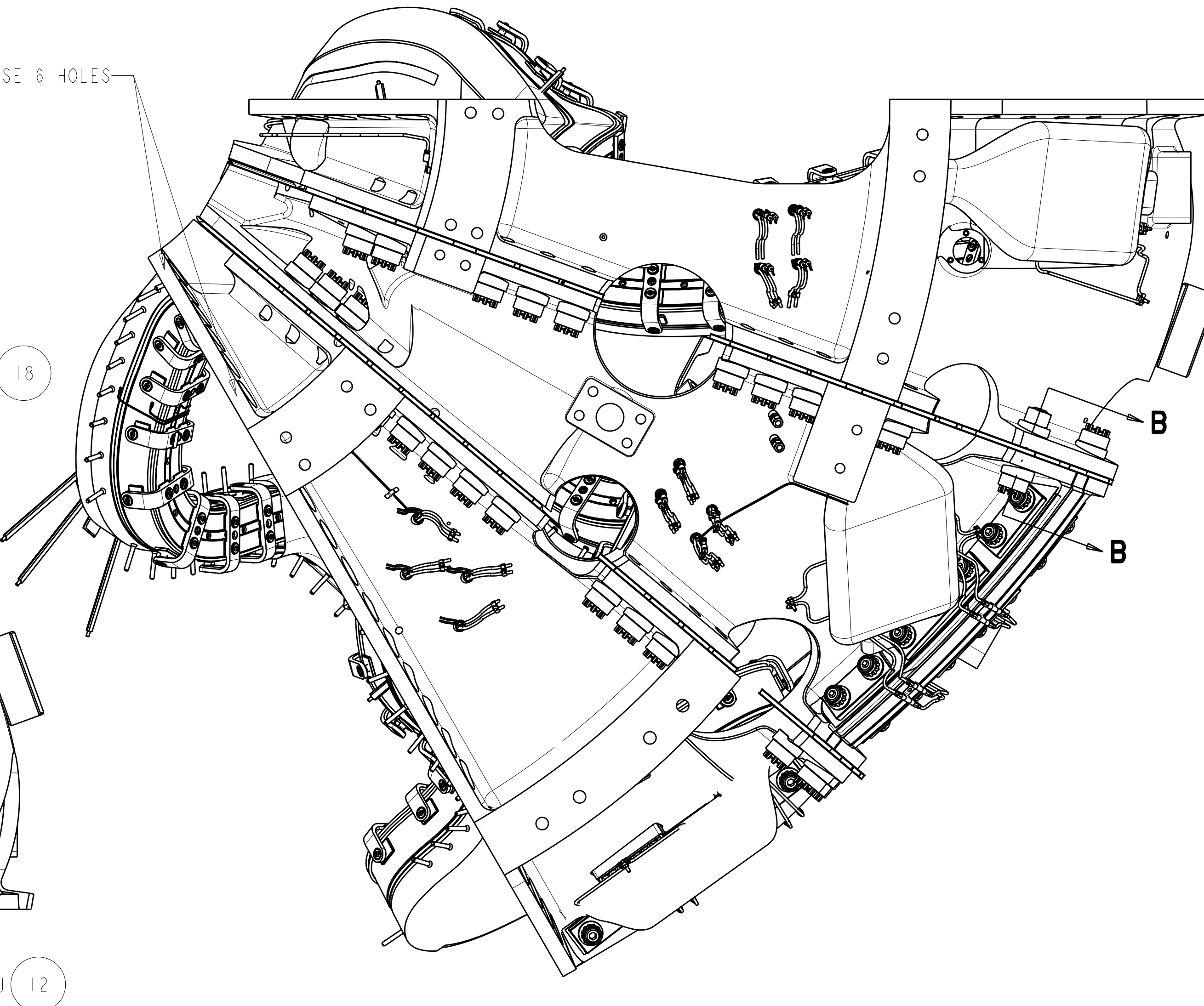
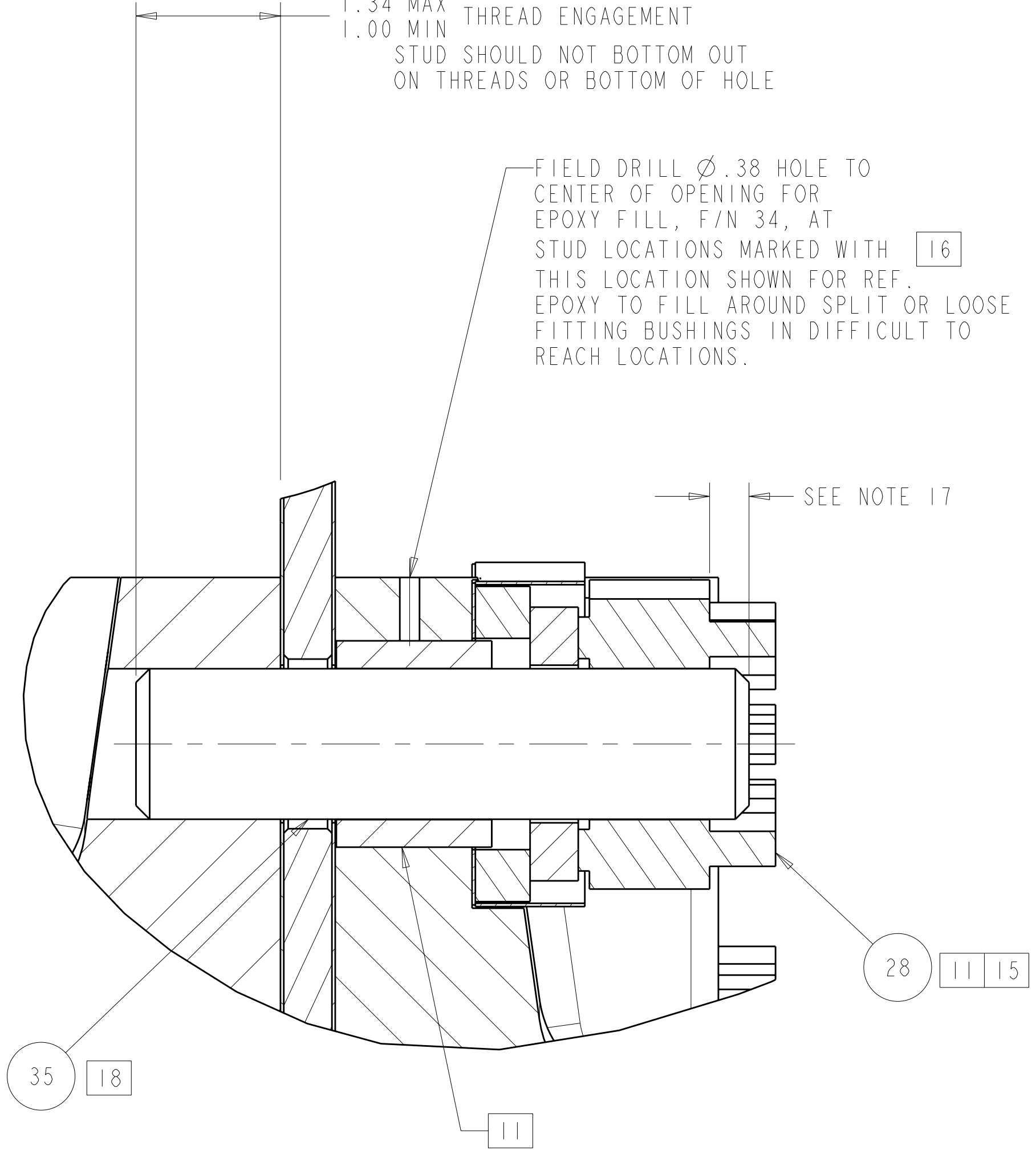


**TOP VIEW**  
SCALE 0.125

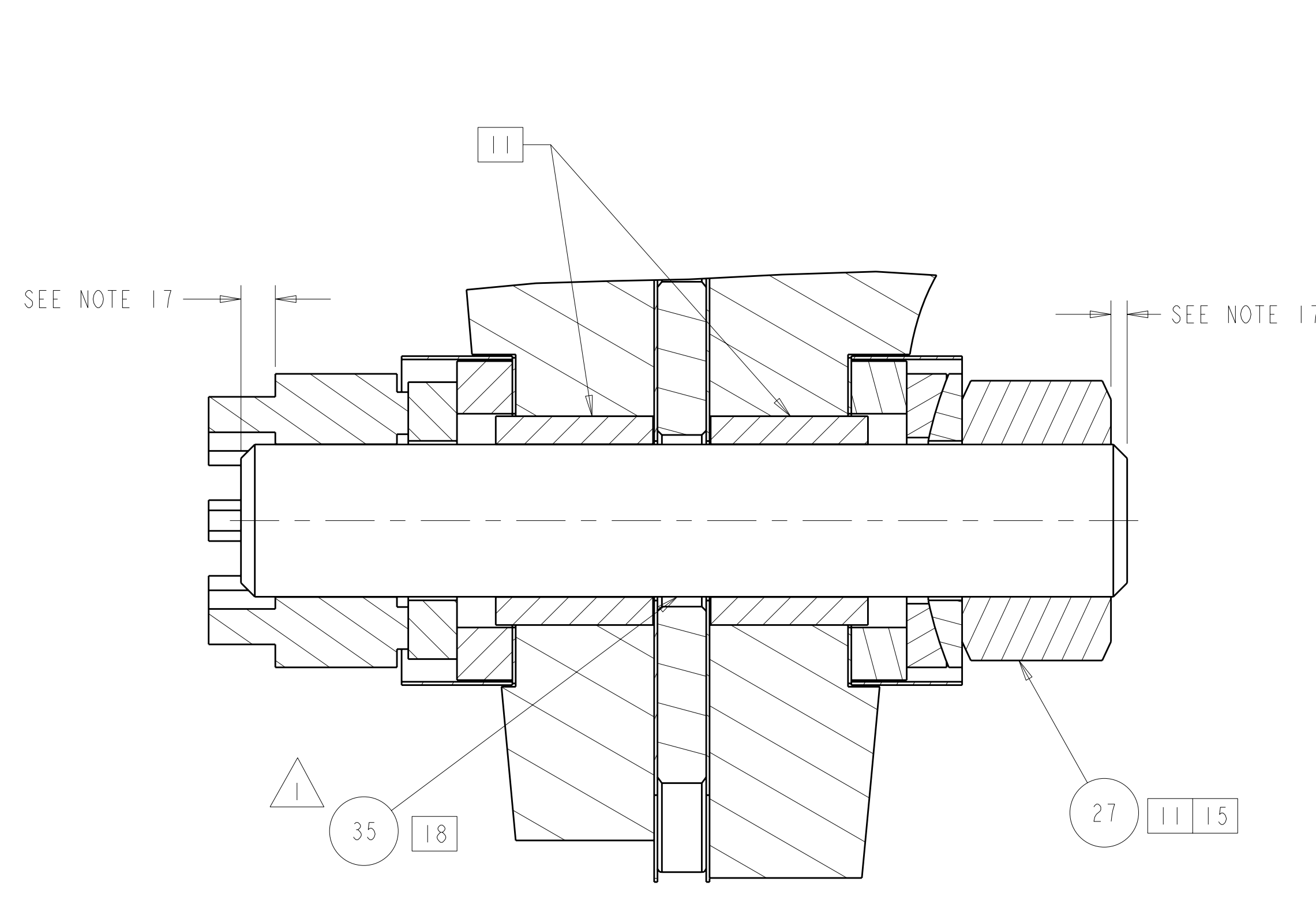


**BOTTOM VIEW**  
SCALE 0.125

**-1 THRU -6 MCWF HALF PERIOD ASSY**  
SCALE NOTED



**SECTION A-A -TYP TAPPED STUD KIT**  
SCALE 1.00



**SECTION B-B -TYP THRU STUD KIT**  
SCALE 1.00

- NOTES:
- DRAWING PREPARED IN ACCORDANCE WITH ASME Y14.8M-1996.
  - INTERPRET DIMENSIONS AND TOLERANCES PER ANSI Y14.5M-1994.
  - DIMENSIONS ARE IN INCHES.
  - MAGNETIC PERMEABILITY NOT TO EXCEED 1.02 AS TESTED BY A SEVERN INDICATOR. AVAILABLE FROM: SEVERN ENGINEERING AUBURN, ALABAMA 36830 WWW.SEVERNGINEERING.COM
  - DRAWING DEPICTS FINAL MACHINED STATE OF ASSEMBLY DEFINED BY PRO/ENGINEER FILE SE140-003.ASM.
  - UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE RELATED TO DATUM A- (PRIMARY X-Y PLANE, TOP) DATUM B- (SECONDARY Y-Z PLANE, SIDE) DATUM C- (TERTIARY X-Z PLANE, FRONT)
  - DIMENSIONS APPLY AT TEMPERATURE OF 20-30°C (68-86°F).
  - DIMENSIONS AND TOLERANCES EXCLUDE PROCESS MATERIAL ALLOWANCES WHICH MAY ADD MASS.
  - APPROXIMATE WEIGHT = 24.265 LBS
  - SEE LATEST REVISION OF SPECIFICATION NCSX-CSPEC-185-02-00 FOR ADDITIONAL REQUIREMENTS.
  - MACHINE BUSHING OD AFTER MATCHING ALIGNMENT WITH CORRESPONDING HOLE ON MATING FLANGE. SEE DRAWING SE140-190 FOR ADDITIONAL INFORMATION ON STUD KITS.
  - SHIMS AND SHEAR PLATES TO BE CUSTOM FIT PRIOR TO INSTALLATION SEE DWG SE140-046 FOR WELDING AND OTHER INFORMATION.
- WING BLADDERS, F/N 25, TO BE LOCATED APPROX AS SHOWN ON EITHER COIL FACE AND SECURED WITH ADHESIVE, F/N 32, FOLLOWING MANUFACTURERS' DIRECTIONS.
  - ALTERNATE FILL METHOD IS TO USE BAG F/N 38 TRIMMED TO FIT AS REQ'D AND FILL WITH EPOXY MIXTURE CONSISTING OF F/N 32, PART A 600G, PART B 240G, AND F/N 37 360G, FIBERGLASS ROPE, F/N 38, TO BE CHOPPED PRIOR TO MIXING WITH EPOXY PER SPEC NCSX-CSPEC-185-02-00.
  - WING SUPPORTS, F/N 31, TO BE INSTALLED IF WING DEFLECTION EXCEEDS MAXIMUM ALLOWED TOLERANCE VALUES AFTER FINAL WELDING OF SHIMS IS COMPLETE. SEE DRAWING SE140-060 FOR ADDITIONAL INFORMATION.
  - USE STUD KITS SE140-190-1 AND -2, F/N 29 AND 30, IN ANY HOLE WHERE THE FLANGE THICKNESS IS THINNER THAN 1.25. SEE DRAWING SE140-190 FOR ADDITIONAL INFORMATION.
  - DRILL Ø.38 HOLES THRU FLANGE AT HOLE LOCATIONS NOTED: C COIL D19, D24, D25, D26 AND THE 6 ADDED INBOARD HOLES. ALSO TO BE DRILLED BUT NOT SHOWN ARE: B COIL E27 AND E28, A COIL E10. OTHER HOLES MAY BE DRILLED WITH PRIOR CONFIRMATION OF ENGINEERING. HOLES TO BE USED TO EPOXY FILL AROUND LOOSE OR SPLIT BUSHINGS IN DIFFICULT TO REACH LOCATIONS.
  - FOR PROPER THREAD ENGAGEMENT SEE DRAWING SE140-190.
  - WRAP STUD IN AREA WHERE SHIM WILL FIT WITH 1 & 1/4 TURNS, MINIMUM, OF MATERIAL CHOSEN FROM ITEMS IN F/N 35 NOT TO EXCEED .03 MAXIMUM THICKNESS.
  - THESE PART NUMBERS ASSIGNED BASED ON CASTING IDENTIFICATIONS, "A1"....."C6"

REV	DESCRIPTION	BY	DATE	CHK	DEPT	DATE	PE	REQ	DATE	ORNL	DOE	DATE	
3	FOR #6 PER ECN# 5376	GM	09/08	MC		09/08							
3	AND 38, ADDED OPTIONAL ADDITIONAL BLADDER												
3	RELOCATED BLADDER #6 AND ADDED NOTES AND F/N 37												
2	ADDED F/N 36, PER ECN# 5356	GM	05/08	MC		05/08							
1	DETAIL A SHEET 2, PER ECN # 5332	GM	05/08	MC		05/08							
1	HOLES ZONE G5 AND NOTE 16, DELETED												
1	# 10, ADDED F/N 35, ADDED FIELD DRILL												
1	ADDED NOTE 17, 18, 19, CHANGED SPEC # IN NOTE												
1	F/N'S F/N 26, SE140-046 WAS SE140-040												
1	DELETED F/N 7 THRU 11, RENUMBERED REMAINING												
0	ORIGINAL ISSUE	GM	01/08	MC		01/08							
REV	DESCRIPTION	BY	DATE	CHK	DEPT	DATE	PE	REQ	DATE	ORNL	DOE	DATE	
REV	REVISION OR ISSUE PURPOSE	BY	DATE	CHK	DEPT	DATE	PE	REQ	DATE	ORNL	DOE	DATE	
3	AR	AR	AR	AR	AR	AR	AR	SE140-050-2	19"X20" TEFLON BAG			38	
3	AR	AR	AR	AR	AR	AR	AR	-37	FIBERGLASS ROPE	GLR125HD		37	
2	I	I	I	I	I			SE140-046-2	A2B2C2 THRU A6B6C6 SHIM AND SHEAR PLATE KIT	G-10 STRIP OR KAPTON TAPE OR MYLAR TAPE	.015 THICK .002 TO .005 THICK	36	
1	AR	AR	AR	AR	AR	AR	AR	-35	INSULATING WRAP			35	
16	AR	AR	AR	AR	AR	AR	AR	-34	EPOXY	STYCAST 2850FT	CMR-DIRECT CAMBRIDGE, CBS 8HR, UK +44(0)1223 473631 WWW.CMR-DIRECT.COM	34	
	AR	AR	AR	AR	AR	AR	AR	-33	DOW GREAT INSULATING FOAM	POLYMERIC DIISOCYANATE POLYOLS AND HYDROCARBON GAS	BRADCO SUPPLY CORP TRENTON, NJ 08618 609-393-7000 WWW.BRADCOSUPPLY.COM	33	
13	AR	AR	AR	AR	AR	AR	AR	-32	ADHESIVE	CTD-540	COMPOSITE TECHNOLOGY DEVELOPMENT, INC LAFAYETTE, CO 80026 303-664-0394 WWW.CTD-MATERIALS.COM	32	
14	AR	AR	AR	AR	AR	AR	AR	SE140-060	WING SUPPORT			31	
15 11	AR	AR	AR	AR	AR	AR	AR	SE140-190-2	MCWF FLANGE TAPPED STUD KIT			30	
15 11	AR	AR	AR	AR	AR	AR	AR	SE140-190-1	MCWF FLANGE THRU STUD KIT			29	
11	54	54	54	54	54	54	54	SE140-190-4	MCWF FLANGE TAPPED STUD KIT			28	
11	I	I	I	I	I	I	I	SE140-190-3	MCWF FLANGE THRU STUD KIT			27	
12	I	I	I	I	I	I	I	SE140-046-1	AIBICI SHIM AND SHEAR PLATE KIT			26	
13	5	5	5	5	5	5	5	SE140-050-1	WING BLADDER			25	
	I							SE140-103-6	MCWF TYPE "C6" ASSY			24	
	I							SE140-103-5	MCWF TYPE "C5" ASSY			23	
								SE140-103-4	MCWF TYPE "C4" ASSY			22	
								SE140-103-3	MCWF TYPE "C3" ASSY			21	
								SE140-103-2	MCWF TYPE "C2" ASSY			20	
								SE140-103-1	MCWF TYPE "C1" ASSY			19	
I								SE140-102-6	MCWF TYPE "B6" ASSY			18	
								SE140-102-5	MCWF TYPE "B5" ASSY			17	
								SE140-102-4	MCWF TYPE "B4" ASSY			16	
								SE140-102-3	MCWF TYPE "B3" ASSY			15	
								SE140-102-2	MCWF TYPE "B2" ASSY			14	
								SE140-102-1	MCWF TYPE "B1" ASSY			13	
I								SE140-101-6	MCWF TYPE "A6" ASSY			12	
								SE140-101-5	MCWF TYPE "A5" ASSY			11	
								SE140-101-4	MCWF TYPE "A4" ASSY			10	
								SE140-101-3	MCWF TYPE "A3" ASSY			9	
								SE140-101-2	MCWF TYPE "A2" ASSY			8	
								SE140-101-1	MCWF TYPE "A1" ASSY			7	
AR	X	X	X	X	X	X	X	SE140-003-6	MCHP-6 RIGHT SIDE PERIOD 3 -A6/B6/C6			6	
AR	X	X	X	X	X	X	X	SE140-003-5	MCHP-5 LEFT SIDE PERIOD 3 -A5/B5/C5			5	
AR	X	X	X	X	X	X	X	SE140-003-4	MCHP-4 RIGHT SIDE PERIOD 2 -A4/B4/C4			4	
AR	X	X	X	X	X	X	X	SE140-003-3	MCHP-3 LEFT SIDE PERIOD 2 -A3/B3/C3			3	
AR	X	X	X	X	X	X	X	SE140-003-2	MCHP-2 RIGHT SIDE PERIOD 1 -A2/B2/C2			2	
AR	X	X	X	X	X	X	X	SE140-003-1	MCHP-1 LEFT SIDE PERIOD 1 -A1/B1/C1			1	
SE100-003	-6	-5	-4	-3	-2	-1		CAGE CODE	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	FIND NO
									←	←			

RELEASED FOR FABRICATION/INSTALLATION  
PPPL Drafting

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**P** THIS DRAWING PRODUCED ON PRO-ENGINEER

SCALE NOTED  
TOLERANCES UNLESS OTHERWISE SPECIFIED

FRACTIONS: 1/16, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1

XX DECIMALS: ±.01

XXX DECIMALS: ±.005

ANGLES: ±0°15'

BREAK SHARP EDGES 06 MAX

FINISH: UNLESS OTHERWISE SPECIFIED

DES	DATE	APP'D
D WILLIAMSON	01/2008	[Signature]
G LOVETT	01/2008	[Signature]
C M COLE	01/2008	[Signature]

PPPL DRFT	J SEIGEL	12/2007
VERSION NO.	3	
PLANT ORNL		
BLDG 5700		
FL SHT OF	1 2	
TYPE CLASS	A U	
RELEASE LEVEL		
Fabrication		

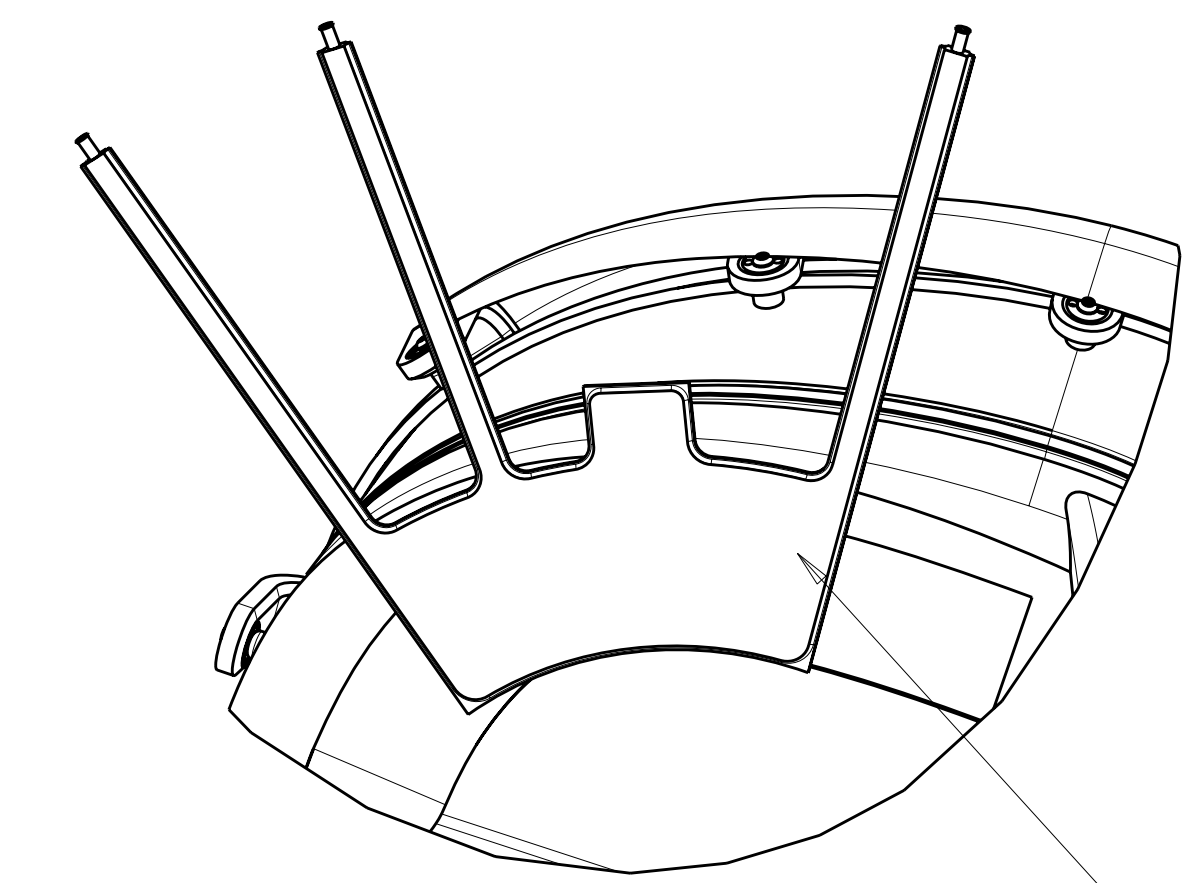
Ok Ridge National Laboratory managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC05-00OR22725 UT-BATTELLE, LLC. Oak Ridge, Tennessee  
PROJECT NAME: NATIONAL COMPACT STELLARATOR EXPERIMENT

**MODULAR COILS ASSEMBLY**  
1/2 FIELD PERIOD

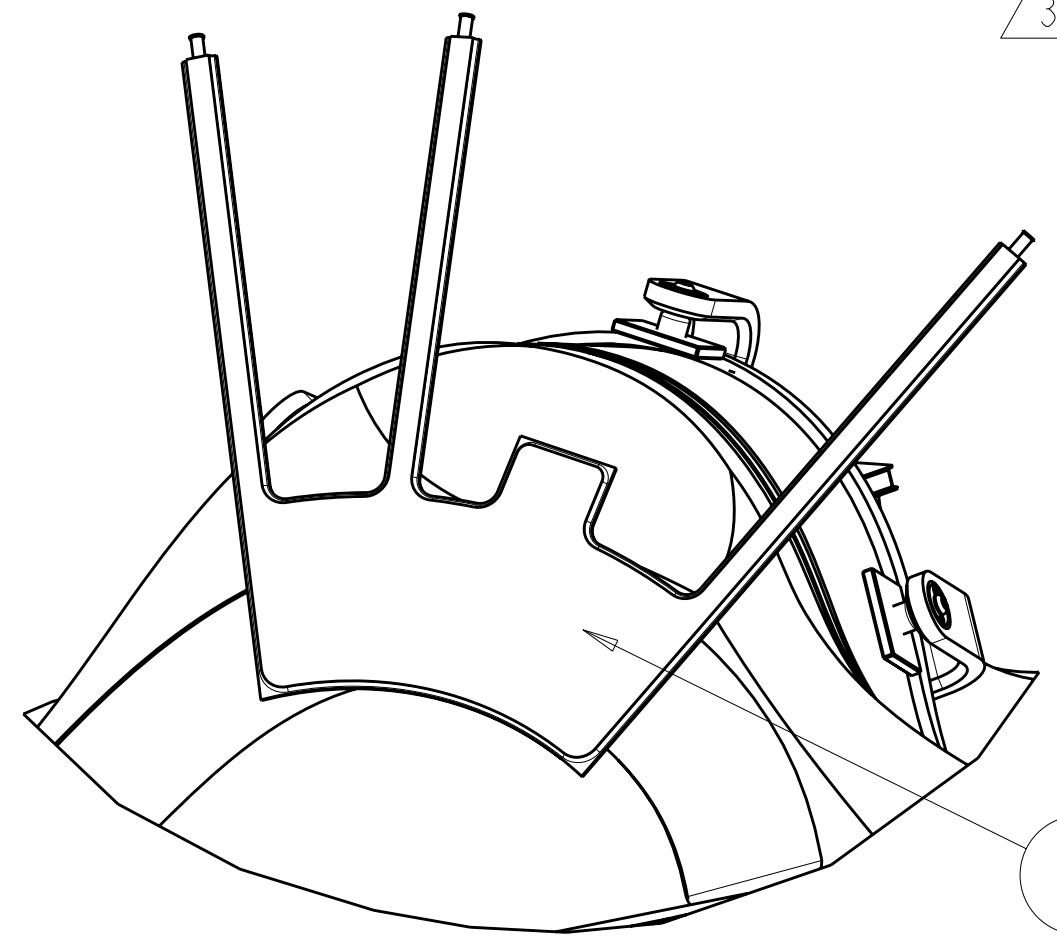
SE140-003

SE140-003

A

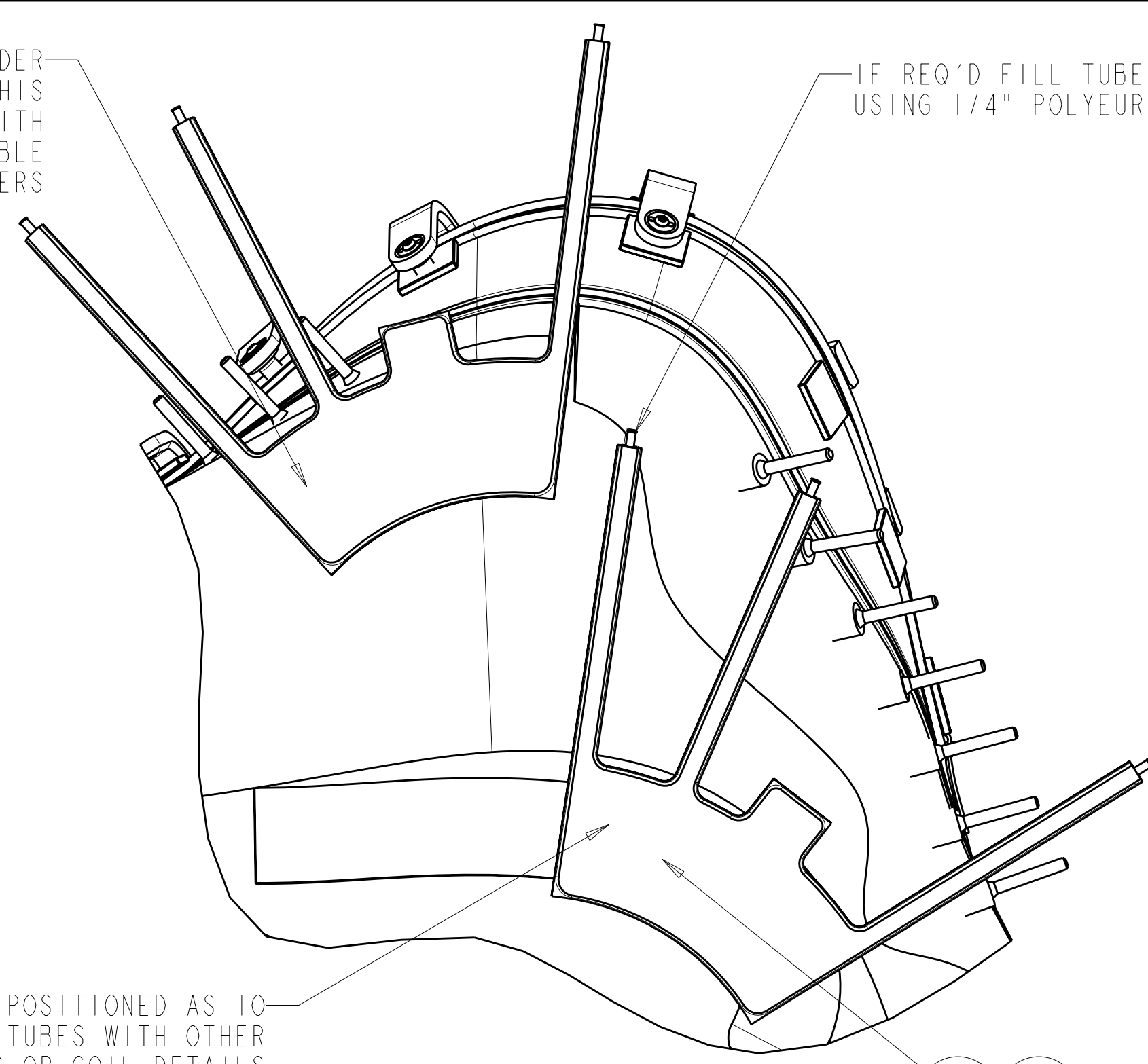


WING BLADDER #2 BETWEEN A AND B COIL - SHOWN ON B WING [13]  
SCALE .25



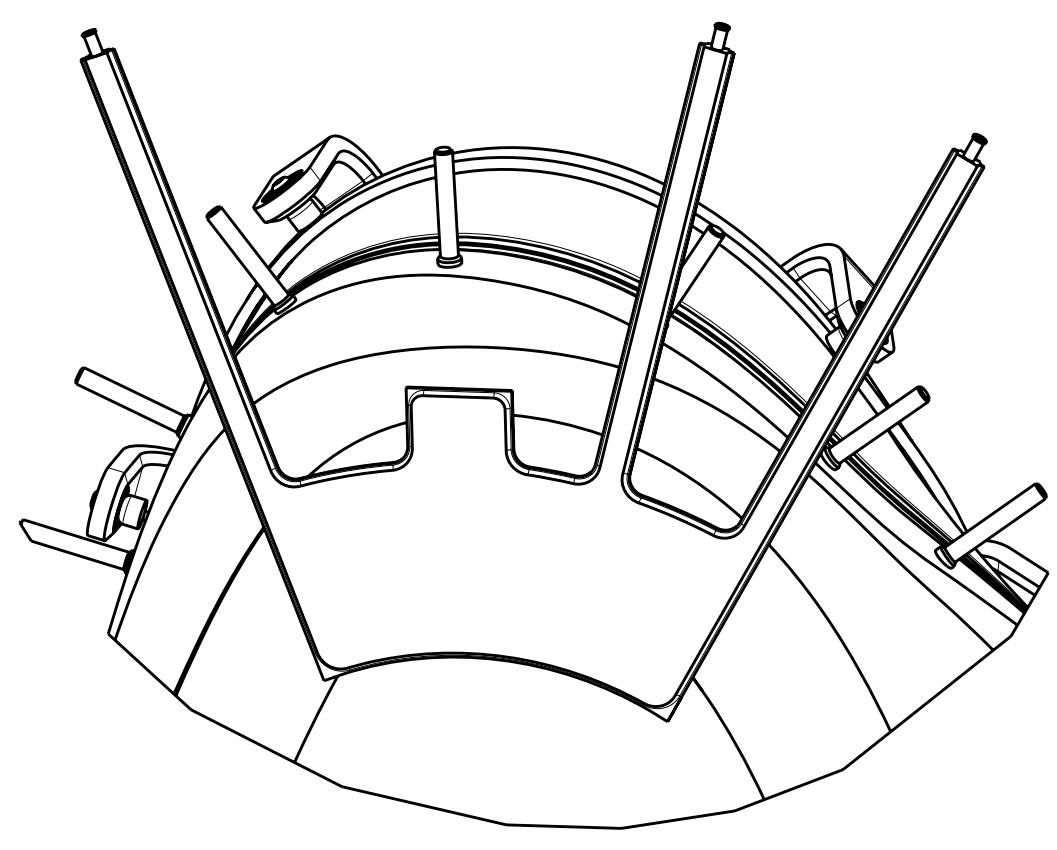
WING BLADDER #3 BETWEEN A AND B COIL - SHOWN ON A WING [13]  
SCALE .25

25 32 REF TYP

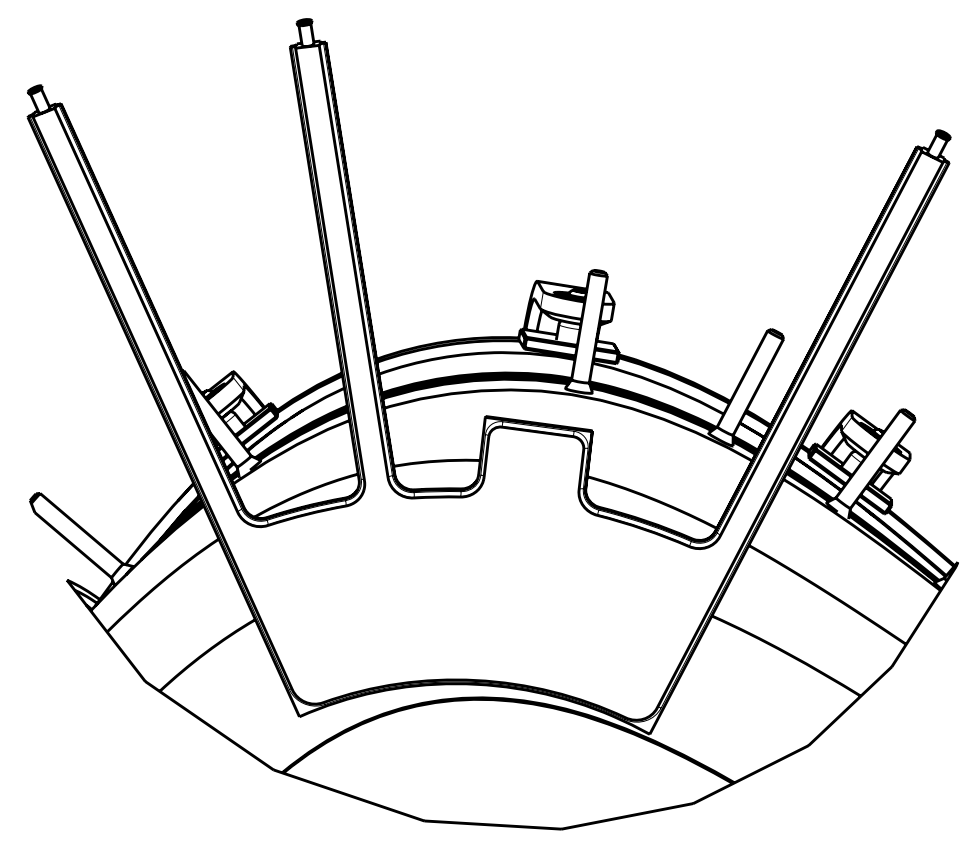


WING BLADDER #6 BETWEEN B AND C COIL - SHOWN ON C WING [13]  
SCALE .25

25 32 REF



WING BLADDER #7 BETWEEN B AND C COIL - SHOWN ON B WING [13]  
SCALE .25



WING BLADDER #9 BETWEEN C AND C COIL - SHOWN ON C WING [13]  
SCALE .25

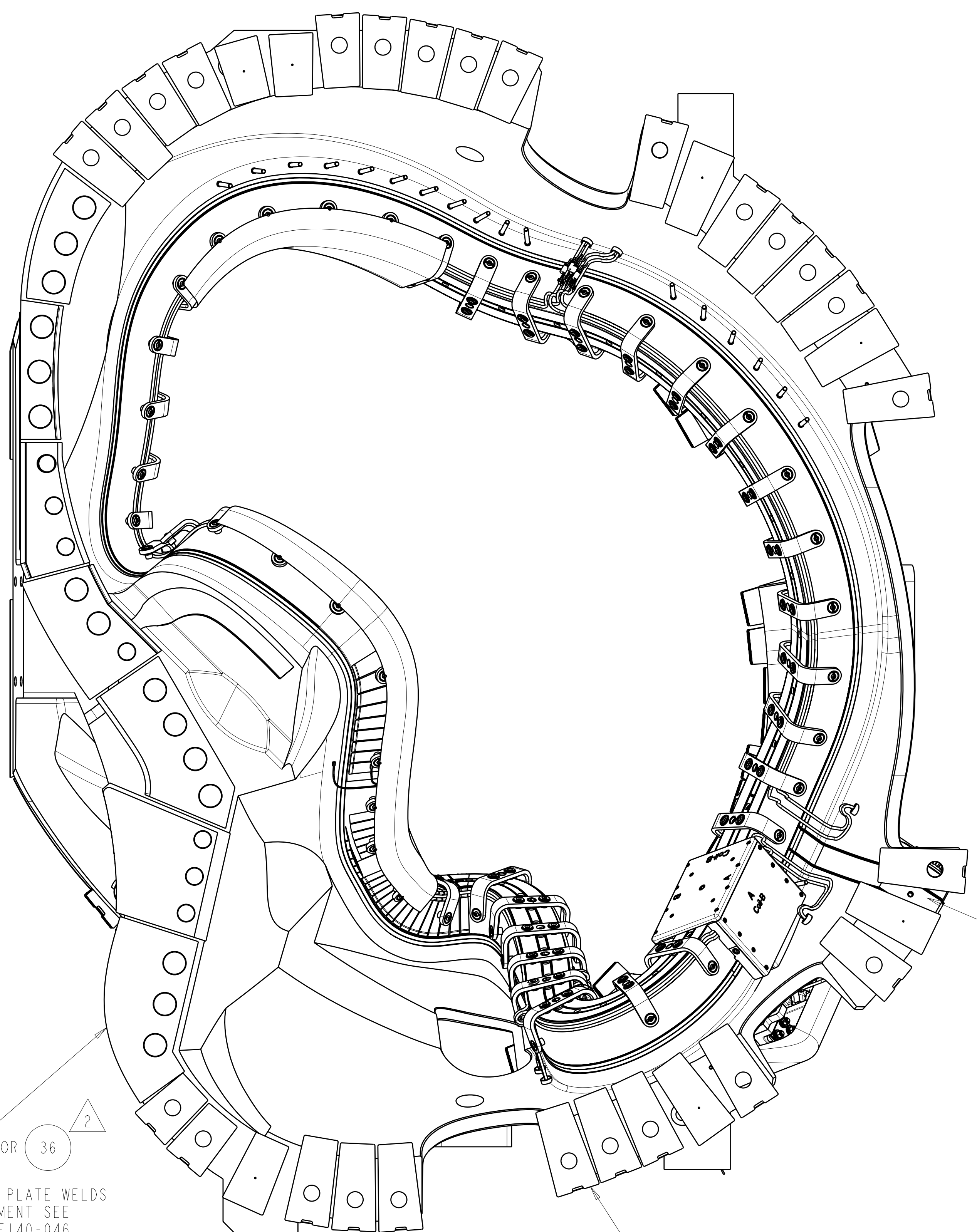
NOTE: WING SUPPORTS CANNOT BE USED FOR THIS WING UNTIL FINAL MACHINE ASSEMBLY SE100-001

3 ALTERNATE BAG AND FILL METHOD MAY BE USED WHERE WING GAPS ARE DETERMINED TO BE LARGER THAN .50" - .75" [13]

3 BLADDERS TO BE POSITIONED AS TO NOT CROSS FILL TUBES WITH OTHER BLADDERS OR COIL DETAILS

IF REQ'D FILL TUBES MAY BE EXTENDED USING 1/4" POLYURETHANE TUBING

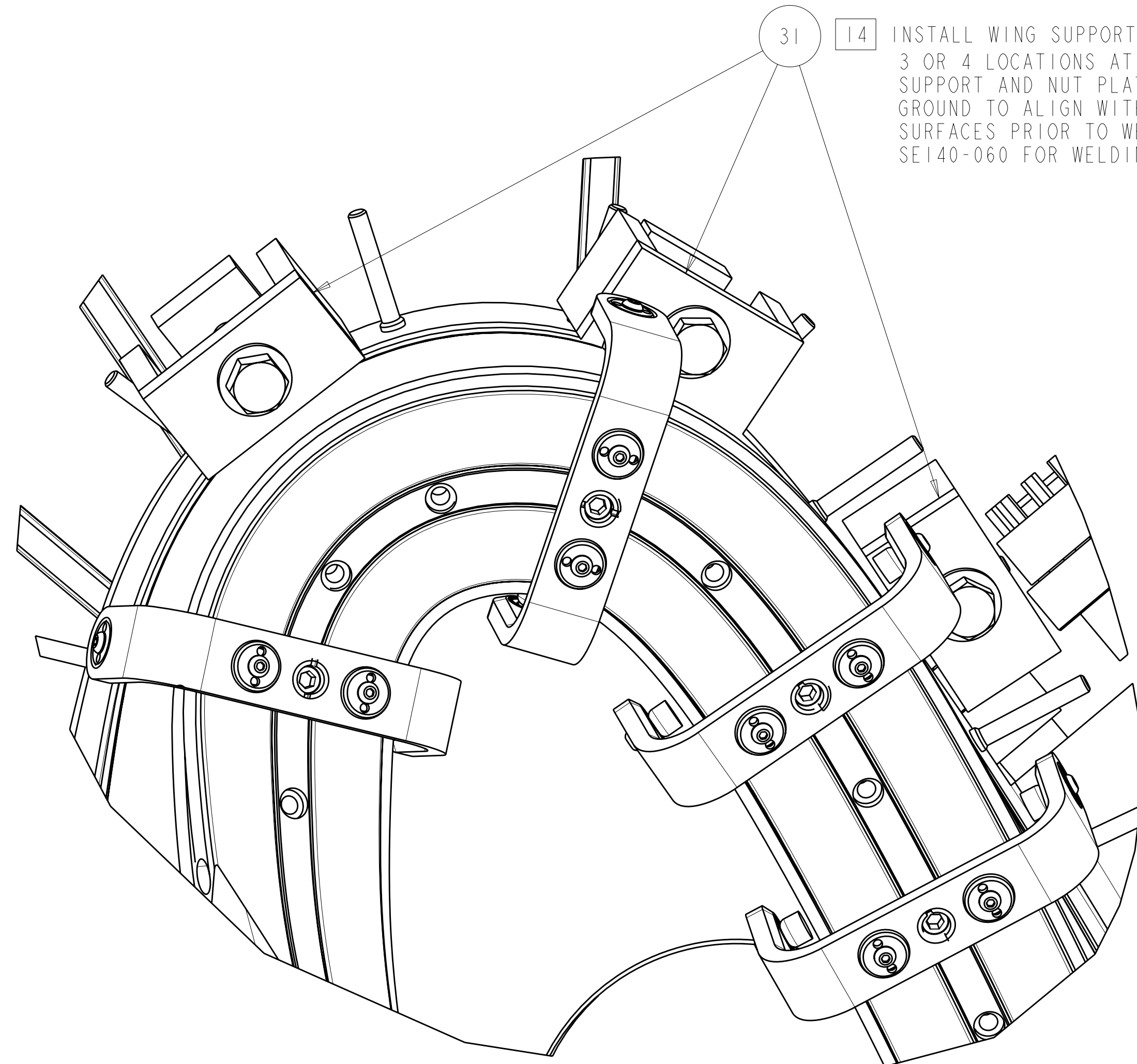
3 OPTIONAL ADDITIONAL BLADDER TO BE LOCATED APPROX THIS POSITION AND ATTACHED WITH CLIPS OR OTHER SUITABLE RETAINERS



VIEW OF B COIL A FLANGE A COIL REMOVED  
SCALE 0.15

12 26 OR 36  
FOR SHEAR PLATE WELDS AND PLACEMENT SEE DRAWING SE140-046

REF 26 12



TYPICAL WING 4 PLACES  
SCALE .50

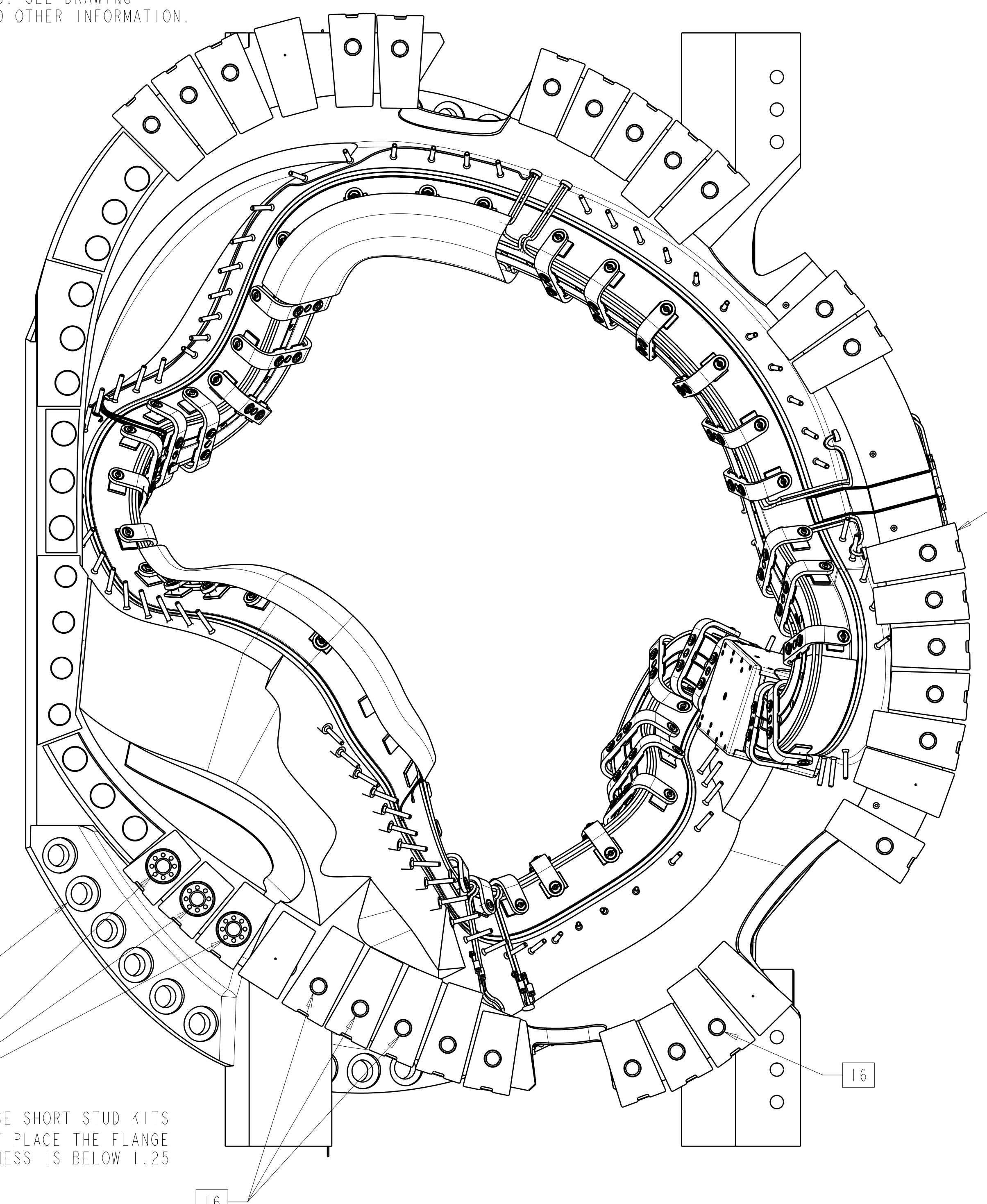
31 14 INSTALL WING SUPPORTS, IF NEEDED, AT 3 OR 4 LOCATIONS AT EACH WING AS SHOWN. SUPPORT AND NUT PLATES WILL NEED TO BE GROUND TO ALIGN WITH WING AND COIL SURFACES PRIOR TO WELDING. SEE DRAWING SE140-060 FOR WELDING AND OTHER INFORMATION.

33 FILL ALL GAPS WITH FILLER AFTER COILS ARE WELDED TOGETHER

26 12 FOR SHEAR PLATE WELDS AND PLACEMENT SEE DRAWING SE140-046

16 THESE 6 INBOARD HOLES

30 15 USE SHORT STUD KITS ANY PLACE THE FLANGE THICKNESS IS BELOW 1.25



VIEW OF C COIL B FLANGE B COIL REMOVED  
SCALE 0.15

26 12 REF

Oak Ridge National Laboratory managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC05-00OR22725 UT-BATTELLE, LLC. Oak Ridge, Tennessee									
PROJECT NAME <b>NATIONAL COMPACT STELLARATOR EXPERIMENT</b>									
MODULAR COILS ASSEMBLY 1/2 FIELD PERIOD									
VERSION NO. 3	PLANT ORNL	BLDG 5700	FL 3	SHT OF 2	TYPE 2	CLASS A	RELEASE LEVEL Fabrication		
SE140-003							REV 3		