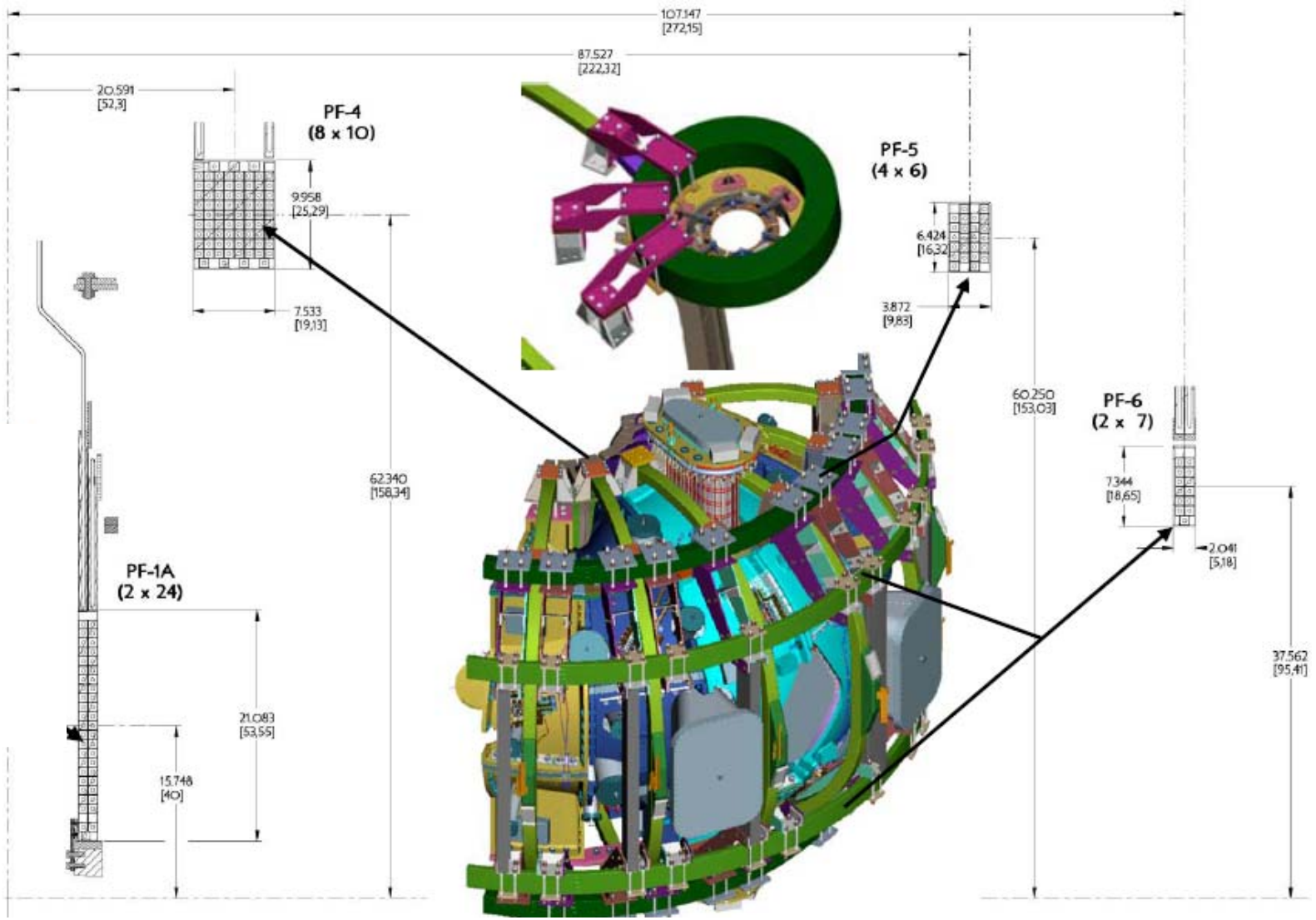
NCSX Coil Protection System

(Excepts from Lehman Review April 2008)

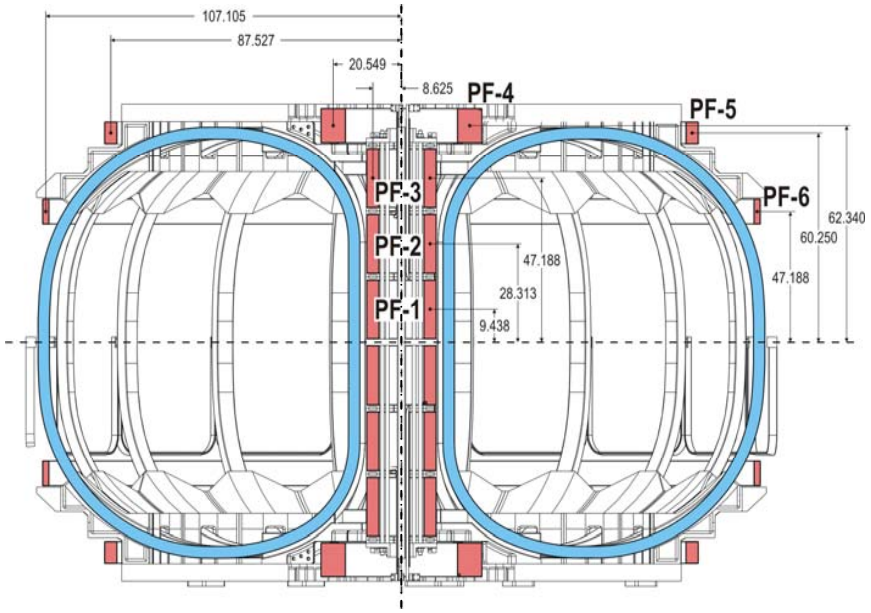
P.L. Goranson

Work Package 163

NCSX Coils


107.147
[272,15]
87.527
[222,32]
20.591
[52,3]
PF-4
(8 x 10)
9.958
[25,29]
7.533
[19,13]
PF-5
(4 x 6)
6.424
[16,32]
3.872
[9,83]
60.250
[153,03]
PF-6
(2 x 7)
7.344
[18,65]
2.041
[5,18]
37.562
[95,41]
62.340
[158,34]
PF-1A
(2 x 24)
21.083
[53,55]
15.748
[40]

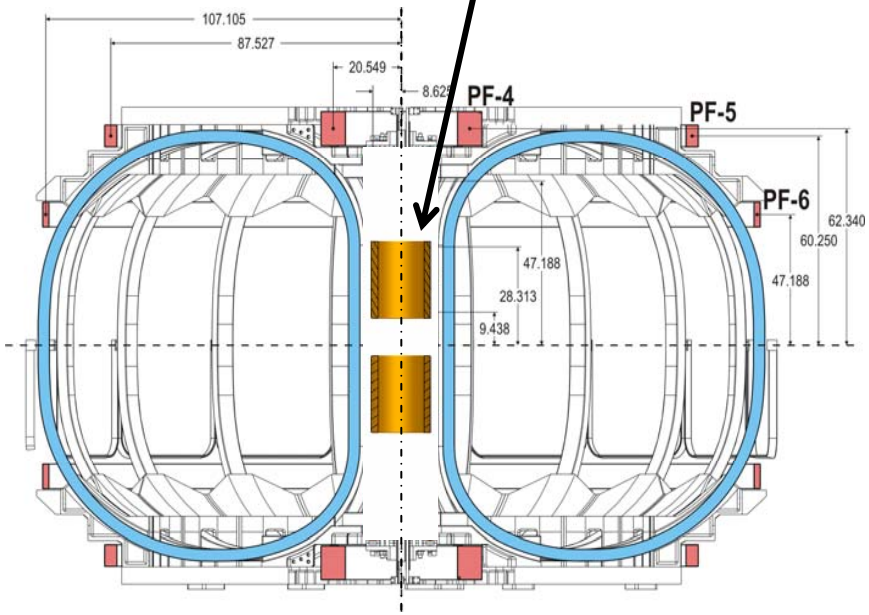
Central Solenoid, TF, and PF Configurations



Upgrade Configuration

- Baseline is PF1a, PF4, PF5, and PF6 (2 each, upper and lower).
- Device can be upgraded if desired, where PF1a is replaced by PF1, PF2, PF3.

PF1a coils from NSTX are baseline



Baseline Configuration

WBS 163 Coil Protection System

Description

This element covers the specification of coil protection requirements for the coil protection system.

Scope

Work covers Title I, II, and III Engineering support for development of the system, including any drawings, electrical and I&C schematics, or analyses. There is no design, fabrication, or hardware included under this package.

The results of thermal, electrical and mechanical analysis will be used to define allowable operating limits for the coils for commissioning, normal research operations, and fault conditions. Appropriate diagnostics and permissive, alarm, and failsafe signals to the power supply controllers and I&C systems will be defined.

Cost

Description:

This effort covers all Title I, II, and III engineering for the Coil Protection System. No hardware is anticipated for this job, only design interface with WBS 4 and 5.

Task ID	Multiplier	Unit	Number of Units		Hours	ORNL EM	ORNL DSN
Title I an II Design							
Pro-E models (avg)	8	hrs/model		0	0	0	
assy dwgs	24	hrs/dwg	120	0	0	0	
Detail drawings	16	hrs/dwg		0	0	0	
installation dwg	16	hrs/dwg		0	0	0	
cooling schematic	0	hrs/dwg		0	0	0	
electrical schematic	8	hrs/dwg		0	0	0	
I&C schematic	20	hrs/dwg	120	4	80	0	120
stress analysis	0	hrs/calc		0	0	0	
thermal analysis	24	hrs/calc		0	0	0	
special analysis (electromagnetics)	40	hrs/calc		2	80	40	
Procurement Specifications	16	hrs/spec		0	0	0	
preliminary and final design reviews	40	hrs/rev		1	40	40	
meetings/reporting/presentations	10%	% of tot hrs			20	20	
Subtotal Title I & II Design					***220***	***100***	***120***

Schedule & Staffing

Schedule

Activity ID	MILE -STONE LEVEL	Activity Description	Duration (work days	SHIFTS	Forecast Start	Forecast Finish	Total Float	Cost to Complete	FY08 FY09 FY10
163.001		Design Coil protection(input to WBS 4 & 5)	65		01OCT08*	12JAN09	435	31,576.20	ORNLEM =100hr ;ornldm=80;ea//em=40

Staffing

Jeff Harris – 270 hours in 2009

Cost Estimate Risks

Coil Protection Requirements (WBS 163)

Maturity – low

Job is at conceptual design stage. It interacts simultaneously with a several other WBS and relies on ongoing analysis. Number of documents is not established.

Complexity – low

Specifications may be replaced with data sheets where procured items are available as stock items.

Many parameters are supplied from other WBS areas and are already available.

Protocols and systems must be compatible with both initial commissioning and full research operations.