

CLOSE OUT NOTES- Poloidal Field Coil Jobs 9450-1*-1302 and 1352**

TO: Larry Dudek
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SUBJECT: Poloidal Field Coil Design: 9450-1***-1302
Poloidal Field Coil Fabrication: 9450-1***-1352

Scope

This job includes all Poloidal Field Coil design and manufacturing planning activities.

Status as of 9-3-08

Design of PF coils was completed May 2007. A RFP was submitted for review and bids were received for manufacturing the PF coils. The low bid received was within the budgeted estimate. Prior to award, the NCSX Project was cancelled.

Interfaces

N/A

Specifications

All specifications are complete and current versions are posted on NCSX Web Site.

Schematics and PIDs

N/A

Models

All models are complete

Drawings

All poloidal field coil drawings are complete and posted on the Engineering View Drawing Web Site

Analyses

All analyses are complete and current versions are posted on NCSX Web Site. The Project made the decision to do a global FMECA vs. one for each decision. At the time of Project cancellation, the global FMECA had not yet been completed.

Testing

N/A

Costs

No pending costs following cancellation of NCSX Project.

Remaining Work

N/A

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Lessons Learned:

No specific lessons learned were observed.

Conclusion:

The design and specifications were completed. Re-startup of the PF coils would only require a new RFP and award of contract. The existing RFP and supporting procurement documentation will be retained for 5 years from Project cancellation – May, 2013.

NSCX Poloidal Field Coils

Michael Kalish

Outline



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

Requirements



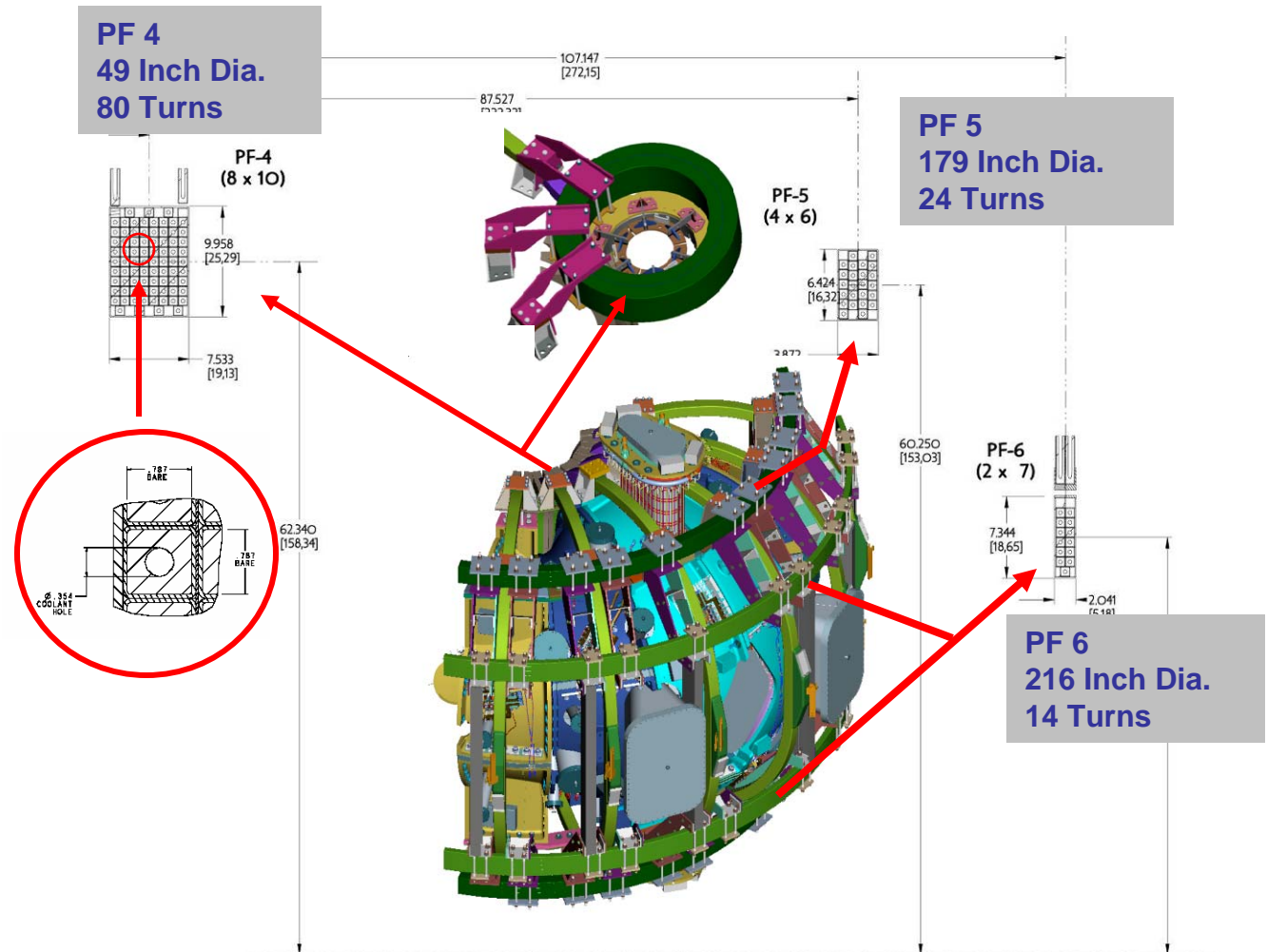
- GRD requirements for the operating scenarios drive the analysis which provides physical requirements to the coils
- PF coils must withstand EM and thermal loads generated by the operating scenarios
- Analysis must demonstrate compliance with thermal, stress, and fatigue criteria
- Individual requirements 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

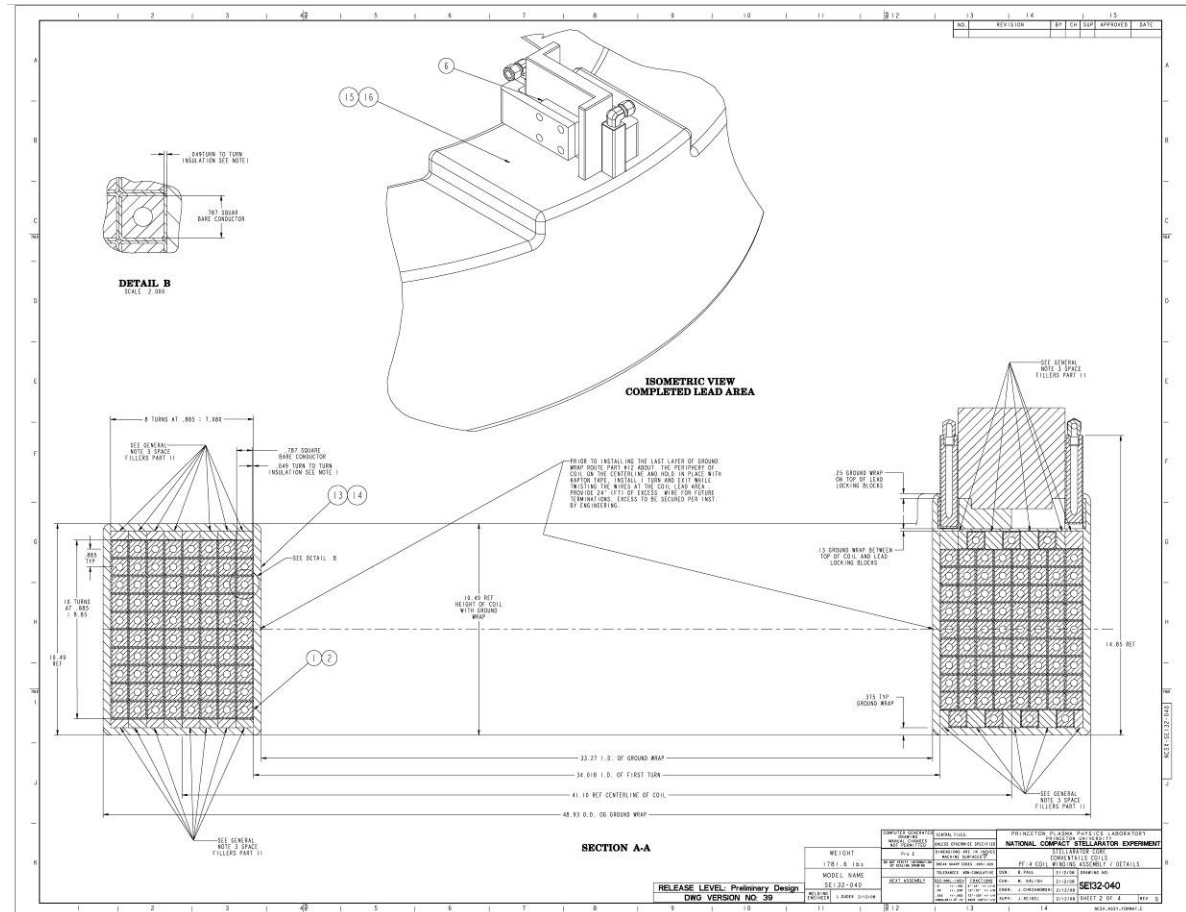
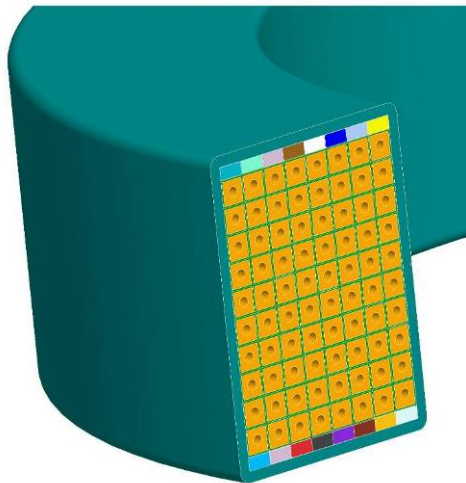
- Two of each PF coil type
- Symmetric round coil geometry
- LN2 cooled solid copper conductor
- Same conductor used for 3 coil types
- VPI Construction
- No SS steel coil case as in TF's



Design - PF Coils



- Final Design Complete
- System Requirements documents generated for coils
- Detailed Procurement specifications and drawings are key to obtaining quality from vendors



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

