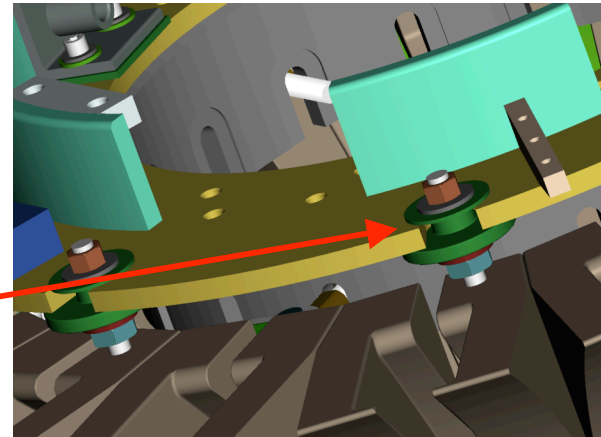
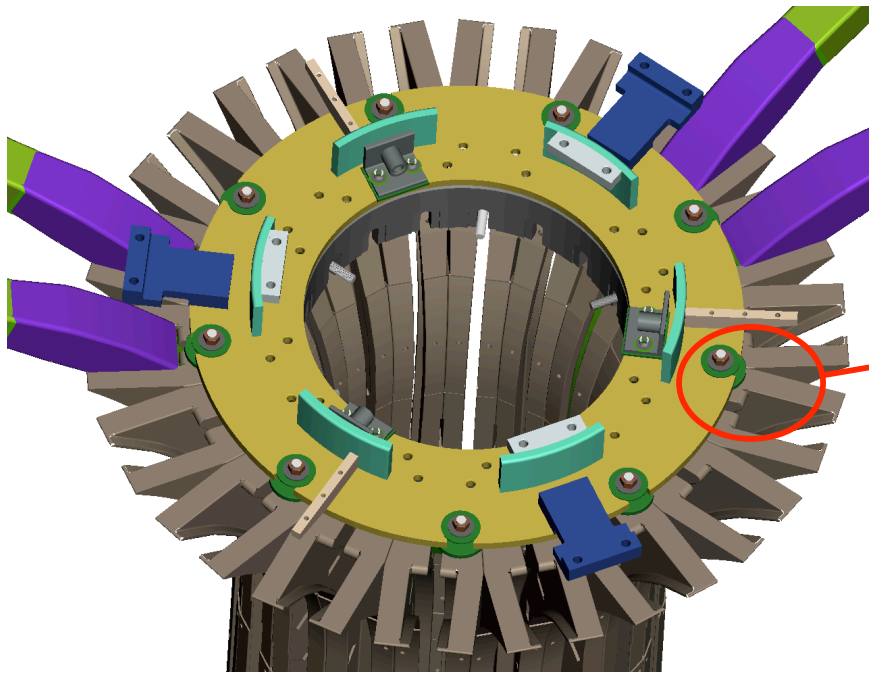


Re-Baseline Cost Review

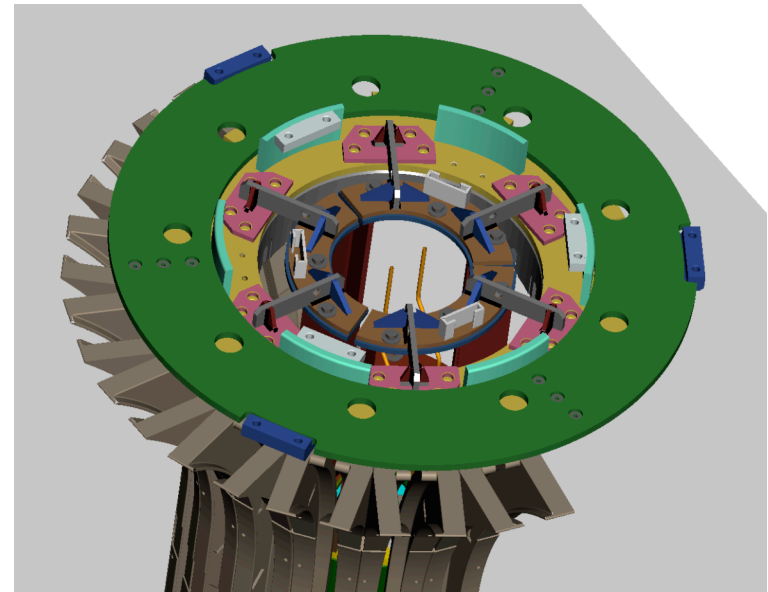
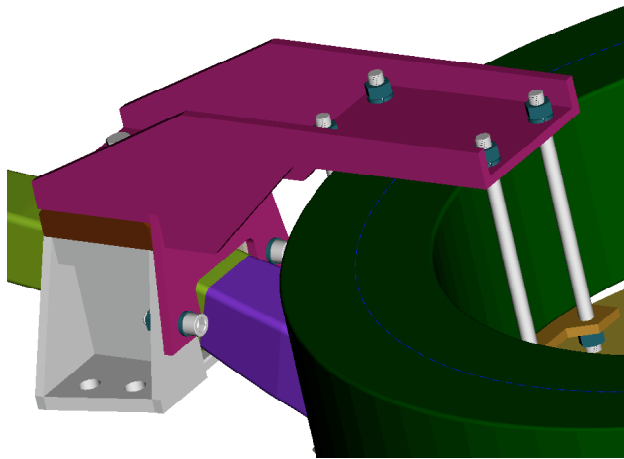
- Fred Dahlgren - 3 Aug 2007

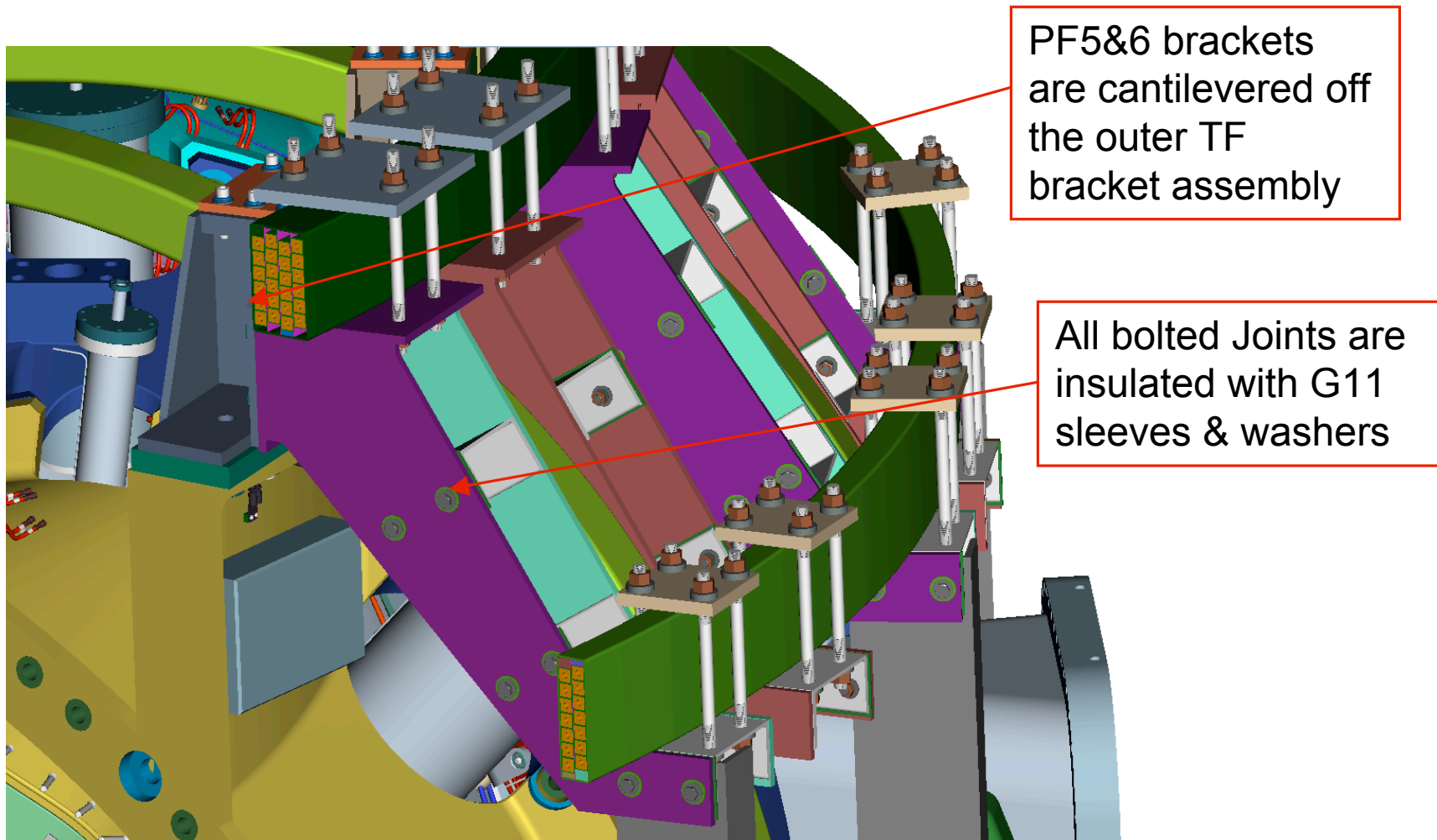
TF & PF Coil Support Structure

- Structure provides the load path for TF and PF coil EM forces.
- Machine-Base support interface must react gravity & seismic forces and must provide radial and torsional compliance ($\partial T = -220 \text{ deg.K}$)
- Project GRD requires material relative magnetic permeability < 1.02
- All Parts Fabricated from Aluminum alloy 5083-H24 rolled plate.
- Welded construction (Full penetration, AlAl₅Si₁Si₂ filler)
- Machining required on coil-structure interface surfaces
- Insulating breaks required on bolted connections to eliminate stray fields from eddy-currents
- All bolts, nuts, washers must meet permeability requirements (A286 or 718 Inconel)

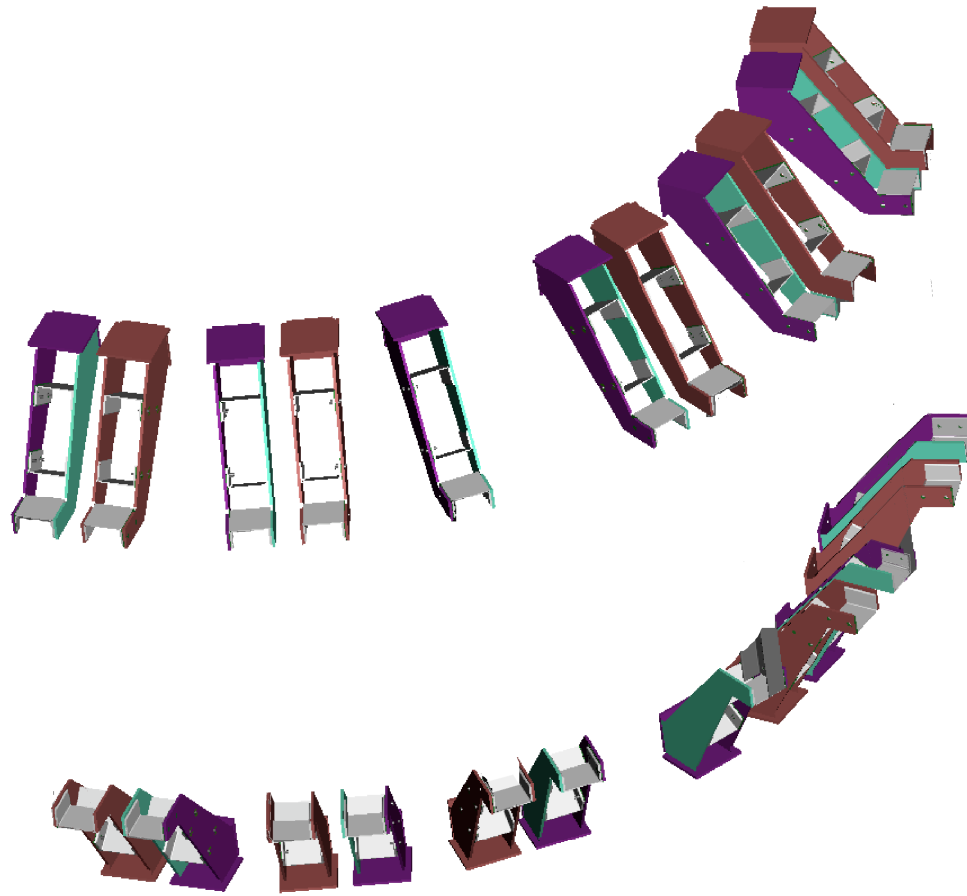


TF Pre-load & PF4 Mounting

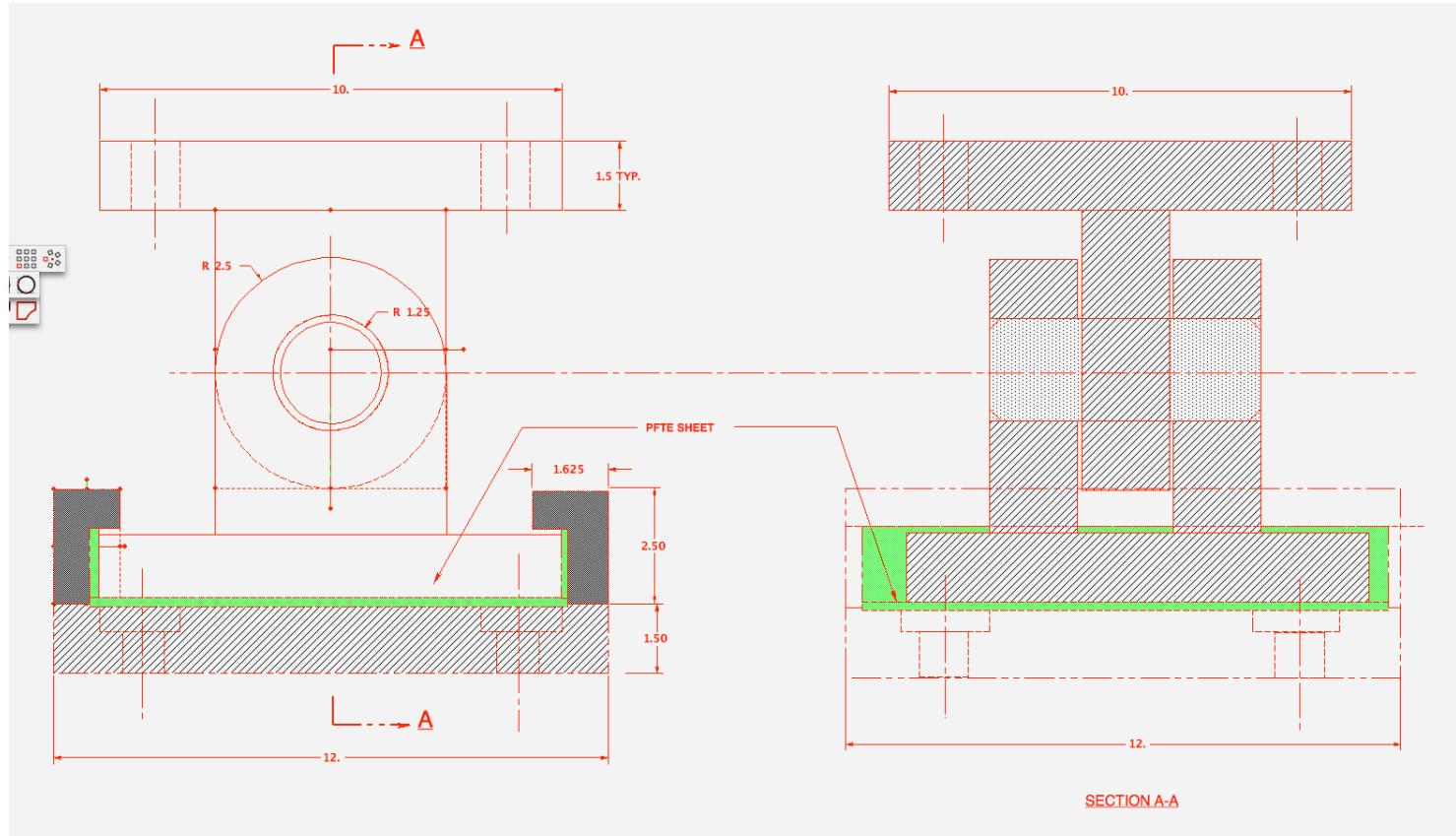




PF Coils are shimmed & clamped to the support brackets



Outer PF5 & 6 Coil Supports

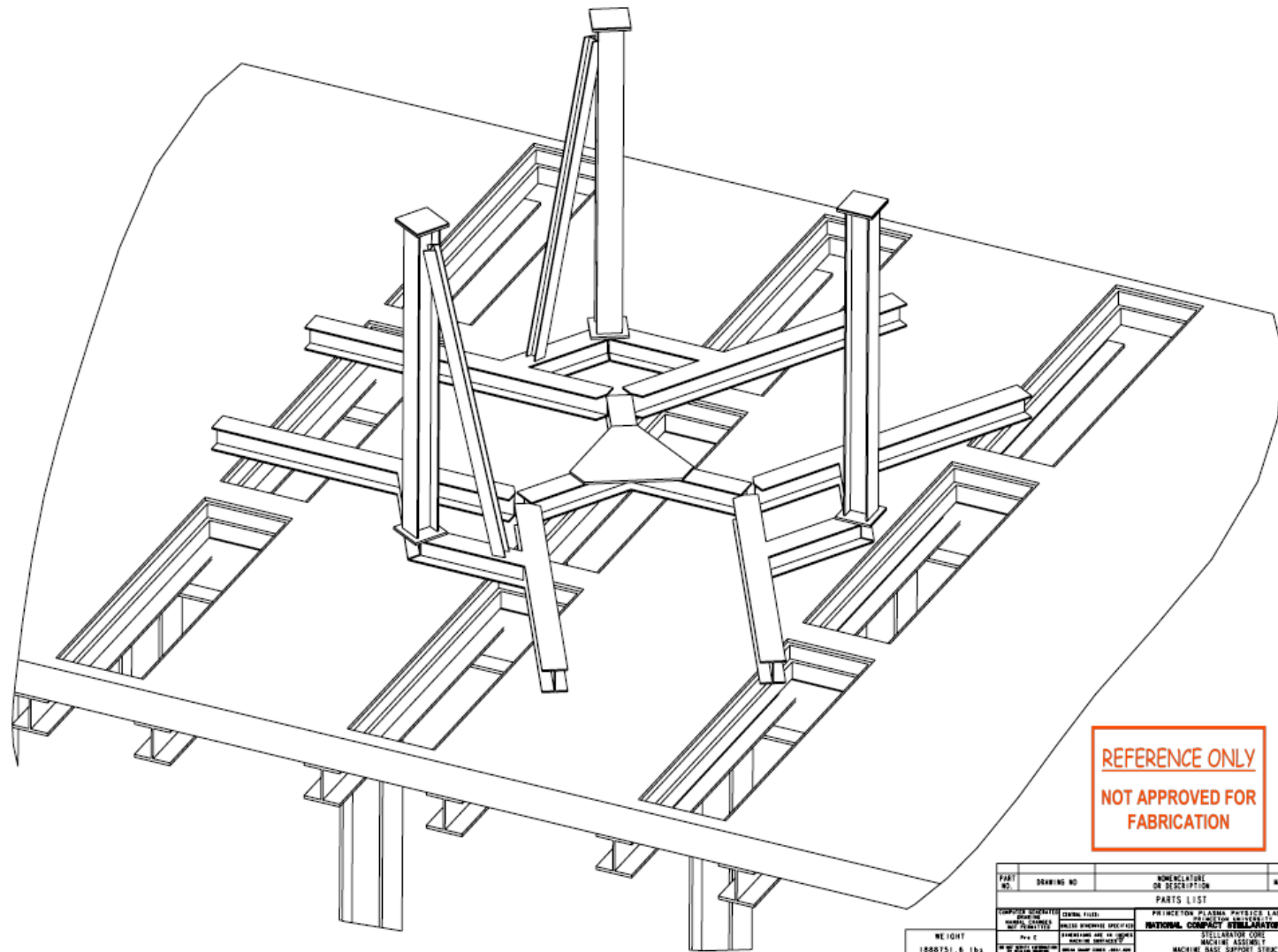


1240 lbs (for 6 Assys.)

Machine - Base Support Structure & Interface

~83,000 lbs / field period

~250,000 lbs (125 tons)



REFERENCE ONLY
 NOT APPROVED FOR
 FABRICATION

PART NO.	DRAWING NO.	NUMERICAL OR DESCRIPTION	MATERIAL	QTY	INFO
PARTS LIST					
SUPPLIER QUOTATION DATE: _____ PART NO. _____ WEIGHT: _____ MODEL NAME: _____ Dwg. Version: _____		PRINCETON PLASMA PHYSICS LABORATORY NATIONAL COMPACT USTANATION EXPERIMENT STEELWORK CORE MACHINE ASSEMBLY MACHINE BASE SUPPORT STRUCTURE			
WEIGHT	1000.51	lb			
MODEL NAME	SE172-202-R1				
RELEASE LEVEL	DRAWN				
DWG VERSION NO.	0				
					SHEET NO. _____ SHEET 1 OF 3 REV. _____

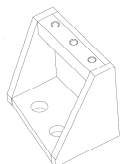
Base Support Structure

NCSX Coil Support Structure – 1501/1550 Re-baseline estimate – Rev.I 16 June 2007

1. Inner TF support Structure

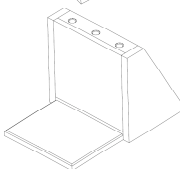
1a. Supp't brkts. (72 req'd.)

Cutting & machining	6.0 hrs x	\$92.00 =	\$552.00
Weld prep & weld	2.2 hrs x	76.00 =	167.20
Clean-up de-scale de-burr	0.5 hrs x	76.00 =	38.00
Mat'l.: AlAly.5083 plate.....	40 lbs. x	4.56 =	182.40



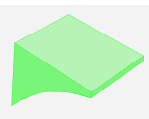
*1b. G11-CR Mtg. blocks (36 req'd.)

Cutting & machining (2 pcs.)	2.5 hrs x	\$92.00 =	\$230.00
Epoxy adhesive bond to coil	0.5 hrs x	\$75.00 =	37.50
Mat'l.: G11-CR plate \$48.00 per pc.	2 pcs. x	\$48.00 =	96.00



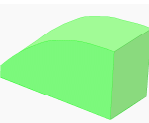
*1c. G11-CR Side Wedge Shims (4 pcs. Req'd per set x 36 sets)

Cutting & Machining wedges	3.0 hrs. x	\$92.00 =	\$276.00
Mat'l.: G11-CR plate \$42.00 per pr.	2 pcs. x	42.00 =	84.00
Teflon pads 1/8" thk.	2 pcs. x	27.00 =	54.00



**1d. Inconel Hardware (36 sets Req'd.)

(4) 1-8 N.C. x 2.5" Hex Head Bolts	4 pcs. x	\$50.40 =	\$201.60
(4) 1" Flat Washer – Heavy Series	4 pcs. x	3.65 =	14.60
(4) 1" Lock Washer	4 pcs. x	2.95 =	11.80
(6) 1/2 -13 N.C. Hex Head Bolts	6 pcs. x	19.80 =	118.80
(6) 1/2 Flat Washers – Heavy Series	6 pcs. x	2.65 =	15.90
(6) 1/2 Split Lock Washer	6 pcs. x	2.10 =	12.50



1e. T.F. Bridge Clamp (36 Req'd)

Cutting & machining	3.0 hrs x	\$92.00 =	\$276.00
Mat'l.: AlAly.5083 plate.....	12.0lbs x	4.56 =	54.72

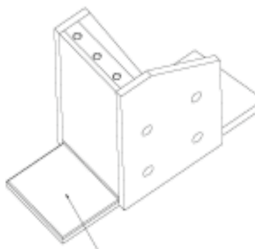
*1f. PFTE coated G11-CR wedge assemblies (72 Req'd.)

Cutting & machining	2 pcs. x 3.0 hrs x	92.00 =	550.00
Teflon coating	2 pcs @	\$40.00/pc. =	80.00

2. Outer TF support Structure

2a. Supp't brkts. (72 req'd.)

Cutting & machining	7.5 hrs x	\$92.00 =	\$690.00
Weld prep & weld	2.5 hrs x	76.00 =	190.00
Clean-up de-scale de-burr	0.5 hrs x	76.00 =	38.00
Mat'l.: AlAly.5083 plate.....	55 lbs. x	4.56 =	250.80



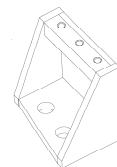
*2b. G11-CR Mtg. blocks (36 req'd.)

Cutting & machining (2 pcs.)	2.5 hrs x	\$92.00 =	\$230.00
Epoxy adhesive bond to coil	0.5 hrs x	\$75.00 =	37.50
Mat'l.: G11-CR plate \$48.00 per pc.	2 pcs. x	\$48.00 =	96.00

Outer TF support Structure (con't.)

*2c. G11-CR Side Wedge Shims (4 pcs. Req'd per set x 36 sets)

Cutting & Machining wedges	3.0 hrs. x	\$92.00 =	\$276.00
Mat'l.: G11-CR plate \$42.00 per pr.	2 pcs. x	42.00 =	84.00
Teflon pads 1/8" thk.	2 pcs. x	27.00 =	54.00



**2d. Inconel Hardware (36 sets Req'd.)

(4) 1-8 N.C. x 2.5" Hex Head Bolts	4 pcs. x	\$50.40 =	\$201.60
(4) 1" Flat Washer – Heavy Series	4 pcs. x	3.65 =	14.60
(4) 1" Lock Washer	4 pcs. x	2.95 =	11.80
(6) 1/2 -13 N.C. Hex Head Bolts	6 pcs. x	19.80 =	118.80
(6) 1/2 Fl at Washers – Heavy Series	6 pcs. x	2.65 =	15.90
(6) 1/2 Split Lock Washer	6 pcs. x	2.10 =	12.50

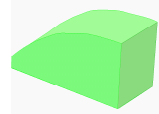
2e. T.F. Bridge Clamp (36 Req'd)

Cutting & machining	3.0 hrs x	\$92.00 =	\$276.00
Mat'l.: AlAly.5083 plate.....	12.0lbs x	4.56 =	54.72



*2f. PFTE coated G11-CR wedge assemblies (72 Req'd.)

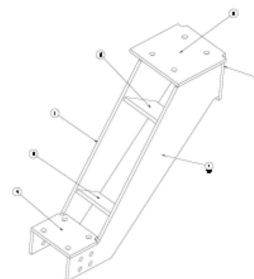
Cutting & machining	2 pcs. x 3.0 hrs x	92.00 =	550.00
Teflon coating	2 pcs @	\$40.00/pc. =	80.00



3. PF5/PF6 Support Brkt. Ass'y. (66 Req'd.)

3.a Bracket Ass'y (66 Req'd.)

Cutting & Machining	12.0 hrs	x\$92.00 =	\$1104.00
Weld prep & weld	6.5 hrs x	76.00 =	494.00
Clean-up de-scale de-burr	1.5 hrs x	76.00 =	114.00
Mat'l.: AlAly.5083 plate.....	120.0lbs x	4.56 =	547.20



3b. P.F. 5 Bridge Clamps (66 Req'd)

Cutting & machining	3.0 hrs x	\$92.00 =	\$276.00
Mat'l.: AlAly.5083 plate.....	12.0lbs x	4.56 =	54.72

3c. P.F. 6 Bridge Clamps (66 Req'd)

Cutting & machining	3.0 hrs x	\$92.00 =	\$276.00
Mat'l.: AlAly.5083 plate.....	12.0lbs x	4.56 =	54.72

**3d. Inconel Hardware (66 sets Req'd.)

(4) 3/4-10 N.C. x 8.5" Hex Head Bolts ...	4 pcs. x	\$ 68.90 =	\$275.60
(4) 3/4-10 N.C. x 9.5" Hex Head Bolts ...	4 pcs. x	73.90 =	295.60
(4) 3/4-10 N.C. Hex Nuts	4 pcs. x	24.80 =	99.20
(8) 1" Flat Washer – Heavy Series	8 pcs. x	3.65 =	29.20
(8) 1" Lock Washer	8 pcs. x	2.95 =	23.80

3e Positioning Brkt. Ass'y. (21 Req'd)

Cutting & Machining	8.0 hrs	x \$92.00 =	\$ 736.00
Weld prep & weld	2.5 hrs x	76.00 =	190.00
Clean-up de-scale de-burr	1.5 hrs x	76.00 =	114.00
Mat'l.: AlAly.5083 plate.....	35.0lbs x	4.56 =	159.60

4. P F5/PF6 Support Frame Ass'y Long Span (6 Ass'y. Req'd)

- 4a. Vertical channels (For 3 -Req'd. per ass'y)
 Cutting & Machining2.0 hrs x \$92.00 = \$184.00
 Clean-up de-scale de-burr0.8 hrs x 76.00 = 60.80
 Mat'l.: AlAly.5083 channel44.0lbs x 8.50 = 374.00

- **4b. Inconel Mtg. Hardware (6 sets of 4 per ass'y)
 (4) 1/2 -13 N.C. Hex Head Bolts4 pcs. x 24.50 = 98
 (4) 1/2 -13 N.C. Hex Nuts4 pcs. x 16.80 = 67
 (4) 1/2 Flat Washers – Heavy Series4 pcs. x 2.65 = 10
 (4) 1/2 Split Lock Washer4 pcs. x 2.10 = 8



5. P F5/PF6 Support Frame Ass'y Short Span (6 Ass'y. Req'd)

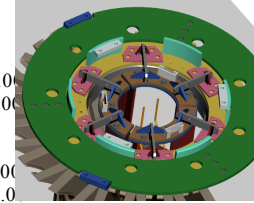
- 5a. Vertical channels (For 3 -Req'd. per ass'y)
 Cutting & Machining2.0 hrs x \$92.00 = \$184.00
 Clean-up de-scale de-burr0.8 hrs x 76.00 = 60.80
 Mat'l.: AlAly.5083 channel.....44.0lbs x 8.50 =374.00

- **5b. Inconel Mtg. Hardware (3 sets of 4 per ass'y)
 (4) 1/2 -13 N.C. Hex Head Bolts4 pcs. x 24.50 = 98.00
 (4) 1/2 -13 N.C. Hex Nuts4 pcs. x 16.80 = 67.20
 (4) 1/2 Flat Washers – Heavy Series4 pcs. x 2.65 = 10.60
 (4) 1/2 Split Lock Washer4 pcs. x 2.10 = 8.40



6. TF Pre-load Ring & PF4 Support Brkts (2 rings, 2 sets of brkts.)

- 6a. Base Ring
 Castings 355 lbs x \$35.00 = \$12,425.00
 Machining 120 hrs x 92.00 = 11,040.00
- 6b. PF4 Brkts Inco plate weldments – (6 Top & 6 Bottom)
 (6) Cutting & Machining2.5 hrs x 6 x \$92.00 = \$1380.00
 (6) Weld prep & weld1.5 hrs x 6 x 76.00 = 684.00
 (6) Clean-up de-scale de-burr3.0 hrs x 6 x 76.00 = 228.00
 (6) Mat'l.: Inconel 625 plate41.0lbs x 28.50 = 1168.50



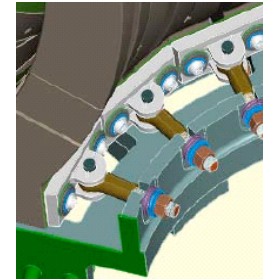
7. C.S. Coil mtg. brkts. (2x=12 brkts total)

- 7a. Inconel Suppt't brackets (2 sets Req'd – 6 Top & 6 Bottom)
 (6) Cutting & Machining6.5 hrs x 6 x \$92.00 = \$3588.00
 (6) Weld prep & weld2.5 hrs x 6 x 76.00 = 1140.00
 (6) Clean-up de-scale de-burr3.0 hrs x 6 x 76.00 = 228.00
 (6) Mat'l.: Inconel 625 plate67.0lbs x 6 x 28.50 = 11,336.40

- **7b. Inconel Mtg. Hardware (6 sets of 4 per ass'y)
 (4) 1/2 -13 N.C. Hex Head Bolts4 pcs. x 24.50 = 98.00
 (4) 1/2 -13 N.C. Hex Nuts4 pcs. x 16.80 = 67.20
 (4) 1/2 Flat Washers – Heavy Series4 pcs. x 2.65 = 10.60
 (4) 1/2 Split Lock Washer4 pcs. x 2.10 = 8.40

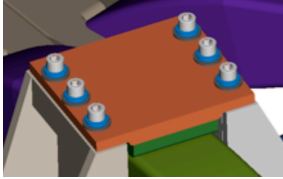
8. T.F. Pre-load clamp Assemblies

- 8a. Stلالloy casting (36 Required) \$350.00 x 36 = 12,600.00
 (36) Inco 3/4 -10NC Pivot Bolt.1.25 grip 41.50 x 36 = 1,494.00
 (36) Inco 3/4 -10NC Hex Nut24.80 x 36 = 892.80
 (72) Inco 1/2 -13NC Hex Head Bolt16.80 x 72 = 1,209.60
 (72) Inco 1/2 Flat Washers2.65 x 72 = 190.80
 (72) G11-CR Washer1.40 x 72 = 100.80
 (72) G11-CR Sleeve2.50 x 72 = 180.00
 (36) Inco 3/4-10NC Jack Nut28.50 x 36 = 1,026.00
 (36) Inco 3/4 Swivel Eye -Bolt51.50 x 36 = 1,854.00
 (36) G11-CR 1/4 thk. Insul. Pad18.50 x 36 = 666.00



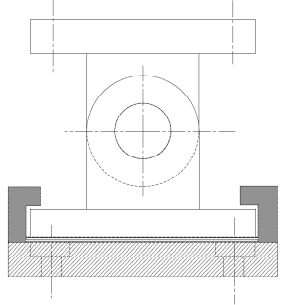
9. P.F. 4 Bridge clamps (12 req'd.)

- 9a. (1) C & M Plates 6" x 6" x 3/4".....4.5 hrs x 1 x \$92.00 = 414.00
- 9b. Clean-up de-scale de-burr1.5 hrs x 76.00 = 114.00
- **9c. Inconel Hardware
- (4) 1/2 -13 N.C. Hex Head Bolts4 pcs. x 24.50 = 98.00
- (4) 1/2 -13 N.C. Hex Nuts4 pcs. x 16.80 = 67.20
- (4) 1/2 Flat Washers – Heavy Series4 pcs. x 2.65 = 10.60
- (4) 1/2 Split Lock Washer4 pcs. x 2.10 = 8.40
- *9d. (1) G11-CR 1/4" thk. Insul. Pad18.50 = 18.50
- *9e. (2) Teflon pads2 pcs. x 27.00 = 54.00
- 9f. 6 x 6 x 3/4" thick Inconel601 plate.....27.0lbs x 22.50 = 607.50



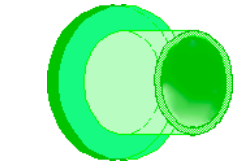
10. Inner & outer spacer blocks MCWF-TF supp't brkts (24 Req'd.)

- 10a. C & M blocks.....10hrs x 92.00 = 920.00
- 10b. Clean-up, de-scale & de-burr.....1.5 hrs x 92.00 = 138.00
- **10c. (4) Inco 3/4 -10NC Hex Bolt4.25 grip 64.90 x 4 = 259.60
- **10d. (4) Inco 3/4 Flat Washers3.40 x 4 = 13.60
- 10e. ALAly.5083 plate 6" x 6" x 3" thick.32lbs ea. X \$4.50 = 144.00



11. Machine/base support Interface (3 Req'd.)

- 11a. C & M plates(11 parts) 80 hrs x 92.00 = 7,360.00
- 11b. Weld Clevises & side plates16 hrs x 75.00 = 1,200.00
- 11c. Clean-up, de-scale & de-burr.....4 hrs x 92.00 = 368.00
- 11c. Spherical Bearings1 x 2850.00 = 2850.00
- *11e. C & M G11 & Teflon sheets8 hrs x 92.00 = 736.00
- 11f. Inco 625 plates & rnd. Bar.....144 lbs x 28.50 = 4,104.00
- *11g. G11-CR Plate10" x 10" x 1" = 158.00
- *11h. Teflon sheet8" x 8" x .13" = 56.00
- **11i. Inconel Hardware (2 sets Req'd.)
- (4) 1-8 N.C. x 2.5" Hex Head Bolts4 pcs. x \$50.40 = \$201.60
- (4) 1" Flat Washer – Heavy Series4 pcs. x 3.65 = 14.60
- (4) 1" Lock Washer4 pcs. x 2.95 = 11.80



12..Misc. Assembly Hardware

- 12a. G11 bushings TF clamps360 x 2.50 = 900.00
- 12b. G11 washers TF clamps360 x 0.80 = 288.00
- 12c. G11 bushings Frame Assy'168 x 2.50 = 420.00
- 12d. G11 washers PF Clamps168 x 0.80 = 134.40
- 12e. G11 bushings PF Clamps168 x 2.50 = 420.00
- 12f. G11 washers Frame Ass'y168 x 0.80 = 134.40
- 12g. G11 bushings M/B interface24 x 2.50 = 60.00
- 12h. G11 washers M/B interface24 x 0.80 = 19.20
- **12i. Inconel 718 .75 ID B'ville washers.....720 x 12.50 = 9,000.00
- **12j. Inconel 718 1.03 ID B'ville washers...360 x 26.93 = 9,694.80

Job 1501/1550 M&S Summary & Totals:

1. Inner TF Support Structure (36)		
1a	I-C&M4 3 2	67,651.40
1b		13,086.00
1c		14,904.00
1d		13,507.20
1e	I-C&M1 0 8	11,906.00
1f		45,360.00
2. Outer TF Support Structure (36)		
2a	I-C&M5 4 0	84,154.00
2b		13,086.00
2c		14,904.00
2d		13,507.00
2e	I-C&M1 0 8	11,906.00
2f		45,360.00
3. PF5/PF6 Support Bracket Assembly (66)		
3a	I-C&M5 0 4	149,107.00
3b	I-C&M1 0 8	21,828.00
3c	I-C&M1 0 8	21,828.00
3d		47,749.40
3e	I-C&M168	25,190.00
4. PF5/PF6 Support Frame Assembly – Long (6)		
4a	I-C&M1 2	3,712.80
4b		8,842.00
5. PF5/PF6 Support Frame Assembly – Short (3)		
5a	I-C&M1 2	3,712.80
5b		4,420.90
6. TF Pre-Load Ring & PF4 Support (2)		
6a.	I-C&M2 4 0	46,930.00
6b	I-C&M15	920.00
7. C.S. Coil Mounting Brackets (12)		
7a	I-C&M7 8	32,584.00
7b		2,210.40
8. TF Coil Pre-Load Clamp Assemblies (36)		
8a		20,214.00
9. PF4 Coil Mounting Clamp (12)		
9a	I-C&M5 4	4,968.00
9b		1,368.00
9c		2,210.40
9d		222.00
9e		648.00
9f		7,295.00
10. MCWF-TF Mtg. Brkt. Spacer block & shim		
10a	I-C&M240	22,080.00
10b		3,312.00
10c		6,230.40
10d		326.40
10e		21,888.00
11. Machine/Base Support Interface		
11a	I-C&M240	22,080.00
11b		3,600.00
11c		1,104.00
11d		8,550.00
11e		2,208.00
11f		12,312.00
11g		484.00
11h		168.00
11i		5,184.20
12. Misc. Assembly Hardware		
12a		900.00
12b		288.00
12c		420.00
12d		134.00
12e		420.00
12f		134.00
12g		60.00
12h		19.20
12i		9,000.00
12j		9,694.80

SUB TOTAL : \$ 891,877.42
 + 50% mat'l. allowance on 8,350 lbs,AL.Aly.5083-H116: 8,350 x 4.56 x 0.5 = \$18,788.25
 Less scrap value \$ 0.20/lb 8,350 x 0.20 x 0.5 = - 835.00
TOTAL COST \$ 909,830.67

TOTAL M&S PF/TF COIL STRUCTURE*	\$ 909,830.67
ADD INSPECTION, PACKAGING & SHIPPING	25,000.00
TOTAL COST FOB PLAINSBORO NJ	\$ 934,830.67

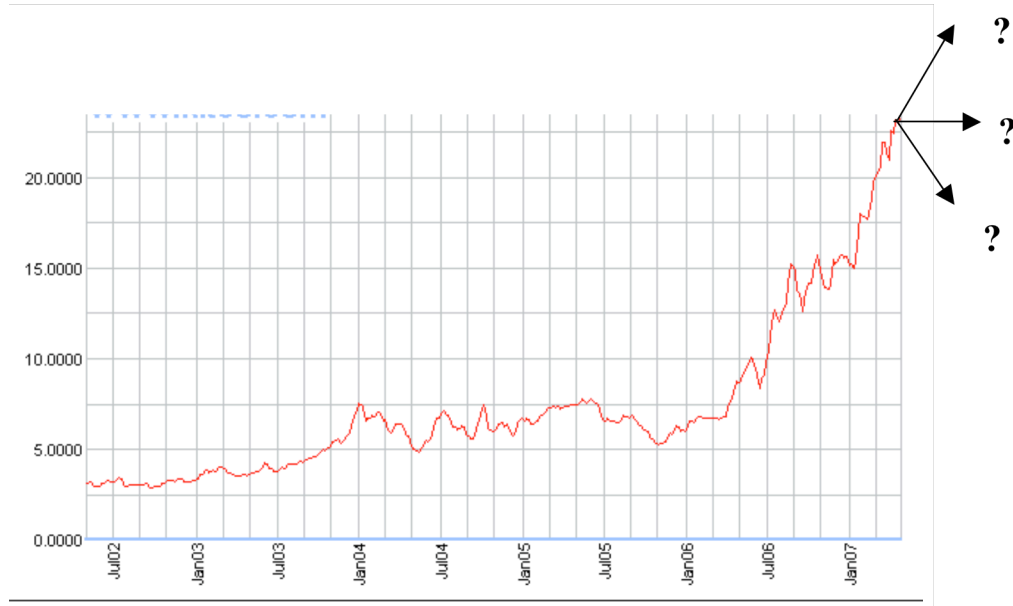
***THIS DOES NOT INCLUDE THE CS SUPPORTS OR TRIM COIL SUPPORT,
OR ENGINEERING, DESIGN AND ASSEMBLY LABOR.**

NOTES:

1. **LABOR RATES BASED ON WEB SURVEY AND SLAC IN-HOUSE RATES**
2. **316L @ \$7.50/LB. RANGE OF THREE QUOTES ON .5" - .75" PLATE**
3. **SOLUTION ANNEAL MAY ADD 15 – 20% . NO VENDOR WILL CERTIFY THE MAGNETIC PERMEABILITY AS LESS THAN 1.02 (1.2 – 1.5 TYPICAL)**
4. **HARDWARE COSTS BASED ON 1 QUOTE B&G MFG. & MCMASTER-CARRCATALOG PRICING WHERE AVAILABLE. (INCONEL 718 ~ 4X MORE).**
5. **INCONEL 625 PLATE WITH CURRENT COMMODITY SURCHARGES COST ~ \$28.50/LB. BASED ON FERGUSON METALS QUOTE (WEB SURVEY YIELDED \$29-32.00/LB. , AND METALSUPPLIER QUOTED \$48.50 FOR SAME. (\$22.50 INCONEL-601)**
6. **\$10.50 APPROX. SCRAP INCONEL718 PRICE PER LB.:**
<http://www.recycle.net/specs/gr060152.html> <http://grn.com/a/0455.html>
7. **AlAly 5083-H116 quote From MetalsalesUSA –CEM Supply Harvey, La**

Risks & Cost Saving Opportunities

Main uncertainty:



Current Nickel price is ~ \$23.00/lb.
(Closing bid Friday 27 April was 48,700 per tonne - Bloomberg)

- Using A286 (~25% Ni) hardware could save ~ \$8/lb or ~ 50k\$ - Availability may be an issue.
- Using Aluminum alloy could save ~ \$22/lb if eddy currents are acceptable.

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5/1/2007

Response w/Exceptions

To: Fred Dahlgren
 PPPL
 PO Box 451
 Princeton, NJ 08543

Buyer Quote#: BRFQ042607-1
 Supplier Quote#: rick a
 RFQ ID#: 106934

From: Metal Suppliers Online
 PO Box 711
 Hampstead, NH 03841
 p: (603) 329-0101
 f: (603) 329-0171

Ship To: Fred Dahlgren
 PO Box 451
 Princeton, NJ, 08543

sales@metalsupplieronline.com

RFQ Exp Date	Req Del Date	Ship Via	F.O.B.	Freight Terms
5/30/2007	7 days ARO	No Preference	Shipping Point	Freight Collect

Quantity	Units	Description	Unit Price	Total (\$ US)
8000 ▶ 7100	lbs	Super Alloy A-286 Plate Thickness: 0.5 in Width: 36 in Length: 72 in Offer whatever you have in stock. I have the following in stock: 3 @ 48" x 163.8" 1 @ 48" x 92.5" & 2 @ 47.8" x 168" Shipping From: Los Angeles, CA 90061	\$29.97/lb	\$212,787.00

This purchase is tax exempt
 Will consider alternate offerings
 Accepted Payment term: New Account
 This offer expires in 10 days.

Subtotal: \$212,787.00
 Tax:
 Total: \$212,787.00



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Cost of A286 plate: \$29/lb

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4/26/2007

Response w/Exceptions

To: Fred Dahlgren
 PPPL
 PO Box 451
 Princeton, NJ 08543

Buyer Quote#: BRFQ041807-1
 Supplier Quote#: rick a
 RFQ ID#: 106580

From: Metal Suppliers Online
 PO Box 711
 Hampstead, NH 03841
 p: (603) 329-0101
 f: (603) 329-0171

Ship To: Fred Dahlgren
 PO Box 451
 Princeton, NJ, 08543

sales@metalsupplieronline.com

RFQ Exp Date	Req Del Date	Ship Via	F.O.B.	Freight Terms
4/30/2007	3 months ARO ▶ 10 days	No Preference	Shipping Point	Freight Collect

Quantity	Units	Description	Unit Price	Total (\$ US)
36	sheets	Super Alloy Inconel(r) Alloy 625 Plate Thickness: 0.5 in Width: 18 in Length: 36 in Domestic Material Required Mill is Allegheny Shipping From: Los Angeles, CA 90061	\$4,587.77/sheet	\$165,159.72

This purchase is tax exempt
 Will consider alternate offerings
 Accepted Payment term: New Account
 This offer expires in 10 days.

Subtotal: \$165,159.72
 Tax:
 Total: \$165,159.72



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[Click to view the \(1\) competing bid\(s\).](#)

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4/3/2007 Response To Request

To: Fred Dahlgren PPPL PO Box 451 Princeton, NJ 08543	Buyer Quote#: B.Q.-2 Supplier Quote#: rick a RFQ ID#: 106016	
From: Metal Suppliers Online PO Box 711 Hampstead, NH 03841 p: (603) 329-0101 f: (603) 329-0171 sales@metalsuppliersonline.com	Ship To: Fred Dahlgren PO Box 451 Princeton, NJ, 08543	

RFQ Exp Date	Req Del Date	Ship Via	F.O.B.	Freight Terms
4/30/2007	8 weeks ARO	No Preference	Shipping Point	Freight PPD & All

Quantity	Units	Description	Unit Price	Total (\$ US)
22	sheets	Stainless Steel 316L Plate Thickness: 0.5 in Width: 24 in Length: 36 in Domestic Material Required Shipping From: Rochester Hills, MI 48306	\$944.90/sheet	\$20,787.80
			Subtotal:	\$20,787.80
			Tax	
			Total:	\$20,787.80

This purchase is tax exempt
Will consider alternate offerings
Accepted Payment term: New Account
This offer expires in 10 days.

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Cost of 316L ~ \$7.50/lb

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4/3/2007 Response To Request

To: Fred Dahlgren PPPL PO Box 451 Princeton, NJ 08543	Buyer Quote#: B.Q.-3 Supplier Quote#: rick a RFQ ID#: 106017	
From: Metal Suppliers Online PO Box 711 Hampstead, NH 03841 p: (603) 329-0101 f: (603) 329-0171 sales@metalsuppliersonline.com	Ship To: Fred Dahlgren PO Box 451 Princeton, NJ, 08543	

RFQ Exp Date	Req Del Date	Ship Via	F.O.B.	Freight Terms
4/30/2007	8 weeks ARO	No Preference	Shipping Point	Freight PPD & All

Quantity	Units	Description	Unit Price	Total (\$ US)
10	pieces	Stainless Steel 316L Plate Thickness: 0.75 in Width: 36 in Length: 96 in solution annealed plate Domestic Material Required Shipping From: Rochester Hills, MI 48306	\$4,971.30/piece	\$49,713.00
			Subtotal:	\$49,713.00
			Tax	
			Total:	\$49,713.00

This purchase is tax exempt
Will consider alternate offerings
Accepted Payment term: New Account
This offer expires in 10 days.

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4/26/2007 Response w/Exceptions

To: Fred Dahlgren
PPPL
PO Box 451
Princeton, NJ 08543

From: Metal Suppliers Online
PO Box 711
Hampstead, NH 03841
p: (603) 329-0101
f: (603) 329-0171
sales@metalsuppliersonline.com

Buyer Quote#: BRFQ041807-1
Supplier Quote#: rick a
RFQ ID#: 106580

Ship To: Fred Dahlgren
PO Box 451
Princeton, NJ, 08543

RFQ Exp Date	Req Del Date	Ship Via	F.O.B.	Freight Terms
4/30/2007	3-months-ARO ▶ 10 days	No Preference	Shipping Point	Freight Collect

Quantity	Units	Description	Unit Price	Total (\$ US)
36	sheets	Super Alloy Inconel(r) Alloy 625 Plate Thickness: 0.5 in Width: 18 in Length: 36 in Domestic Material Required Mill is Allegheny Shipping From: Los Angeles, CA 90061	\$4,587.77/sheet	\$165,159.72

This purchase is tax exempt
Will consider alternate offerings
Accepted Payment term: New Account
This offer expires in 10 days.

Subtotal:	\$165,159.72
Tax	
Total:	\$165,159.72

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4/26/2007 Response w/Exceptions

To: Fred Dahlgren
PPPL
PO Box 451
Princeton, NJ 08543

From: Metal Suppliers Online
PO Box 711
Hampstead, NH 03841
p: (603) 329-0101
f: (603) 329-0171
sales@metalsuppliersonline.com

Buyer Quote#: BRFQ041807-2
Supplier Quote#: rick a
RFQ ID#: 106581

Ship To: Fred Dahlgren
PO Box 451
Princeton, NJ, 08543

RFQ Exp Date	Req Del Date	Ship Via	F.O.B.	Freight Terms
4/30/2007	3-months-ARO ▶ 45 days	No Preference	Shipping Point	Freight Collect

Quantity	Units	Description	Unit Price	Total (\$ US)
24	plates	Super Alloy Inconel(r) Alloy 625 Plate Thickness: 0.75 in Width: 18 in Length: 36 in Domestic Material Required Mill is Carlson. Stock due late May. Shipping From: Los Angeles, CA 90061	\$6,868.15/plate	\$164,835.60

This purchase is tax exempt
Will consider alternate offerings
Accepted Payment term: New Account
This offer expires in 10 days.

Subtotal:	\$164,835.60
Tax	
Total:	\$164,835.60

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Page 1 of 2 <http://www.metalsuppliersonline.com/buy/mybuying/ViewResponse.asp?bidID=61257>

Page 1 of 2

Cost of Inconel 625 ~ \$47/lb (note Huntington verbal quote ~ \$29/lb)

Budgetary Quote From Passiac County Welders PCG, Inc.

PLEASE ACCEPT OUR BUDGETARY PROPOSAL ON YOUR PRELIMINARY DRAWINGS

AS PER YOUR REQUEST ON THE ITEMS LISTED BELOW.

6 REQD---- PF-6 VERTICAL STIFFENER DWG. SE151-152 REV O.	\$ 1,645.00 EACH	\$ 9,870.00
12 REQD----PF-6 VERTICAL STIFFENER DWG. SE151-153 REV O.	\$ 1,310.00 EACH	\$ 15,720.00
6 REQD----PF-6 SUPPORT ARC DWG. SE151-156 REV O.	\$ 2,471.00 EACH	\$ 14,826.00
12 REQD---PF-6 SUPPORT ARC DWG. SE151-160 REV O.	\$ 3,253.00 EACH	\$ 39,036.00
42 REQD---PF-5 & PF-6 SUPPORT BRACKET DWG. SE151-175 REV O.	\$ 3,204.00 EACH	\$ 134,568.00
72 REQD--- COIL REAR LEFT SUPPORT DWG. SE151-177 REV O.	\$ 1,552.00 EACH	\$ 111,744.00
72 REQD----TF COIL FRONT LEFT BRK. DWG. SE151-179 REV O.	\$ 1,424.00 EACH	\$ 102,528.00

THESE ARE 316L STAINLESS STEEL WELDMENTS AND WHICH REQUIRE SOLUTION ANNEALING. FULL PENETRATION WELDS ARE REQUIRED.

\$ 428,292.00

FOB WAYNE, N.J.

MATERIAL IS BASED ON CURRENT MARKET CONDITIONS AND IS SUBJECT TO CHANGE AT TIME OF PLACEMENT OF AN ORDER.

TERMS 1/3 UPON MATERIAL ORDER
1/3 UPON FIRST PIECE INSPECTION
BALANCE NET 30 DAYS

REGARDS JOE TALERICO

Weights:

DWG. SE151-152 REV O	41.1 x 6	246.6
DWG. SE151-153 REV O	44.0 x 12	528.0
DWG. SE151-156 REV O	54.4 x 6	326.4
DWG. SE151-160 REV O	107.5 x 12	1,290.0
DWG. SE151-175 REV O	113.7 x 42	4,775.4
DWG. SE151-177 REV O	46.3 x 72	3,333.6
DWG. SE151-179 REV O	33.2 x 72	2,390.0
	total weight:	12,890.4 lbs

50% allowance + 6,445 = 19,335 lbs. @ \$7.50/lb. = \$145,012.00 for 316L

@ \$28.50/lb = \$551,047.00 for Inconel 625 (∂ = \$406,035 less scrap values)

NOTE: The above estimates do not include TF pre-load eye-bolt ass'ys, pre-load ring, PF4 supports, PF bridge clamps, Base supp't struct. interfaces, CS structure & interface, mtg. hardware, or insulators.

Independent ROM quote

Roy Sheppard, Energy Industries of Ohio -Technical Liaison

Part #	Description	Quantity	Price	Extention
SE-151-175	aluminum support bracket	66	\$4,795.00	\$316,470.00
SE-151-152	Vertical stiffener	6	\$903.00	\$5,418.00
SE-151-153	Vertical stiffener	12	\$725.00	\$8,700.00
SE-151-177-E	rear left support bracket w/extension	36	\$495.00	\$17,820.00
SE-151-177	rear left support bracket less extension	36	\$470.00	\$16,920.00
SE-151-179-E	front left bracket w/extension	36	\$445.00	\$16,020.00
SE-151-179-E	front left bracket less extension	36	\$420.00	\$15,120.00
				\$396,468.00

Notes:

1. Material Al 5086-H116
2. Quote complete to print
3. Part includes LPI - 100% of all welds
4. pricing for SE-151-175 was based on original estimate of 42 units. Price may come down for new, higher volume
5. This is a ROM quote only based on preliminary drawings.

Glossary:

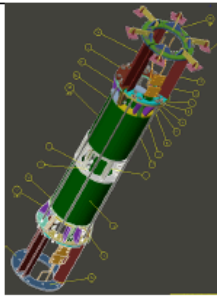
LPI	Liquid Dye Penetrant Inspection?
ROM	(Rough Order of Magnetude)

Note: This quote is for items listed only.

Job 1353 - CS Structural Procurement

Materials and Subcontracts (M&S)

Description:
 This effort covers manufacturing of the interim central solenoid support structure and integration of the PF1aU&L with the structure. The pieces of structure are procured via one or more fixed price contracts. This structure is for MIE day-1 operations using the old salvaged PF coils from NSTX. A new structure will be necessary for operations with the baseline PF1,2&3 coils.



Purchased parts:

upper and lower interface hub	\$124,768	see notes below
brackets to TF structure	\$23,120	
spacers and tie rods	\$25,072	
subtotal, purchased parts	\$172,960	

outside engr rate = 130 \$ per hour
 outside fab rate = 92 \$ per hour
 outside inspection/technician rate = 75 \$ per hour

Worksheet:

Center solenoid upper interface hub

Fabrication / parts costs

Item / description	Value	Unit	Cost \$/unit	No.	Cost \$
Center hub Weldment	92	lbs	28	1	\$2,576
Upper solenoid hub weldment Assy	236	lbs	28	1	\$6,608
Machining of upper hub weldments, 2 setups	64	hrs	92	1	\$5,888
Inspection	8	hrs	75	1	\$600
Insulation and shims between weldments	1	interface	1500	12	\$18,000
misc bolts and assembly hardware-upper	1	lot	10000	1	\$10,000
lower solenoid hub weldment Assy	236	lbs	28	1	\$6,608
Machining of lower hub weldments, 2 setups	64	hrs	92	6	\$35,328
Inspection	8	hrs	75	6	\$3,600
Insulation and shims between castings	1	interface	1500	12	\$18,000
misc bolts and assembly hardware-lower	1	lot	10000	1	\$10,000
Package & Shipping					\$5,000
					subtotal Integrated TF structure fab./matl
	628	lbs	20		\$12,560
Material Surcharges 316L - Inconel 625					
					Adjusted Total
					\$124,768

Brackets to TF structure

Fabrication / parts costs

Item / description	Value	Unit	Cost \$/unit	No.	Cost \$
Upper tie plate to TF coil structure	500	lbs	8	1	\$4,000
Machining of upper and lower crown segment casting	40	hrs	92	2	\$7,360
lower brackets to TF coil structure	30	lbs	8	6	\$1,440
machining of lower brackets	16	hrs	92	6	\$8,832
					subtotal brackets to TF coil fab./matl
	516	lbs	20		\$12,800
Material Surcharges 316L - Inconel 625					\$10,320
					Adjusted Total
					\$23,120

Center Solenoid assembly hardware

Item / Description	Value	Unit	Cost \$/unit	No Units	Cost \$
1"OD, 96" long Tie Rods	90	lbs	25	6	\$2,262
G-10 separation discs & misc.	150	lbs	20	7	\$21,000
Material Surcharges 316L - Inconel 625	90		20		\$1,810
					Total:
					\$25,072

Center Solenoid PF1a Upper to Lower interconnect Bus

Fabrication / parts costs

Item / description	Value	Unit	Cost \$/unit	No. of Units	Cost \$
Copper OFHC extrusion 3/4"sq. w/.38dia hole	10	lbs/ft.	\$4.25	2	\$74.38
CTD-112 (or equiv.) Epoxy/Glass pre-preg. Insulation 1" rolls		per roll	\$98.00	4	\$392.00
Bend return & supply bus segments	12	hrs	\$81.00	2	\$1,944.00
Wrap & cure bus segments	40	hrs	\$81.00	1	\$3,240.00
Machine & assemble (braze) LN2 fittings	8	hrs	\$81.00	4	\$2,592.00
Cut & bend Cu Jumpers	12	hrs	\$81.00	2	\$1,944.00
Silver-braze & clean-up jumper lead-stem mtg. plates	8	hrs	\$81.00	8	\$5,184.00
Cut & machine jumper/lead-stem mtg. plates	16	hrs	\$81.00	8	\$10,368.00
Cut & Machine G11 clamps	12	hrs	\$81.00	3	\$2,916.00
Hardware B'ville washers -Inconel718			\$38.50	64	\$2,464.00
Hardware Inconel hex nuts 1/2-13			\$32.00	32	\$1,024.00
Hardware Inconel 718 hex bolts 1/2-13 x 2"			\$42.00	32	\$1,344.00
Silver brush plate all bolted bus surfaces			\$20.00	8	\$160.00
Handy-Harman Silver braze BA9-1 easy-fl0-45 filler alloy	5	oz.	\$109.83	1	\$109.83
					subtotal of assembly hardware
					\$33,756.21

JOB 1353 TOTALS: \$205,716

