

NSCX Poloidal Field Coils

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Outline



- Requirements
- Interfaces
- Design and Fabrication Status
- Cost and schedule estimates
- Risks and mitigation

Requirements



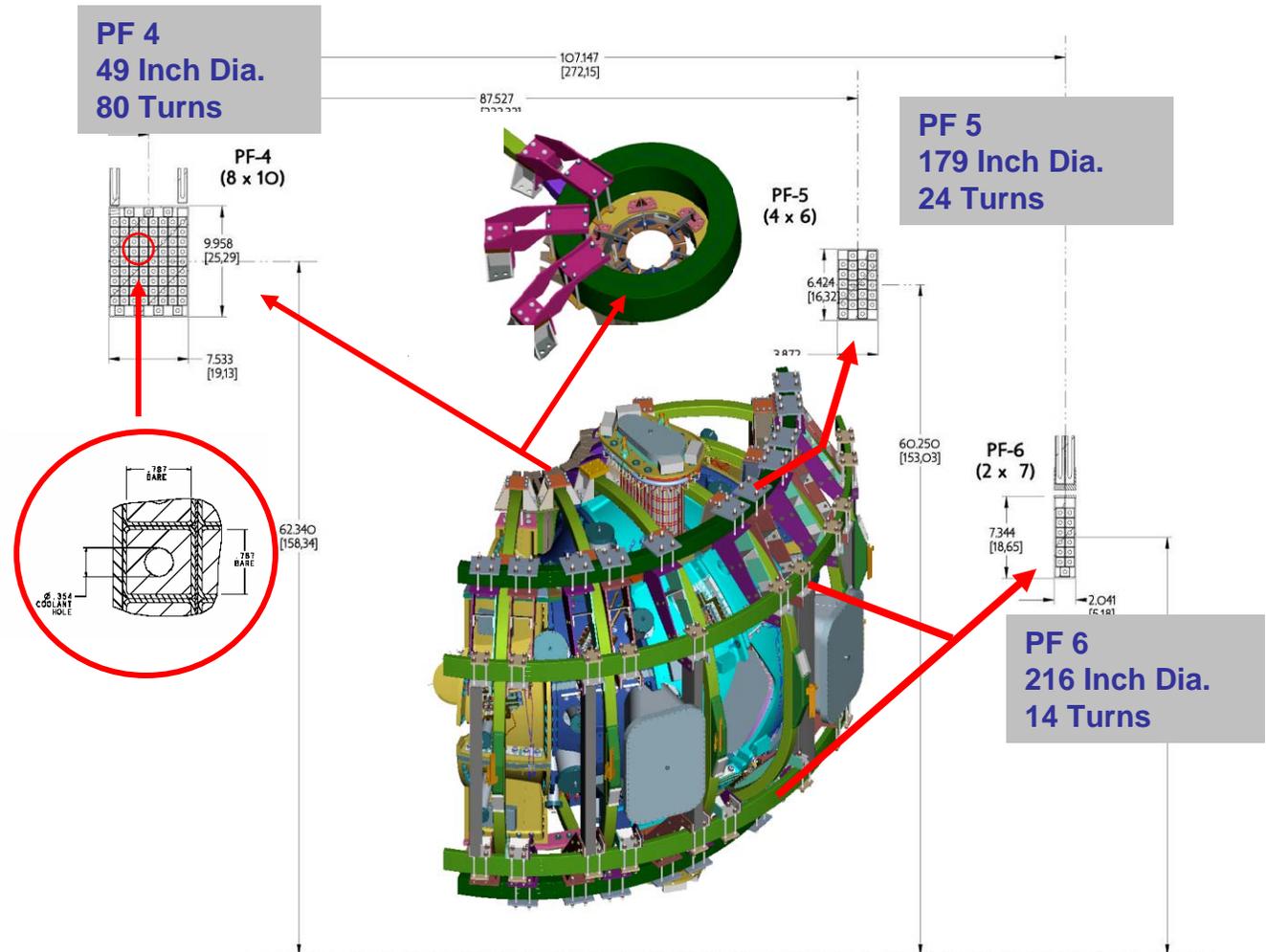
- GRD requirements for the operating scenarios drive the analysis which provides physical requirements to the coils
- PF coils must withstand EM and thermal loads generated by the operating scenarios
- Analysis must demonstrate compliance with thermal, stress, and fatigue criteria
- Individual requirements for PF coils are documented in the PF coil SRD (system requirements document)

Interfaces

- Interface requirements are defined in the System Requirement Documents for PFCoils
- Interfaces included bus connections, liquid nitrogen requirements, and physical interfaces with adjacent hardware
- A magnetics model of the magnet systems determines EM loads and stresses
- The Pro-E model provides the means for integrating all parts and finding interferences

Design - PF Coils

- Two of each PF coil type
- Symmetric round coil geometry
- LN2 cooled solid copper conductor
- Same conductor used for 3 coil types
- VPI Construction
- No SS steel coil case as in TF's



PF Procurement Status



- Long lead conductor order is placed
- Multiple Vendors have submitted bids for coils
- All bids meet project cost and schedule requirements
- Bid evaluation in process
- TF coil experience will expedite evaluation and oversight of PF coil vendors
 - Induction Brazing Process Developed
 - High Confidence in Maintenance of Geometry
 - VPI Process Developed and Proved out

Estimate, Basis



- PF Coil costs based on budgetary quotes, now verified by bids which fall within budget levels and PPPL oversight during fabrication

PF Coil Schedule

Job: 1352 - PF Coil Procurement-CHRZANOWSKI								
PF Coil Fabrication								
141-038.1		PF Conductor Delivery	65	21FEB08A	08MAY08	1,621	200,210.40	41=161.2\$ CHRZANOWSKI=48hr;
141-039		Bid & Award Materials	21	03MAR08*	31MAR08	1,581	8,500.80	
141-040		PF Materials Awarded	0		31MAR08	1,581	0.00	
1352-100		Materials Delivery PF 4,5,6	68	01APR08	07JUL08	1,581	168,502.14	41=136\$ CHRZANOWSKI=80hr; 35=05\$ SV=80
141-035		Bid & Award PF Coil Fabrication	60*	07MAR08*	30MAY08	303	34,276.00	
141-036	2	PF Coils Awarded	0		30MAY08	303	0.00	
1352-121		Design/Fab Tooling for PF 5	85	02JUN08	30SEP08	304	273,900.00	48=273.9\$
1352-122		Design/Fab Tooling for PF 6	85	02JUN08	30SEP08	303	320,100.00	48=320.1\$
1352-145		Fabricate/Divr PF 5 & 6 Lower	95	01OCT08	23FEB09	304	156,519.00	48=153
1352-145M	2	PF 5&6 Lower Delivered	0		23FEB09	304	0.00	
1352-146		Fabricate/Divr PF 5 & 6 Upper	154	24FEB09	30SEP09	456	156,519.00	48=153
1352-120		Tooling for PF 4	55	01OCT08	18DEC08	303	73,656.00	48=72\$
1352-151		Fabricate/Divr PF 4 lower & upper	194	19DEC08	30SEP09	303	41,124.60	48=40.2
141-031		Title III engr WBS 132	370	05MAY08	23OCT09	1,252	144,916.98	CHRZANOWSKI=392hr; SV=392
141-901		PF5 Lower Inspection & Test	5	24FEB09	02MAR09	304	3,545.70	CHRZANOWSKI=10hr; EM/TB=20hr;
141-902		PF6 Lower Inspection & Test	5	24FEB09	02MAR09	304	3,545.70	CHRZANOWSKI=10hr; EM/TB=20hr;
141-905		PF5 Upper Inspection & Test	5	01OCT09	07OCT09	456	3,649.20	CHRZANOWSKI=10hr; EM/TB=20hr;
141-906		PF6 Upper Inspection & Test	5	01OCT09	07OCT09	457	3,649.20	CHRZANOWSKI=10hr; EM/TB=20hr;
141-900		PF4 Lower Inspection & Test	5	01OCT09	07OCT09	303	3,649.20	CHRZANOWSKI=10hr; EM/TB=20hr;
141-900A		PF4 Upper Inspection & Test	5	01OCT09	07OCT09	461	3,649.20	CHRZANOWSKI=10hr; EM/TB=20hr;
141-903		Refurbish PF 1a	20	08OCT10*	04NOV10	154	7,229.60	EM/TB=80hr;

- Multiple Bids Received
- Vendors under evaluation
- All bids are within existing budget and schedule

- May 13th Target for Award
- Conductor Ordered
- 304 Days Float for most critical delivery of lower coils

PF Coil Risk and Mitigations



- Lack of qualified vendors bidding jobs
 - PF Coils presently in procurement with multiple bids
- Quality Issues with vendors
 - Close monitoring of vendors with frequent PPPL visits and review
 - Detailed requirements called for in procurement specification
 - Detailed inspection, test and manufacturing documentation required
- Failure or loss of Coil during Fabrication or Assembly
 - Procurement of spare copper for one additional PF coil
- Schedule risk due to poor performance at vendors
 - Procurements accelerated to maximize float in schedule
 - Constant PPPL oversight with detailed schedule review at vendor