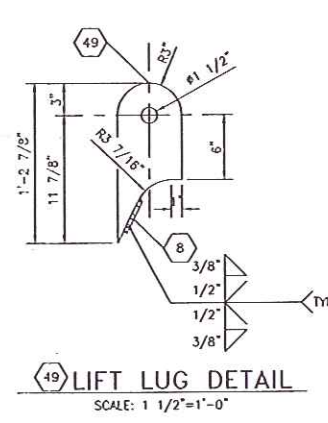
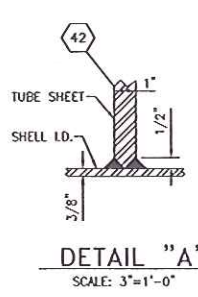
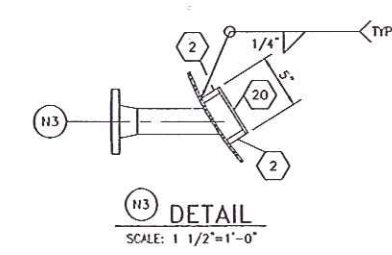
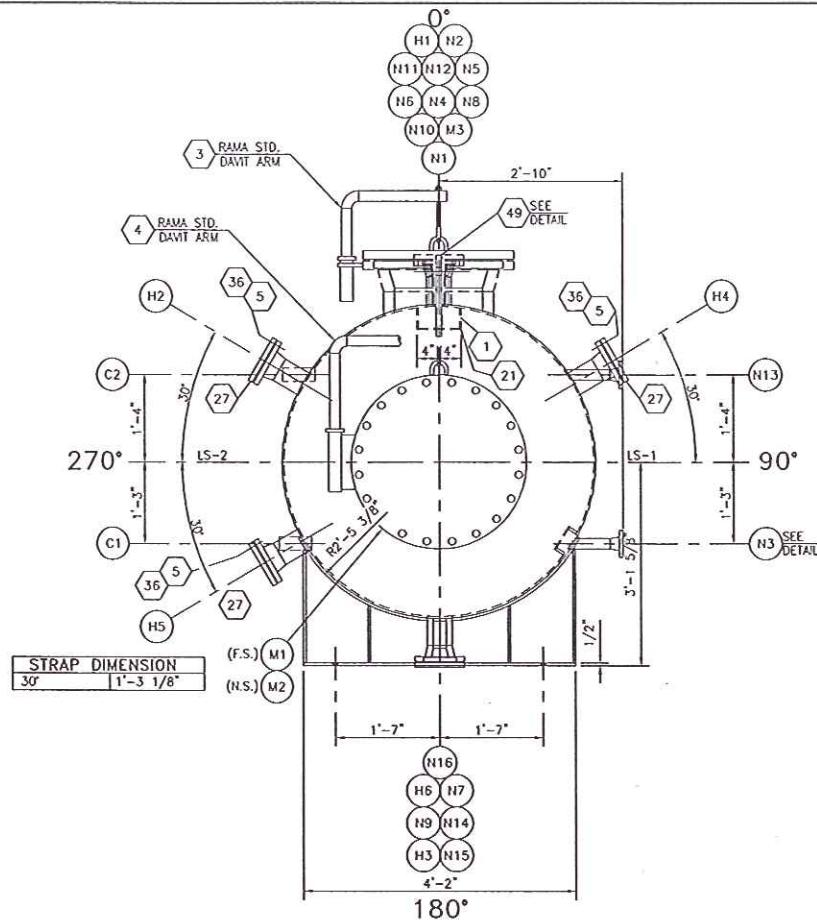




BILL OF MATERIAL	
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PK	DESCRIPTION	QTY	UNIT	PRICE
1	BAR RND - 2.0000" x 0.2500" x 3.750" LG.	1	SA36	4
2	BAR FLAT - 0.5000"	1	SA36	4
3	DAVIT ARM - RAMA STD. 20"	1501	DAVIT ARM	SA36/SA106-B
4	DAVIT ARM - RAMA STD. 24"	1501	DAVIT ARM	SA36/SA106-B
5	GSKT 4.00" - 1501 1/8" SPIRAL WOUND METAL/COMP.	304	SS	6
6	GSKT 20.00" - 1501 1/8" SPIRAL WOUND METAL/COMP.	304	SS	1
7	GSKT 24.00" - 1501 1/8" SPIRAL WOUND METAL/COMP.	304	SS	2
8	HEAD 0.375" NDL x 57.750" OD x 57.000" ID - F & D	1	SA36-70	1
9	FLATE - RAMA STD. 10" HOLE NAME PLATE	1	SA36/304SS	1
10	PIPE 1.50" x 0.281" WALL x 6.4375" LG. SH.S.	1	SA106-B	3
11	PIPE 1.50" x 0.281" WALL x 9.1875" LG. SH.S.	1	SA106-B	1
12	PIPE 16.00" x 0.375" WALL x 5.0000" LG. SH.S.	1	SA106-B	2
13	PIPE 2.00" x 0.218" WALL x 6.5000" LG. SH.S.	1	SA106-B	2
14	PIPE 2.00" x 0.343" WALL x 6.375" LG. SH.S.	1	SA106-B	6
15	PIPE 2.00" x 0.343" WALL x 8.5625" LG. SH.S.	1	SA106-B	1
16	PIPE 20.00" x 0.375" WALL x 5.0000" LG. SH.S.	1	SA106-B	1
17	PIPE 24.00" x 0.375" WALL x 4.0625" LG. SH.S.	1	SA106-B	1
18	PIPE 4.00" x 0.437" WALL x 6.1875" LG. SH.S.	1	SA106-B	6
19	PIPE 4.00" x 0.237" WALL x 5.7500" LG. SH.S.	1	SA106-B	6
20	PL. 0.250" x 5.00" OD - PL. DISK	1	SA36	1
21	PL. 0.250" x 8.00" x 8.000" - PL. 30/REC	1	SA36	1
22	PL. 0.250" x 64.75" OD x 57.750" ID - PL. DONUT	1	SA36	2
23	PL. 0.375" x 85.000" x 180.2500" LG. - ROLLED CYL.	1	SA516-70	1
24	PL. 0.375" x 120.000" x 180.2500" LG. - ROLLED CYL.	1	SA516-70	1
25	RFBL 20.00" - 01501 RF BLIND FLANGE	1	SA105	1
26	RFBL 24.00" - 01501 RF BLIND FLANGE	1	SA105	1
27	RFVN 4.00" - 01501 RF VELD NECK FLANGE	1	SA105	6
28	RFVN 1.50" - 01501 RF VELD NECK FLANGE x 0.281" WALL	1	SA105	4
29	RFVN 16.00" - 01501 RF VELD NECK FLANGE x 0.375" WALL	1	SA105	27
30	RFVN 2.00" - 01501 RF VELD NECK FLANGE x 0.218" WALL	1	SA105	28
31	RFVN 2.00" - 01501 RF VELD NECK FLANGE x 0.343" WALL	1	SA105	7
32	RFVN 20.00" - 01501 RF VELD NECK FLANGE x 0.375" WALL	1	SA105	1
33	RFVN 24.00" - 01501 RF VELD NECK FLANGE x 0.375" WALL	1	SA105	1
34	RFVN 3.00" - 01501 RF VELD NECK FLANGE x 0.300" WALL	1	SA105	1
35	RFVN 4.00" - 01501 RF VELD NECK FLANGE x 0.237" WALL	1	SA105	6
36	STUD 0.625" x 3.75" LG. - 20 REO/SET V/2 NUTS	SA193-B7/SA194-2H		
37	STUD 1.125" x 6.25" LG. - 20 REO/SET V/2 NUTS	SA193-B7/SA194-2H		
38	STUD 1.250" x 7.00" LG. - 20 REO/SET V/2 NUTS	SA193-B7/SA194-2H		
39	1/2" O.D. x 6"-1" TIE RODS	SA307-B		
40	3/4" O.D. x 12 GA x 5'-10 9/16" STRAIGHT LENGTH	SA178-A		
41	PL. 0.625" x 11.687" OD - PL. DISK	SA36		
42	PL. 1.000" x 36.87" OD - PL. DISK	SA516-70		
43	PL. 0.500" x 56.00" x 4.500" - SAJIDE VEAR PL.	SA36		
44	PL. 0.500" x 22.88" x 10.000" - SAJIDE SIDE PL.	SA36		
45	PL. 0.500" x 50.000" x 10.000" - SAJIDE BASE PL.	SA36		
46	PL. 0.500" x 64.56" x 12.000" - SAJIDE VEAR PL.	SA36		
47	PL. 0.500" x 64.56" x 50.000" - SAJIDE VEAR PL.	SA36		
48	CPGL 1.50" - 3000L x 6.0000" LG.	SA105		
49	PL. 1.000" x 6.00" x 14 7/8" LG. LIFT LUG	SA516-70		

NOTES :

1. Flange bolt holes to straddle vessel centerlines unless otherwise noted.
2. Drill & tap 1/4" telltale hole in reinforcing pad.
3. Outside projection shown in the nozzle schedule is the vessel O.D. unless otherwise noted.
4. Inside projection shown in the nozzle schedule is minimum only.
5. All lot dimensions are from the reference line.
6. All nozzles shall be adequately protected and covered for shipment.
7. Shell design pressure 100 psig @ 350F
8. Tube design pressure 15 psig @ 650F
9. Shell hydro pressure 20 psig
10. Tube hydro pressure 25 psig
9. Vessel is exempt from impact testing per UG-200(1)
10. All internal welds shall be seal welds.

ISSUED FOR
CONSTRUCTION

DATE: 02/25/05
BY: JWH

* Heads must conform to UCS-79 and UCS-81, Section VII, Div. I and Section II for materials. MTR's are required.

* All other materials UG-80, 8a, Section VII, Div. I. MTR's and/or COC's are required.

SPECIFICATIONS

YEAR BUILT	2006	TAG/MODEL NUMBER	B502	
SERIAL NO.	02848	NATIONAL B.O. NO.	1127	
DESIGN PRESSURE INTERNAL	NOTE 2	PSIG	0 TEMP. NOTE 2	"F VIN/MAX
DESIGN PRESSURE EXTERNAL	NOTE 3	PSIG	0 TEMP.	"F VIN/MAX
HYDRO PRESSURE INTERNAL	NOTE 4	J.E. LONG	SEAMS	100%
CORROSION ALLOWANCE	0.015	J.E. ROUND	SEAMS	100%
RADIOGRAPHY	RT-1	STRESS RELIEF	YES	
FLANGE RATING	150	COUPLING RATING	3000	
SHELL MATL. SPEC.	SAS16-70	HEAD MATL. SPEC.	SAS16-70	
FLANGE MATL. SPEC.	SAS105	CPLG. MATL. SPEC.	SAS105	
PIPE MATL. SPEC.	SAS106-8	BN FIT. MATL. SPEC.	SAS124-W78	
REPAID MATL. SPEC.	SAS16-70	STRUC. MATL. SPEC.	SAS35	
RF GSK. MATL. SPEC.	304 SS	FLG. STUD SPEC.	SAS193-B7	
RJ GSK. MATL. SPEC.	-	FLG. NUT SPEC.	SAS194-LB	
EMPTY WEIGHT	17,270 LBS.	FULL LIQUID WEIGHT	37,365 LBS.	
RF GSK. DESC.	1/8" SPIRAL WOUND METAL/COMP.			
RJ GSK. DESC.	-			
WELD PROCEDURE	WIG-S, F-345, SAW-S			
INSULATION DESC.	4" HOT			
INSPECTION BY	HSS-C & RUMA			
CONSTRUCTION CODE	ASME SEC. VIII DIV. 1 1999 ADDENDA			
EXT. SURFACE TREATMENT	PER CUSTOMER SPEC'S			
INT. SURFACE TREATMENT	-			



DESCRIPTION	WASTE HEAT EXCHANGER (B502) 57" I.D. X 17'-1" S/S
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CUSTOMER
GIANT
YORKTOWN REFINERY

SCALE : 3/4"=1'-0"		W.O. # 6051	
CUST. PO#		QUOTE #	
DRAWN JDW	01/25/06	DWG. NO.	REV.
CHECK PDV	02/25/06	D-5860-V012	3

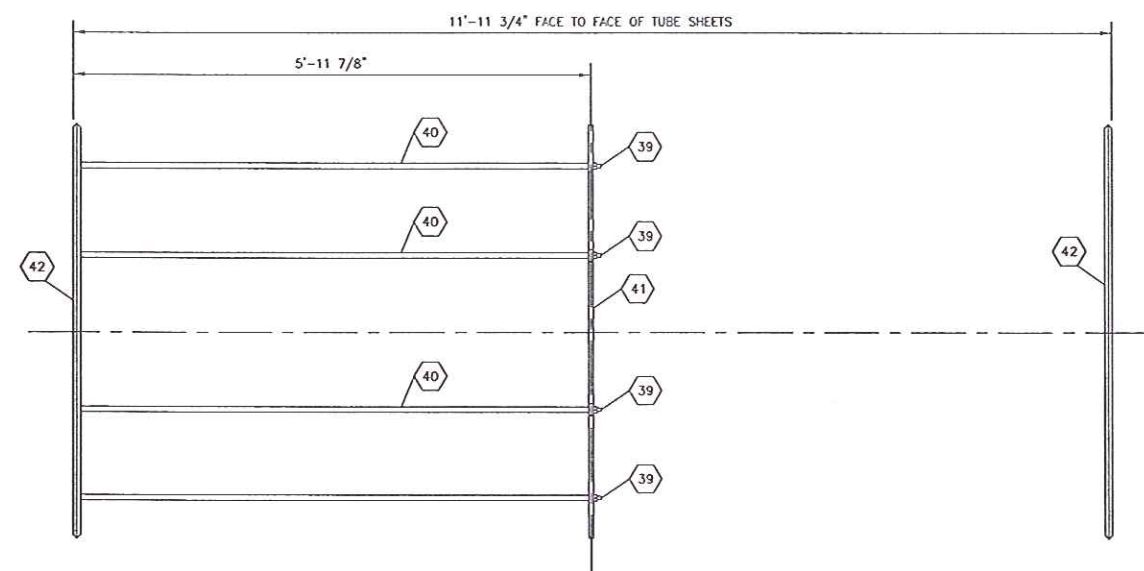
C2	1	SPARE W/PLUG	1.50	6000	CPLC	--	--	6.0000	SA105	--	--	--	YES	SFIS	--	XII	3/8"	--	--	--	48
C1	1	SPARE W/PLUG	1.50	6000	CPLG	--	--	6.0000	SA105	--	--	--	YES	SFIS	--	XII	3/8"	--	--	--	48
N16	1	DRAIN	2.00	0150	RFWN	1.93	0.218	6.5000	SA106-B	--	--	--	8.0000	0.1250	N	X	3/8"	1/8"	--	13	30
N15	1	DRAIN	2.00	0150	RFWN	1.93	0.218	6.5000	SA106-B	--	--	--	8.0000	0.1250	N	X	3/8"	1/8"	--	13	30
N14	1	BLOWDOWN	2.00	0150	RFWN	1.68	0.343	6.375	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	14	31
N13	1	BLOWDOWN	1.50	0150	RFWN	1.33	0.281	9.1875	SA106-B	--	--	--	END V	TFIS	N	V	3/8"	--	--	11	28
N12	1	RELIEF	1.50	0150	RFWN	1.33	0.281	6.4375	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	10	28
N11	1	RELIEF	1.50	0150	RFWN	1.33	0.281	6.4375	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	10	28
N10	1	PRESS. IND.	1.50	0150	RFWN	1.33	0.281	6.4375	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	10	28
N9	1	BRIDLE	2.00	0150	RFWN	1.68	0.343	6.375	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	14	31
N8	1	BRIDLE	2.00	0150	RFWN	1.68	0.343	6.375	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	14	31
N7	1	BRIDLE	2.00	0150	RFWN	1.68	0.343	6.375	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	14	31
N6	1	BRIDLE	2.00	0150	RFWN	1.68	0.343	6.375	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	14	31
N5	1	VENT	2.00	0150	RFWN	1.68	0.343	6.375	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	14	31
N4	1	OUTLET	3.00	0150	RFWN	2.90	0.300	6.1875	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	18	34
N3	1	INLET	2.00	0150	RFWN	1.68	0.343	8.5625	SA106-B	--	--	--	END V	TFIS	N	V	3/8"	--	--	15	31
N2	1	OUTLET	16.00	0150	RFWN	15.25	0.375	5.0000	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	12	29
N1	1	INLET	16.00	0150	RFWN	15.25	0.375	5.0000	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	12	29
J3	1	MANWAY	20.00	0150	RFWN	19.25	0.375	5.0000	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	16	32
M2	1	MANWAY	24.00	0150	RFWN	23.25	0.375	4.0625	SA106-B	--	--	--	SIDE V	TFIS	N	V	3/8"	--	--	17	33
M1	1	MANWAY	24.00	0150	RFWN	23.25	0.375	4.0625	SA106-B	--	--	--	SIDE V	TFIS	N	V	3/8"	--	--	17	33
H6	1	HAND HOLE	4.00	0150	RFWN	4.02	0.237	5.7500	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	19	35
H5	1	HAND HOLE	4.00	0150	RFWN	4.02	0.237	5.7500	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	19	35
H4	1	HAND HOLE	4.00	0150	RFWN	4.02	0.237	5.7500	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	19	35
H3	1	HAND HOLE	4.00	0150	RFWN	4.02	0.237	5.7500	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	19	35
H2	1	HAND HOLE	4.00	0150	RFWN	4.02	0.237	5.7500	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	19	35
H1	1	HAND HOLE	4.00	0150	RFWN	4.02	0.237	5.7500	SA106-B	--	--	--	8.0000	TFIS	N	V	3/8"	--	--	19	35
MARK NO.		SERVICE	SIZE	RATING	TYPE	BORE	WALL	LG. NECK	MAT'L	OD & THK	MAT'L	REINFORCING PAD	O.S.	I.S.	PROJECTION	WELD DETAIL	A	B	C	PIPE	NOZZLE
																	WELD SIZE			MRP NO.	

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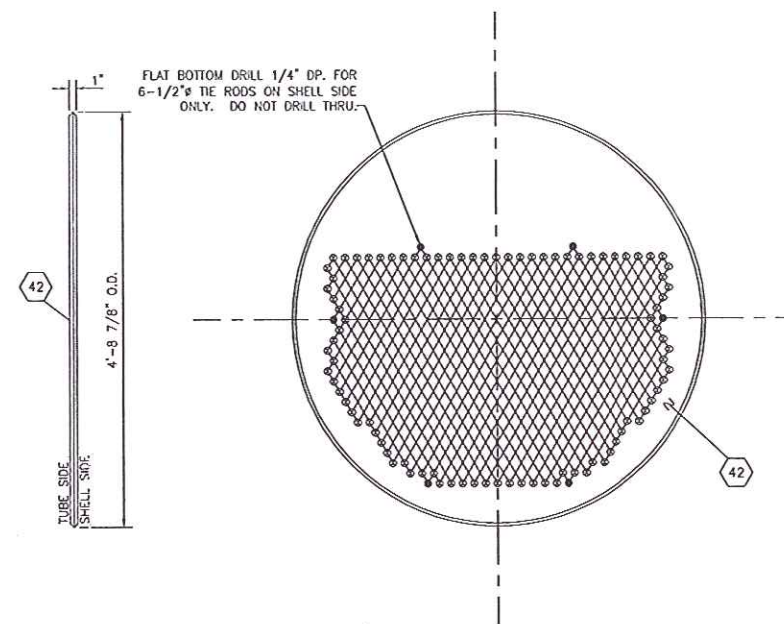
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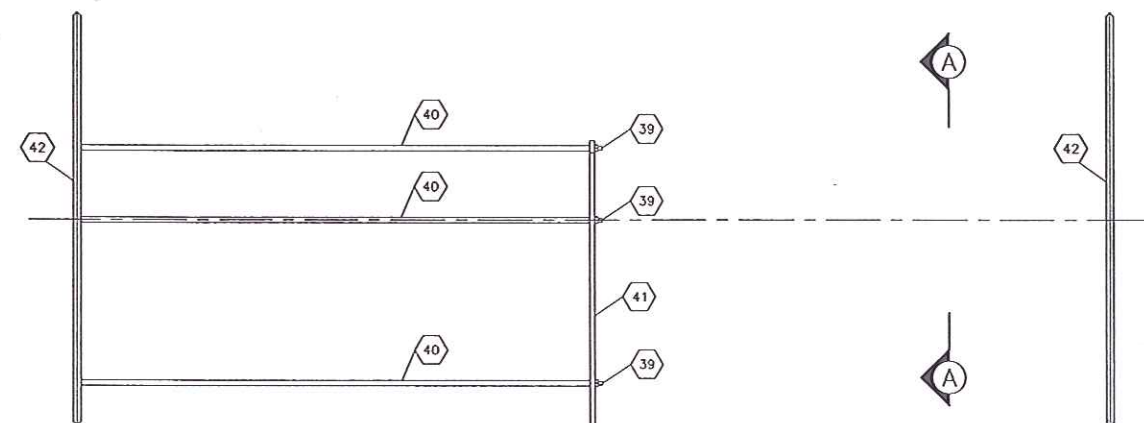
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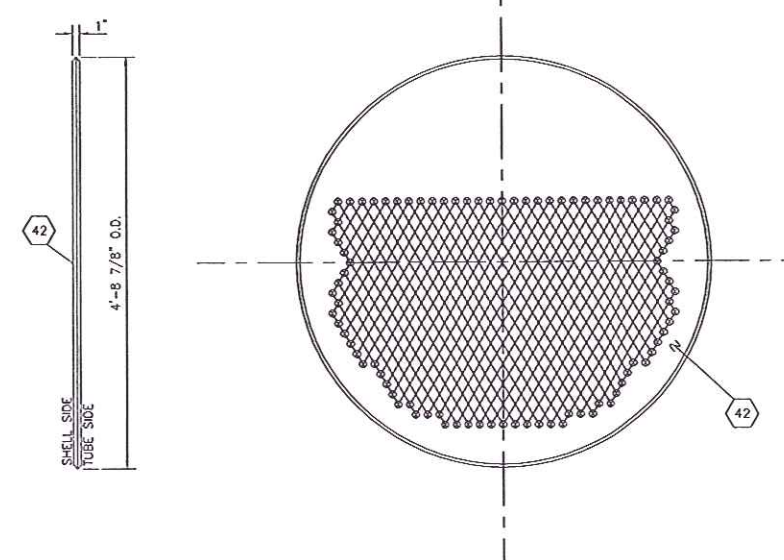
BUNDLE PLAN VIEW



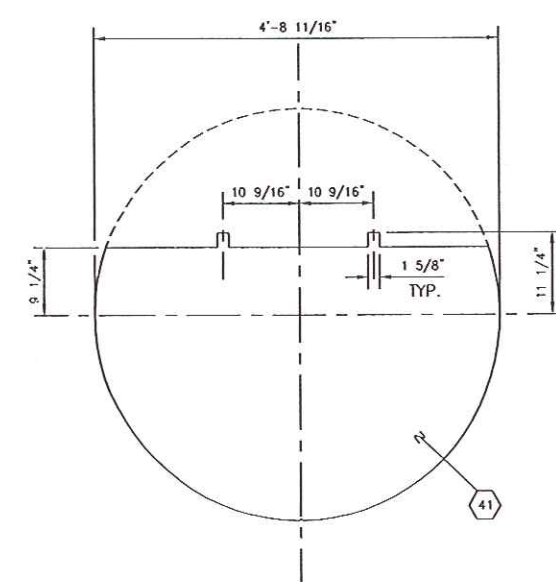
FRONT STATIONARY TUBE SHEET



BUNDLE ELEVATION



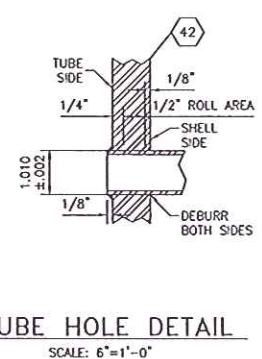
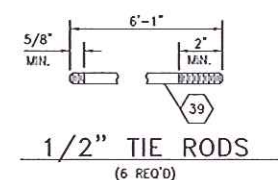
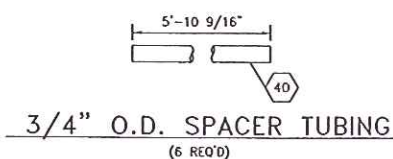
BACK STATIONARY TUBE SHEET



SECTION A-A

11" MWL
12" MSGL

ISSUED FOR
CONSTRUCTION
DATE: 02/25/06
BY: JDW



TUBE HOLE DETAIL
SCALE: 6"=1'-0"

- NOTES
1. DRILL & REAM TUBE HOLES TO 1.010" ±.002 FOR 592-1" O.D. TUBES ON A 1 5/8" Δ PITCH & 50 3/16" TUBE CIRCLE.
 2. TUBES TO BE DRY ROLLED BEFORE WELDING & LIGHTLY ROLLED AFTERWARDS
 3. DRILL 9/16" HOLES FOR TIE RODS.
 4. REMOVE ALL SHARP CORNERS FROM BAFFLE.

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REFERENCE DRAWINGS	
NUMBER	DESCRIPTION
D-5860-V012	WASTE HEAT EXCHANGER (B502)

REVISIONS	
NO.	DESCRIPTION
0	ISSUED FOR FOR CONSTRUCTION

INTERSTATE TREATING, INC.
P.O. Box 1386
Cdsssa, Texas 79760-1386

DESCRIPTION	
TUBE SHEET & BUNDLE ASSEMBLY FOR WASTE HEAT EXCHANGER (B502)	
CUSTOMER	
GIANT YORKTOWN REFINERY	
SCALE: 1"=1'-0"	W.O. NO. 6051
CUST. PO#	QUOTE NO.
DRAWN JDW 01/30/06	DATE
CHECK PDV 02/25/06	REV. 0