SABLE OFFSHORE ENERGY PROJECT REVIEW

Permission to proceed does not constitute acceptance of design, calculations, test methods or materials developed or selected by Suppliers and does not relieve Supplier from full compliance with contractual or other obligations.

- [x] 1. Reviewed and accepted (subject to minor comments). Submit final version in Data Books.
- [ ] 2. Revise and resubmit. Work may proceed subject to incorporation of changes indicated.
- [ ] 3. Revise and resubmit. Work may NOT proceed.
- [ ] 4. No further review required. (for information only)

SOEP: Sign: Bob Webb Date: 10 Aug 99

SUPPLIER: RNG PRO-TECH
P.O. NUMBER: ZAPM2103A
P.O. DESCRIPTION: VESSELS

SABLE OFFSHORE ENERGY

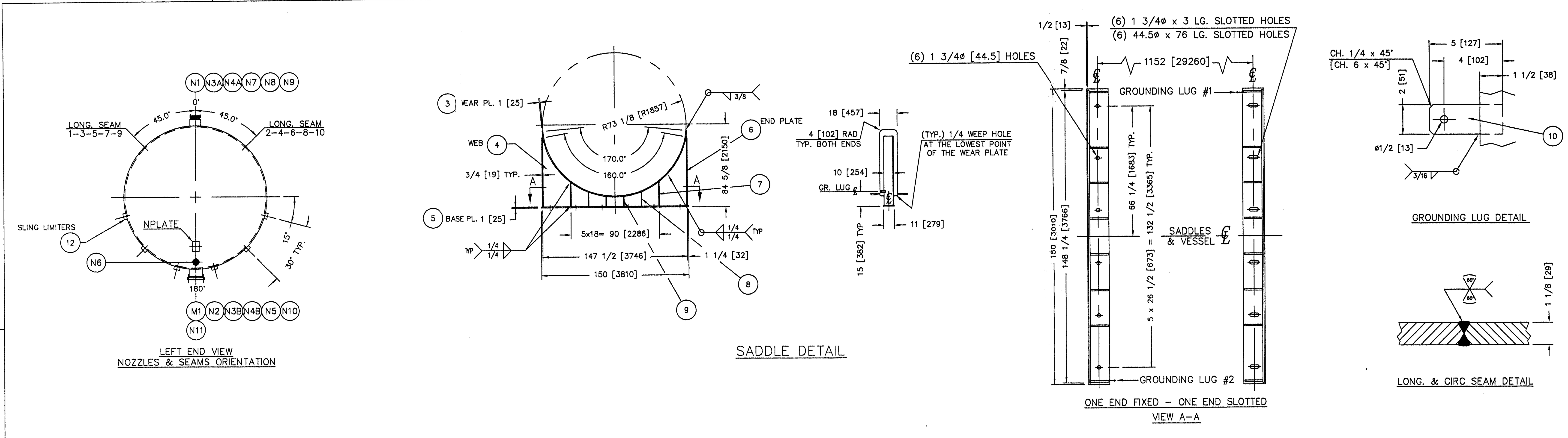
EQUIPMENT TAG NUMBERS:	Sub. No.	Date	Supplier Sign.
D2100-D	005		
D2100-E	004	99/08/10	
	003		
	002		
	001		

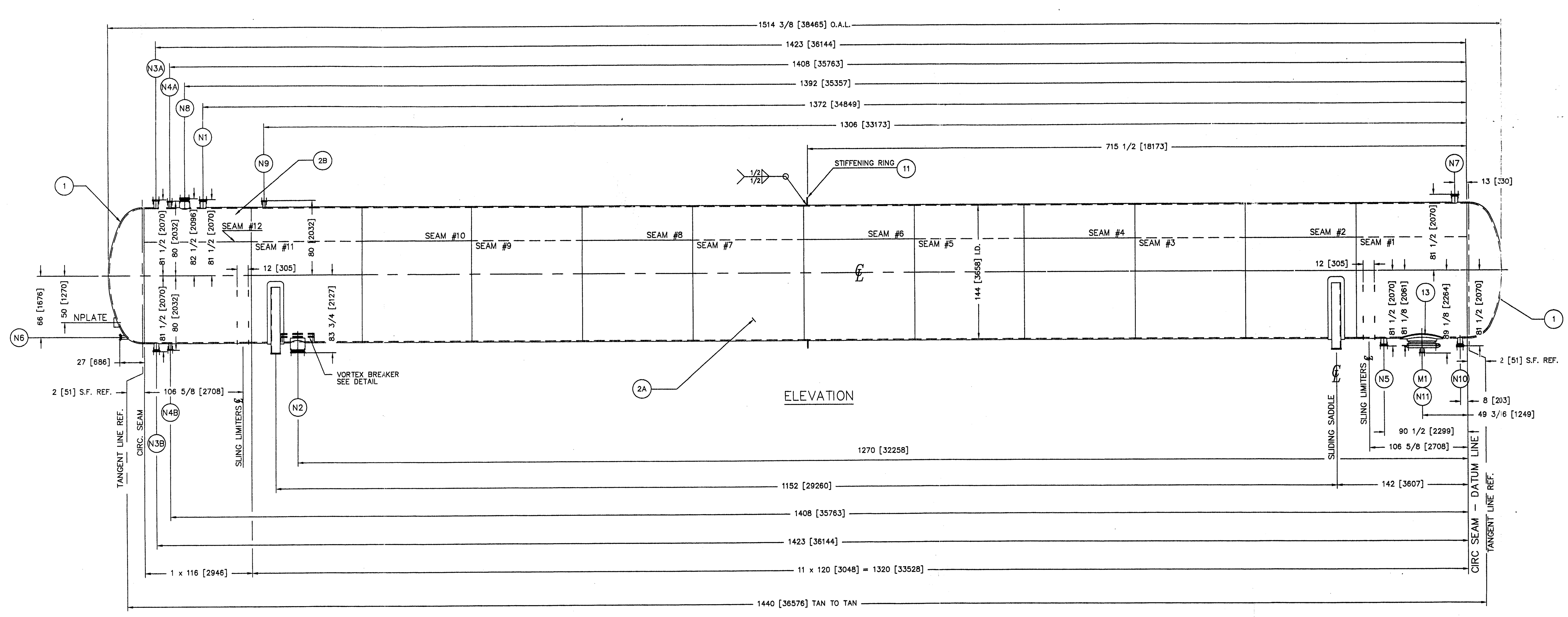
SDRL Code(s)	P.O. No.	Prime Code	Sequence No.	Sheet No.	Sub. No.
B01	ZAPM2103A	1-B	1-10002	1-0011	004

AS BUILT

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	ITEM NUMBERS & B.O.M. ADDED	15-09-98	
	2	N2 SCH. INCREASED – B.O.M. UPDATED CLEANING & PAINTING SYSTEM ADDED	10-21-98	
	3	WELDING PROC. (*–P1) ADDED – NOTE 7 MODIFIED	07-12-98	
	4	PAINTING SYSTEM – REVISED	22-12-98	





MAJOR COMPONENT DESIGN DATA

VESSEL DESIGNED PER :

EDITION OF ASME CODE SECTION VIII DIVISION 1
CODE STAMP: SERIAL NO: NATIONAL BOARD NO:

DESIGN PRESSURE INTERNAL: 250 PSIG [1724 kPag] @ 149 DEG F [65°C]
DESIGN PRESSURE EXTERNAL: –11 PSIG [–76 kPag] @ 149 DEG F [65°C]
OPERATING PRESSURE:
HYDRO TEST: 375 PSIG [2586 kPag] @ 50 DEG F [10°C]

MAWP: 250 PSIG [1724 kPag]
MAP: 250 PSIG [1724 kPag]
MDMT: –17 DEG F [–27°C]

DESIGN LIQUID LEVEL : FULL
LIQUID S.G. (DESIGN) : 0.67
PWHT: NO
IMPACT TESTING NOT REQ'D PER UCS–66
INSULATION : NO

HEAD TYPE, TOP: 2:1 ELLIPSOIDAL

RADIOGRAPH: HEAD/SHELL: FULL UW–11(A) SHELL CIRC: FULL UW–11(A) SHELL LONG: FULL UW–11(A)
JOINT EFFICIENCY: HEAD/SHELL: 1 SHELL CIRC: 1 SHELL LONG: 1

ESTIMATED WEIGHT:
EMPTY: 242101 LBS [110046 kg]
TEST: 1116908 LBS [507686 kg]
OPERATING: 828222 LBS [376464 kg]

ESTIMATED CAPACITY: 104904 US GALLONS [397062 LITRES]

MATERIAL:

SHELL: SA–516–70N
HEADS: SA–516–70N
FLANGES: SA–105N
NOZZLES: SA–105N
BLINDS: SA–105N & SA–516–70N
REINFORCING PADS: SA–516–70N
SADDLES & WEAR PLATES: G40.21–44W & SA–516–70N
GASKETS: 316 S.S. SPIRAL WOUND GRAFOIL FILLED
BOLTS & NUTS: SA–193–B7 & SA–194–2H
EXTERNAL CLIPS: SA–516–70 & SA–36
VORTEX BREAKER: SA–36

REGISTRATION BY: PROVINCE OF NOVA SCOTIA
INSPECTION BY: PROVINCE OF QUEBEC

INTERNAL FINISH:
PLATES WITH MILL FINISH
WELDS WITH FLUX & SPATTER REMOVED

2 SURFACE PREP. & PAINTING: 4800 SQ.FT

CLEANING :
SANDBLAST PER SSPC–SP10 EXTERNAL SURFACES ONLY
PAINTING :

PRIMER COAT: INTERZONE 954: 18 MILS
TOP COAT: INTERFINE 629 HS : 3 MILS
4 TOTAL SYSTEM D.F.T. : 21 MILS

NOTE :
HYDROSTATIC TEST PRESSURE TO BE HELD FOR ONE HOUR

REV	P/N	ITEM	QTY	DESCRIPTION	MAT'L
2		13	1	PAD 3/4" – 49 1/4 O.D. x 32 7/8 I.D.	SA–516–70N
2		12	24	F.B. 3" x 3/8" x 6" LG.	SA–36 OR 44W
		11	1	PL. 1" THK x 8" WIDE (RING 4 PCS)	SA–516–70N
		10	2	FB. 2"WIDE X 5"LG. X 1/4" THK.	SA–36 OR 44W
2		9	4	PL. 9.25" WIDE X 10"LG. X 0.75" THK.	CSA G40.21–44W
2		8	4	PL. 9.25"WIDE X 14.47"LG. X 0.75"THK.	CSA G40.21–44W
2		7	4	PL. 9.25"WIDE X 24.46LG. X 0.75"THK.	CSA G40.21–44W
2		6	4	PL. 9.25"WIDE X 70.75"LG X 0.75"THK.	CSA G40.21–44W
2		5	2	BASE PLATE 11" WIDE X 150"LG X 1"TK.	CSA G40.21–44W
2		4	2	PL. 70.75" X 148.25 X .75" THK.	CSA G40.21–44W
2		3	2	WEAR PL 18" WIDE X 218 1/2" X 1" TK.	SA–516–70N
		2B	1	PL 116 WIDE X 455.93 LG X 1.125 THK.	SA–516–70N
		2A	11	PL 120 WIDE X 455.93 LG X 1.125 THK.	SA–516–70N
		1	2	2:1 HEAD 143.75" ID X 1.25 NOM. THK.	SA–516–70N

NOZZLE SCHEDULE

MARK	SERVICE	NOZZLE SIZE	NOZZLE DESCRIPTION	NOZZLE ORIENT	NOZZLE CORR. ALLOW.	NOZZLE NECK MAT'L	NOZZLE IMPACT TEST	NOZZLE NORMAL-IZED	FLANGE SIZE	FLANGE TYPE	FLANGE CLASS	FLANGE RATING	FLANGE FLG MAT'L	REINFORCING PAD MATERIAL	REINFORCING PAD IMPACT TEST	REINFORCING PAD NORMAL-IZED
N11	MANWAY BLIND CONNECTION	2	2 I.D. X .655 WALL	180.0	0.0625	SA 105 FORGING	N	Y	2	LWN	300#	708.15	A105	–	–	–
M1	MANWAY W/HINGED COVER & 2-300 RFLWN	24	24 I.D. X 4 WALL	180.0	0.0625	SA 105 FORGING	N	Y	24	F	150#	272.75	A105	SA 516 70	N	Y
N10	PURGE C/W BLIND	3	2.9 I.D. X 1.24 WALL	180.0	0.0625	SA 105 FORGING	N	Y	3	HB	300#	708.15	A105	–	–	–
N9	PRESS.VENT TO FLARE	2	2 I.D. X .655 WALL	0.0	0.0625	SA 105 FORGING	N	Y	2	LWN	300#	708.15	A105	–	–	–
N8	VENT C/W BLIND WITH 2"NPT	6	6 I.D. X 2.5 WALL	0.0	0.0625	SA 105 FORGING	N	Y	6	F	150#	272.75	A105	–	–	–
N7	RELIEF	4	3.83 I.D. X 1.305 WALL	0.0	0.0625	SA 105 FORGING	N	Y	4	HB	150#	272.75	A105	–	–	–
N6	THERMOWELL	2	1.94 I.D. X 1 WALL	180.0	0.0625	SA 105 FORGING	N	Y	2	HB	300#	708.15	A105	–	–	–
N5	TRANSFER	4	3.83 I.D. X 1.305 WALL	180.0	0.0625	SA 105 FORGING	N	Y	4	HB	150#	272.75	A105	–	–	–
N4B	LEVEL INDIC./TRIP	2	2 I.D. X .655 WALL	180.0	0.0625	SA 105 FORGING	N	Y	2	LWN	300#	708.15	A105	–	–	–
N4A	LEVEL INDIC./TRIP	2	2 I.D. X .655 WALL	0.0	0.0625	SA 105 FORGING	N	Y	2	LWN	300#	708.15	A105	–	–	–
N3B	LEVEL CONTROL	3	2.9 I.D. X 1.24 WALL	180.0	0.0625	SA 105 FORGING	N	Y	3	HB	300#	708.15	A105	–	–	–
N3A	LEVEL CONTROL	3	2.9 I.D. X 1.24 WALL	0.0	0.0625	SA 105 FORGING	N	Y	3	HB	300#	708.15	A105	–	–	–
N2	LIQUID OUTLET	10	9.56 I.D. X 3.25 WALL	180.0	0.0625	SA 105 FORGING	N	Y	10	F	150#	708.15	A105	–	–	–
N1	PRODUCT INLET	4	3.83 I.D. X 1.305 WALL	0.0	0.0625	SA 105 FORGING	N	Y	4	HB	150#	272.75	A105	–	–	–

WELDING PROCEDURES

PROCESS \ WPS / MAT'L	P1–P1	P1–P8	*–P1
1 S.M.A.W.	PP–52–1	PP–07–1	
2 S.A.W. S.M.A.W.			
3 F.C.A.W.	PPT–19–1		PP–30
4 S.A.W.	PP–516–5		

* CSA: G40.21–44W 3

GENERAL NOTES:

1. FLANGE BOLT HOLES SHALL STRADDLE NORMAL VESSEL CENTERLINES UNLESS NOTED.
2. WELDS SHALL BE NEAT IN APPEARANCE, FREE OF SLAG, UNDERCUTS AND OTHER DEFECTS.
3. NOZZLE AND TAIL DIMENSION TOLERANCES SHALL BE +/– 1/8 INCH UNLESS OTHERWISE NOTED.
4. REINFORCING PADS AND PAD SECTIONS SHALL HAVE 1/4 INCH NPT WEEP HOLE LOCATED AS LOW AS POSSIBLE IN THE PAD WHEN THE VESSEL IS IN OPERATING POSITION. PLUG WEEP HOLE WITH HEAVY GREASE.
5. VESSEL SHALL BE CLEANED OF SCALE, OIL, WELD SPATTER AND ALL OTHER FOREIGN MATTER BEFORE HYDROSTATIC TESTING.
6. COAT ALL NOZZLE GASKET SURFACES WITH PROTECTIVE LUBRICANT BEFORE BLANKING FOR SHIPMENT.
7. (3) CLOSE OPENINGS WITH PROTECTIVE COVERS OF WOOD WITH FOUR OR MORE BOLTS. WELD END OPENINGS SHALL BE CLOSED WITH PIPE CAPS AND HEAVY TAPE.

UNE DIVISION DE/A DIVISION OF RNG GROUP INC.

RNG Pro-Tech Inc.

Sable Island Project - D2100 D/E
144" ID Propane Storage Bullets

SIZE	JOB NO.	DWG NO.	REV
D	1214-98	980047-2	4

SCALE NTS | DATE 08-26-98 | SHEET 1 OF 2

DRAW | CHECK

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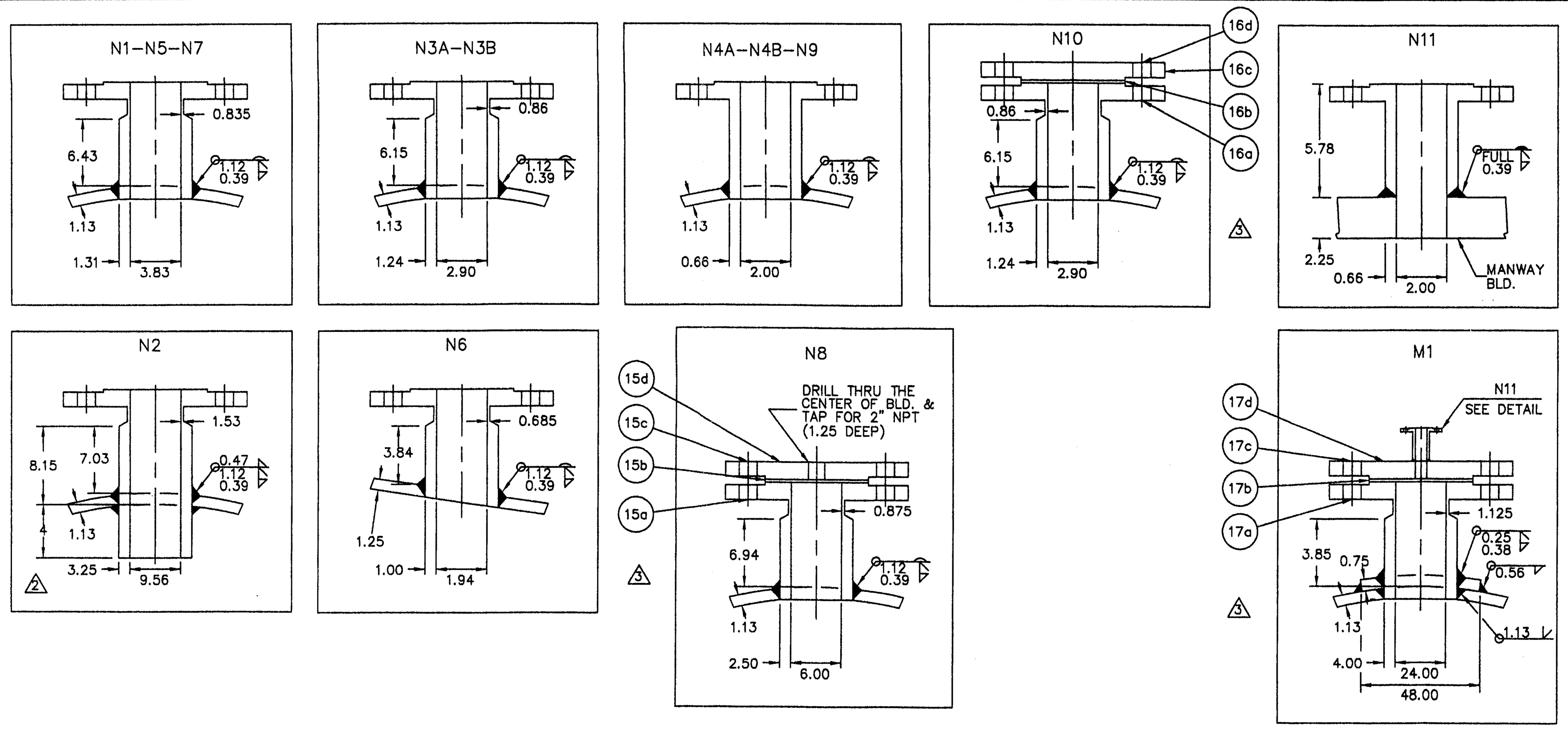
[ ] 3. Revise and resubmit. Work may NOT proceed.	P.O. DESCRIPTION: VESSEL
[ ] 4. No further review required. (for information only).	SABLE OFFSHORE ENERGY
SOEP: Sign: [signature] Date: 10 AUG 99	

EQUIPMENT TAG NUMBERS:	Sub. No.	Date	Supplier Sign.
	005		
D2100-D	004	99/08/10	
D2100-E	003	99/08/10	
	002		
	001		

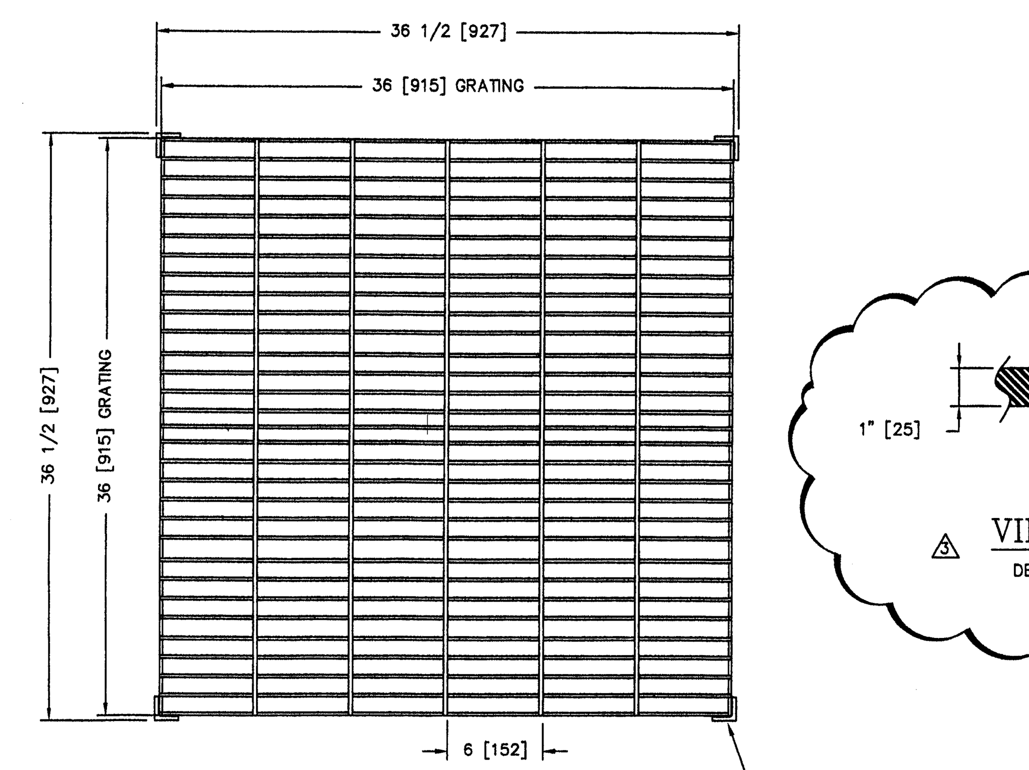
SDRL Code(s)	P.O. No.	Prime Code	Sequence No.	Sheet No.	Sub. No.
B01	ZAPM2103A	1-B	99024	002	~~001~~ 3

AS-BUILT

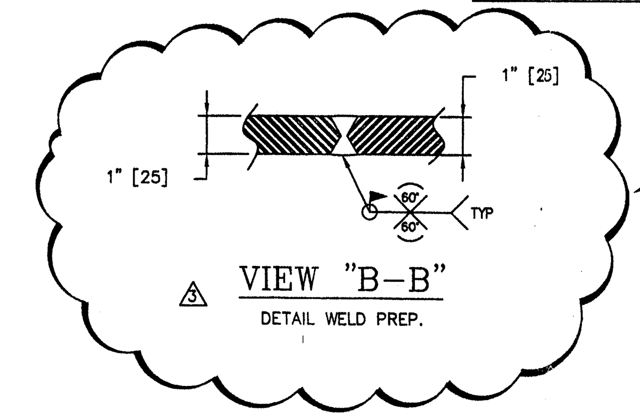
REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	ITEM NUMBERS, B.O.M. ADDED & METRIC NPLATE MOD.	15-09-98	
	2	N2 DETAIL-CRN ADDED NOZZLES DETAILS (NECK THK & GROOVE HEIGHT) ADDED	10-21-98	
	3	STIFFENING RING & BLIND DETAIL ADDED ITEMS 15 TO 17 ADDED	12-07-98	
	4	BLIND DETAIL REVISED	22-12-98	



2 NOZZLES DETAILS



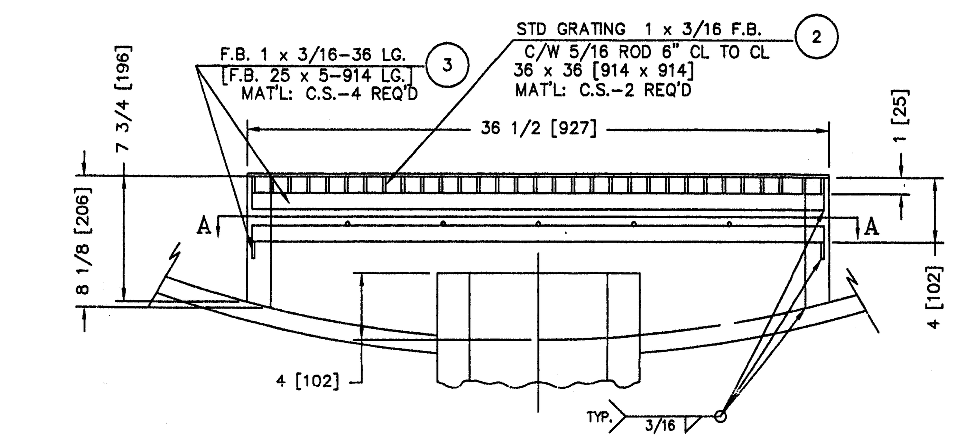
COUPE A-A



VIEW "B-B"

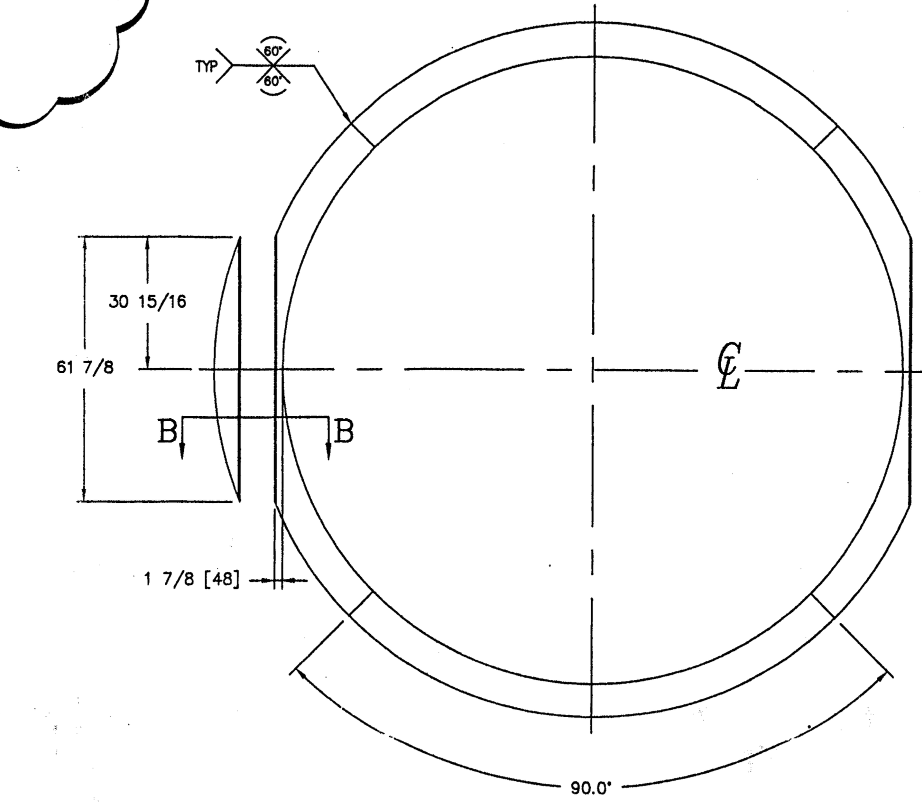
DETAIL WELD PREP.

NOTE:
BEFORE SHIPPING; ON BOTH SIDES OF THE VESSEL, STIFFENING RING MUST BE CUT WITH EDGES PREPARED AS SHOWN. REMOVED PARTS SHALL BE CORRECTLY IDENTIFIED, SHIPPED LOOSE AND WELDED BACK IN PLACE BY FIELD ERECTORS.



NOTE: DO NOT WELD THE GRATING TO LEGS

VORTEX BREAKER DETAIL



STIFFENING RING DETAIL 3

(ITEMS 11 FROM DWG 980047-2 PAGE 1)

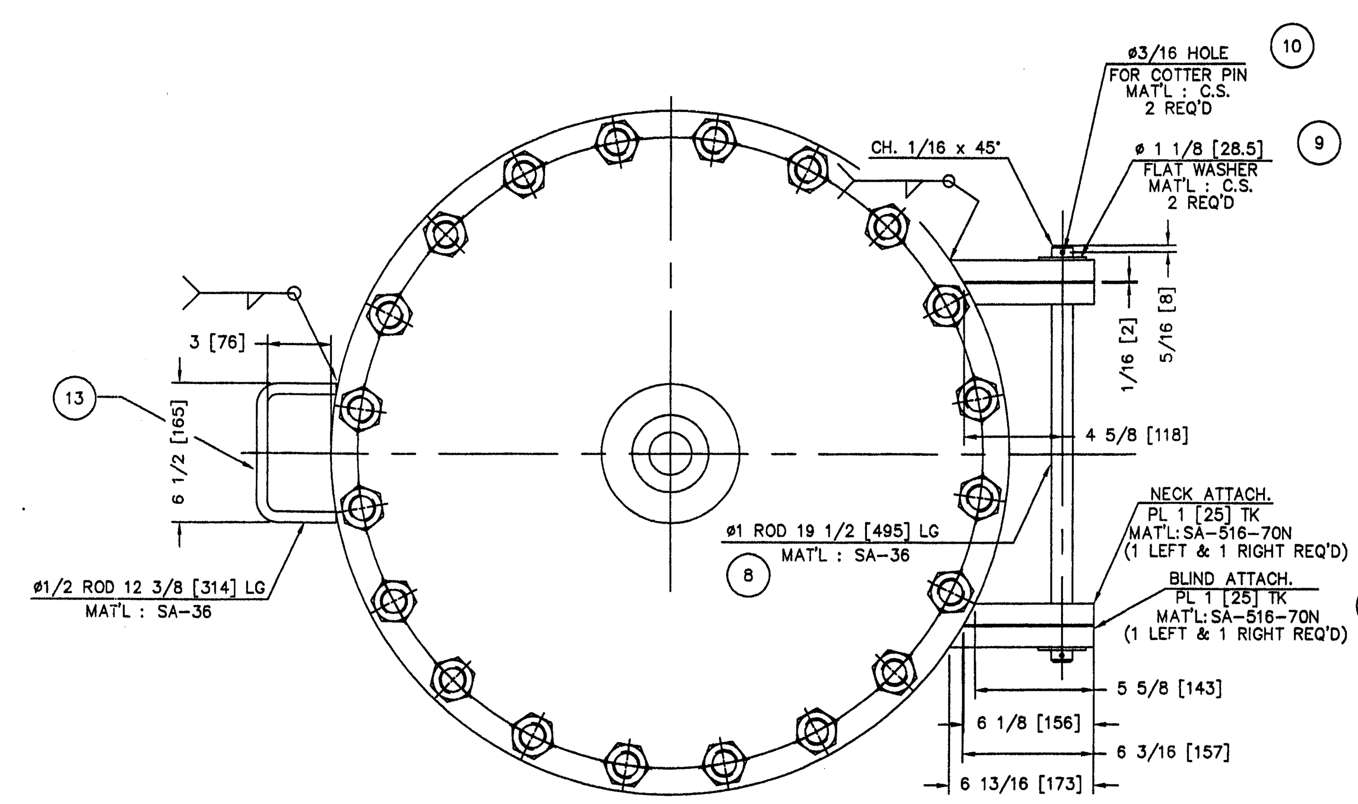
CERTIFIED BY
RNG Pro-Tech Inc.
SHERBROOKE,QUEBEC
U W RT-1
MAWP 250 & -11 PSI AT 149 °F
M.D.M.T. -17 °F AT 250 & -11PSI
SERIAL NO:
YEAR BUILT: 1998
C.R.N. NO: 8124.8 2
DIA. 144 I.D. O/A LGTH: 1515
CAPACITY: 104904 USWG
ITEM NO. D2100D

CERTIFIED BY
RNG Pro-Tech Inc.
SHERBROOKE,QUEBEC
W RT
MAWP 1724 1 KPa AT 65 °C
M.D.M.T. -27 °C AT 1724 1 kPa
SERIAL NO: SERIAL
YEAR BUILT: 1998
C.R.N. NO: 8124.8 2
DIA. 3,66 I.D. O/A LGTH: 38,48
CAPACITY: 397105 LITRES
ITEM NO. D2100D

CERTIFIED BY
RNG Pro-Tech Inc.
SHERBROOKE,QUEBEC
U W RT-1
MAWP 250 & -11 PSI AT 149 °F
M.D.M.T. -17 °F AT 250 & -11PSI
SERIAL NO:
YEAR BUILT: 1998
C.R.N. NO: 8124.8 2
DIA. 144 I.D. O/A LGTH: 1515
CAPACITY: 104904 USWG
ITEM NO. D2100E

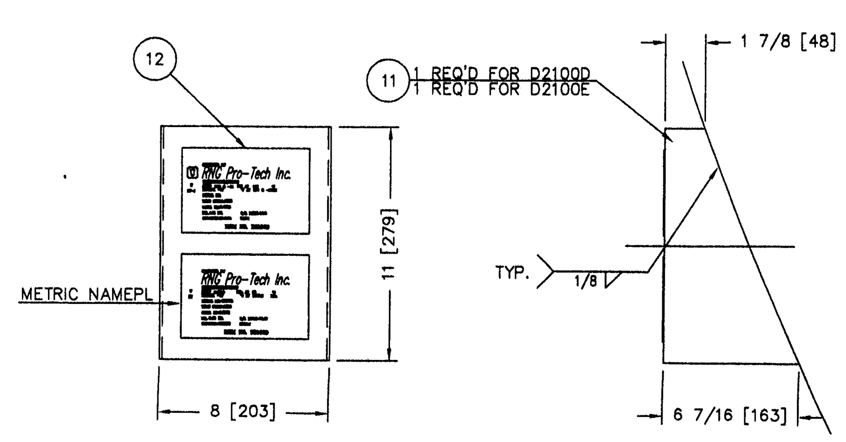
CERTIFIED BY
RNG Pro-Tech Inc.
SHERBROOKE,QUEBEC
W RT
MAWP 1724 KPa AT 65 °C
M.D.M.T. -27 °C AT 1724 2 kPa
SERIAL NO: SERIAL
YEAR BUILT: 1998
C.R.N. NO: 8124.8 2
DIA. 3,66 I.D. O/A LGTH: 38,48
CAPACITY: 397105 LITRES
ITEM NO. D2100E

NAMEPLATE STAMPING DETAIL

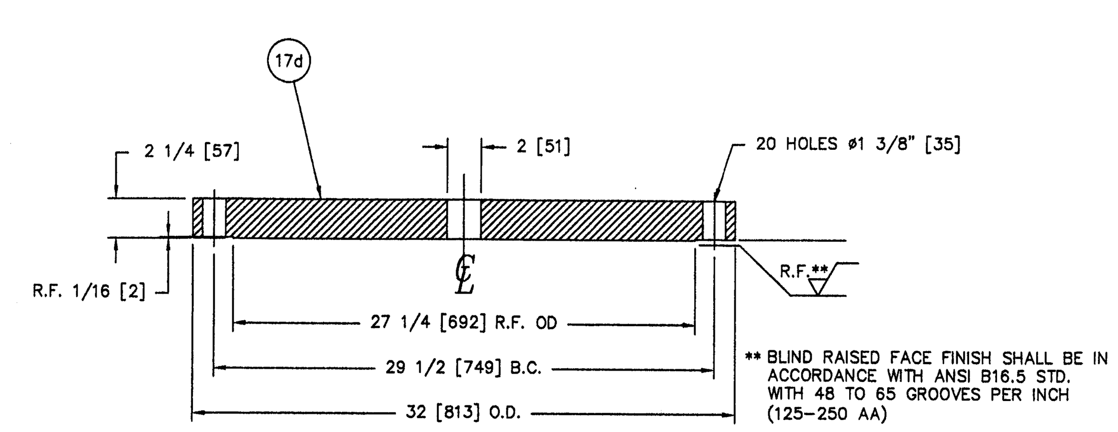


	17d	1	PL. 2 1/2" THK. x 33" OD.	SA-516-70 (N)
	17c	24	ø 1 1/4" BOLTS x 6 1/4" LG.	SA-193-B7
	17b	1	24" FLEXITALLIC GASKET - 300#	316 S.S.
	17a	24	ø 1 1/4" NUTS	SA-194-2H
	16d	8	ø3/4" BOLTS x 3 1/2" LG.	SA-193-B7
	16c	1	3" - 300# BLIND FLANGE	SA-105 (N)
	16b	1	3" FLEXITALLIC GASKET - 300#	316 S.S.
	16a	8	ø 3/4" NUTS	SA-194-2H
	15d	1	6" - 150# BLIND FLANGE	SA-105 (N)
	15c	8	ø 3/4" BOLTS x 3 1/2" LG.	SA-193-B7
	15b	1	6" FLEXITALLIC GASKET - 300#	316 S.S.
	15a	8	ø NUTS 3/4"	SA-194-2H
	14	-	-	-
	13	1	ø1/2" ROD x 12 3/8" LG.	SA-36 OR *
	12	2	PLAQUE 4" WIDE X 6"LG. X 3/32"THK.	S.S. 304L
	11	2	PL. 11"WIDE X 21 1/8"LG. X 3/16"THK.	SA-516-70
	10	2	COTTER PIN ø 3/16	C.S
	9	2	FLAT WASHER ø 1 1/8"	C.S.
	8	1	1" ROD X 19 1/2"LG.	SA-36 OR *
	7	1	PL 3 1/2" WIDE X 7 1/2" LG. X 1"THK	SA-516-70N
	6	1	PL 3 1/2" WIDE X 7 1/2" LG. X 1"THK.	SA-516-70N
	5	1	PL 3"WIDE X 9 1/2"LG. X 1"THK.	SA-516-70N
	4	1	PL 3"WIDE X 9 1/2"LG. X 1" THK.	SA-516-70N
	3	4	FB 1" WIDE X 3/16"THK. X 36" LG.	SA-36
	2	2	STD GRATING 1 x 3/16 - 36 x 36	SA-36
	1	4	L 1 1/2 X 1 1/2 X 3/16 TK 8 1/8 LG	SA-36 OR *
P/N	ITEM	QTY	DESCRIPTION	MAT'L

* CSA: G40.21-44W

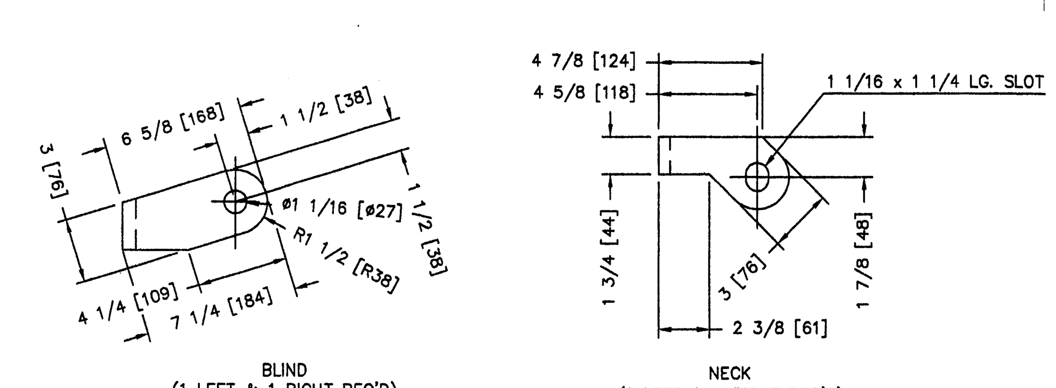


NAMEPLATE BRACKET DETAIL



** BLIND RAISED FACE FINISH SHALL BE IN ACCORDANCE WITH ANSI B16.5 STD. WITH 48 TO 65 GROOVES PER INCH (125-250 AA)

BLIND DETAIL 3 4



BLIND (1 LEFT & 1 RIGHT REQ'D)

NECK (1 LEFT & 1 RIGHT REQ'D)

MANWAY COVER HINGE DETAIL

UNE DIVISION DE/A DIVISION OF RNG GROUP INC.

RNG Pro-Tech Inc. *Sable Island Project - D2100 D/E 144" ID Propane Storage Bullets*			DRAW / CHECK
SIZE D	JOB NO. 1214-98	DWG NO. 980047-2	REV 4
SCALE NTS	DATE 08-26-98	SHEET 2 OF 2	

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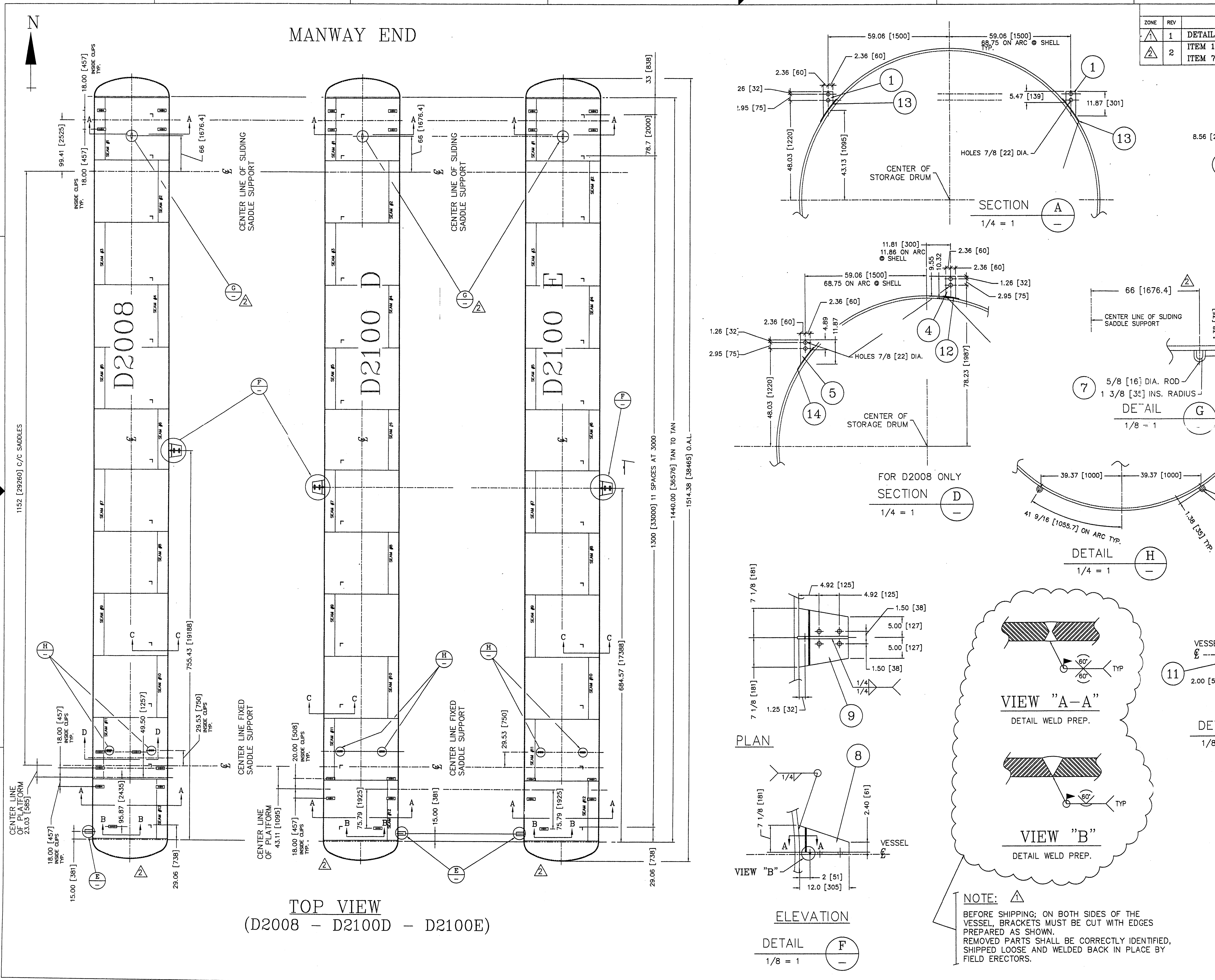
[ ] 2. Revise and resubmit. Work may proceed subject to incorporation of changes indicated.	P.O. NUMBER: ZAPM2103A		
[ ] 3. Revise and resubmit. Work may NOT proceed.	P.O. DESCRIPTION: VESSEL		
[ ] 4. No further review required. (for information only).	EQUIPMENT TAG NUMBERS: D2008, D2100-D, D2100-E		
SOEP Sign: [signature] Date: 10 AUG 99	SDRL Code(s): B01	P.O. No.: ZAPM2103A	Prime Code: 1-B; Sequence No.: 1-99041; Sheet No.: 000; Sub. No.: 002

Sub. No.	Date	Supplier Sign.
005		
004		
003		
002	99/08/10	
001		

AS-BUILT

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
1	1	DETAIL WELD PREP. ADDED	11.DEC.98.	J.F.
2	2	ITEM 15 LOCATION ON TOP VIEW & ITEM 7 LOCATION ON MANWAY END	04.JAN.99	J.F.



NOTE: 1

BEFORE SHIPPING; ON BOTH SIDES OF THE VESSEL, BRACKETS MUST BE CUT WITH EDGES PREPARED AS SHOWN.
REMOVED PARTS SHALL BE CORRECTLY IDENTIFIED, SHIPPED LOOSE AND WELDED BACK IN PLACE BY FIELD ERECTORS.

PART NO.	ITEM	DESCRIPTION	MATERIAL	QTY	HEAT #/SLAB
	15	PL. 3/8" THK. X 3" WIDE X 10" LG.	SA-516-70	3	
	14	PL. 3/8" THK. X 3" WIDE X 13" LG.	SA-516-70	1	
	13	PL. 3/8" THK. X 3" WIDE X 13" LG.	SA-516-70	24	
	12	PL. 3/8" THK. X 3" WIDE X 10" LG.	SA-516-70	1	
	11	F.B. 1/2" THK. X 4" WIDE X 7 1/4" LG.	SA-36 OR 44W	3	
	10	F.B. 1/2" THK. X 4" WIDE X 7 1/4" LG.	SA-36 OR 44W	3	
	9	PLATE 5/8" THK. X 12" WIDE X 14 1/4" LG.	SA-516-70	3	
	8	PLATE 5/8" THK. X 7 1/8" WIDE X 12" LG.	SA-516-70	3	
	7	ROD 5/8" X 8" LG.	SA-36 OR 44W	3	
	6	ROD 5/8" X 8" LG.	SA-36 OR 44W	6	
	5	PL 3/8" THK. X 4 3/4" WIDE X 11 7/8" LG.	SA-516-70	1	
	4	PL. 3/8' THK. X 4 3/4" WIDE X 10 5/16" LG.	SA-516-70	1	
	3	L 1/4" THK. X 3" X 3" X 14 1/4" LG.	SA-36 OR 44W	39	
	2	PL. 3/8" THK. X 4 3/4" WIDE X 8.564" LG.	SA-516-70	3	
	1	PL. 3/8" THK. X 4 3/4" WIDE X 11 7/8" LG.	SA-516-70	24	

BILL OF MATERIAL

UNE DIVISION DE/A DIVISION OF RNG GROUP INC.

RNG Pro-Tech Inc.

Sable Island Project - D2100 D/E & D2008
Location platform lugs, pipe support clips.

SIZE	JOB NO.	DWG NO.	REV
D	1214-98	980047-4	2

SCALE NTS | DATE 10-08-98 | SHEET 1 OF 1 | DRAW | CHECK

980047-4

U:\DRAWINGS\SABLE\980047-4 10-08-98