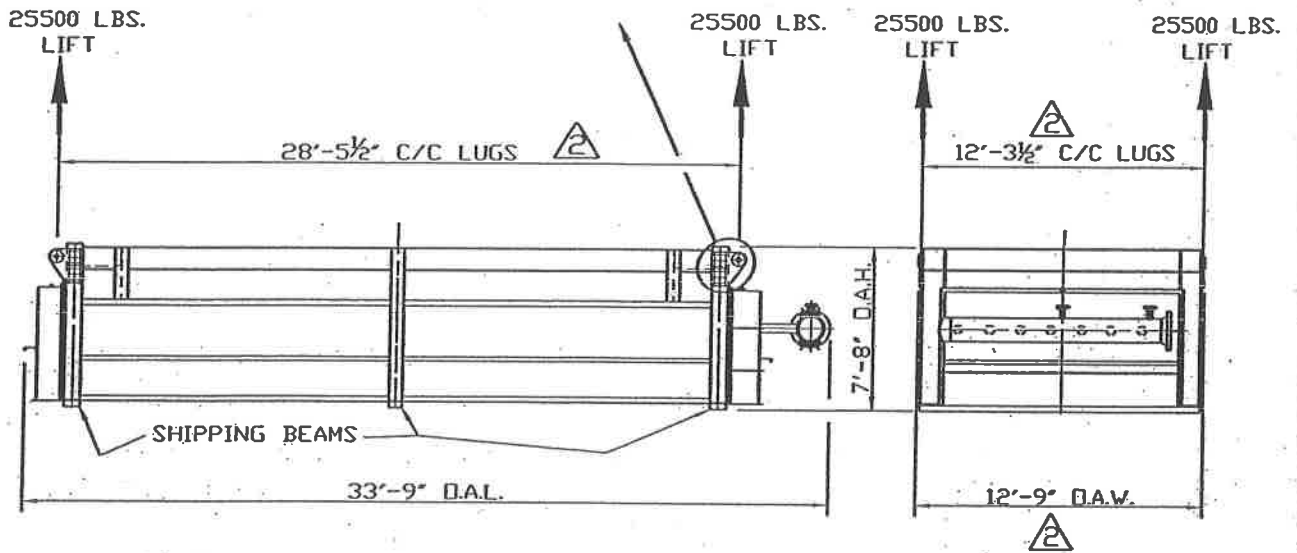


LIFT LUG DETAIL

(TYPICAL 4 PLACES)



ONE - REQD. THUS MK-2A1

WEIGHT = 102,000 Lbs.

WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
 BP GAS PARTIAL PROCESSING (GPP) PROJECT
 BP Z PAD FACILITY
 NORTH SLOPE, ALASKA
 EPT NO. 36324244-02

PROPRIETARY INFORMATION

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LC #

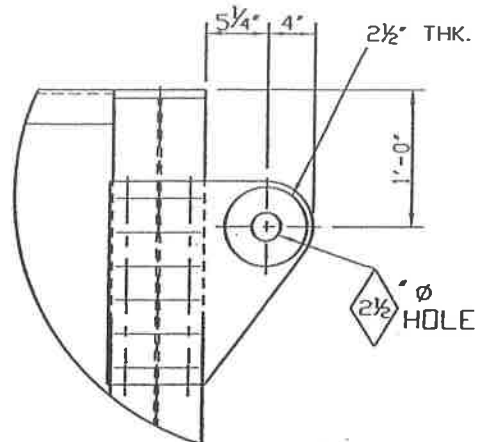
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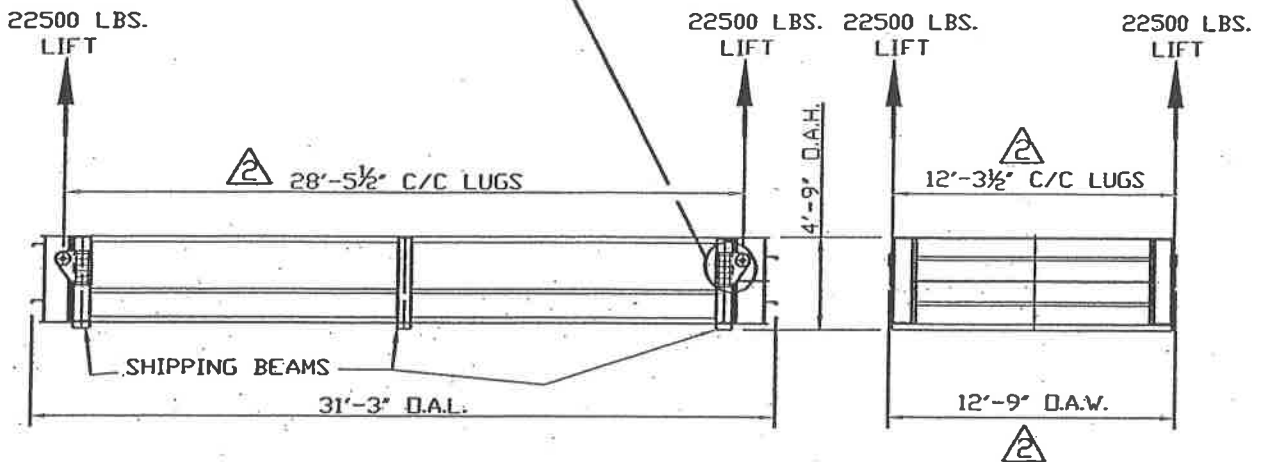
THE G.C. BROACH COMPANY • 7667 E. 45th PLACE • TULSA, OK. 74145

SHIPPING SKETCH
 UPPER CONVECTION BOX

DWN.	D.G.N.	04/30/08	REV.	P.D.D.	11/4/08	APPR.	05/15/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	F.E.L.	05/15/08	CHK.	M.S.	11/4/08	BY	S	N.T.S.	20071233	A-1233-16A	2



LIFT LUG DETAIL
(TYPICAL 4 PLACES)



ONE - REQD. THIS MK-2B1
WEIGHT = 90,000 Lbs.

WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
BP GAS PARTIAL PROCESSING (GPP) PROJECT
BP Z PAD FACILITY
NORTH SLOPE, ALASKA
EPT NO. 36324244-02

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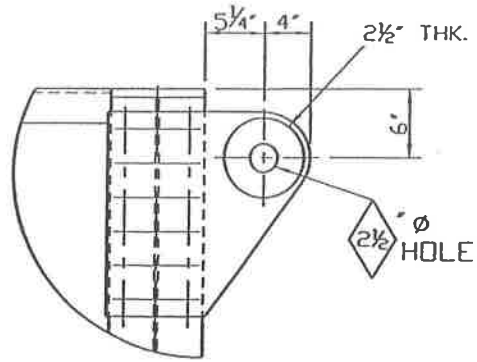


THE G.C. BROACH COMPANY - 7667 E. 46TH PLACE - TULSA, OK. 74145

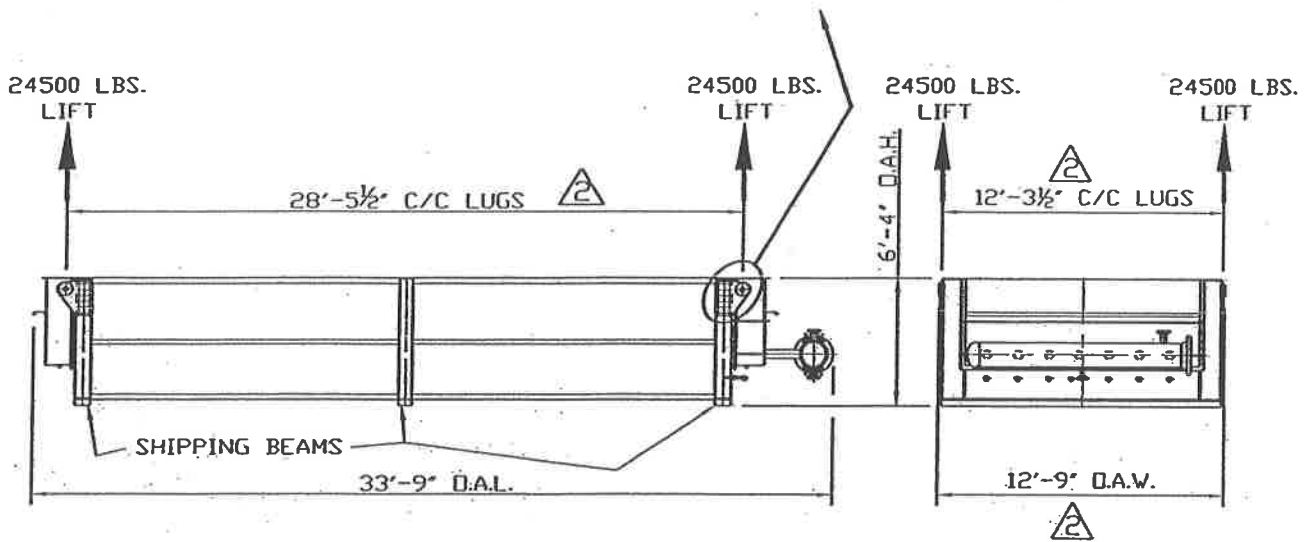
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SHIPPING SKETCH
MIDDLE CONVECTION BOX

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CHK.	F.E.L.	05/15/08	CHK.	M.S.	11/4/08	BY	S	N.T.S.	20071233	A-1233-16B	2



LIFT LUG DETAIL
(TYPICAL 4 PLACES)



ONE - REQD. THUS MK-2C1
WEIGHT = 98,000 Lbs.

WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
BP GAS PARTIAL PROCESSING (GPP) PROJECT
BP Z PAD FACILITY
NORTH SLOPE, ALASKA
EPT NO. 36324244-02

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LC #

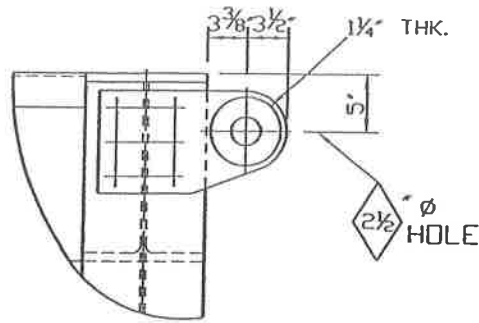
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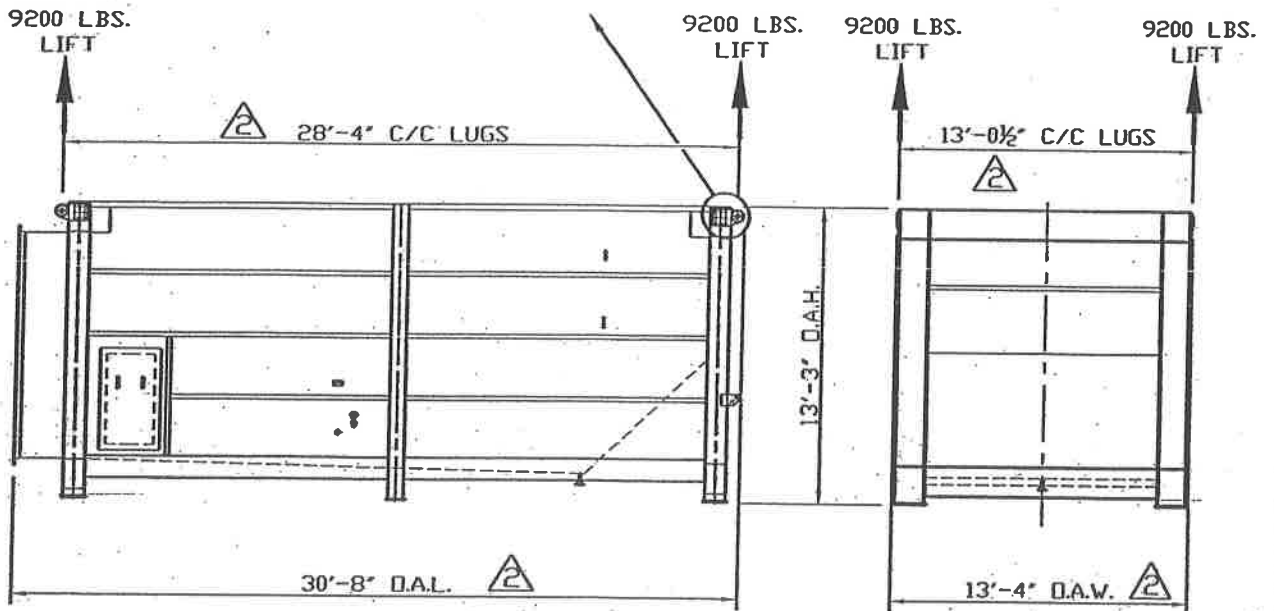
THE G.C. BROACH COMPANY - 7667 E. 46TH PLACE - TULSA, OK 74145

SHIPPING SKETCH
LOWER CONVECTION BOX

DWN.	D.G.N.	04/30/08	REV.	P.D.D.	11/4/08	APPR.	05/15/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	F.E.L.	05/15/08	CHK.	M.S.	11/4/08	BY	S	N.T.S.	20071233	A-1233-16C	2



LIFT LUG DETAIL
(TYPICAL 4 PLACES)



ONE - REQD. THUS. MK-2D1
WEIGHT = 36,800 Lbs.

WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
BP GAS PARTIAL PROCESSING (GPP) PROJECT
BP Z PAD FACILITY
NORTH SLOPE, ALASKA
EPT. NO. 36324244-02

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LC #

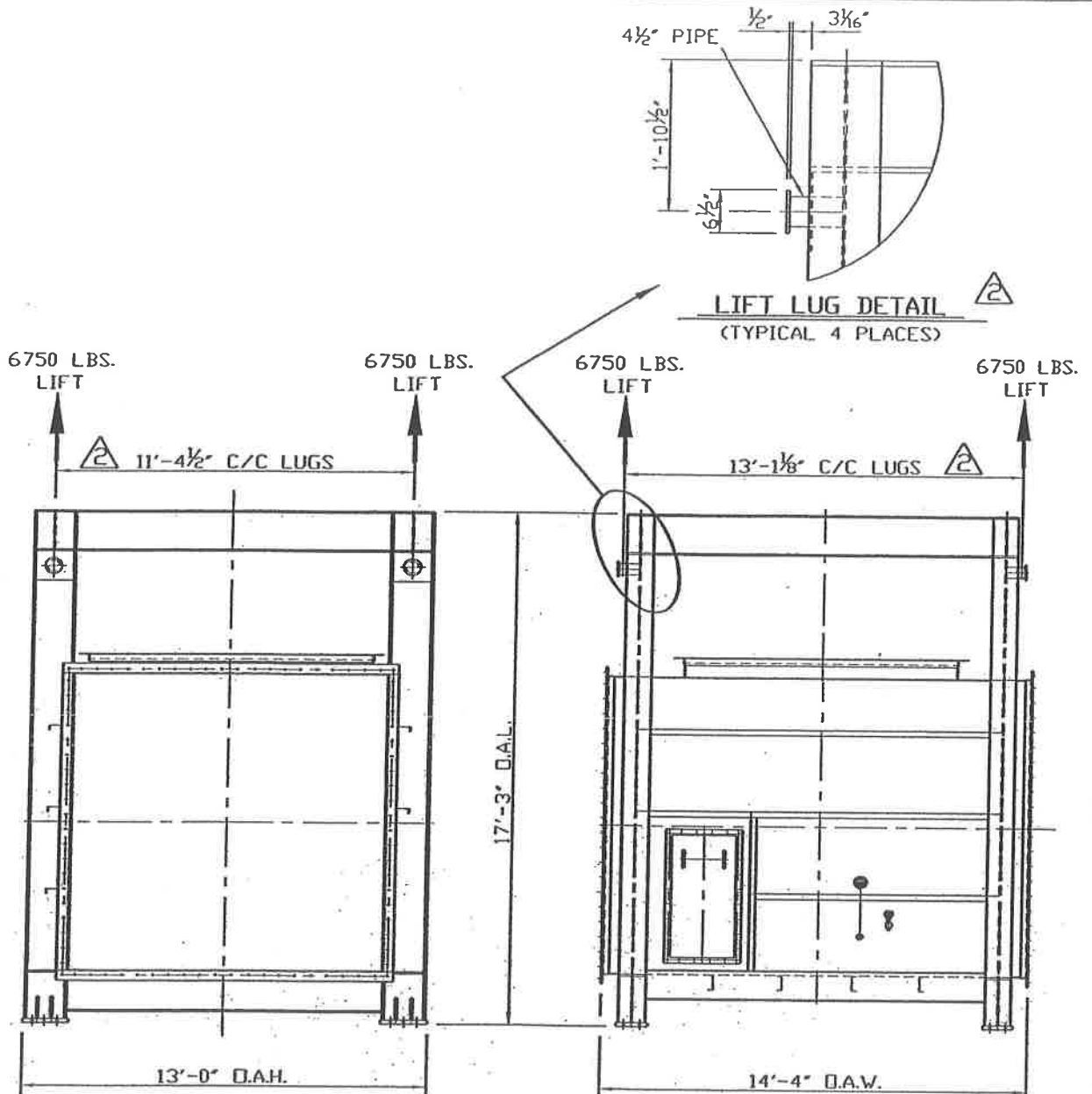


THE G.C. BROACH COMPANY - 7667 E. 45th PLACE - TULSA, OK. 74145

FILE NAME: 123316D-A2

SHIPPING SKETCH
PLENUM

DWN.	D.G.N.	04/30/08	REV.	P.D.D.	11/4/08	APPR	05/15/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	F.E.L.	05/15/08	CHK.	M.S.	11/4/08	BY	S	N.T.S.	20071233	A-1233-16D	2



LIFT LUG DETAIL
(TYPICAL 4 PLACES)

ONE - REQD. THUS MK-2E1
WEIGHT = 27,000 Lbs.

WASTE HEAT RECOVERY UNIT H-Z6002
 BP EXPLORATION (ALASKA) INC.
 BP GAS PARTIAL PROCESSING (GPP) PROJECT
 BP Z PAD FACILITY
 NORTH SLOPE, ALASKA
 EPT. NO. 36324244-02

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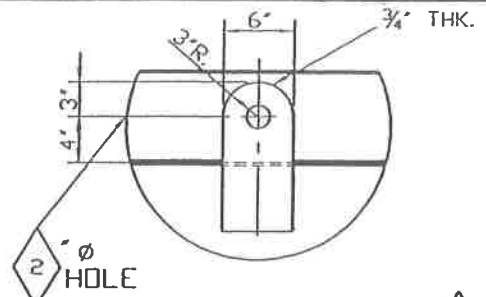


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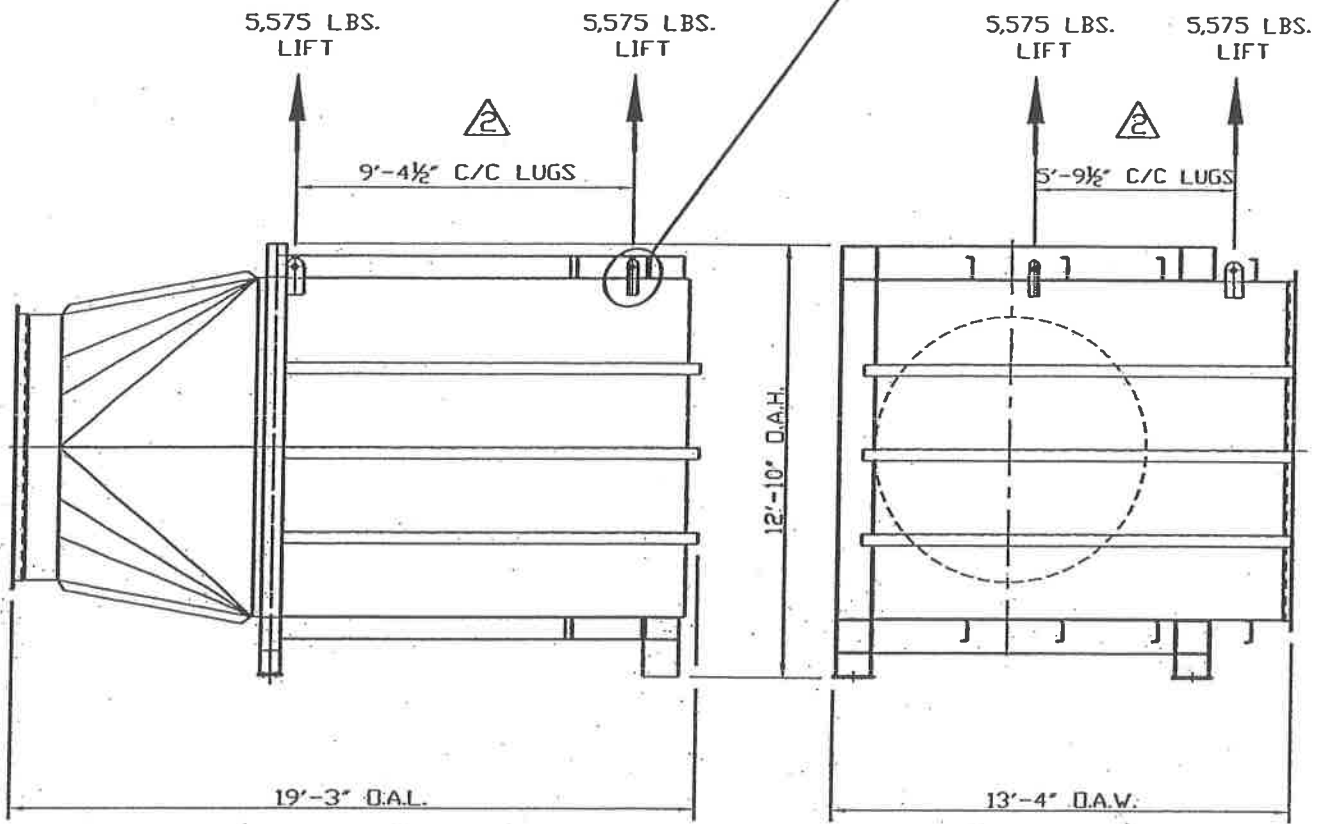
FILE NAME: 123316E-A2

SHIPPING SKETCH
DIVERTER DUCT

DWN.	D.G.N.	04/30/08	REV.	P.D.D.	11/4/08	APPR	05/15/08	SCALE	JOB NO.	DWG. NO.	REV NO.
CHK.	F.E.L.	05/15/08	CHK.	M.S.	11/4/08	BY	S	N.T.S.	20071233	A-1233-16E	2



LIFT LUG DETAIL
(TYPICAL 3 PLACES)



ONE - REQD. THIS MK-2F1
WEIGHT = 16,725 Lbs.

WASTE HEAT RECOVERY UNIT H-Z6002
BP EXPLORATION (ALASKA) INC.
BP GAS PARTIAL PROCESSING (GPP) PROJECT
BP Z PAD FACILITY
NORTH SLOPE, ALASKA
EPT. NO. 36324244-02

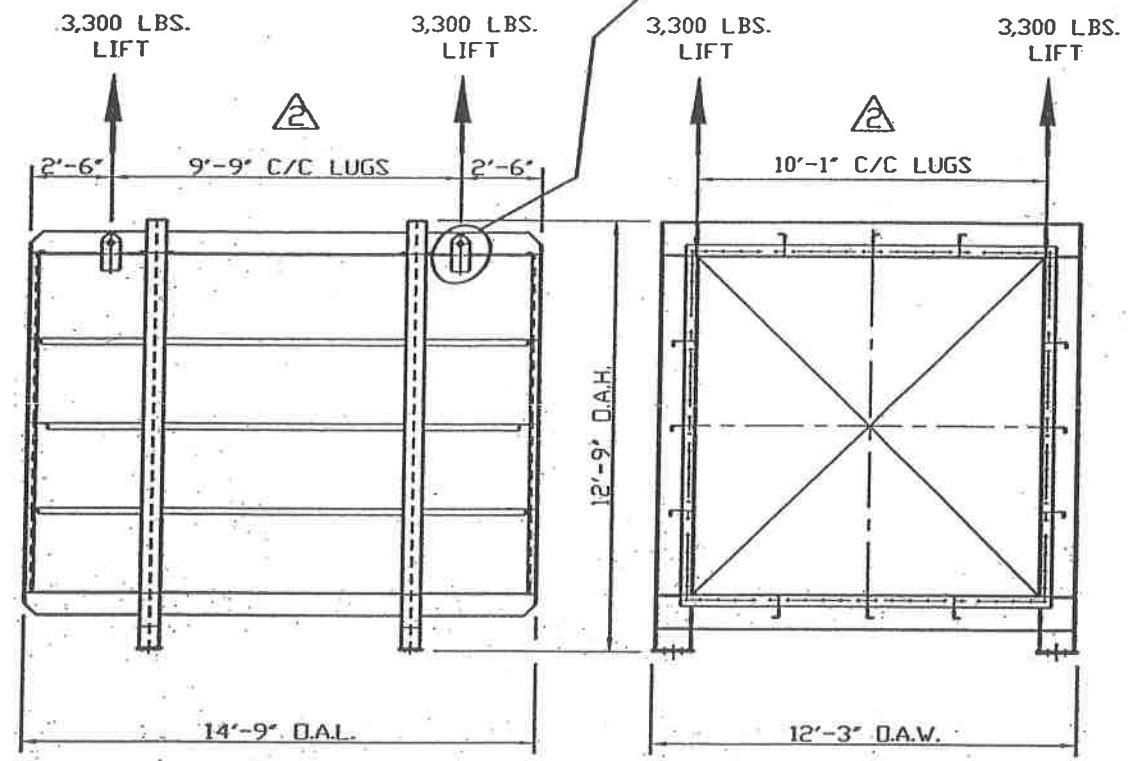
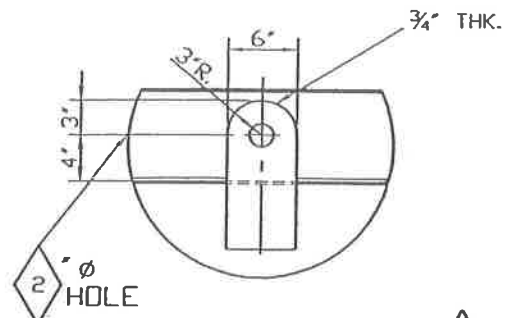
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FILE NAME: 123316F-A2

SHIPPING SKETCH
INLET DUCT

DWN.	D.G.N.	04/30/08	REV.	P.D.D.	11/4/08	APPR.	05/15/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	F.E.L.	05/15/08	CHK.	M.S.	11/4/08	BY	S	N.T.S.	20071233	A-1233-16F	2



ONE - REQD. THUS MK-201
 WEIGHT = 13,200 Lbs.

WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
 BP GAS PARTIAL PROCESSING (GPP) PROJECT
 BP Z PAD FACILITY
 NORTH SLOPE, ALASKA
 EPT NO. 36324244-02

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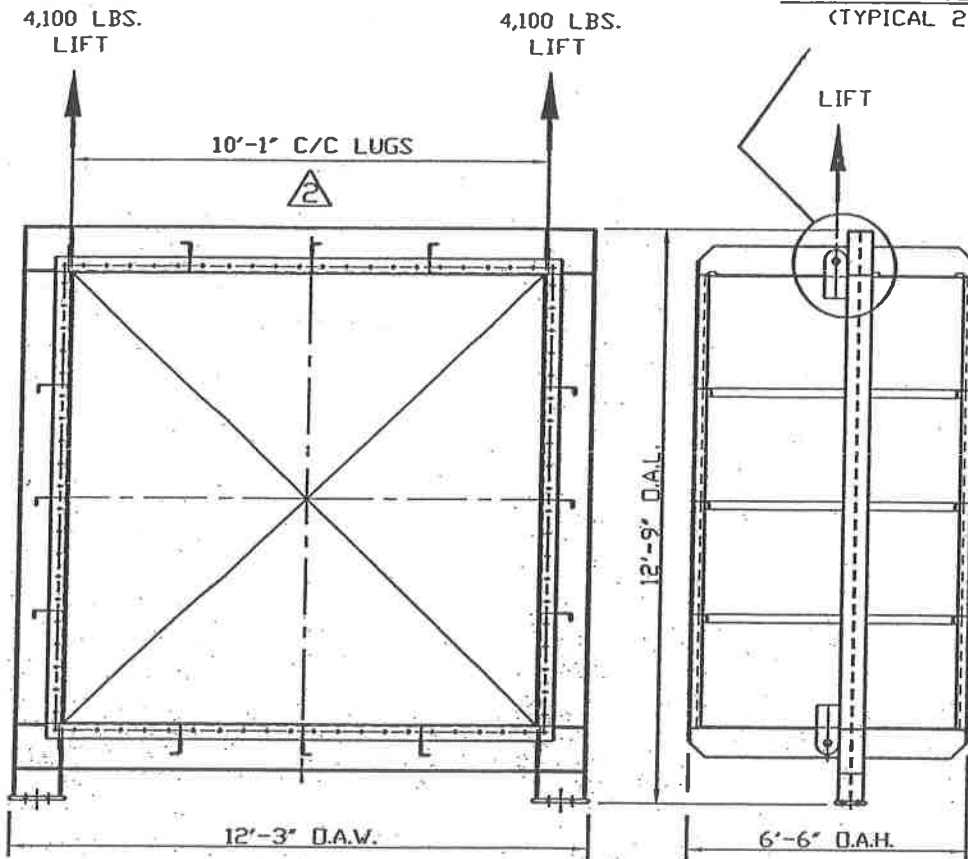
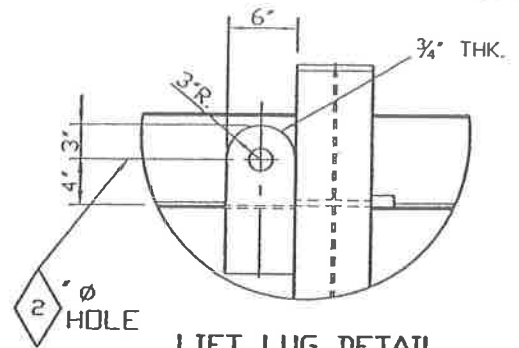
LC #



FILE NAME: 123316G-A2

SHIPPING SKETCH
LONG INTERMEDIATE DUCT

DWN.	D.G.N.	04/30/08	REV.	P.D.D.	11/4/08	APPR	05/15/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	F.E.L.	05/15/08	CHK.	M.S.	11/4/08	BY	S	N.T.S.	20071233	A-1233-16G	2



ONE - REQD. THUS MK-2R1
 WEIGHT = 8,200 Lbs.

WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
 BP GAS PARTIAL PROCESSING (GPP) PROJECT
 BP Z PAD FACILITY
 NORTH SLOPE, ALASKA
 EPT NO. 36324244-02

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LC #

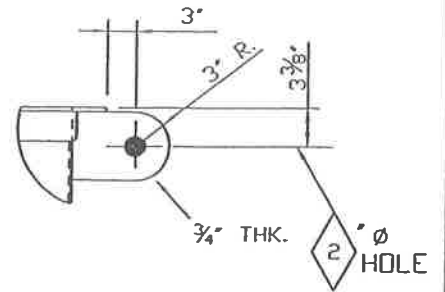
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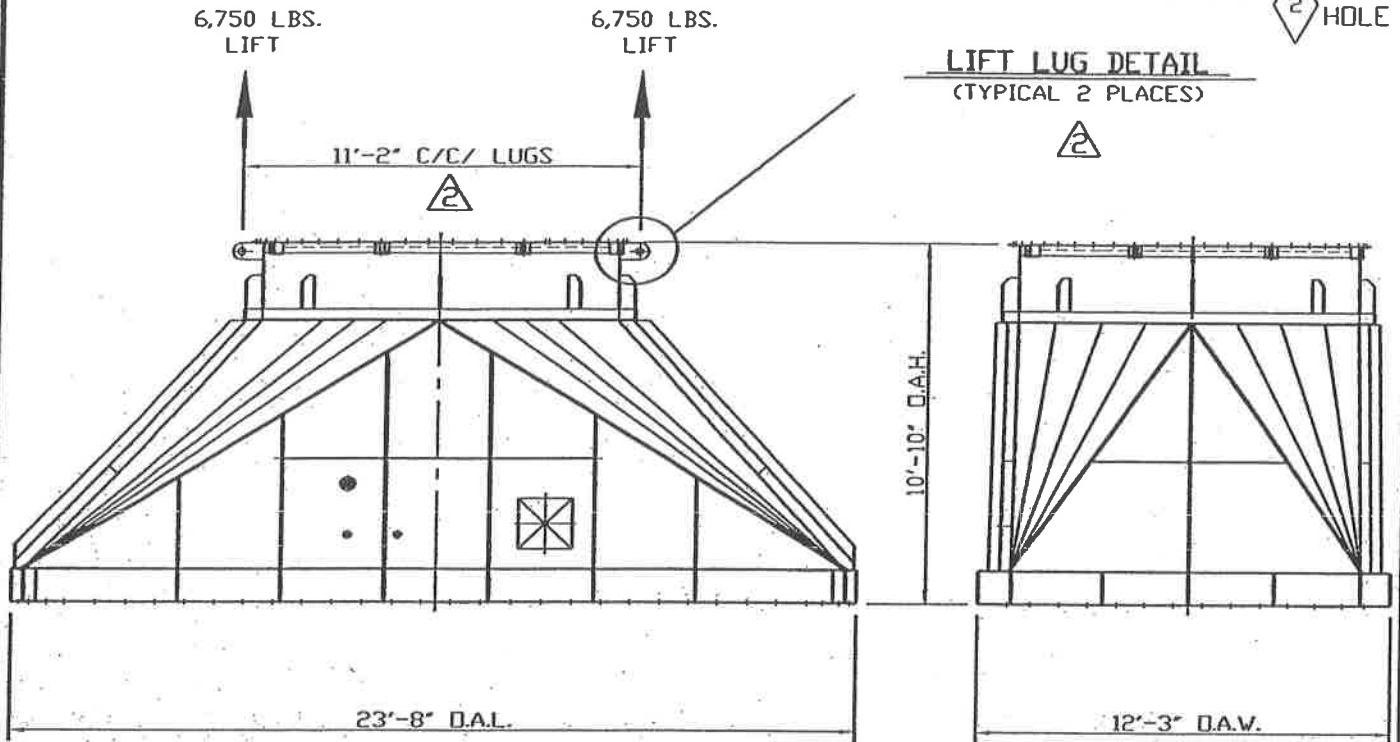
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SHIPPING SKETCH
 SHORT INTERMEDIATE DUCT

DWN.	D.G.N.	04/30/08	REV.	P.D.D.	11/4/08	APPR.	05/15/08	SCALE	JOB NO.	DVG. NO.	REV. NO.
CHK.	F.E.L.	05/15/08	CHK.	M.S.	11/4/08	BY	S	N.T.S.	20071233	A-1233-16H	2



LIFT LUG DETAIL
(TYPICAL 2 PLACES)



ONE - REQD. THUS MK-4A1
WEIGHT = 13,500 Lbs.

WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
BP GAS PARTIAL PROCESSING (GPP) PROJECT
BP Z PAD FACILITY
NORTH SLOPE, ALASKA
EPT NO. 36324244-02



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LC #

FILE NAME: 123316J-A2

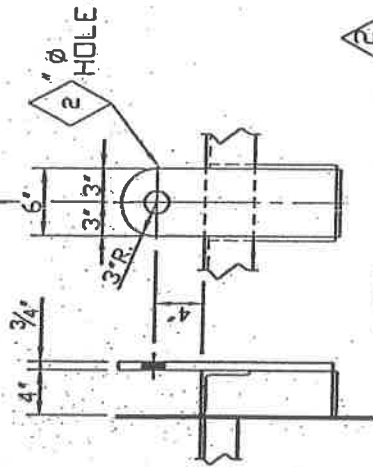


THE G.C. BROACH COMPANY - 7667 E. 46th PLACE - TULSA, OK 74145

SHIPPING SKETCH
TRANSITION

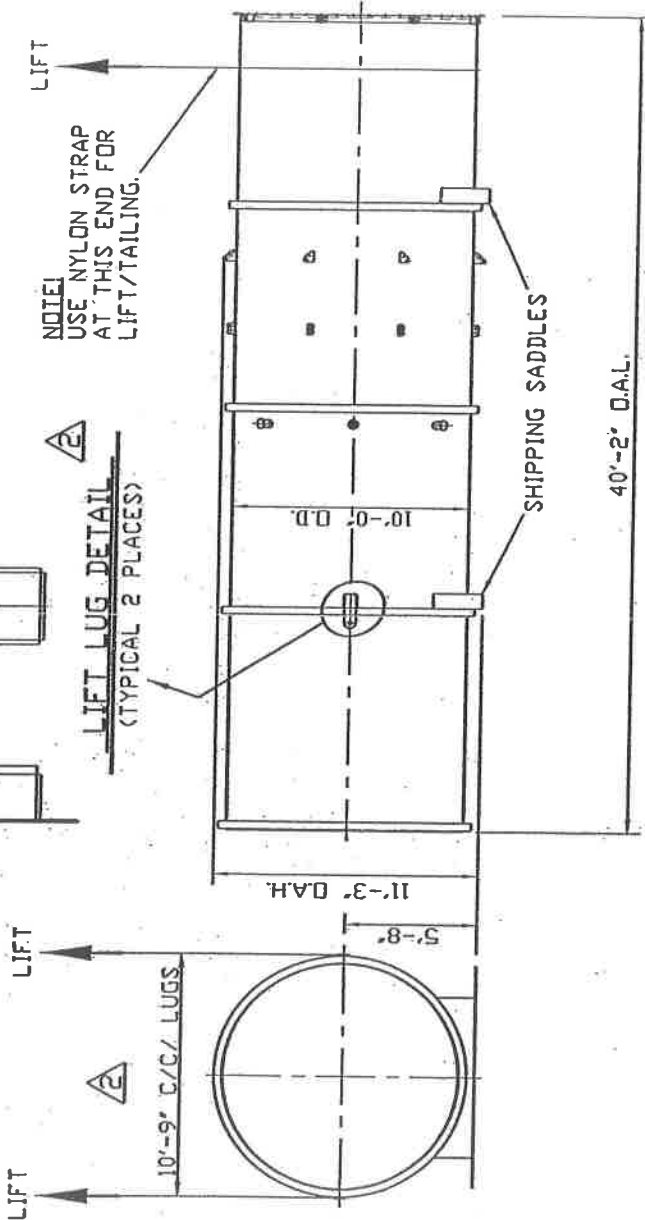
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CHK.	F.E.L.	05/15/08	CHK.	M.S.	11/4/08	BY	S	N.T.S.	20071233	A-1233-16J	2

8,100 LBS.
LIFT



NOTE!
USE NYLON STRAP
AT THIS END FOR
LIFT/TAILING.

LIFT LUG DETAIL
(TYPICAL 2 PLACES)



ONE - REQD. THUS MK-4B1
WEIGHT = 16,200 Lbs.

WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
BP GAS PARTIAL PROCESSING (GPP) PROJECT
BP Z PAD FACILITY
NORTH SLOPE, ALASKA
EPT NO. 36324244-02

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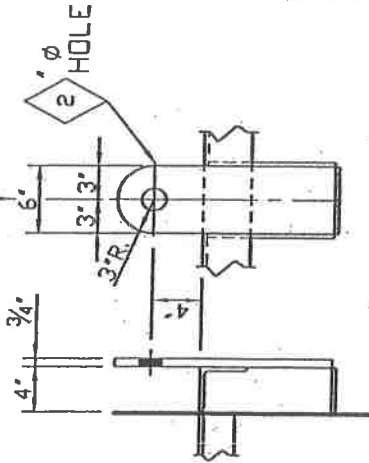
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SHIPPING SKETCH
MAIN STACK

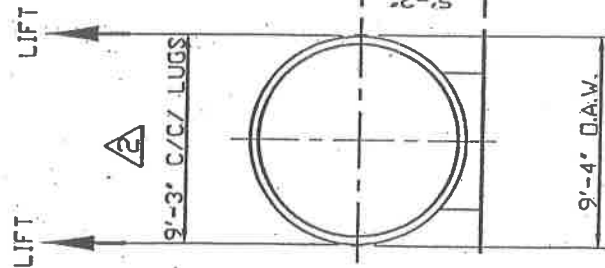
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CHK.	F.E.L.	05/15/08	CHK.	M.S.	11/4/08	BY	S	N.T.S.	20071233	A-1233-16K	2

13,000 LBS.
LIFT



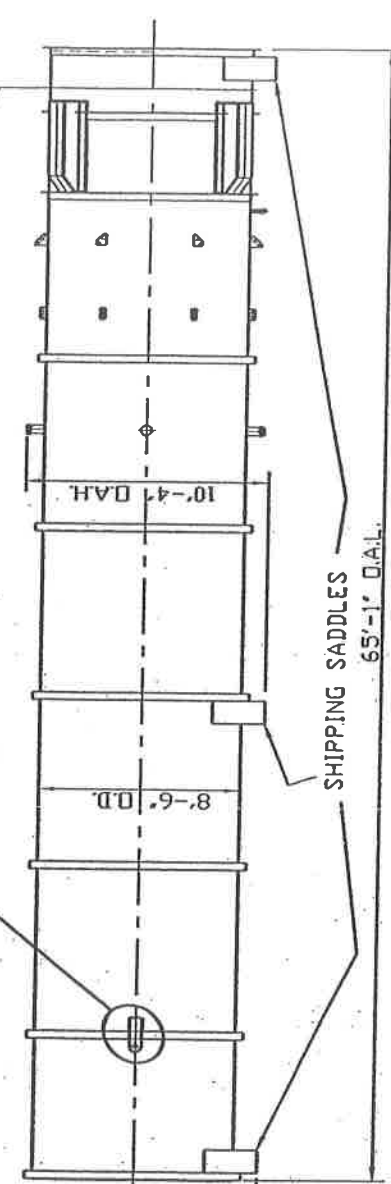
NOTE:
USE NYLON STRAP
AT THIS END FOR
LIFT/TAILING.

LIFT LUG DETAIL
(TYPICAL 2 PLACES)



LIFT

LIFT



SHIPPING SADDLES
65'-1" O.A.L.

ONE - REQD. THUS MK-4F1
WEIGHT = 26,000 Lbs.

WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
BP GAS PARTIAL PROCESSING (GPP) PROJECT
BP Z PAD FACILITY
NORTH SLOPE, ALASKA
EPT NO. 36324244-02



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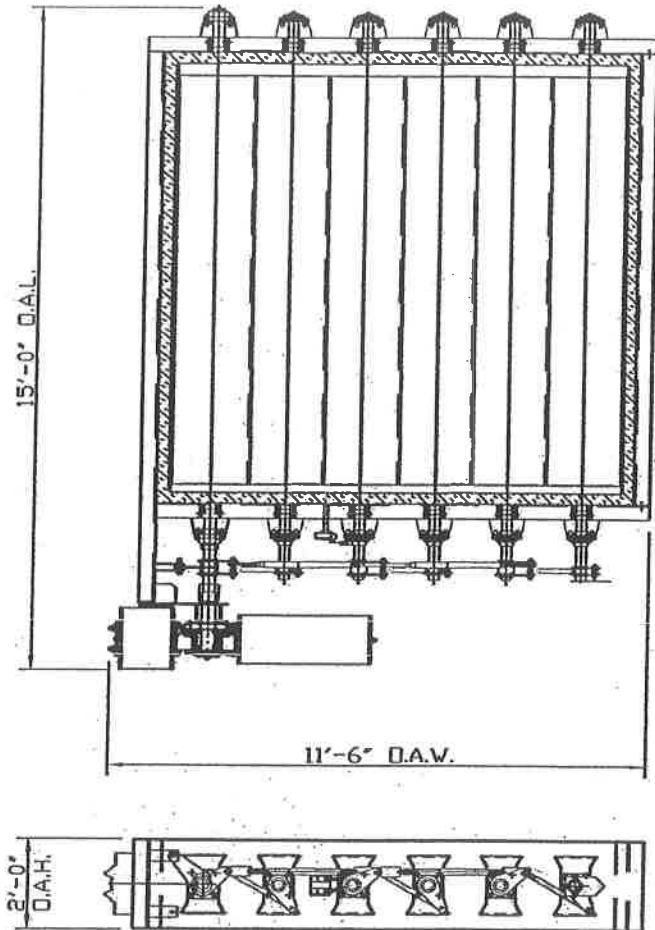
FILE NAME: 123316M-A2



THE G.C. BROACH COMPANY - 7667 E. 46th PLACE - TULSA, OK 74145

SHIPPING SKETCH
BYPASS STACK

DWN.	D.G.N.	04/30/08	REV.	P.D.D.	11/4/08	APPR	05/15/08	SCALE	JOB NO.	DWG. NO.	REV NO.
CHK.	F.E.L.	05/15/08	CHK.	M.S.	11/4/08	BY	S	N.T.S.	20071233	A-1233-16M	2



ONE - REQD. THIS
 WEIGHT = 6,000 Lbs.

WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
 BP GAS PARTIAL PROCESSING (GPP) PROJECT
 BP Z PAD FACILITY
 NORTH SLOPE, ALASKA
 EPT NO. 36324244-02

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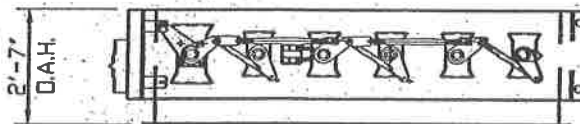
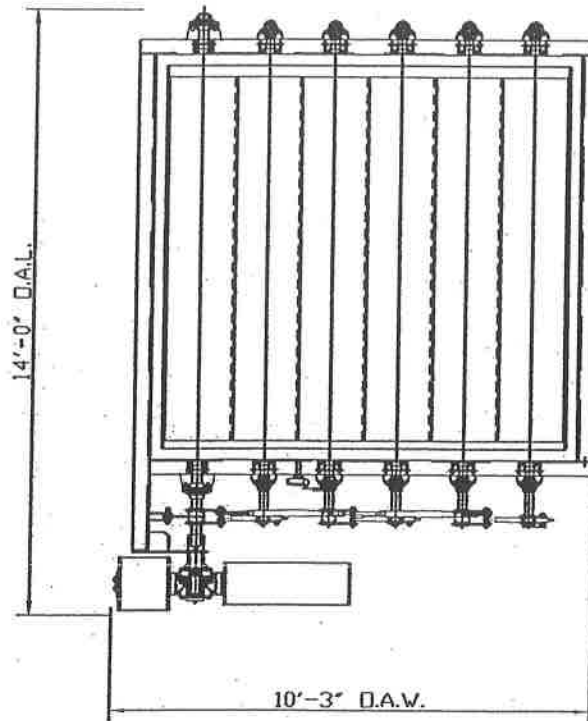
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FILE NAME: 123316N-A2



SHIPPING SKETCH
MAIN DAMPER

DWN.	D.G.N.	04/30/08	REV.	P.D.D.	11/4/08	APPR	05/15/08	SCALE	JOB NO.	20071233	DWG. NO.	A-1233-16N	REV. NO.	2
CHK.	F.E.L.	05/15/08	CHK.	M.S.	11/4/08	BY	S	N.T.S.						



ONE - REQD. THIS
 WEIGHT = 5,000 Lbs.

WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
 BP GAS PARTIAL PROCESSING (GPP) PROJECT
 BP Z PAD FACILITY
 NORTH SLOPE, ALASKA
 EPT NO. 36324244-02



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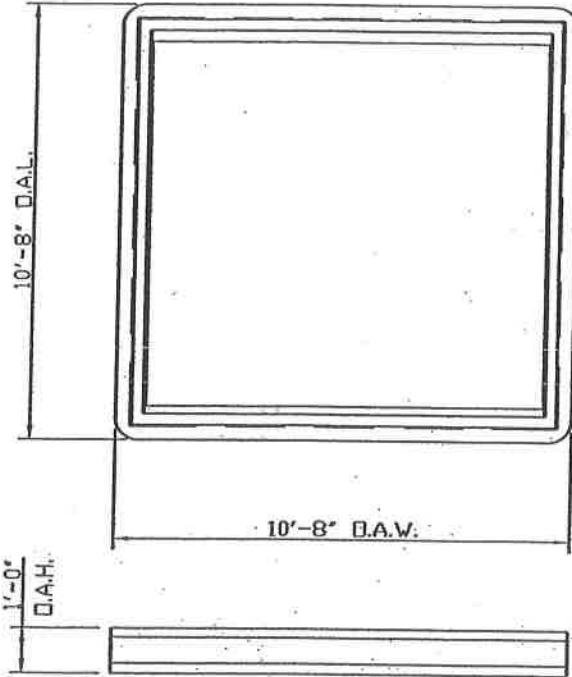
LC #

FILE NAME: 123316P-A2



SHIPPING SKETCH
 BYPASS DAMPER

DWN.	D.G.N.	04/30/08	REV.	P.D.D.	11/4/08	APPR.	05/15/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	F.E.L.	05/15/08	CHK.	M.S.	11/4/08	BY	S	N.T.S.	20071233	A-1233-16P	2



ONE - REQD. THIS
WEIGHT = 2,100 Lbs.

WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
 BP GAS PARTIAL PROCESSING (GPP) PROJECT
 BP Z PAD FACILITY
 NORTH SLOPE, ALASKA
 EPT NO. 36324244-02



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LC #

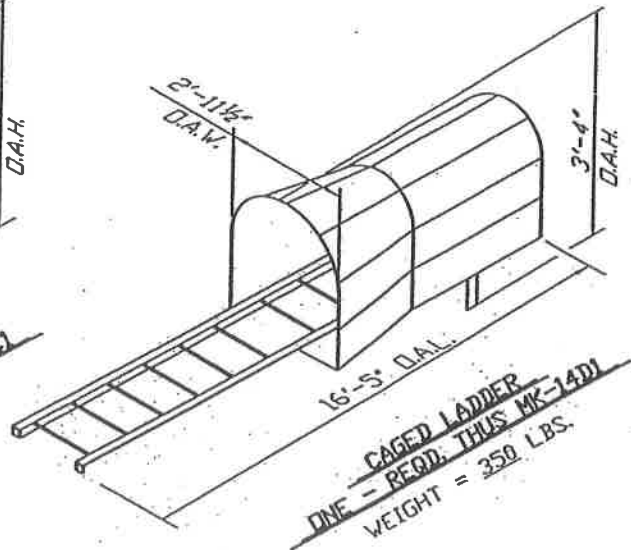
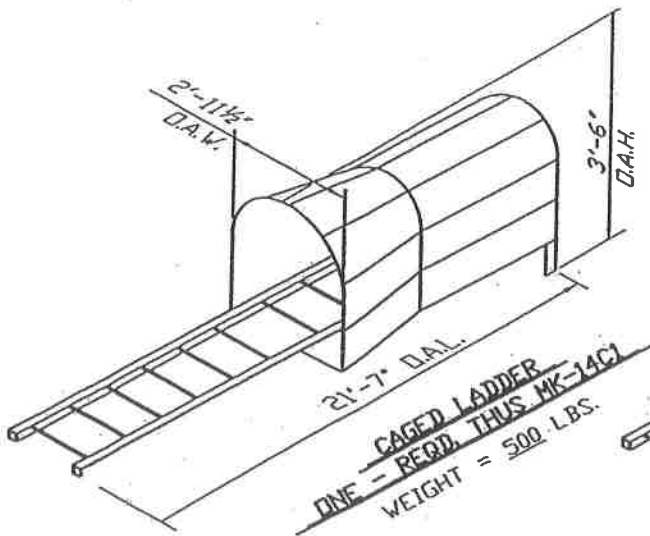
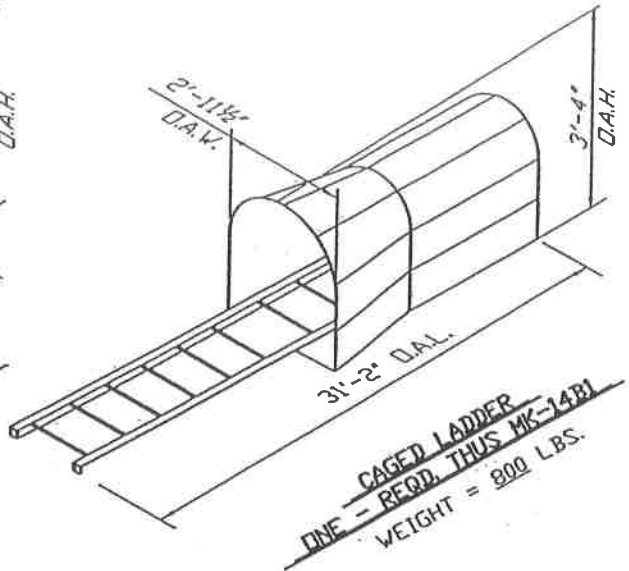
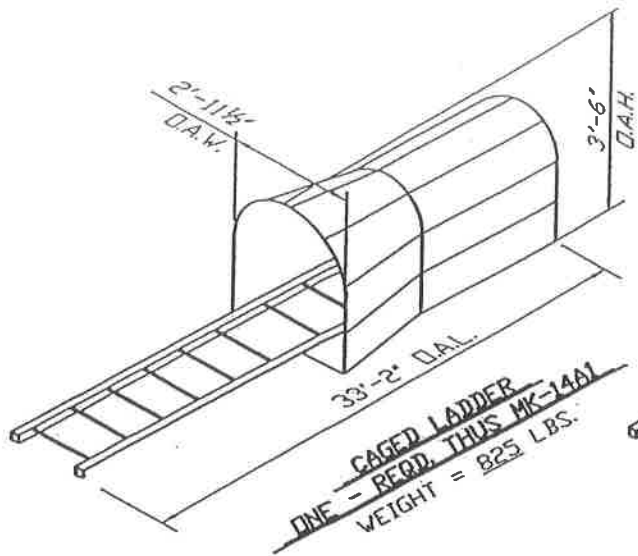
FILE NAME: 123316Q-A2



THE G.C. BROACH COMPANY • 7867 E. 46th PLACE • TULSA, OK, 74145

SHIPPING SKETCH
EXPANSION JOINT

DWN.	D.G.N.	04/30/08	REV.	P.D.D.	11/4/08	APPR	05/15/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	F.E.L.	05/15/08	CHK.	M.S.	11/4/08	BY	S	N.T.S.	20071233	A-1233-16Q	2



WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
BP GAS PARTIAL PROCESSING (GPP) PROJECT
BP Z PAD FACILITY
NORTH SLOPE, ALASKA
EPT NO. 36324244-02

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LC #



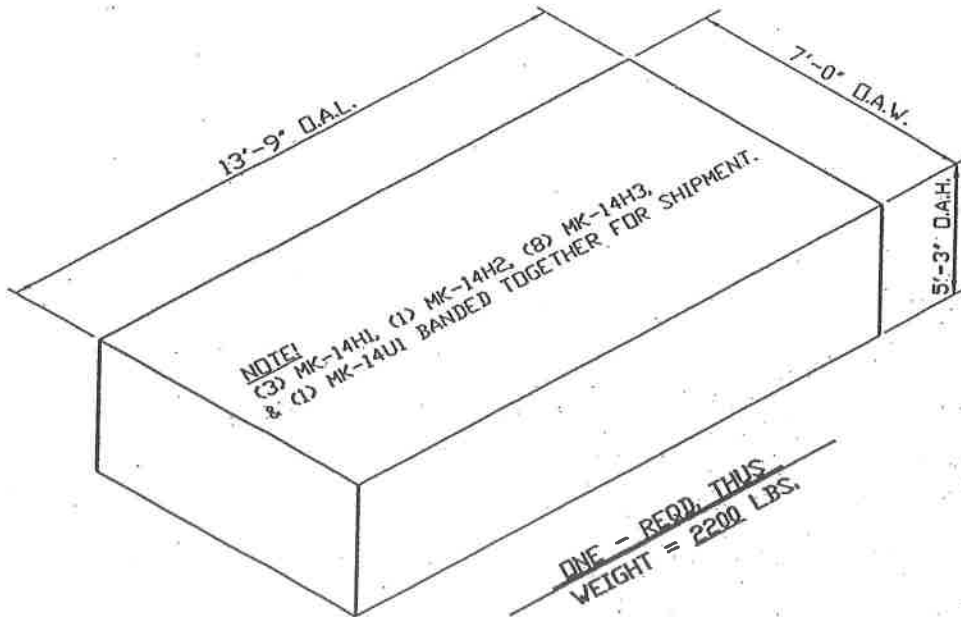
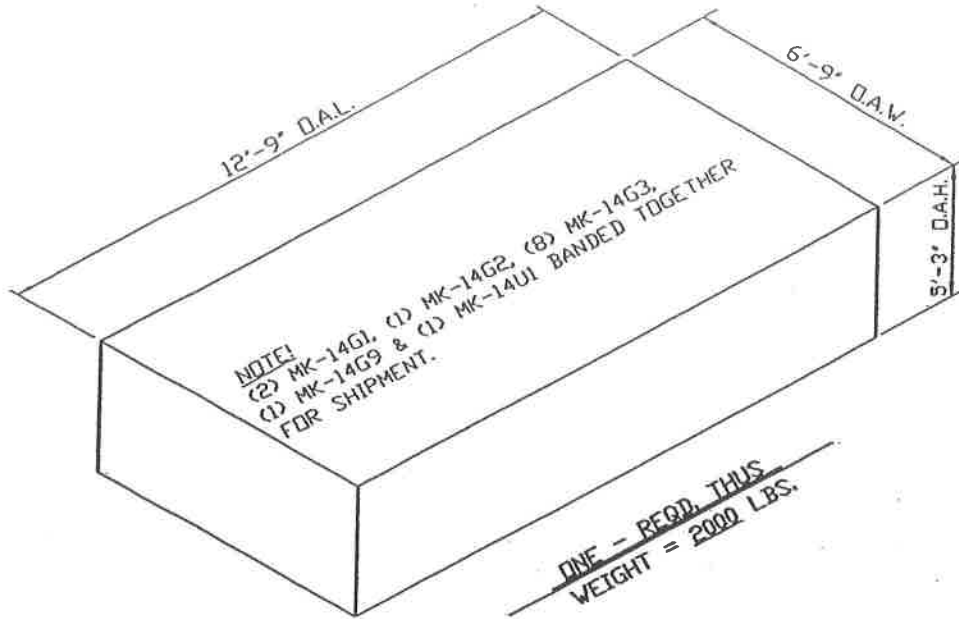
THE G.C. BROACH COMPANY • 7867 E. 46TH PLACE • TULSA, OK. 74145

SHIPPING SKETCH

FILE NAME: 123314R-A0

CAGED LADDERS

DWN.	P.D.D.	11/6/08	REV.		APPR	11/6/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	F.E.L.	11/6/08	CHK.		BY	S.	N.T.S.	20071233	A-1233-16R	0



WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
 BP GAS PARTIAL PROCESSING (GPP) PROJECT
 BP Z PAD FACILITY
 NORTH SLOPE, ALASKA
 EPT NO. 36324244-02

PROPRIETARY INFORMATION

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LC #



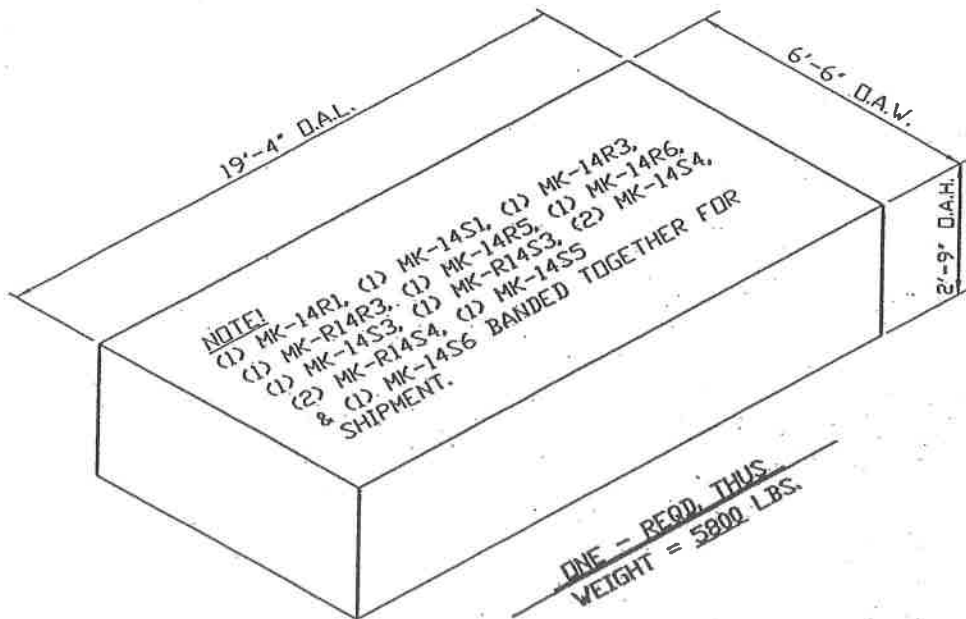
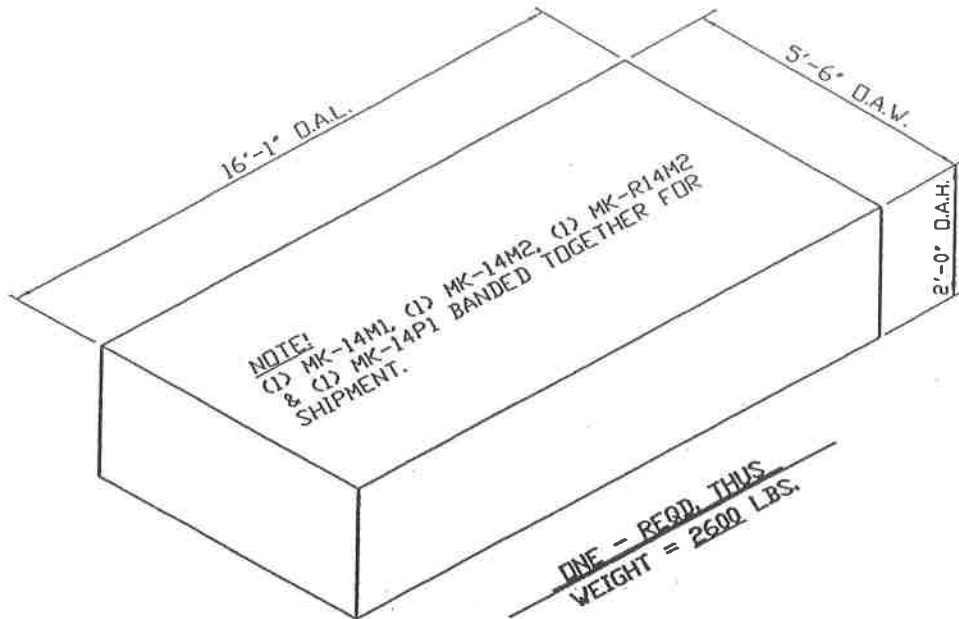
THE G.C. BROACH COMPANY • 7867 E. 46th PLACE • TULSA, OK 74145

SHIPPING SKETCH

FILE NAME: 123314S-A0

PLATFORMS

DWN.	P.D.D.	11/6/08	REV.		APPR	11/6/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	F.E.L.	11/6/08	CHK.		BY	S.	N.T.S.	20071233	A-1233-16S	0



WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
 BP GAS PARTIAL PROCESSING (GPP) PROJECT
 BP Z PAD FACILITY
 NORTH SLOPE, ALASKA
 EPT NO. 36324244-02

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LC #



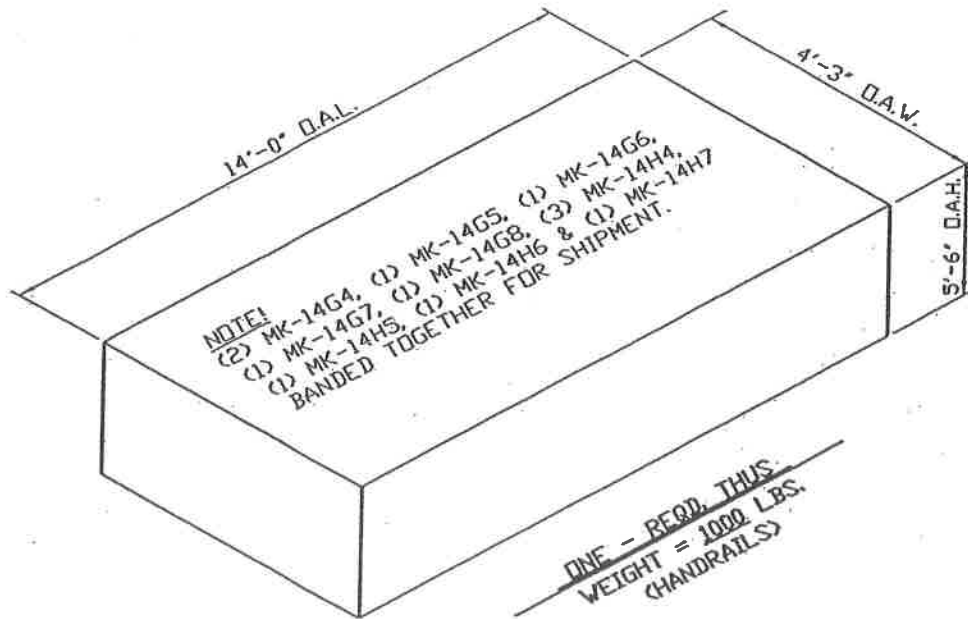
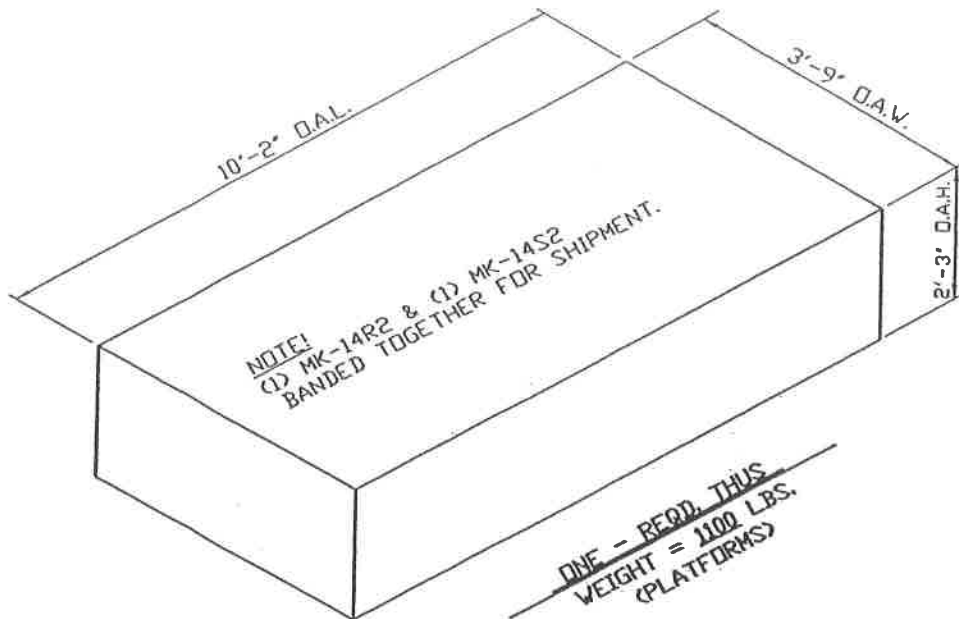
THE G.C. BROACH COMPANY • 7667 E. 46th PLACE • TULSA, OK 74145

SHIPPING SKETCH

FILE NAME: 123314T-A0

PLATFORMS

DWN.	P.D.D.	11/6/08	REV.		APPR	11/6/08	SCALE	JOB NO.	DWG. NO.	REV NO.
CHK.	F.E.L.	11/6/08	CHK.		BY	S.	N.T.S.	20071233	A-1233-16T	0



WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
 BP GAS PARTIAL PROCESSING (GPP) PROJECT
 BP Z PAD FACILITY
 NORTH SLOPE, ALASKA
 EPT NO. 36324244-02

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LC #



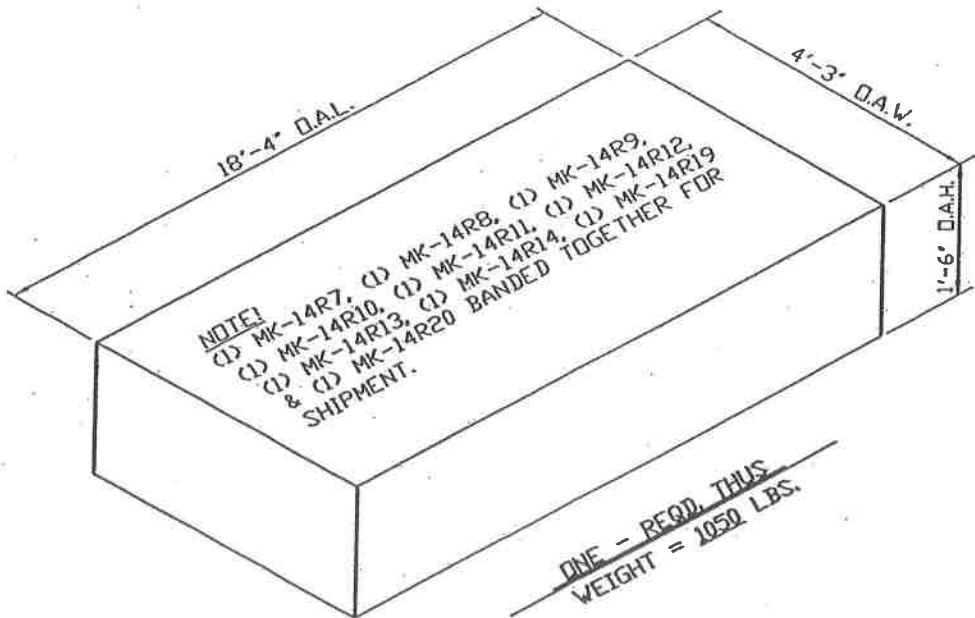
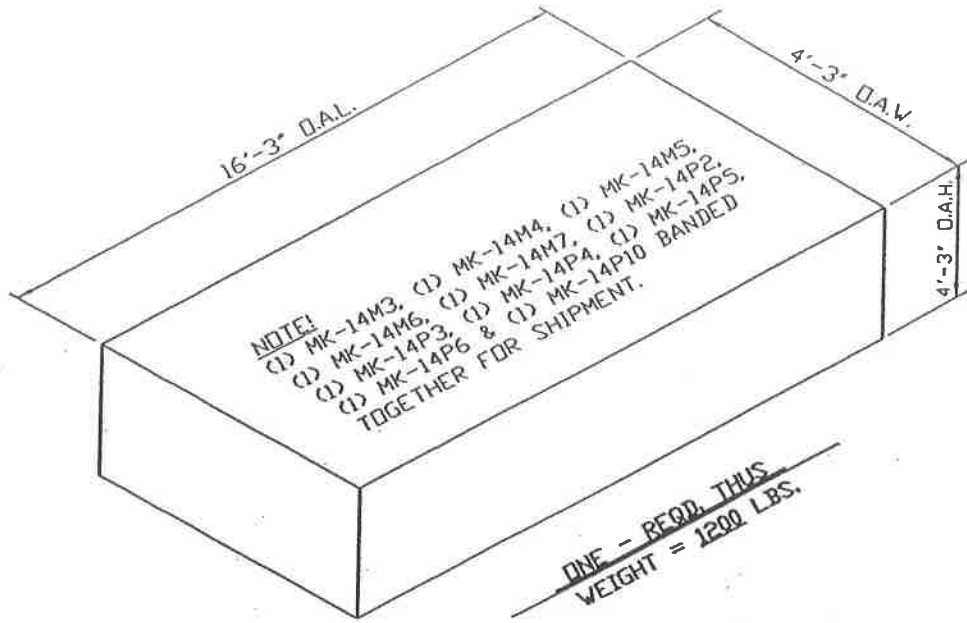
THE G.C. BROACH COMPANY • 7567 E. 45th PLACE • TULSA, OK 74145

SHIPPING SKETCH

FILE NAME: 123314U-A0

PLATFORMS & HANDRAILS

DWN.	P.D.D.	11/6/08	REV.		APPR.	11/6/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	F.E.L.	11/6/08	CHK.		BY	S.	N.T.S.	20071233	A-1233-16U	0



WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
 BP GAS PARTIAL PROCESSING (GPP) PROJECT
 BP Z PAD FACILITY
 NORTH SLOPE, ALASKA
 EPT NO. 36324244-02

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LC #



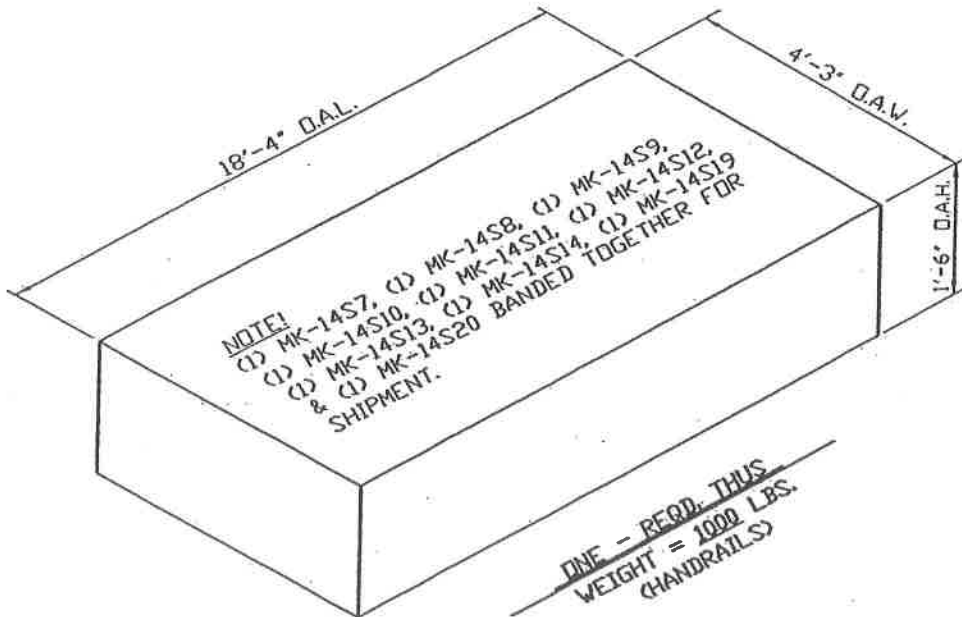
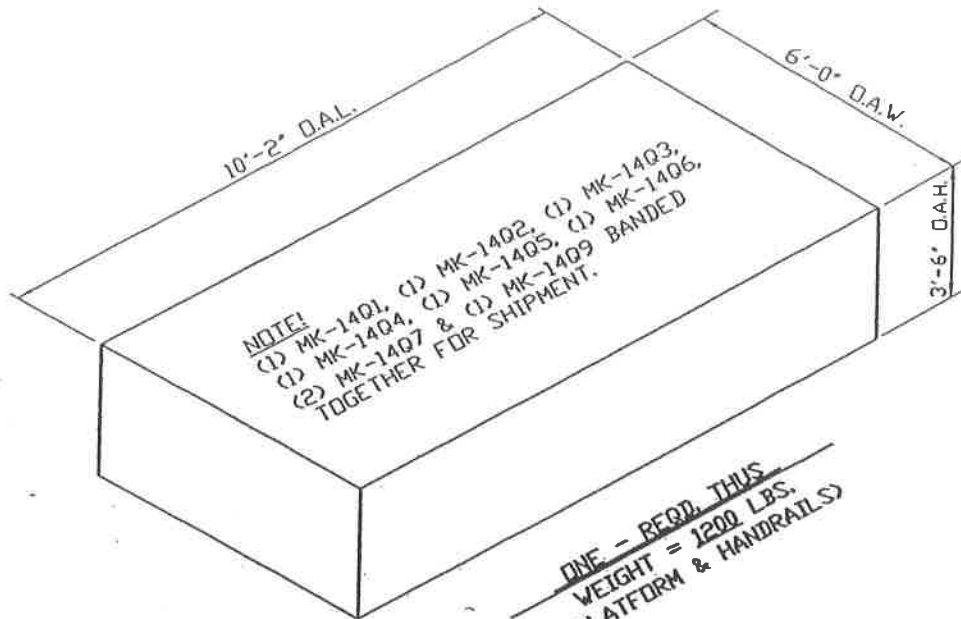
THE G.C. BROACH COMPANY - 7657 E. 45th PLACE - TULSA, OK 74143

SHIPPING SKETCH

FILE NAME: 123314V-A0

HANDRAILS

DWN.	P.D.D.	11/6/08	REV.		APPR	11/6/08	SCALE	JOB	DWG.	REV
CHK.	F.E.L.	11/6/08	CHK.		BY	S.	N.T.S.	NO. 20071233	NO. A-1233-16V	NO. 0



WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
 BP GAS PARTIAL PROCESSING (GPP) PROJECT
 BP Z PAD FACILITY
 NORTH SLOPE, ALASKA
 EPT NO. 36324244-02

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LC #



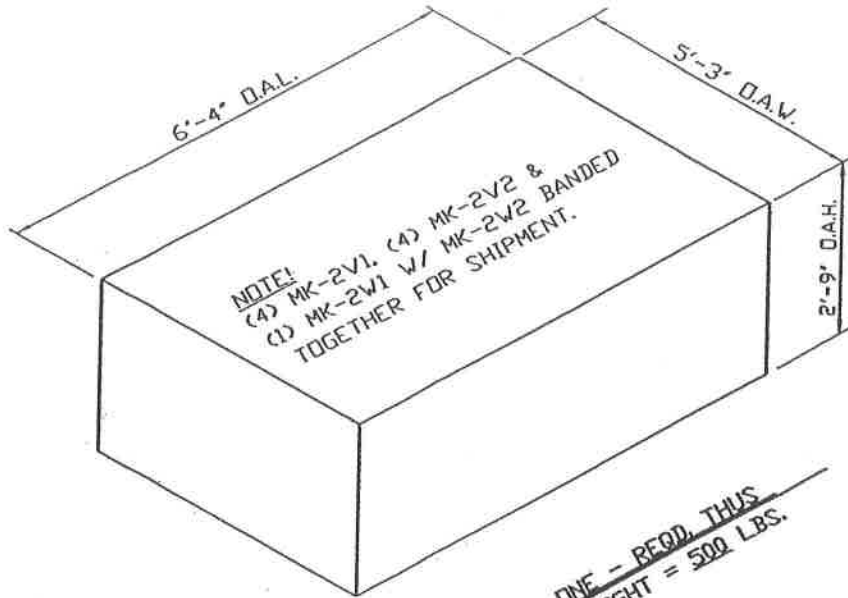
THE G.C. BROACH COMPANY • 7667 E. 46th PLACE • TULSA, OK 74145

SHIPPING SKETCH

FILE NAME: 123314W-A0

PLATFORMS & HANDRAILS

DWN.	P.D.D.	11/6/08	REV.		APPR.	11/6/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	F.E.L.	11/6/08	CHK.		BY	S.	N.T.S.	20071233	A-1233-16W	0



~~ONE - REQD. THIS
WEIGHT = 500 LBS.~~

WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
BP GAS PARTIAL PROCESSING (GPP) PROJECT
BP Z-PAD FACILITY
NORTH SLOPE, ALASKA
EPT NO. 36324244-02

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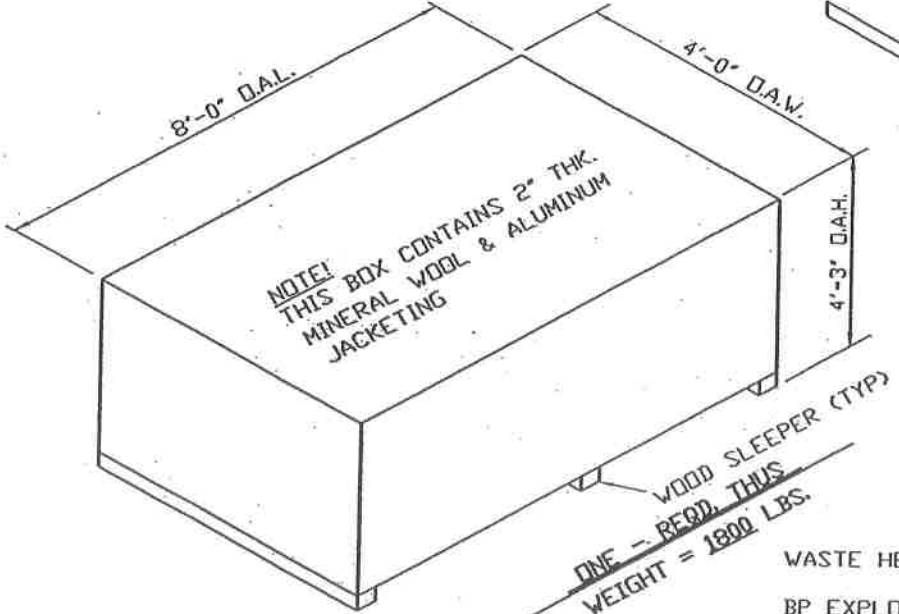
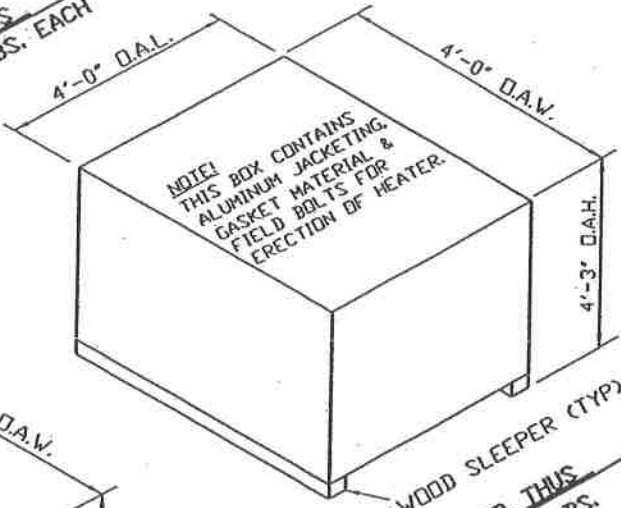
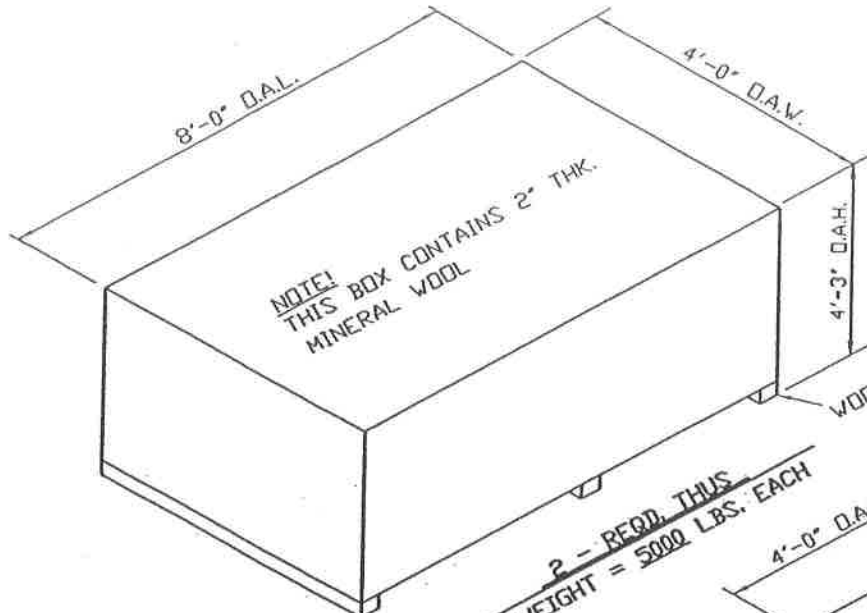


SHIPPING SKETCH

FILE NAME: 123314X-A0

PERSONNEL PROTECTION PANELS

DVN.	P.D.D.	11/6/08	REV.		APPR.	11/6/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	F.E.L.	11/6/08	CHK.		BY	S.	N.T.S.	20071233	A-1233-16X	0



WASTE HEAT RECOVERY UNIT H-Z6002

BP EXPLORATION (ALASKA) INC.
 BP GAS PARTIAL PROCESSING (GPP) PROJECT
 BP Z PAD FACILITY
 NORTH SLOPE, ALASKA
 EPT NO. 36324244-02

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LC #



THE G.C. BROACH COMPANY • 7667 E. 46th PLACE • TULSA, OK. 74145

SHIPPING SKETCH

FILE NAME: 123314Y-A0

MINERAL WOOL INSULATION
 & ALUMINUM JACKETING

DWN.	P.D.D.	11/6/08	REV.		APPR.	11/6/08	SCALE	JOB	DWG.	REV
CHK.	F.E.L.	11/6/08	CHK.		BY	S.	N.T.S.	NO. 20071233	NO. A-1233-16Y	NO. 0

**List of Materials Supplied By the G.C. Broach Company
For Field Assembly of the Waste Heat Recovery Unit**

Item No.	No. Req'd	DESCRIPTION	Remarks
1.	1	UPPER CONVECTION BOX MK-2A1	
2.	1	MIDDLE CONVECTION BOX MK-2B1	
3.	1	LOWER CONVECTION BOX MK-2C1	
4.	1	PLENUM MK-2D1	
5.	1	DIVERTER DUCT MK-2E1	
6.	1	INLET DUCT MK-2F1	
7.	1	LONG INTERMEDIATE DUCT MK-2Q1	
8.	1	SHORT INTERMEDIATE DUCT MK-2R1	
9.	1	TRANSITION MK-4A1	REF. ITEM # 15 ON DWG. #D-20071233-1A
10.	1	MAIN STACK MK-4B1	REF. ITEM # 15 ON DWG. #D-20071233-1A
11.	1	BYPASS STACK MK-4F1	REF. ITEM # 16 ON DWG. #D-20071233-1A
12.	1	EFFOX OPPOSED BLADE BYPASS DAMPER W/ BETTIS ACTUATOR & POSITIONER	REF. ITEM # 21 ON DWG. #D-20071233-1A
13.	1	EFFOX OPPOSED BLADE MAIN DAMPER W/ BETTIS ACTUATOR & POSITIONER	REF. ITEM # 22 ON DWG. #D-20071233-1A
14.	1	EFFOX EXPANSION JOINT	
15.	4	PERSONNEL PROTECTION PANELS MK-2V1	
16.	4	PERSONNEL PROTECTION PANELS MK-2V2	
17.	24	ATTACHMENT CLIPS MK-2V3	
18.	1	PERSONNEL PROTECTION PANELS MK-2W1	
19.	2000	SQ. FT. 2" THK. 4# DENSITY MINERAL WOOL INSULATION	INSTALL ON MK-4A1 & MK-4B1
20.	18	BOXES, .032" THK. STUCCO EMBOSSED ALUMINUM JACKET (3'-0" WIDE X 50'-0" LG. ROLL)	INSTALL ON MK-4A1 & MK-4B1
21.	903	LIN. FT. 3/4" WIDE X .020" THK. TP. 304 S.S. BANDING STRIP (21 FT. PER ROLL)	TO SECURE ALUMINUM CILINDER JACKETS ON MK-4A1 & MK-4B1
22.	150	WINGSEAL CLIPS TP 304 S.S.	USE ON BANDING STRIPS
23.	2	BOXES, NO. 8 X 1/2" LG. HEX HEAD SELF TAPING SCREWS (S.S. 410) (QUANTITY 1000 PER BOX)	FOR ALUMINUM JACKET JOINTS
24.	15	TUBES (10 FL OZ) CONSTRUCTION GRADE CAULKING BOSS 380	1/8" DIA. BEAD FOR SEALING ALUMINUM JACKET JOINTS
25.	1325	LIN. FT. 1/8" THK. X 2" WIDE DROP WRAP TAPE FIBER GLASS WOVEN GASKET (FOR ALL BOLTED FIELD JOINTS)	REF. ITEM # 31 ON DWG. #D-20071233-1A
26.	1	SHIPPING ENVELOPE CONTAINING BROACH DRAWINGS, CODE PAPERS, ETC...	
27.	7	4" STD. WT. L.R. 180° WELDING RETURN BENDS, PER SA-420, WPL6 (SEAMLESS)	MK-2A1 TO MK-2B1 COILS
28.	7	4" STD. WT. L.R. 180° WELDING RETURN BENDS, PER SA-420, WPL6 (SEAMLESS)	MK-2B1 TO MK-2C1 COILS
29.	110	3/4"Ø X 2" LG. M.B. (A-320-L7 ZINC PLATED)	MK-2A1 TO MK-2B1 (SIDES)

PROPRIETARY INFORMATION

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THE G. C. BROACH CO. • 7667 E. 46 PL. • TULSA, OKLA. 74145

File Name: 123312A-A0

**Field Material List
WASTE HEAT RECOVERY UNIT
SHEET 1 OF 5**

DWN.	PDD	12/2/08	REV.		APPR.	12/2/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	FEL	12/2/08	CHK.		BY	S.		20071233	A-1233-12A	0

**List of Materials Supplied By the G.C. Broach Company
For Field Assembly of the Waste Heat Recovery Unit**

30.	110	3/4"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-2A1 TO MK-2B1 (SIDES)
31.	110	3/4"Ø WASHERS (F436 ZINC PLATED)	MK-2A1 TO MK-2B1 (SIDES)
32.	38	3/4"Ø X 2 3/4" LG. M.B. (A-320-L7 ZINC PLATED)	MK-2A1 TO MK-2B1 (COLUMNS)
33.	38	3/4"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-2A1 TO MK-2B1 (COLUMNS)
34.	38	3/4"Ø WASHERS (F436 ZINC PLATED)	MK-2A1 TO MK-2B1 (COLUMNS)
35.	26	3/4"Ø X 2 1/4" LG. M.B. (A-320-L7 ZINC PLATED)	MK-2A1 TO MK-2B1 (ENDS)
36.	26	3/4"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-2A1 TO MK-2B1 (ENDS)
37.	26	3/4"Ø WASHERS (F436 ZINC PLATED)	MK-2A1 TO MK-2B1 (ENDS)
38.	110	3/4"Ø X 2" LG. M.B. (A-320-L7 ZINC PLATED)	MK-2B1 TO MK-2C1 (SIDES)
39.	110	3/4"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-2B1 TO MK-2C1 (SIDES)
40.	110	3/4"Ø WASHERS (F436 ZINC PLATED)	MK-2B1 TO MK-2C1 (SIDES)
41.	38	3/4"Ø X 2 3/4" LG. M.B. (A-320-L7 ZINC PLATED)	MK-2B1 TO MK-2C1 (COLUMNS)
42.	38	3/4"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-2B1 TO MK-2C1 (COLUMNS)
43.	38	3/4"Ø WASHERS (F436 ZINC PLATED)	MK-2B1 TO MK-2C1 (COLUMNS)
44.	26	3/4"Ø X 2 1/4" LG. M.B. (A-320-L7 ZINC PLATED)	MK-2B1 TO MK-2C1 (ENDS)
45.	26	3/4"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-2B1 TO MK-2C1 (ENDS)
46.	26	3/4"Ø WASHERS (F436 ZINC PLATED)	MK-2B1 TO MK-2C1 (ENDS)
47.	150	3/4"Ø X 2" LG. M.B. (A-320-L7 ZINC PLATED)	MK-2C1 TO MK-2D1 (SIDES & ENDS)
48.	150	3/4"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-2C1 TO MK-2D1 (SIDES & ENDS)
49.	150	3/4"Ø WASHERS (F436 ZINC PLATED)	MK-2C1 TO MK-2D1 (SIDES & ENDS)
50.	38	3/4"Ø X 2 3/4" LG. M.B. (A-320-L7 ZINC PLATED)	MK-2C1 TO MK-2D1 (COLUMNS)
51.	38	3/4"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-2C1 TO MK-2D1 (COLUMNS)
52.	38	3/4"Ø WASHERS (F436 ZINC PLATED)	MK-2C1 TO MK-2D1 (COLUMNS)
53.	26	3/4"Ø X 2 1/2" LG. M.B. (A-320-L7 ZINC PLATED)	MK-2C1 TO MK-2D1 (ENDS)

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THE G. C. BROACH CO. • 7667 E. 46 PL. • TULSA, OKLA. 74145

File Name: 123312A-A0

**Field Material List
WASTE HEAT RECOVERY UNIT
SHEET 2 OF 5**

DWN.	PDD	12/2/08	REV.		APPR.	12/2/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	FEL	12/2/08	CHK.		BY	S.		20071233	A-1233-12A	0

**List of Materials Supplied By the G.C. Broach Company
For Field Assembly of the Waste Heat Recovery Unit**

54.	26	3/4"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-2C1 TO MK-2D1 (ENDS)
55.	26	3/4"Ø WASHERS (F436 ZINC PLATED)	MK-2C1 TO MK-2D1 (ENDS)
56.	4	1/2"Ø X 3 1/2" LG. STUDS (A-320-L7 ZINC PLATED)	FLANGED THERMOWELL TO MK-2D1
57.	8	1/2"Ø HEX NUTS (A-194-L7 ZINC PLATED)	FLANGED THERMOWELL TO MK-2D1
58.	1	1/8" THK. SERVICE SHEET GASKET FOR 1 1/2"-150# RF-WN FLANGE (FIBER)	FLANGED THERMOWELL TO MK-2D1
59.	4	1/2"Ø X 3 1/2" LG. STUDS (A-320-L7 ZINC PLATED)	FLANGED THERMOWELL TO MK-2E1
60.	8	1/2"Ø HEX NUTS (A-194-L7 ZINC PLATED)	FLANGED THERMOWELL TO MK-2E1
61.	1	1/8" THK. SERVICE SHEET GASKET FOR 1 1/2"-150# RF-NW FLANGE (FIBER)	FLANGED THERMOWELL TO MK-2E1
62.	80	1/2"Ø X 1 3/4" LG. M.B. (A-320-L7 ZINC PLATED)	BYPASS DAMPER TO MK-2E1
63.	80	1/2"Ø HEX NUTS (A-194-L7 ZINC PLATED)	BYPASS DAMPER TO MK-2E1
64.	80	1/2"Ø WASHERS (F436 ZINC PLATED)	BYPASS DAMPER TO MK-2E1
65.	90	1/2"Ø X 1 3/4" LG. M.B. (A-320-L7 ZINC PLATED)	MAIN DAMPER TO MK-2E1
66.	90	1/2"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MAIN DAMPER TO MK-2E1
67.	90	1/2"Ø WASHERS (F436 ZINC PLATED)	MAIN DAMPER TO MK-2E1
68.	54	5/8"Ø X 2" LG. M.B. (A-320-L7 ZINC PLATED)	MK-2F1 TO CUSTOMER EXHAUST DUCT
69.	54	5/8"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-2F1 TO CUSTOMER EXHAUST DUCT
70.	54	5/8"Ø WASHERS (F436 ZINC PLATED)	MK-2F1 TO CUSTOMER EXHAUST DUCT
71.	88	5/8"Ø X 1 3/4" LG. M.B. (A-320-L7 ZINC PLATED)	MK-2F1 TO MK-2E1
72.	88	5/8"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-2F1 TO MK-2E1
73.	88	5/8"Ø WASHERS (F436 ZINC PLATED)	MK-2F1 TO MK-2E1
74.	56	1/2"Ø X 1 1/2" LG. M.B. (A-320-L7 ZINC PLATED)	TERMINAL END HEADER BOX FIELD JOINTS
75.	56	1/2"Ø HEX NUTS (A-194-L7 ZINC PLATED)	TERMINAL END HEADER BOX FIELD JOINTS
76.	56	1/2"Ø WASHERS (F436 ZINC PLATED)	TERMINAL END HEADER BOX FIELD JOINTS
77.	56	1/2"Ø X 1 1/2" LG. M.B. (A-320-L7 ZINC PLATED)	RETURN END HEADER BOX FIELD JOINTS
78.	56	1/2"Ø HEX NUTS (A-194-L7 ZINC PLATED)	RETURN END HEADER BOX FIELD JOINTS
79.	56	1/2"Ø WASHERS (F436 ZINC PLATED)	RETURN END HEADER BOX FIELD JOINTS
80.	180	1/2"Ø X 1 3/4" LG. M.B. (A-320-L7 ZINC PLATED)	EFFOX EXPANSION JOINT TO EFFOX MAIN DAMPER & MK-2Q1
81.	180	1/2"Ø WASHERS (F436 ZINC PLATED)	EFFOX EXPANSION JOINT TO EFFOX MAIN DAMPER & MK-2Q1

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THE G. C. BROACH CO. • 7667 E. 46 PL. • TULSA, OKLA. 74145

File Name: 123312A-A0
Field Material List
WASTE HEAT RECOVERY UNIT
SHEET 3 OF 5

DWN.	PDD	12/2/08	REV.		APPR.	12/2/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	FEL	12/2/08	CHK.		BY	S.		20071233	A-1233-12A	0

**List of Materials Supplied By the G.C. Broach Company
For Field Assembly of the Waste Heat Recovery Unit**

82.	180	5/8"Ø X 2" LG. M.B. (A-320-L7 ZINC PLATED)	MK-2R1 TO MK-2Q1 & MK-2D1
83.	180	5/8"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-2R1 TO MK-2Q1 & MK-2D1
84.	180	5/8"Ø WASHERS (F436 ZINC PLATED)	MK-2R1 TO MK-2Q1 & MK-2D1
85.	17	1/2"Ø X 1 1/2" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-2V1 & MK-2V2 TO MK-4F1
86.	50	1/2"Ø X 1 1/4" LG. M.B. W/ WASHER (GR. 8 ZINC PLATED)	MK-2V3 TO MK-2V1 & MK-4V2
87.	3	1/2"Ø X 1 1/2" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-2W1 TO MK-4F1
88.	4	1/2"Ø X 3 1/2" LG. STUDS (A-320-L7 ZINC PLATED)	FLANGED THERMOWELL TO MK-4A1
89.	8	1/2"Ø HEX NUTS (A-194-L7 ZINC PLATED)	FLANGED THERMOWELL TO MK-4A1
90.	1	1/8" THK. SERVICE SHEET GASKET FOR 1 1/2"-150# RF-WN FLANGE (FIBER)	FLANGED THERMOWELL TO MK-4A1
91.	95	3/4"Ø X 2 3/4" LG. M.B. (A-320-L7 ZINC PLATED)	MK-4A1 TO MK-2A1 (SIDES & ENDS)
92.	95	3/4"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-4A1 TO MK-2A1 (SIDES & ENDS)
93.	190	3/4"Ø BEVEL WASHERS (F436 ZINC PLATED)	MK-4A1 TO MK-2A1 (SIDES & ENDS)
94.	18	3/4"Ø X 2 1/4" LG. M.B. (A-320-L7 ZINC PLATED)	MK-4A1 TO MK-2A1 (CORNERS)
95.	18	3/4"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-4A1 TO MK-2A1 (CORNERS)
96.	18	3/4"Ø FLAT WASHERS (F436 ZINC PLATED)	MK-4A1 TO MK-2A1 (CORNERS)
97.	9	1"Ø X 11 1/2" LG. STUDS (A-320-L7 ZINC PLATED)	MK-4B1 TO MK-4A1
98.	18	1"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-4B1 TO MK-4A1
99.	18	1"Ø FLAT WASHERS (F436 ZINC PLATED)	MK-4B1 TO MK-4A1
100.	35	3/4"Ø X 2" LG. M.B. (A-320-L7 ZINC PLATED)	MK-4B1 TO MK-4A1
101.	35	3/4"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-4B1 TO MK-4A1
102.	35	3/4"Ø FLAT WASHERS (F436 ZINC PLATED)	MK-4B1 TO MK-4A1
103.	60	1/2"Ø X 1 3/4" LG. M.B. (A-320-L7 ZINC PLATED)	MK-4F1 TO BYPASS DAMPER
104.	60	1/2"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-4F1 TO BYPASS DAMPER
105.	60	1/2"Ø FLAT WASHERS (F436 ZINC PLATED)	MK-4F1 TO BYPASS DAMPER
106.	18	1"Ø X 3" LG. M.B. (A-320-L7 ZINC PLATED)	MK-4F1 TO MK-2E1
107.	18	1"Ø HEX NUTS (A-194-L7 ZINC PLATED)	MK-4F1 TO MK-2E1
108.	18	1"Ø FLAT WASHERS (F436 ZINC PLATED)	MK-4F1 TO MK-2E1
109.	9	5/8"Ø X 2" LG. M.B. (A-320-L7 ZINC PLATED)	SILENCER TO MK-4F1
110.	9	5/8"Ø HEX NUTS (A-194-L7 ZINC PLATED)	SILENCER TO MK-4F1

PROPRIETARY INFORMATION

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THE G. C. BROACH CO. • 7667 E. 46 PL. • TULSA, OKLA. 74145

File Name: 123312A-A0

**Field Material List
WASTE HEAT RECOVERY UNIT
SHEET 4 OF 5**

DWN.	PDD	12/2/08	REV.		APPR.	12/2/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	FEL	12/2/08	CHK.		BY	S.		20071233	A-1233-12A	0

**List of Materials Supplied By the G.C. Broach Company
For Field Assembly of the Waste Heat Recovery Unit**

111.	9	5/8"Ø FLAT WASHERS (F436 ZINC PLATED)	SILENCER TO MK-4F1
112.	4	1/2"Ø X 3" LG. M.B. (A-320-L7 ZINC PLATED)	ROSEMOUNT TEMPERATURE INDICATOR TO MK-4F1
113.	8	1/2"Ø HEX NUTS (A-194-L7 ZINC PLATED)	ROSEMOUNT TEMPERATURE INDICATOR TO MK-4F1
114.	1	1/8" THK. SPIRAL WOUND "CG" GASKET FOR 1 1/2"-150# RF-FLANGE (TP 304 SS)	ROSEMOUNT TEMPERATURE INDICATOR TO MK-4F1
115.			
116.			
117.			
118.			
119.			

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THE G. C. BROACH CO. • 7667 E. 46 PL. • TULSA, OKLA. 74145

File Name: 123312A-A0

**Field Material List
WASTE HEAT RECOVERY UNIT
SHEET 5 OF 5**

DWN.	PDD	12/2/08	REV.		APPR.	12/2/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	FEL	12/2/08	CHK.		BY	S.		20071233	A-1233-12A	0

**List of Materials Supplied By the G.C. Broach Company
For Field Assembly of Ladder & Platforms**

Item No.	No. Req'd	DESCRIPTION	Remarks
1.	1	LADDER MK-14A1	
2.	1	LADDER MK-14B1	
3.	1	LADDER MK-14C1	
4.	1	LADDER MK-14D1	
5.	3	PLATFORMS MK-14G1	
6.	1	PLATFORM MK-14G2	
7.	8	PLATFORM KNEE BRACES MK-14G3	
8.	3	HANDRAIL MK-14G4	
9.	1	HANDRAIL MK-14G5	
10.	1	HANDRAIL MK-14G6	
11.	1	HANDRAIL MK-14G7	
12.	3	PLATFORMS MK-14H1	
13.	1	PLATFORM MK-14H2	
14.	8	PLATFORM KNEE BRACES MK-14H3	
15.	3	HANDRAIL MK-14H4	
16.	1	HANDRAIL MK-14H5	
17.	1	HANDRAIL MK-14H6	
18.	1	HANDRAIL MK-14H7	
19.	1	PLATFORM MK-14M1	
20.	1	PLATFORM KNEE BRACES MK-14M2	
21.	1	PLATFORM KNEE BRACES MK-R14M2	
22.	1	HANDRAIL MK-14M3	
23.	1	HANDRAIL MK-14M4	
24.	1	HANDRAIL MK-14M5	
25.	1	HANDRAIL MK-14M6	
26.	1	TOE BAR MK-14M7	
27.	1	PLATFORM MK-14P1	
28.	1	HANDRAIL MK-14P2	
29.	1	HANDRAIL MK-14P3	
30.	1	HANDRAIL MK-14P4	
31.	1	HANDRAIL MK-14P5	
32.	1	HANDRAIL MK-14P6	
33.	1	TOE BAR MK-14P10	
34.	1	PLATFORM MK-14Q1	
35.	1	HANDRAIL MK-14Q2	
36.	1	HANDRAIL MK-14Q3	
37.	1	HANDRAIL MK-14Q4	
38.	1	HANDRAIL MK-14Q5	
39.	1	HANDRAIL MK-14Q6	
40.	2	PLATFORM KNEE BRACES MK-14Q7	
41.	1	TOE BAR MK-14Q9	
42.	1	PLATFORM MK-14R1	
43.	1	PLATFORM MK-14R2	

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THE G. C. BROACH CO. • 7667 E. 46 PL. • TULSA, OKLA. 74145

File Name: 123312B-A0

**Field Material List
LADDERS & PLATFORMS
SHEET 1 OF 5**

DWN.	PDD	12/2/08	REV.	PDD	5/18/09	APPR.	12/2/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	FEL.	12/2/08	CHK.	FEL.	5/18/09	BY	S		20071233	A-1233-12B	1

**List of Materials Supplied By the G.C. Broach Company
For Field Assembly of Ladder & Platforms**

44.	1	PLATFORM SUPPORT BEAM MK-14R3	
45.	1	PLATFORM SUPPORT BEAM MK-R14R3	
46.	2	PLATFORM KNEE BRACES MK-14R4	
47.	2	PLATFORM KNEE BRACES MK-R14R4	
48.	1	PLATFORM SUPPORT CHANNEL MK-14R5	
49.	1	PLATFORM KNEE BRACE MK-14R6	
50.	1	HANDRAIL MK-14R7	
51.	1	HANDRAIL MK-14R8	
52.	1	HANDRAIL MK-14R9	
53.	1	HANDRAIL MK-14R10	
54.	1	HANDRAIL MK-14R11	
55.	1	HANDRAIL MK-14R12	
56.	1	HANDRAIL MK-14R13	
57.	1	HANDRAIL MK-14R14	
58.	1	TOE BAR MK-14R19	
59.	1	TOE BAR MK-14R20	
60.	1	PLATFORM MK-14S1	
61.	1	PLATFORM MK-14S2	
62.	1	PLATFORM SUPPORT BEAM MK-14S3	
63.	1	PLATFORM SUPPORT BEAM MK-R14S3	
64.	2	PLATFORM KNEE BRACES MK-14S4	
65.	2	PLATFORM KNEE BRACES MK-R14S4	
66.	1	PLATFORM SUPPORT CHANNEL MK-14S5	
67.	1	PLATFORM KNEE BRACE MK-14S6	
68.	1	HANDRAIL MK-14S7	
69.	1	HANDRAIL MK-14S8	
70.	1	HANDRAIL MK-14S9	
71.	1	HANDRAIL MK-14S10	
72.	1	HANDRAIL MK-14S11	
73.	1	HANDRAIL MK-14S12	
74.	1	HANDRAIL MK-14S13	
75.	1	HANDRAIL MK-14S14	
76.	1	TOE BAR MK-14S19	
77.	1	TOE BAR MK-14S20	
78.	20	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14A1 TO MK-14Q1 MK-14R1 & MK-14S1
79.	8	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14B1 TO MK-14H2
80.	5	3/4"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14B2 TO MK-4B1 & MK-14B1
81.	2	LADDER BASE MOUNTING BOLTS MK-14T1	MK-14B1 TO MK-14Q1
82.	5	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14C1 TO MK-14P1
83.	3	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14C1 TO MK-14P2 & MK-14P5
84.	2	LADDER BASE MOUNTING BOLTS MK-14T1	MK-14D1 TO MK-14P1
85.	5	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14D1 TO MK-14G5 & MK-14G6
86.	5	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14D1 TO MK-14G7

PROPRIETARY INFORMATION

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THE G. C. BROACH CO. • 7667 E. 46 PL. • TULSA, OKLA. 74145

File Name: 123312B-A0

**Field Material List
LADDERS & PLATFORMS
SHEET 2 OF 5**

DWN.	PDD	12/2/08	REV.	PDD	5/18/09	APPR.	12/2/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	FEL	12/2/08	CHK.	FEL	5/18/09	BY	S		20071233	A-1233-12B	1

**List of Materials Supplied By the G.C. Broach Company
For Field Assembly of Ladder & Platforms**

87.	17	3/4"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14G1, MK-14G2, & MK-14G9 TO MK-4F1
88.	55	3/4"Ø X 2" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14G3 TO MK-14G1 MK-14G2, MK-14G9 & MK-4F1; MK-14G1 & MK-14G2 JOINTS
89.	58	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14G4 THRU MK-14G8 TO MK-14G1 MK-14G2 & MK-14G9; ALL HANDRAIL JOINTS
90.	17	3/4"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14H1 & MK-14H2 TO MK-4B1
91.	55	3/4"Ø X 2" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14H3 TO MK-14H1, MK-14H2 & MK-4B1; MK-14H1 & MK-14H2 PLATFORM JOINTS
92.	57	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14H4 THRU MK-14H7 TO MK-14H1 & MK-14H2; ALL HANDRAIL JOINTS
93.	9	3/4"Ø X 2" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14M1 TO MK-2E1
94.	5	3/4"Ø X 2" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14M2, MK-R14M2 TO MK-2E1
95.	5	3/4"Ø X 2 1/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14M2 & MK-R14M2 TO MK-14M1
96.	19	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14M3, MK-14M4, MK-14M5 & MK-14M6 TO MK-14M1
97.	7	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14M6 TO MK-14M3 & MK-14M5
98.	5	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14M7 TO MK-14M1 & MK-14M3 & MK-14M5
99.	9	3/4"Ø X 2 1/2" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14P1 TO MK-2E1
100.	30	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14P2, MK-14P3, MK-14P4 & MK-14P5 TO MK-14P1
101.	5	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14P3 TO MK-14P4 & MK-14P2
102.	3	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14P10 TO MK-14P4 & MK-14P5
103.	3	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14P7 TO MK-14P4 & MK-14P2
104.	7	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14P6 TO MK-14P2, MK-14P3 & MK-14P4
105.	5	3/4"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14Q1 TO MK-2A1
106.	15	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14Q2, MK-14Q3, MK-14Q4 & MK-14Q5 TO MK-14Q1
107.	5	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14Q3 TO MK-14Q4 & MK-14Q5
108.	5	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	MK-14Q9 TO MK-14Q2, MK-14Q5 & MK-14Q1

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THE G. C. BROACH CO. • 7667 E. 46 PL. • TULSA, OKLA. 74145

File Name: 123312B-A0
Field Material List
LADDERS & PLATFORMS
SHEET 3 OF 5

DWN.	PDD	12/2/08	REV.	PDD	5/18/09	APPR.	12/2/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	FEL	12/2/08	CHK.	FEL	5/18/09	BY	S		20071233	A-1233-12B	1

**List of Materials Supplied By the G.C. Broach Company
For Field Assembly of Ladder & Platforms**

109	9	3/4"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14Q7 TO MK-14Q1 & MK-2A1
110	10	3/4"Ø X 2" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)	REV 1	MK-14R3 & MK-R14R3 TO MK-2B1
111	3	3/4"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14R5 TO MK-2B1
112	5	3/4"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14R1 TO MK-14R2
113	10	3/4"Ø X 2" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14R1 TO MK-14R3 & MK-R14R3
114	3	3/4"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14R2 TO MK-14R5
115	10	3/4"Ø X 2 1/2" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14R4 & MK-R14R4 TO MK-2C1, MK-14R3 & MK-R14R3
116	5	3/4"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14R6 TO MK-2B1 & MK-14R5
117	28	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14R7, MK-14R8, MK-14R9 & MK-14R14 TO MK-14R1
118	9	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14R11 & MK-14R12 TO MK-14R2
119	5	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14R10 TO MK-14R1 & MK-14R2
120	7	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14R8 TO MK-14R9 & MK-14R14
121	4	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14R9 TO MK-14R11
122	7	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14R19 TO MK-14R1, MK-14R7 & MK14R10
123	5	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14R20 TO MK-14R2 & MK-14R10 & MK14R12
124	7	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14R13 TO MK-14R7 & MK-14R14
125	10	3/4"Ø X 2 1/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14S3 & MK-R14S3 TO MK-2D1
126	3	3/4"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14S5 TO MK-2D1
127	5	3/4"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14S1 TO MK-14S2
128	10	3/4"Ø X 2" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14S1 & MK-14S2 TO MK-14S3 & MK-R14S3
129	3	3/4"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14S2 TO MK-14S5
130	10	3/4"Ø X 2 1/2" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14S4 & MK-R14S4 TO MK-2D1, MK-14S3 & MK-R14S3
131	5	3/4"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-2S6 TO MK-2D1 & MK-14S5
132	28	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14S7, MK-14S8, MK-14S9 & MK-14S14 TO MK-14S1
133	9	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14S11 & MK-14S12 TO MK-14S2
134	5	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14S10 TO MK-14S1 & MK-14S2
135	7	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14S8 TO MK-14S9 & MK-14S14
136	4	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14S9 TO MK-14S11

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THE G. C. BROACH CO. • 7667 E. 46 PL. • TULSA, OKLA. 74145

File Name: 123312B-A0

**Field Material List
LADDERS & PLATFORMS
SHEET 4 OF 5**

DWN.	PDD	12/2/08	REV.	PDD	5/18/09	APPR.	12/2/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	FEL	12/2/08	CHK.	FEL	5/18/09	BY	S		20071233	A-1233-12B	

**List of Materials Supplied By the G.C. Broach Company
For Field Assembly of Ladder & Platforms**

137	7	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14S19 TO MK-14S1, MK-14S7 & MK14S10
138	5	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14S20 TO MK-14S2 & MK-14S10 & MK14S12
139	7	5/8"Ø X 1 3/4" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14S13 TO MK-14S7 & MK-14S14
140	2	PLATFORM DAVIT MK-14U1		
141	2	DAVIT BRACKET MK-14U2		
142	2	DAVIT BRACKET MK-14U3		
143	5	5/8"Ø X 2" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14U2 TO MK-14G8 & MK-14H5
144	5	5/8"Ø X 2" LG. M.B. W/ N&W (GR. 8 ZINC PLATED)		MK-14U3 TO MK-14G9 & MK-14H2
145	2	1/2"Ø CLEVIS PIN W/ 5/32" DIA. HOLE X 3 1/2" LG. McMASTER CARR #92390A399 (18-8 S.S.)		DAVIT KEEPER
146	2	1/8"Ø HAIR PIN COTTER McMASTER CARR #92391A056 (TP 302 S.S.)		DAVIT KEEPER
147	3	SAFETY GATE MK-14E1 (LEFT HANDED SIDE STEP)	REV 1	
148	1	SAFETY GATE MK-14F1 (STEP THRU)	REV 1	
149	5	SAFETY GATE MK-14N1 (RIGHT HANDED SIDE STEP)	REV 1	
150	10	1/4"Ø X 1 1/2" LG. COTTER PIN (C.S.)	REV 1	MK-14E1, MK-14F1 & MK-14N1 TO PLATFORM HANDRAILS
151	2	LADDER SUPPORTS MK-14B2	REV 1	
152				

PROPRIETARY INFORMATION

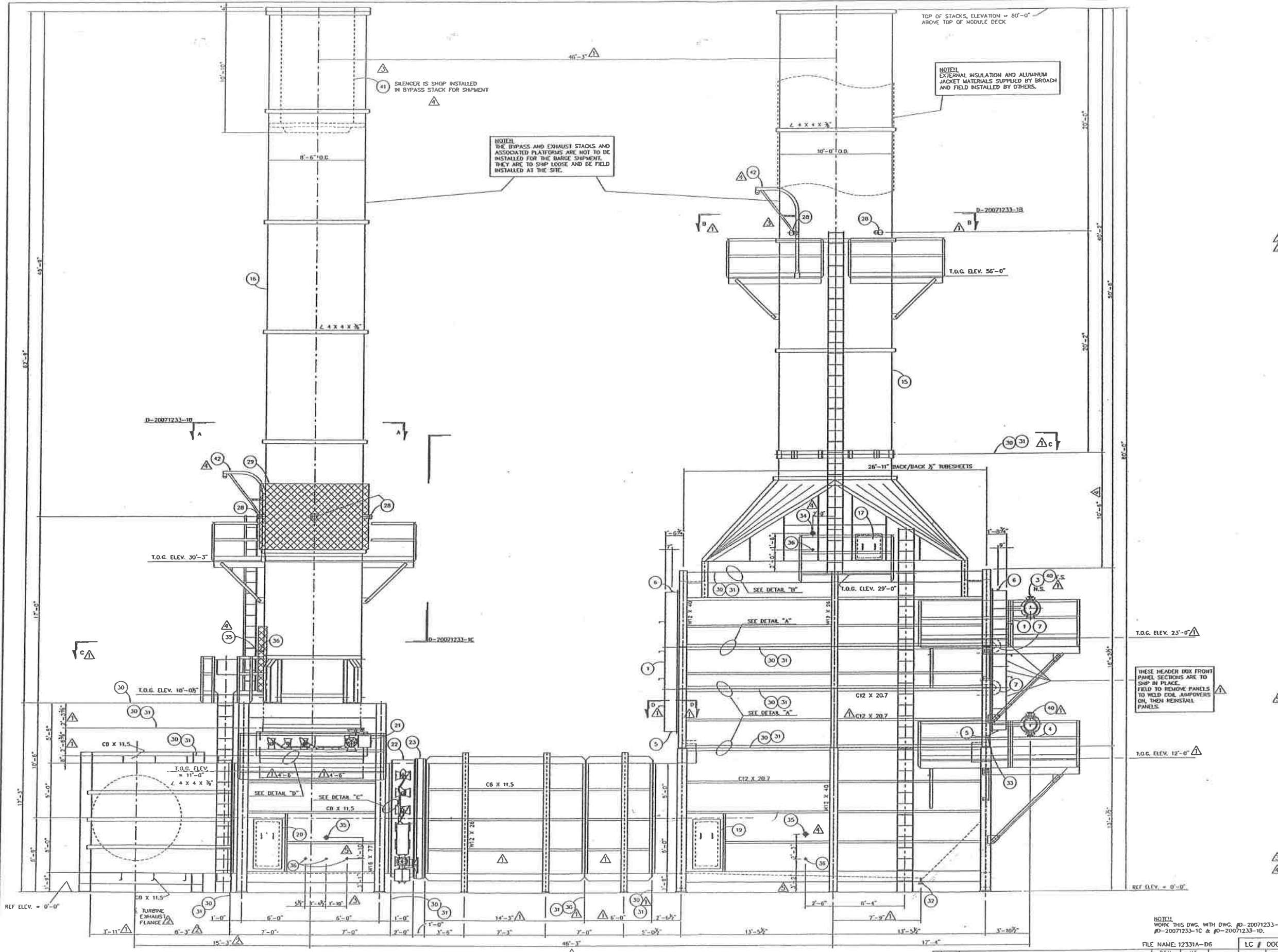
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THE G. C. BROACH CO. • 7667 E. 46 PL. • TULSA, OKLA. 74145

File Name: 123312B-A0
Field Material List
LADDERS & PLATFORMS
SHEET 5 OF 5

DWN.	PDD	12/2/08	REV.	PDD	5/18/09	APPR.	12/2/08	SCALE	JOB NO.	DWG. NO.	REV. NO.
CHK.	FEL	12/2/08	CHK.	FEL	5/18/09	BY	S		20071233	A-1233-12B	1



- COL SPECIFICATIONS:**
- INLET: (1)**
12"-300# RF-WNF PER SA-350-LF2 W/ X-STG. BORE.
- OUTLET: (1)**
SAME AS ABOVE.
- DESIGN CONDITIONS:**
600 P.S.I.G. @ 450F
MINIMUM DESIGN TEMP.
-50F @ 600 P.S.I.G.
- HYDROSTATIC TEST:**
900 P.S.I.G. @ AMBIENT TEMP. (MIN. 50F)
- STRESS RELIEVE:**
NONE.
- RADIOGRAPHIC:**
100%
- CODE STAMP:**
A.S.M.E. SECTION VIII, DIV. 1 2004 NATIONAL BOARD.
- CORROSION ALLOWANCE:**
0/25"
- TUBES: (7 PASSES)**
252- 4" O.D. X 237" AV. WALL SEAMLESS C.S. PIPE PER SA-333, GR. 6
W/ 80-1" HIGH X .050" THK. SOLID C.S. FINS PER FT.
(14) X 20-9" LG. AND (238) X 28"-0" LG.
- FITTINGS:**
231- 4" STD. WT. S.R. 180° WELDING RETURN BENDS.
PER SA-420, WPL6 (SEAMLESS)
14- 4" STD. WT. L.R. 180° WELDING RETURN BENDS.
PER SA-420, WPL6 (SEAMLESS)
- HEADERS:**
2- 12 3/4" O.D. X .680" AV. WALL SEAMLESS C.S. PIPE PER SA-333, GR. 6
WITH (7) EXTRUDED BRANCH CONNS. FOR THE 4" TERMINAL TUBES
DRLET HEADER LENGTH = 8'-9 3/4"
2- 12" X-STG. WELDING PIPE CAPS PER SA-420, WPL6 (SEAMLESS)
1- 2"-300# RF-LWNF WITH BLIND PER SA-350, LF2 (DRAIN)
1- 2"-300# RF-LWNF WITH BLIND PER SA-350, LF2 (VENT)
2- 2"-200# RF-LWNF WITH BLIND PER SA-350, LF2 (THERMOWELL)
- NOTES:** ALL COL. MATERIALS SHALL BE NORMALIZED AND IMPACT TESTED.
- GENERAL NOTES:**
- HEADER BOXES, WITH BOLTED AND GASKETED JOINTS.
 - ALL EXTERNAL STEEL JOINTS TO BE EXTERNALLY SEAL WELDED FOR INTERNAL PRESSURE.
 - HEADER VENT CONN. 2"-300# RF-LWNF W/BLIND (1) (SEE COL. SPECS.)
 - HEADER DRAIN CONN. 2"-300# RF-LWNF W/BLIND (1) (SEE COL. SPECS.)
 - HEADER BOX DRAIN CONNS. 1"-3000# CPLG. W/ PLUG. (2)
 - HEADER BOX SHAFT CONNS. 1"-3000# CPLG. W/ PLUG. (2)
 - WELDED COL. JUMPOVERS, (12" CTRS) FIELD INSTALLED BY OTHERS (14)
 - 16 GA. TP. 304 SS LINER
 - REFRACTORY MIX NO. 1, PER G.C.B. CO. SPEC. 102, (1-2.5-4 LHM)
 - 1" THK. 8# DENSITY (2300T) NEEDLED CERAMIC FIBER BLANKET.
 - 2" THK. 6# DENSITY (2300T) NEEDLED CERAMIC FIBER BLANKET.
 - TP. 304 SS BULLHORN REFRACTORY ANCHORS
 - TP. 310 SS CERAMIC FIBER / LINER ANCHORS (DUPLE PMS)
 - TP. 304 SS CERAMIC FIBER ANCHORS
 - 20'-0" DIA. EXHAUST STACK, EXTERNALLY INSULATED (1)
 - INSULATION MATERIALS SUPPLIED BY BROADH. FIELD INSTALLED BY OTHERS
 - 8'-6" DIA. BYPASS STACK, UNINSULATED (1)
 - EXHAUST STACK ACCESS DOOR 24" X 24". (1)
 - BYPASS STACK ACCESS DOOR 24" X 24". (1)
 - PLENUM ACCESS DOOR, 24" X 48". (1)
 - DIVERTER DUCT ACCESS DOOR, 24" X 48". (1)
 - EFFOX OPPOSED BLADE BYPASS DAMPER (1)
 - BLADES - TP. 304 SS AIR/OIL TUBE
 - SEALS - TP. 316 SS TOP, BOTTOM, AND JAMB SEALS
 - INSULATION - 4" CERAMIC FIBER COVERED WITH 14 GA. 304 SS LINER.
 - LIMIT SWITCHES - (2) 24 VDC DPDT, OPEN AND CLOSED
 - ACTUATOR - BETHS MODEL 2014584-11 WITH SELMER'S PS2 POSITIONER (4-20 MA SIGNAL) AND GEARBOX FOR MANUAL OPERATION TO PSIG AIR SUPPLY REQUIRED
 - EFFOX OPPOSED BLADE MAIN DAMPER (1)
 - BLADES - TP. 304 SS AIR/OIL TUBE
 - SEALS - TP. 316 SS TOP, BOTTOM, AND JAMB SEALS
 - INSULATION - 4" CERAMIC FIBER COVERED WITH 14 GA. 304 SS LINER.
 - LIMIT SWITCHES - (2) 24 VDC DPDT, OPEN AND CLOSED
 - ACTUATOR - BETHS MODEL 2014584-11 WITH SELMER'S PS2 POSITIONER (4-20 MA SIGNAL) AND GEARBOX FOR MANUAL OPERATION TO PSIG AIR SUPPLY REQUIRED
 - EFFOX EXPANSION JOINT, (1)
 - FABRICATED TUBE SUPPORT, TP. 304 SS (1)
 - FABRICATED TUBE SUPPORT, A-516-70 C.S. (2)
 - TUBE SUPPORT PINS, TP. 304 SS (6)
 - TP. 304 SS CORBELS, (20) INCLUDES FUTURE ROWS
 - EPA STACK SAMPLE CONN., 4" WHP/ W/ CAP. (8)
 - BYPASS STACK PERSONNEL PROTECTION PANELS BY BROADH. FIELD INSTALLED BY OTHERS.
 - BOLTED FIELD JOINTS.
 - 2" WIDE X 1/8" THK. OPEN WEAVE GASKET TAPE
 - PLENUM FLOOR DRAIN 1 1/2"-150# RF-FLG. W/ BLIND. (1)
 - TUBESKIN THERMOCOUPLE CONN. 1 1/2"-300# A-105 F.S. THREADED CPLG. WITH A 304 SS PIPE SLEEVE THRU THE TUBE SHEET REFRACTORY
 - EXHAUST STACK FLUEGAS TEMPERATURE CONN. 1 1/2"-150# A-105 F.S. RF FLANGE WITH A 304 SS PIPE SLEEVE THRU THE INSULATION (1)
 - FLUEGAS TEMPERATURE CONN. 1 1/2"-150# A-105 F.S. RF FLANGE WITH A 304 SS PIPE SLEEVE THRU THE INSULATION (2)
 - FLUEGAS PRESSURE CONN. 1 1/2"-300# A-105 F.S. THREADED CPLG. WITH A 304 SS PIPE SLEEVE THRU INSULATION (8)
 - APPLY A 1/8" THICK COAT OF HIGH TEMP. MASTIC TO ALL INTERIOR STEEL SURFACES THAT ARE TO BE LINED WITH CERAMIC FIBER.
 - TP. 304 S.S. TUBESHEET FERRILES
- PAINTING AS FOLLOWS:**
- EXTERIOR STEEL SURFACES OF THE CONNECTION BOX, PLENUM, DIVERTER DUCT, DAMPERS, AND EXHAUST STACK TO BE NEAR WHITE MEDIA BLASTED PER SSPC-SP10 AND PAINTED AS FOLLOWS:
PRIMER - CARBOZINC 11 COLOR #0300 2-3 MILS DFT
INTERMEDIATE - CARBOZINC 803 COLOR #600 RED 4-6 MILS DFT
FINISH - CARBOZINC 134 HG COLOR #C705 GRAY 2-2.5 MILS DFT
 - EXTERIOR STEEL SURFACES OF THE BYPASS STACK TO BE NEAR WHITE MEDIA BLASTED PER SSPC-SP10 AND PAINTED AS FOLLOWS:
PRIMER - CARBOZINC 11 COLOR #0300 GREEN 2-3 MILS DFT
PRIMER SECOND COAT - CARBOZINC 11 PRIMER COLOR #0300 GRAY 2-3 MILS DFT
 - COL. MANIFOLDS TO BE PRIMED ONLY - CARBOZINC 11 COLOR #0300 GREEN 2-3 MILS DFT
 - LADDERS AND PLATFORMS TO BE HOT DIP GALVANIZED.
 - INSTRUMENTS AND DAMPER ACTUATORS - STD. MFG. FINISH
- STRUCTURAL MATERIALS AS FOLLOWS:**
- ALL CONNECTION BOX, DUCT AND STACK, CASING PLATES TO BE A-516, GR. 70 (NORMALIZING NOT REQUIRED)
 - STRUCTURAL SHAPES - WIDE FLANGES, CHANNELS AND ANGLES TO BE A-572, GR. 50 NORMALIZED
 - ALL SHAPES AND PLATES ABOVE TO BE CHAMPY W-NOTCHED TESTED AS FOLLOWS:
15 FT-LBS MIN. AVG. (3 TESTS) WITH A 12 FT-LB MIN. @ -50F.
 - MISC. STIFFENERS TO BE A-36 C.S. (NOT IMPACT TESTED)
 - LADDER AND PLATFORM STEEL TO BE A-36 C.S. (NOT IMPACT TESTED) (SEE COL. SPECS.)
 - PRICE BYPASS STACK SILENCER, SHOP INSTALLED IN BYPASS STACK (1)
 - DRAWN

PROCESS HEATERS
BROADH

THE G.C. BROADH COMPANY • 7667 E. 46th PLACE • NULSA, OK. 74145

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GENERAL LAYOUT & ASSEMBLY
WASTE HEAT RECOVERY UNIT
ITEM NO: H-26002

JOB NO. 20071233 DWG. NO. 0-20071233-1A REV. NO. 6

WASTE HEAT RECOVERY UNIT H-26002

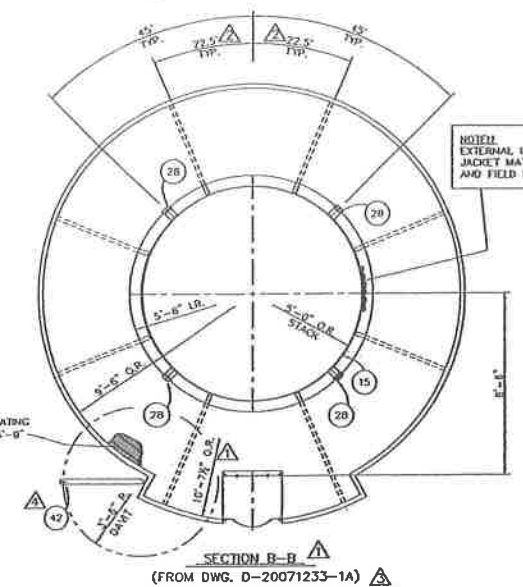
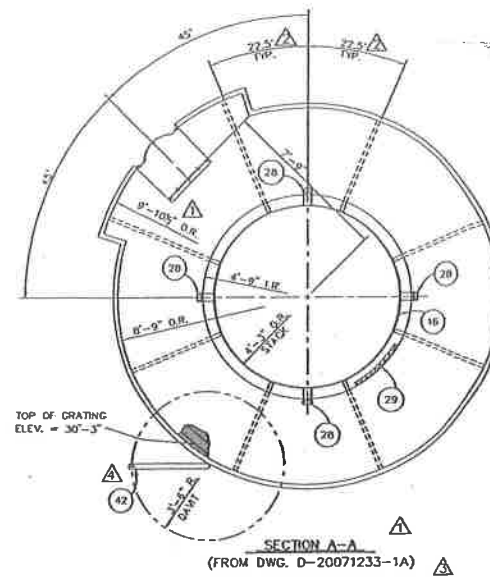
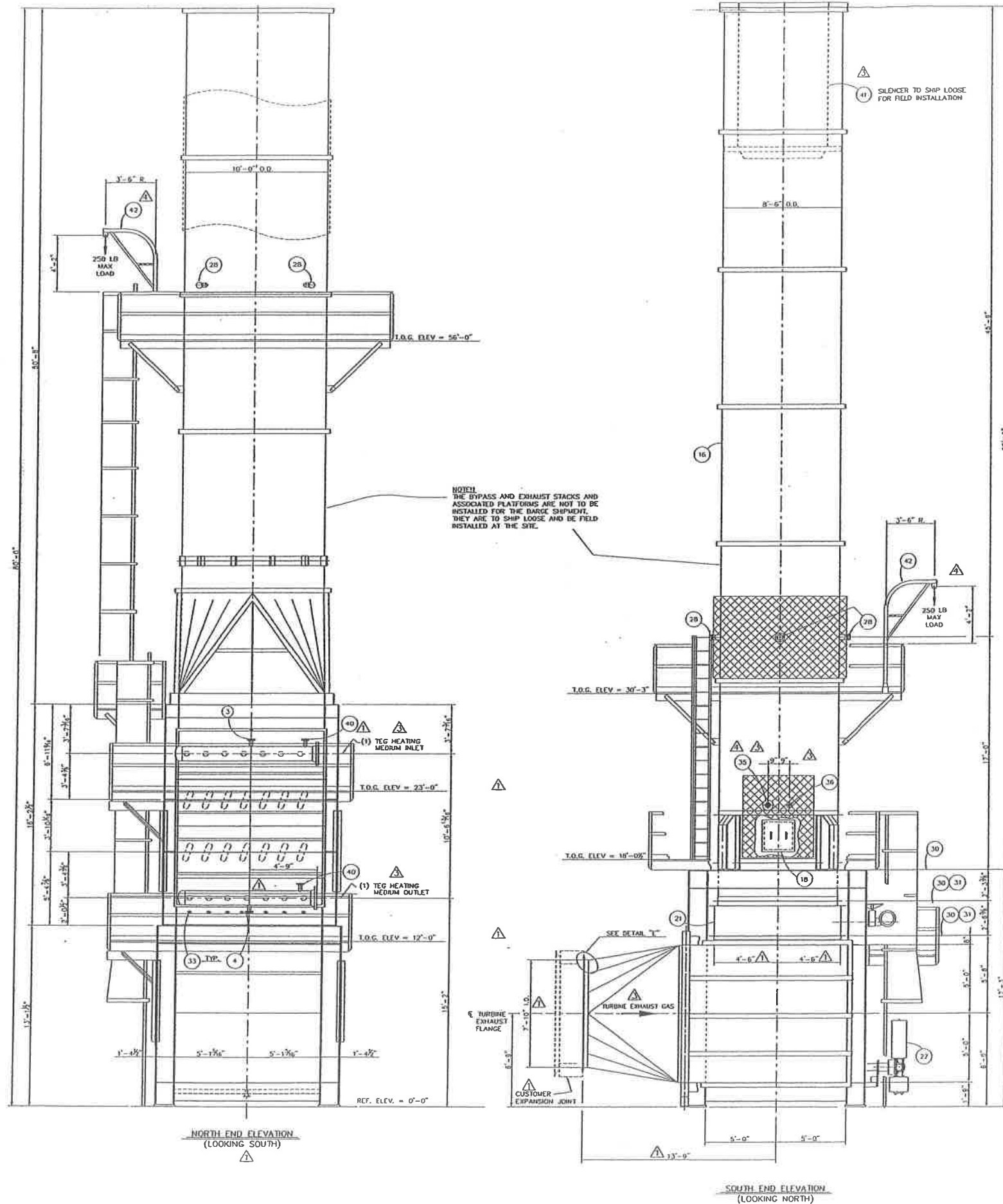
BP EXPLORATION (ALASKA) INC.
BP GAS PARTIAL PROCESSING (CPP) PROJECT
NORTH SLOPE, ALASKA
EPT NO. 36324244-02

SOLD TO: WOBLEYPARSONS
FOR: BP EXPLORATION (ALASKA), INC.
P.O. No.: 10741707-0006
TAG No.: H-26002
SERVICE: OILFIELD WATER WASTE HEAT RECOVERY UNIT
ESTIMATED SHIPPING WEIGHT: 490,000 LBS.

REV.	DATE	BY	DESCRIPTION
1	05/12/09	MS	REVISED GENERAL NOTE #7.
2	04/29/09	MS	REVISED PAINT SPECS.
3	04/29/09	MS	REVISED EPT NO., ADDED DAWTS AND DELETED INSTRUMEN'S
4	04/29/09	MS	REVISED PER CUSTOMER MARK UPS
5	04/29/09	MS	REVISED TURBINE INLET DUCT AND GENERAL REVISIONS.
6	04/29/09	MS	ADDED INTERCONNECTING DUCTS AND GENERAL REVISIONS

FILE NAME: 12331A-DWN L.C. # 000
P.L.D. 08/15/07
CHK M.T.S. 9/26/07
APPR S 9/26/07

SCALE: 1/4" = 1'-0"



NOTE: EXTERNAL INSULATION AND ALUMINUM JACKET MATERIALS SUPPLIED BY BROACH AND FIELD INSTALLED BY OTHERS.

WASTE HEAT RECOVERY UNIT H-26002
 BP EXPLORATION (ALASKA) INC.
 BP GAS PARTIAL PROCESSING (GPP) PROJECT
 BP 2 PAD FACILITY
 NORTH SLOPE, ALASKA
 EPT NO. 36324244-02

PROCESS HEATERS
BROACH
 THE C.C. BROACH COMPANY • 7667 E. 45th PLACE • TULSA, OK, 74145

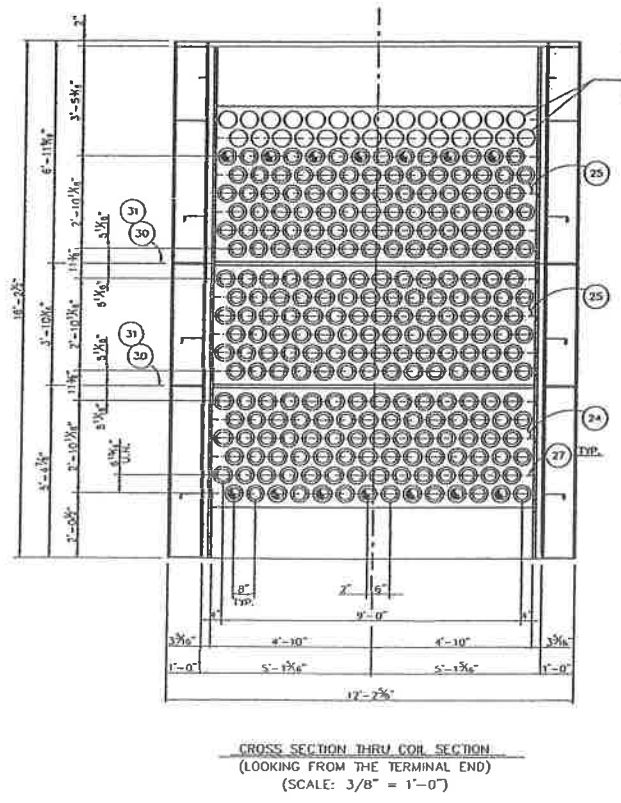
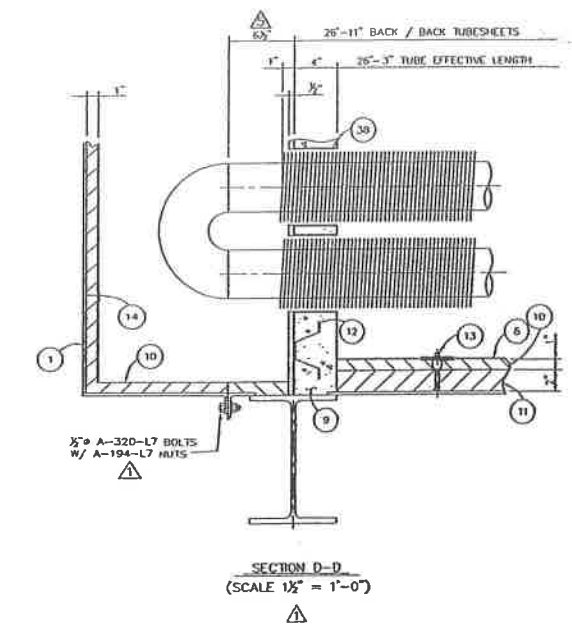
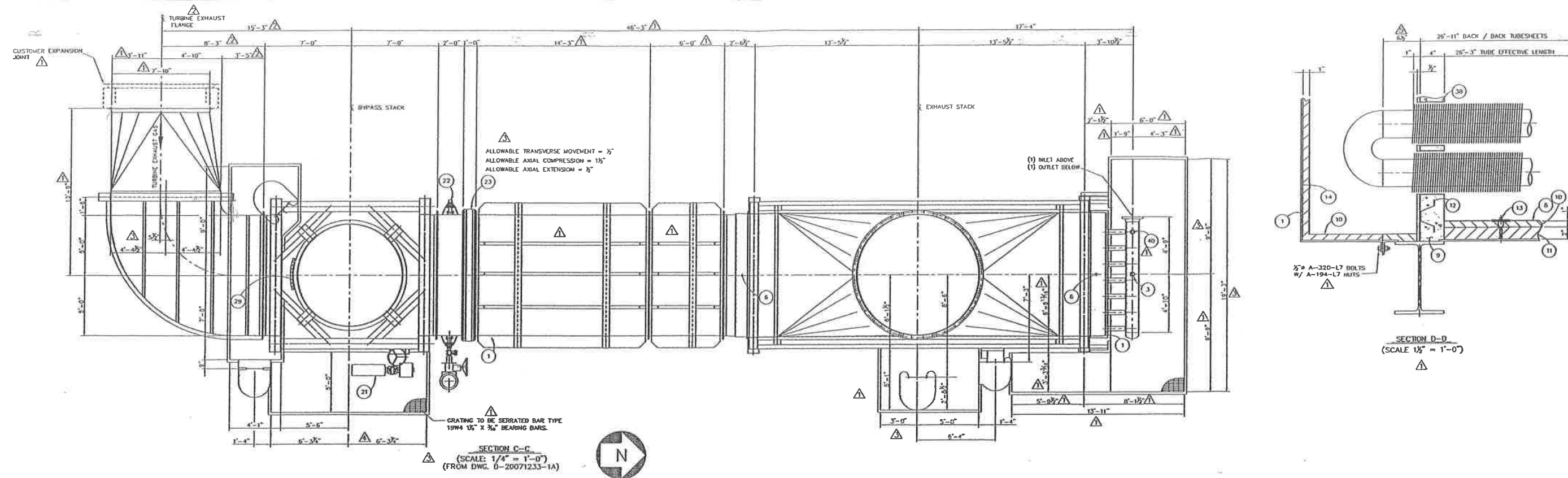
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GENERAL LAYOUT & ASSEMBLY
WASTE HEAT RECOVERY UNIT
 ITEM NO: H-26002

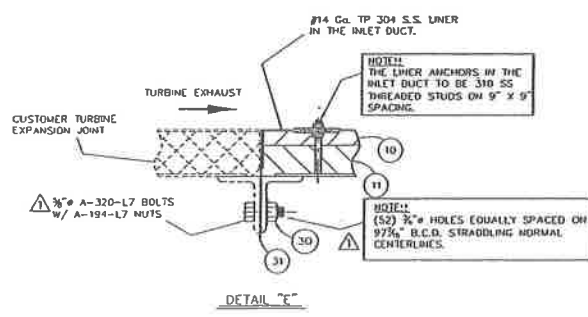
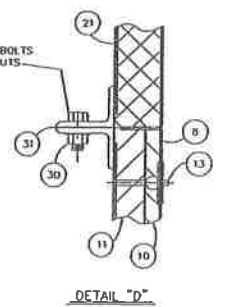
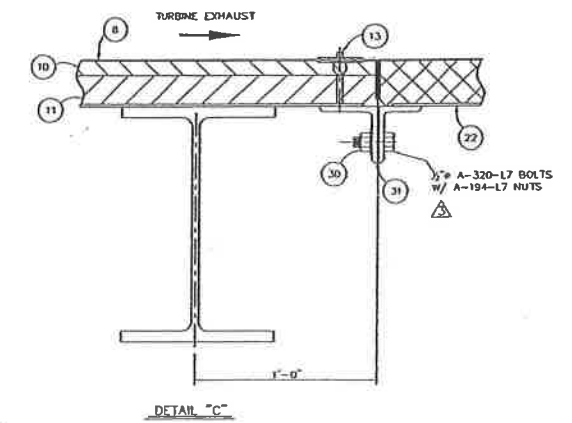
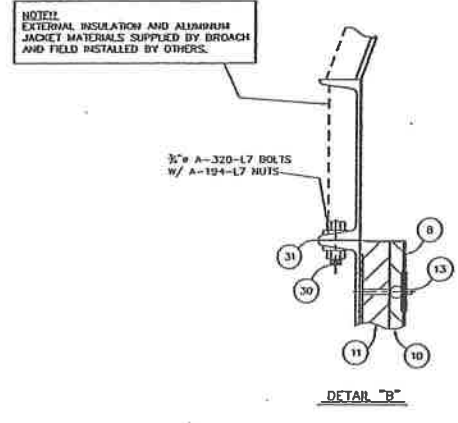
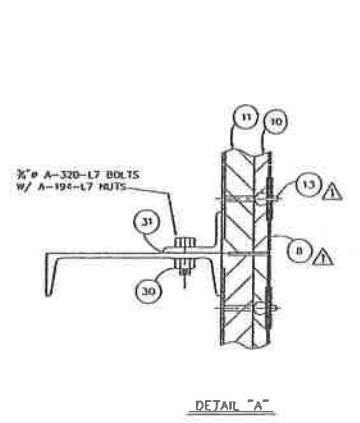
REV	NO.	DATE	DESCRIPTION	BY	CHK	APP	SCALE	JOB NO.	DWG NO.	REV NO.
1	1	08/15/07	REVISED EPT NO. AND ADDED DAWITS	P.S.D.	W.S.		3/8" = 1'-0"	20071233	D-20071233-1B	1
2	2	09/26/07	REVISED PER CUSTOMER MARK UPS	G.C.A.	W.S.					
3	3	09/26/07	REVISED SECTIONS A-A & B-B	G.C.A.	W.S.					
4	4	09/26/07	GENERAL REVISIONS	G.C.A.	W.S.					

NOTE: WORK THIS DWG. WITH DWG. #D-20071233-1A, #D-20071233-1C, & #D-20071233-1D.

FILE NAME:	12331B-04	LC #	000
DWN	P.D.D.	08/15/07	
CHK	M.T.S.	9/26/07	
APP	S	9/26/07	
SCALE	3/8" = 1'-0"	JOB NO.	20071233
		DWG NO.	D-20071233-1B



PROVISION FOR (2) FUTURE ROWS
 OF TUBES AND TUBESHEET BARE
 HOLES TO BE PRE-CUT 300° WITH
 FERRULES PACKED WITH REFRACTORY.



NOTE:
 EXTERNAL INSULATION AND ALUMINUM
 JACKET MATERIALS SUPPLIED BY BROACH
 AND FIELD INSTALLED BY OTHERS.

WASTE HEAT RECOVERY UNIT H-26002
 BP EXPLORATION (ALASKA) INC.
 BP GAS PARTIAL PROCESSING (GPP) PROJECT
 BP Z PAD FACILITY
 NORTH SLOPE, ALASKA
 EPI NO. 36324244-02

PROCESS HEATERS
BROACH
 THE G.C. BROACH COMPANY • 7667 E. 46th PLACE • TULSA, OK. 74145
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GENERAL LAYOUT & ASSEMBLY
WASTE HEAT RECOVERY UNIT
ITEM NO: H-26002

REV	DESCRIPTION	DATE	BY	CHK	APP	SCALE	JOB NO.	DWG. NO.	REV. NO.
1	REVISD DIMENSION IN SECTION D-D.	08/15/07	B.E.H.	M.S.	D.W.N.	P.D.D.	20071233	D-20071233-1C	1
2	REVISD EPT NO.	09/11/09	P.S.G.	M.T.S.	C.R.K.				
3	REVISD PER CUSTOMER MARK UP	02/25/09	B.E.H.						
4	REVISD INLET EXHAUST DUCT.	09/29/08	B.E.H.						
5	ADDED INTERCONNECTING DUCT SECTIONS AND GENERAL REVISIONS.	03/10/08	B.E.H.						

FILE NAME: 12331G-D5
 LC # 000
 SCALE: AS NOTED

NOTE:
 WORK THIS DWG. WITH DWG. #D-20071233-1A, #D-20071233-1B, &
 #D-20071233-1D.

FOUNDATION LOAD TABLE										
SITE CONDITION LOADS (ALL LOADS IN KIIPS)										
BASE NO.	DEAD LOAD w/FUTURE TUBES (VERTICAL)	HYDROTEST LOAD w/FUTURE TUBES (VERTICAL)	SNOW LOAD (VERTICAL)	WIND LOAD		SEISMIC LOAD		LIVE LOAD (VERTICAL)	MAX. BASE REACTION (VERTICAL)	MIN. BASE REACTION (UPLIFT)
				(HORIZONTAL)	(VERTICAL)	(HORIZONTAL)	(VERTICAL)			
A1	71.5	8.0	2.8	14.7	±67.5	11.3	±34.2	9.4	159.2	-----
A2	71.5	8.0	2.8	14.7	±67.5	11.3	±34.2	13.5	163.3	-----
B1	70.3	8.0	2.6	8.7	±46.8	5.1	±21.7	7.8	135.5	-----
B2	70.3	8.0	2.6	8.7	±46.8	5.1	±21.7	9.9	137.6	-----
C1	57.5	5.9	3.6	15.7	±63.4	10.4	±34.7	9.8	140.2	-5.9
C2	57.5	5.9	3.6	15.7	±63.4	10.4	±34.7	10.8	141.2	-5.9
D1	14.0	1.1	1.7	3.3	±14.0	2.0	±8.4	4.6	35.4	-----
D2	14.0	1.1	1.7	3.3	±14.0	2.0	±8.4	4.6	35.4	-----
E1	3.8	-----	1.8	2.0	±1.1	.5	±.3	4.5	11.2	-----
E2	3.8	-----	1.8	2.0	±1.1	.5	±.3	4.5	11.2	-----
F1	3.8	-----	1.8	2.0	±1.1	.5	±.3	4.5	11.2	-----
F2	3.8	-----	1.8	2.0	±1.1	.5	±.3	4.5	11.2	-----
G1	23.2	-----	5.0	10.0	±56.1	2.9	±10.0	13.3	99.6	-32.9
G2	23.2	-----	5.0	10.0	±56.1	2.9	±10.0	15.3	99.6	-32.9
H1	24.6	-----	5.0	11.4	±54.2	2.9	±9.6	15.3	99.1	-29.6
H2	24.6	-----	5.0	11.4	±54.2	2.9	±9.6	15.3	99.1	-29.6
J	4.0	-----	-----	-----	-----	-----	-----	-----	-----	-----
K	4.0	-----	-----	-----	-----	-----	-----	-----	-----	-----

B₁ ACCELERATIONS:
 B_{1R} = 0.0023LZ + 0.33 = .372 (LATERAL ROLL)
 B_{1P} = 0.1 (LONGITUDINAL PITCH)
 B_{1V} = 0.33 (VERTICAL HEAVE)

B₂ ACCELERATIONS:
 B_{2R} = 0.0059LZ + 0.21 = .39 (LATERAL ROLL)
 B_{2V} = 0.0056LY + 0.40 = .694 (VERTICAL HEAVE)

B₃ ACCELERATIONS:
 B_{3P} = 0.0085LZ + 0.11 = .14 (LONGITUDINAL PITCH)
 B_{3V} = 0.0056LY + 0.40 = .694 (VERTICAL HEAVE)

LZ = 18166 FT
 LY = 10572 = 52.5 FT

WORST CASES
 D + LC + B_{1P} + .6W ROLL
 D + LC + B_{1P} + .6W PITCH
 D + LC + B_{1V} + .6W HEAVE

MAXIMUM BASE REACTION FOR BARGE
 CALCULATED PER:
 DEADLOAD + HEAVE + ROLL + WIND

MINIMUM BASE REACTION (UPLIFT) FOR BARGE
 CALCULATED PER:
 DEAD LOAD + HEAVE - ROLL - WIND

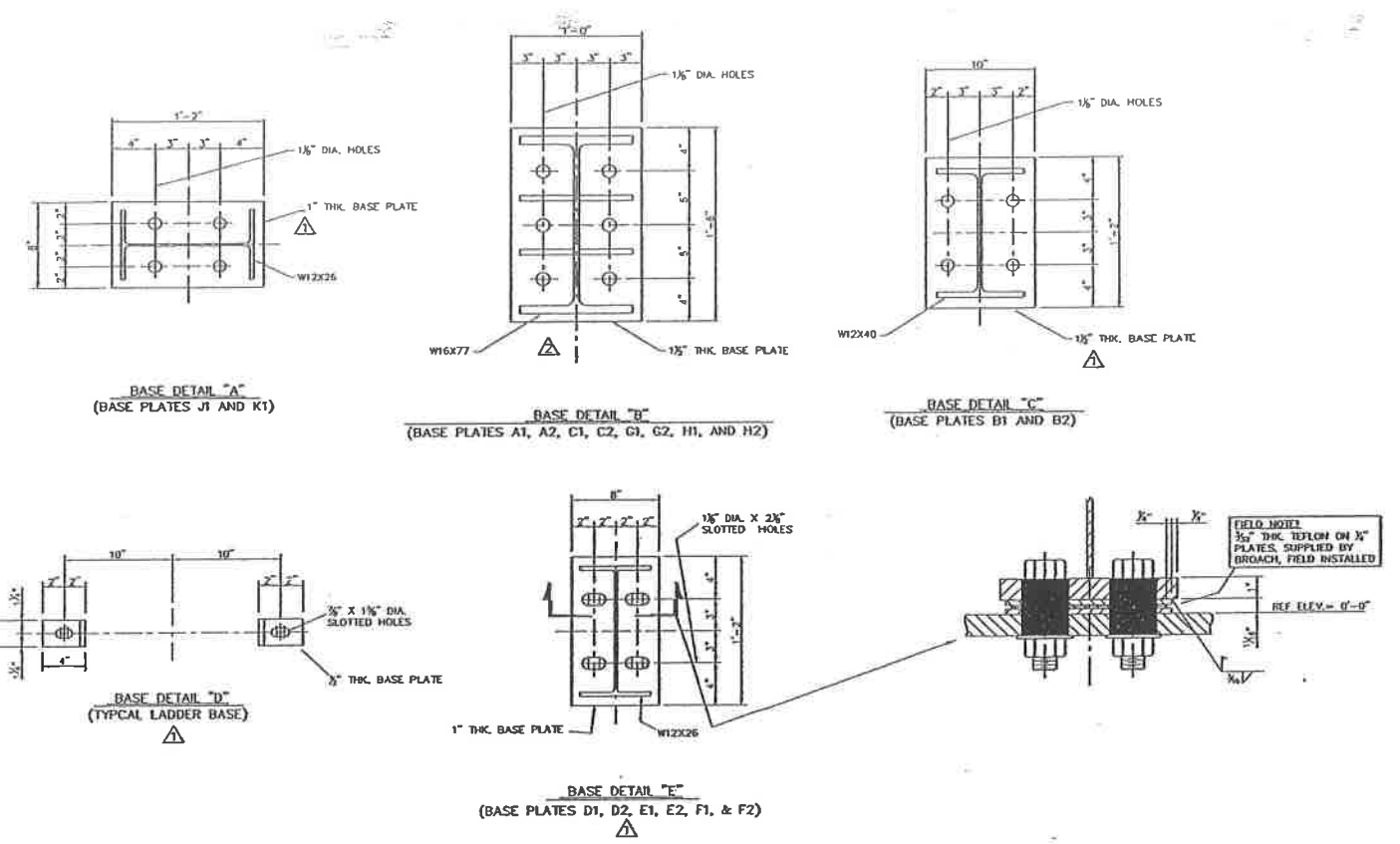
MAXIMUM BASE REACTION FOR SITE
 CALCULATED PER:
 DEAD LOAD + HYDRO LOAD + SNOW + WIND + HEAVE

MINIMUM BASE REACTION (UPLIFT) FOR SITE
 CALCULATED PER:
 DEAD LOAD - WIND
 SNOW LOADS 50 psf
 LIVE LOADS 125 psf (LIGHT MANUFACTURING)

ALL FOUNDATION REACTION ARE RESULTS OF
 STRUCTURAL ANALYSIS USING LOADING PER
 CUSTOMER SPECIFICATIONS.

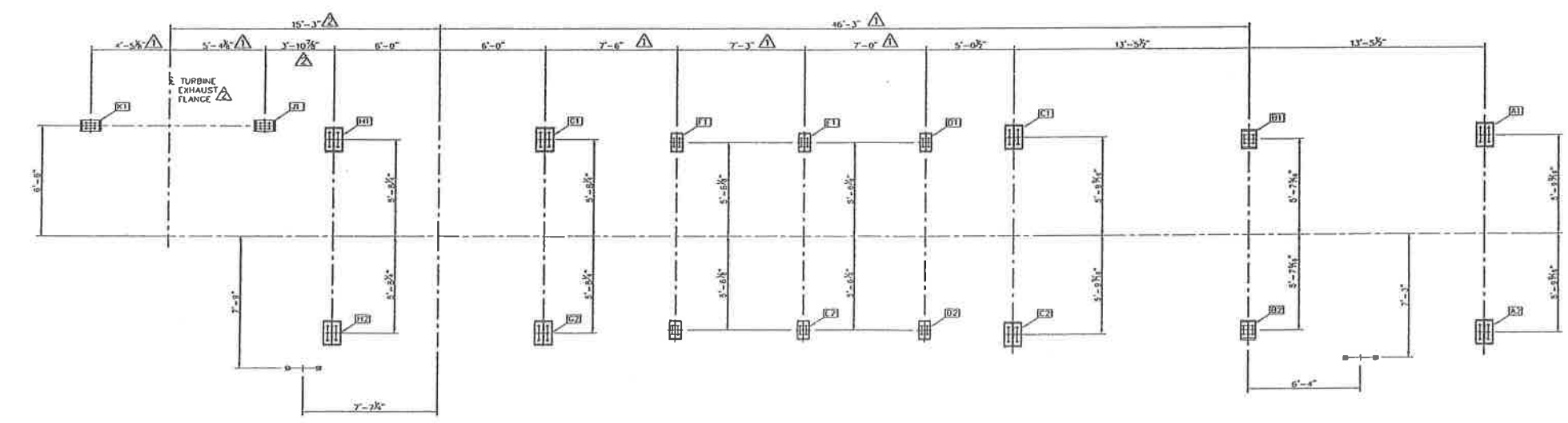
ALL BARGE LOADING INCREASED WITH
 1.2 SAFETY FACTOR.

WIND AND SEISMIC LOADINGS
 INCREASED BY 1.5 SAFETY FACTOR.



FOUNDATION LOAD TABLE										
BARGE CONDITION LOADS (ALL LOADS IN KIIPS)										
BASE NO.	DEAD LOAD (VERTICAL)	BARGE HEAVE (VERTICAL)	BARGE ROLL		BARGE PITCH		WIND LOAD @ 6 OF SITE WIND		MAX. BASE REACTION (VERTICAL)	MIN. BASE REACTION (UPLIFT)
			(HORIZONTAL)	(VERTICAL)	(HORIZONTAL)	(VERTICAL)	(HORIZONTAL)	(VERTICAL)		
A1	70.5	±48.9	32.0	±85.6	9.1	±18.1	7.5	±22.2	227.2	-86.2
A2	70.5	±48.9	32.0	±85.6	9.1	±18.1	7.5	±22.2	227.2	-86.2
B1	70.3	±48.8	14.4	±51.9	8.0	±1.5	4.5	±13.6	184.6	-44.0
B2	70.3	±48.8	14.4	±51.9	8.0	±1.5	4.5	±13.6	184.6	-44.0
C1	56.8	±38.9	30.0	±87.5	10.2	±10.5	8.3	±20.8	204.0	-90.4
C2	56.8	±38.9	30.0	±87.5	10.2	±10.5	8.3	±20.8	204.0	-90.4
D1	14.1	±9.8	6.2	±21.1	2.2	±9.1	2.0	±4.2	49.2	-21.0
D2	14.1	±9.8	6.2	±21.1	2.2	±9.1	2.0	±4.2	49.2	-21.0
E1	4.1	±2.9	1.6	±1.1	0.6	±1.0	2.1	±1.2	9.3	-1.1
E2	4.1	±2.9	1.6	±1.1	0.6	±1.0	2.1	±1.2	9.3	-1.1
F1	4.1	±2.9	1.6	±1.1	0.6	±1.0	2.1	±1.2	9.3	-1.1
F2	4.1	±2.9	1.6	±1.1	0.6	±1.0	2.1	±1.2	9.3	-1.1
G1	15.9	±11.0	6.6	±8.7	2.4	±3.0	2.4	±3.8	39.4	-7.6
G2	17.2	±11.9	6.6	±8.7	2.5	±3.2	2.4	±3.8	41.6	-7.2
H1	17.4	±12.1	6.8	±7.8	2.4	±3.0	3.4	±2.7	40.0	-5.2
H2	18.5	±12.9	6.8	±7.8	2.5	±3.2	3.4	±2.7	41.9	-4.9
J	4.0	±1.2	-----	-----	-----	-----	-----	-----	-----	-----
K	4.0	±1.2	-----	-----	-----	-----	-----	-----	-----	-----

NOTE! THE BARGE LOADS ABOVE DO NOT INCLUDE THE BYPASS AND EXHAUST STACKS. THE STACKS AND ASSOCIATED PLATFORMS ARE TO SHIP LOOSE AND BE FIELD INSTALLED AT THE SITE.



FOUNDATION ANCHOR BOLT PLAN

WASTE HEAT RECOVERY UNIT H-Z6002
 BP EXPLORATION (ALASKA) INC. △
 BP GAS PARTIAL PROCESSING (GPP) PROJECT
 BP Z PAD FACILITY
 NORTH SLOPE, ALASKA
 EPT NO. 36324244-02

BROACH
 PROCESS HEATERS
 THE E.C. BROACH COMPANY • 7667 E. 48th PLACE • TULSA, OK. 74115

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FILE NAME: 123310-D4

REVISED EPT NO.	FILE	DATE	BY	APPR
REVISED CUSTOMER INFORMATION BLOCK	FILE	DATE	BY	APPR
REVISED FOUNDATION LOADINGS, ADDED GUSSETS	FILE	DATE	BY	APPR
REVISED FOUNDATION LOADING	FILE	DATE	BY	APPR

DWN M.T.S. 09/17/07
 CHK P.D.D. 09/24/07
 APPR S 9/26/07

SCALE 1/4" = 1'-0"

JOB NO. 20071233

DWG NO. D-20071233-10

REV NO. 4

GENERAL LAYOUT & ASSEMBLY
 WASTE HEAT RECOVERY UNIT
 ITEM NO: H-Z6002