2(8 holes) TOTALS hours COILS Coils A4-A6; B2-B6 and C6 TC.\$30each x600 =\$18k; SG \$290 each x 62=\$18k FB SG \$277eachx72=\$20k;misc \$4k
MATERIAL & SUPPLIES Coil Supplies 1) Insulation 2) Epoxy- CTD-101 [\$4500.00 per coil @ assume 9 injections] 3) Miscellaneous and safety supplies [@ \$7000/month] 4) Strain gages and thermocouples 5) Cutting hardware for flange bolts VPI Supplies 1) Epoxy/glass for mold shell [Hysol] 2) VPI clean manifold contract [\$1100.00 per VPI] Tech Shop Support- Miscellaneous activities- TBD	Job Number 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1408	Gal/coll	Coil Tech [hours per shift]	Coil Tech [hours per coil] 0 0 0 0 0	Tech Shop Support [hours] 0	200 No. of coils remaining 9 9 9 9	TOTAL Tech Hours	200 6328.8 W/o G&A \$8,000.00 \$45,000.00 \$63,000.00 \$63,000.00 \$3,000.00 \$13,000.00	A1(2 holes) B2(8 holes) TOTALS hours COILS Coils A4-A6; B2-B6 and C6 TC.\$30each x600 =\$18k; SG \$290 each x 62=\$18k FB SG \$277eachx72=\$20k;misc \$4k Coils A4-A6; B3-B6 and C6
MATERIAL & SUPPLIES Coil Supplies 1) Insulation 2) Epoxy- CTD-101 [\$4500.00 per coil @ assume 9 injections] 3) Miscellaneous and safety supplies [@ \$7000/month] 4) Strain gages and thermocouples 5) Cutting hardware for flange bolts VPI Supplies 1) Epoxy/glass for mold shell [Hysol] 2) VPI clean manifold contract [\$1100.00 per VPI] Tech Shop Support- Miscellaneous activities- TBD Hysol 2039 Resi	Job Number 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1459 9450-1***-1408 94	Gal/coil 4.5	Coil Tech [hours per shift]	Coil Tech [hours per coil] 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Tech Shop Support [hours] 0	200 No. of coils remaining 9 9 9 9	TOTAL Tech Hours	200 6328.8 W/o G&A \$8,000.00 \$45,000.00 \$63,000.00 \$63,000.00 \$3,000.00 \$13,000.00	A1(2 holes) B2(8 holes) TOTALS hours COILS Coils A4-A6; B2-B6 and C6 TC.\$30each x600 =\$18k; SG \$290 each x 62=\$18k FB SG \$277eachx72=\$20k;misc \$4k Coils A4-A6; B3-B6 and C6
MATERIAL & SUPPLIES Coil Supplies 1) Insulation 2) Epoxy- CTD-101 [\$4500.00 per coil @ assume 9 injections] 3) Miscellaneous and safety supplies [@ \$7000/month] 4) Strain gages and thermocouples 5) Cutting hardware for flange bolts VPI Supplies 1) Epoxy/glass for mold shell [Hysol] 2) VPI clean manifold contract [\$1100.00 per VPI] Tech Shop Support- Miscellaneous activities- TBD	Job Number 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1408 9450-1***-1459 9450-1***-1408 94	Gal/coll	Coil Tech [hours per shift]	Coil Tech [hours per coil] 0 0 0 0 0	Tech Shop Support [hours] 0	200 No. of coils remaining 9 9 9 9	TOTAL Tech Hours	200 6328.8 W/o G&A \$8,000.00 \$45,000.00 \$63,000.00 \$63,000.00 \$3,000.00 \$13,000.00	A1(2 holes) B2(8 holes) TOTALS hours COILS Coils A4-A6; B2-B6 and C6 TC.\$30each x600 =\$18k; SG \$290 each x 62=\$18k FB SG \$277eachx72=\$20k;misc \$4k Coils A4-A6; B3-B6 and C6

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					
		1		1	
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 program				
2) Estimates are based on actual in-field times as well as consultation with metrology personnel					
3) M&S based upon actual contracts and monthly M&S supporting winding activities on first nin	e coils - see specifics in	M&S below			
			* \$12,469.50		