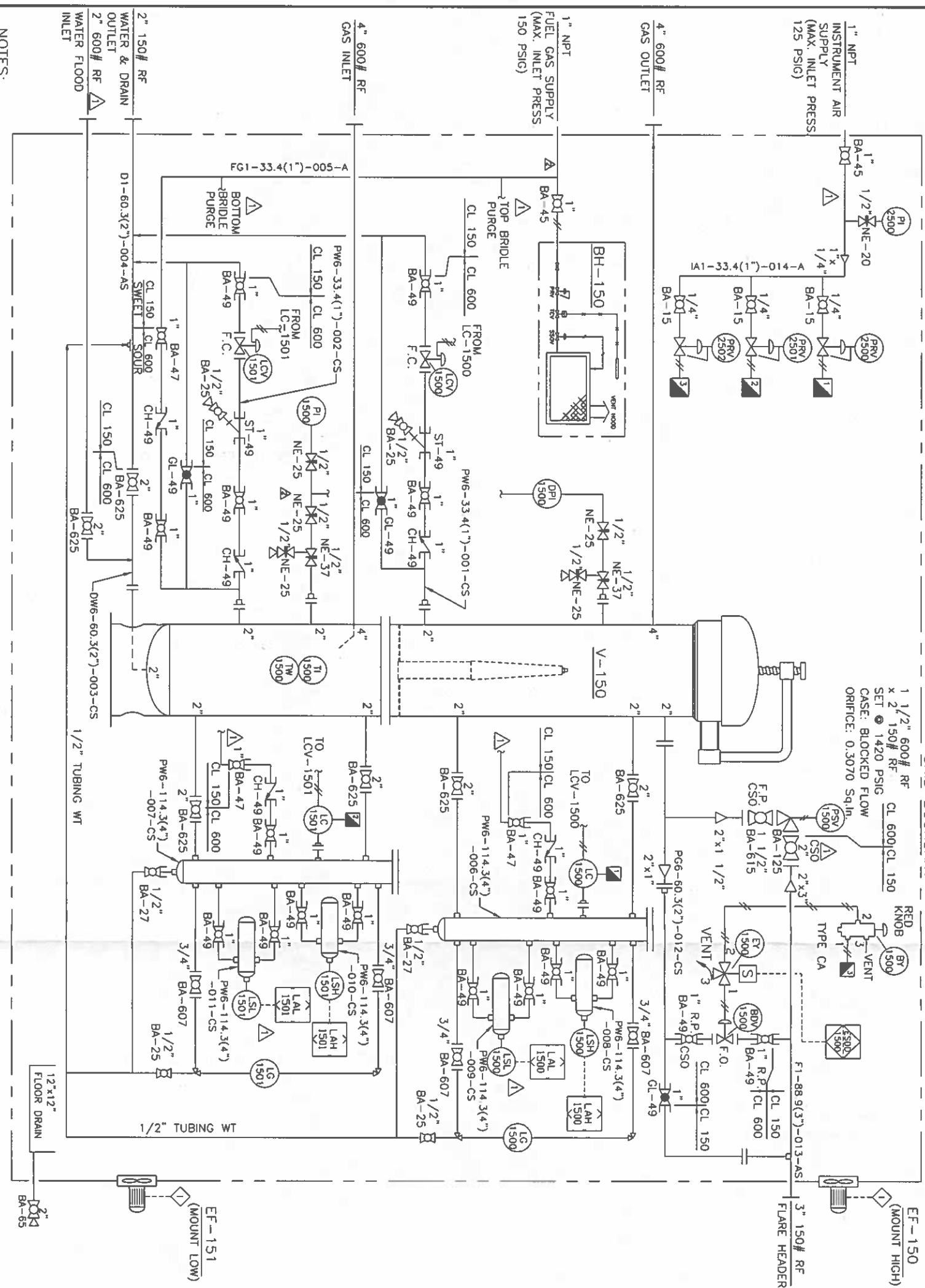


EF-150/151
BLDG EXHAUST FANS 120 VAC
SINGLE PHASE X.P. PROOF

V-150
COALESCER SEPARATOR
10 3/4" OD x 8'-4" S/S x 1420 PSIG @ -20/130°F, 1/8" C.A.
c/w (2) APEX COALESCER ELEMENTS PART # GCA3830K03V
c/w (2) # G4360P222SS ELEMENT RISER

SKID BOUNDARY

BH-150
BUILDING HEATER
16,000 BTU/HR INPUT CCI THERMAL TECHNOLOGIES
MK-II HEATER 12" W x 48"H c/w REGULATOR,
THERMOSTAT, SSOV, PROTECTION GRILL, VENT HOOD,
120 VAC START (NATURAL GAS)



NOTES:
1. ALL INSTRUMENT TUBING TO BE 3/8" DIA. 316 SS
x 0.035" WALL c/w STAINLESS STEEL SWAGelok
TUBE FITTINGS
2. ALL INSTRUMENT DRAIN TUBING TO BE 1/2" DIA.
316 SS c/w 316 S.S. SWAGelok FITTINGS

TIME CARD

C-2981-PP

REV	DESCRIPTION	DATE	BY
A	ADDED LSL-1500/1501 & WATER FLOOD INLET. REVISED AS PER CUSTOMERS MARK-UP. 2" CL. 150 CSO BALL VALVE ON PSY-1500 DISCHARGE.	08/13/08	V.P.
A	CONNECT PURGE GAS FROM	09/22/08	M.C.
A	MOVE PURGE SUPPLY FROM INST. AIR TO INST. GAS SUPPLY. ADD NEEDLE VALVE TO DP1 1500	10/16/08	V.P.
A	REVISED TAGGING AS PER CUSTOMER MARK-UP. REVISED AS PER BUILT	12/12/08	M.C.
A	REVISED FILTER/SEP DESIGN PRESSURE TO 1420 PSIG/ PSY 1500 RESET TO 1420 PSIG		

CUSTOMER: DUVERNAY OIL CORP.		LOCATION: 08-13-054-19 WSM
c/o TUNDRA ENGINEERING ASSOCIATES LTD.		
MECHANICAL FLOW DIAGRAM		
10 3/4" OD COALESCER SKID PACKAGE (SOUR)		
DATE: 08/04/08	DRN BY: V.P.	SCALE: NTS
CHKD BY:	APPRO BY:	DWG NO: C-2981-B
REV: 4		



GENERAL NOTES:

1. ALL ELEVATIONS ARE FROM TOP OF SKID FLOOR.
I.O.S. EL: 6 3/16"
2. MAIN PIPING PLAN TO BE READ IN CONJUNCTION WITH MECHANICAL FLOW DIAGRAM.
3. ALL BUTTWELD PIPING TO BE BUILT IN ACCORDANCE WITH THE LATEST EDITION OF B31.3 PRESSURE PIPING CODE.
4. ALL BUTTWELD PIPING TO BE 0.125" C.A.:

PIPE - 600 ANSI: 4" - SCH 80
PIPE - 600 ANSI: 2" - SCH 160
PIPE - 150 ANSI: 3" - SCH 80
PIPE - 150 ANSI: 2" - SCH 80
NIPPLE - 600 ANSI: 1 1/2" & UNDER - SCH 160
NIPPLE - 150 ANSI: 1 1/2" & UNDER - SCH 160

MATERIALS: PIPING - SA-106B SML's

FLANGES - SA-105N

FITTINGS - SA-234-WPB

BOLTS - SA-193-B7M

NUTS - SA-194-2HM

GASKET - 316 SS FLEXITALLIC

c/w TEFLON INSERTS

ALL TOL/EOL FITTINGS TO BE 3000# - 1 1/2" & UNDER.

5a. ALL BUTTWELD PIPING TO BE 100% RADIOGRAPHED INTERPRETED TO "SEVERE CYCLIC" PWHT AND HYDROTESTED TO 1.5 TIMES OF DESIGN PRESSURE.

5b. PIPING HARDNESS TESTING REQUIRED ON PM, WM, HAZ, BHN, 200. (1) ONE SET REQUIRED PER WELD PROCEDURE USED FOR EACH WELDER FOR EACH CATEGORY WELD AND EACH WELD PROCEDURE USED.

6. ALL TUBING TO BE 3/8" & 1/2" DIA. 316 SS c/w 316 STAINLESS STEEL SWAGelok TUBE FITTINGS

7. ALL INSTRUMENT GAS THREADED PIPING TO BE LEAK TESTED TO 800 KPa.

8. ALL OPENINGS TO BE COVERED PRIOR TO SHIPMENT.

9. UNIT TO BE COMMERCIALY SANDBLASTED PRIOR TO: (1) SHOP COAT OF PRIMER (2) SHOP COAT OF FINISH INDUSTRIAL ENAMEL.

VESSEL : WARM GREY
SKID FLOOR : WARM GREY
PIPING : WARM GREY

10. UNDERSIDE OF SKID TO BE INSULATED WITH 3" POLYURETHANE FOAM c/w FIRE RETARDANT COATING

11. SHIPPING DIMENSIONS : 7'-0" x 9'-0" x 15'-1" HIGH
WEIGHT : 11,000 lbs

REQUIREMENTS FOR HEAT & PRODUCT CHEMICAL ANALYSES

ELEMENT WT. (MAX.)

CARBON 0.23
MANGANESE 1.20%
SULPHUR .025
CU + Ni + Cr + Mo + V 0.60
CARBON EQUIVALENT 0.43

d. CARBON EQUIVALENT SHALL BE CALCULATED AS FOLLOWS:

$$CE = C + \frac{Mn}{6} + \frac{(Cr + Mo + V)}{5} + \frac{(Ni + Cu)}{15}$$

FOR ASTM MATERIALS

b. THE FOLLOWING SHORT FORM CARBON EQUIVALENT MAY BE USED IF VALUES FOR CERTAIN ALLOY ELEMENTS ARE NOT REPORTED.

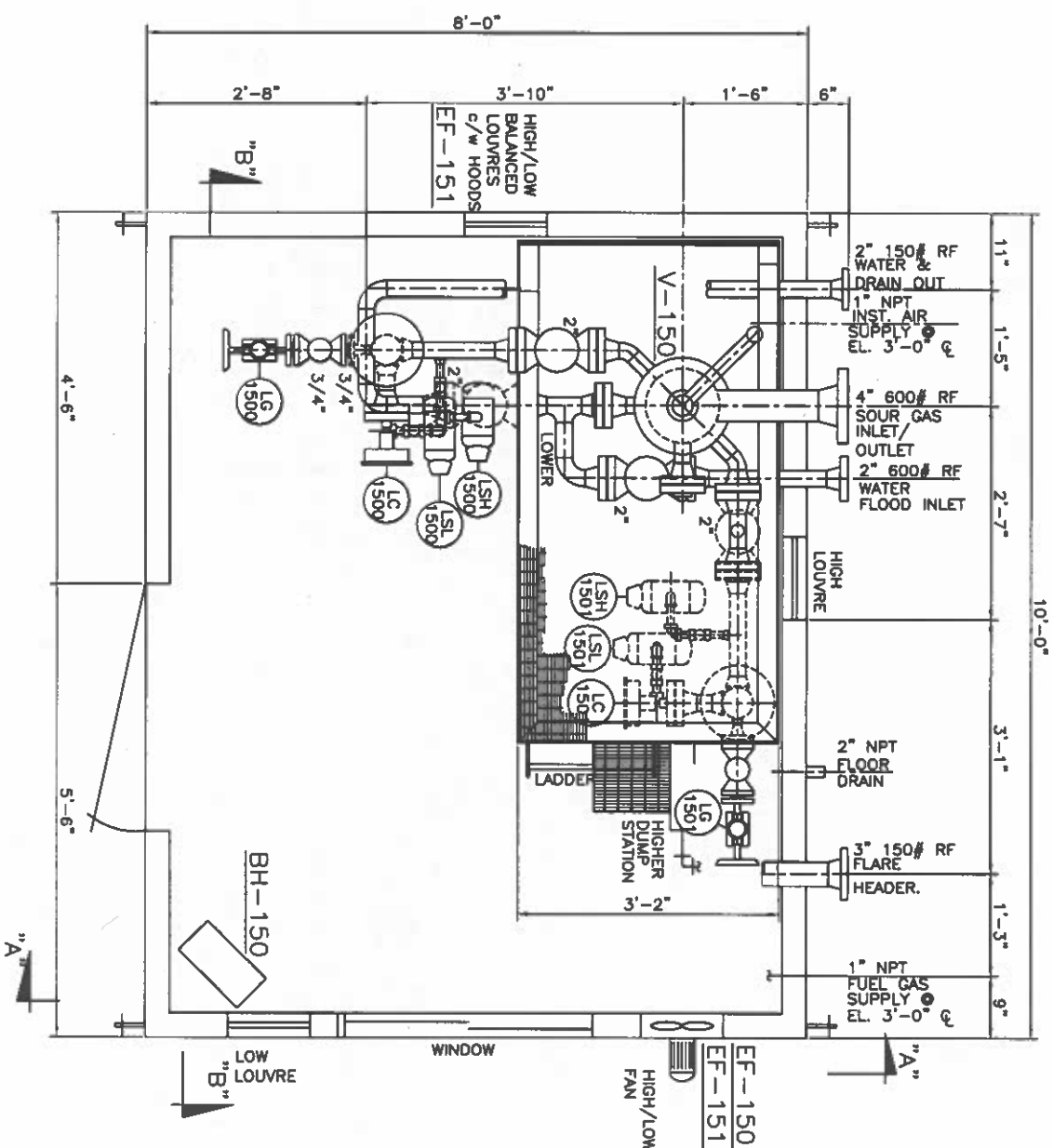
$$CE = C + \frac{Mn}{6} + 0.05 \text{ FOR ASTM MATERIALS}$$

c. FOR EVERY 0.01% REDUCTION OF CARBON STEEL BELOW 0.20%, MANGANESE MAY BE INCREASED BY 0.06%, BUT SHALL NOT EXCEED THE LIMIT OF THE GOVERNING ASTM STANDARD.

d. PIPE, FLANGES & FITTINGS TO HAVE A MAX. YIELD STRENGTH OF 550 MPa

e. PIPE, FLANGES & FITTINGS TO HAVE A MAX. HARDNESS OF 22 HRC (237 HB) EXCEPT

a.) SA-105N FITTINGS TO HAVE A MAX. HARDNESS OF 187 HB
b.) SA-234-WPB FITTINGS TO HAVE A MAX. HARDNESS OF 197 HB



BUILDING NOTES:

Δ SIZE & TYPE: 8'-0" x 10'-0" x 12'-6" EAVE GABLE (4:12)

EXTERIOR: 22 GA. GALVALUME w/ "BACK NINE" GREEN DOORS & TRIM

INTERIOR: 24 GA. WHITE FLUTED ALUMINUM

INSULATION: R12 (ROOF & WALL) c/w 6 MIL VAPOR BARRIER

DOOR: (1) 3' x 7' STEEL DOOR c/w PANIC HARDWARE, LOCK-SET,

20" x 20" IWG WINDOW, CHECKCHAIN, WEATHERSTRIPPING

& CANOPY

WINDOW: (1) 38" x 36" DOUBLE GLAZED SLIDING c/w SCREEN

& LATCH CLOSURE

VENTILATION: (2) 12" x 18" LOUVRES c/w SLIDE CLOSURES

(2) 12" x 18" BALANCED INTAKE LOUVRES c/w STORM HOODS Δ

(8') RIDGE VENTILATOR c/w MANUAL CONTROLS

AND BIRDSCREEN

(2) EXHAUST FAN

OTHER: EAVESTROUGH & DOWNSPOUTS

DOOR RAISED 3"

ICE RAKES (BOTH SIDES)

(1) REQ'D

TIME CARD

C-2981-PP

CUSTOMER: DUVERNAY OIL CORP.

c/o TUNDRA ENGINEERING ASSOCIATES LTD.

MAIN PIPING PLAN

10 3/4" OD FILTER SKID PACKAGE (SOUR)

LOCATION: 08-13-054-19 W51

DATE: 08/04/08

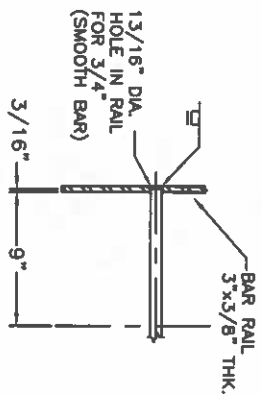
DATE: 08/04/08

DATE: 08/04/08

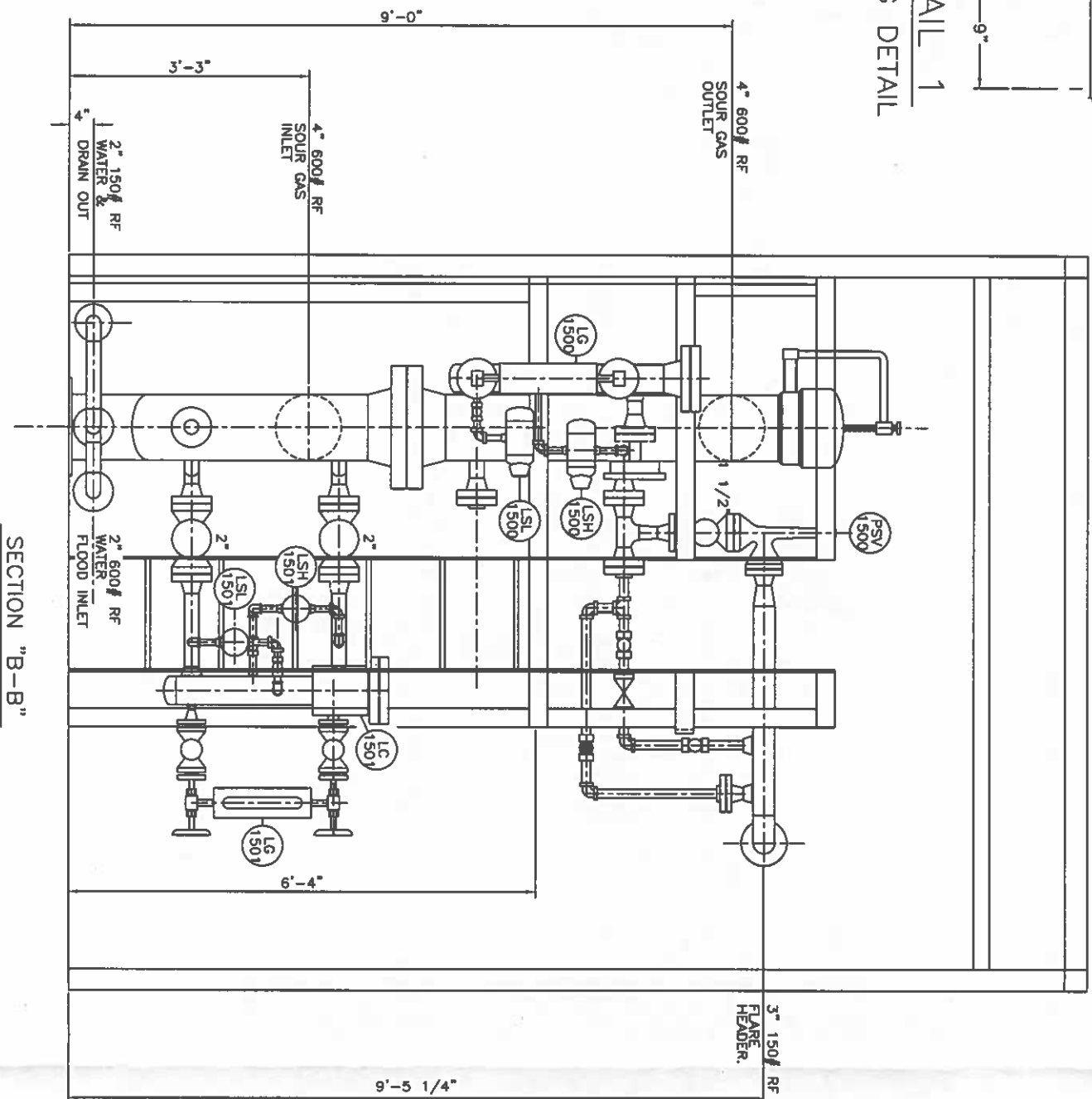
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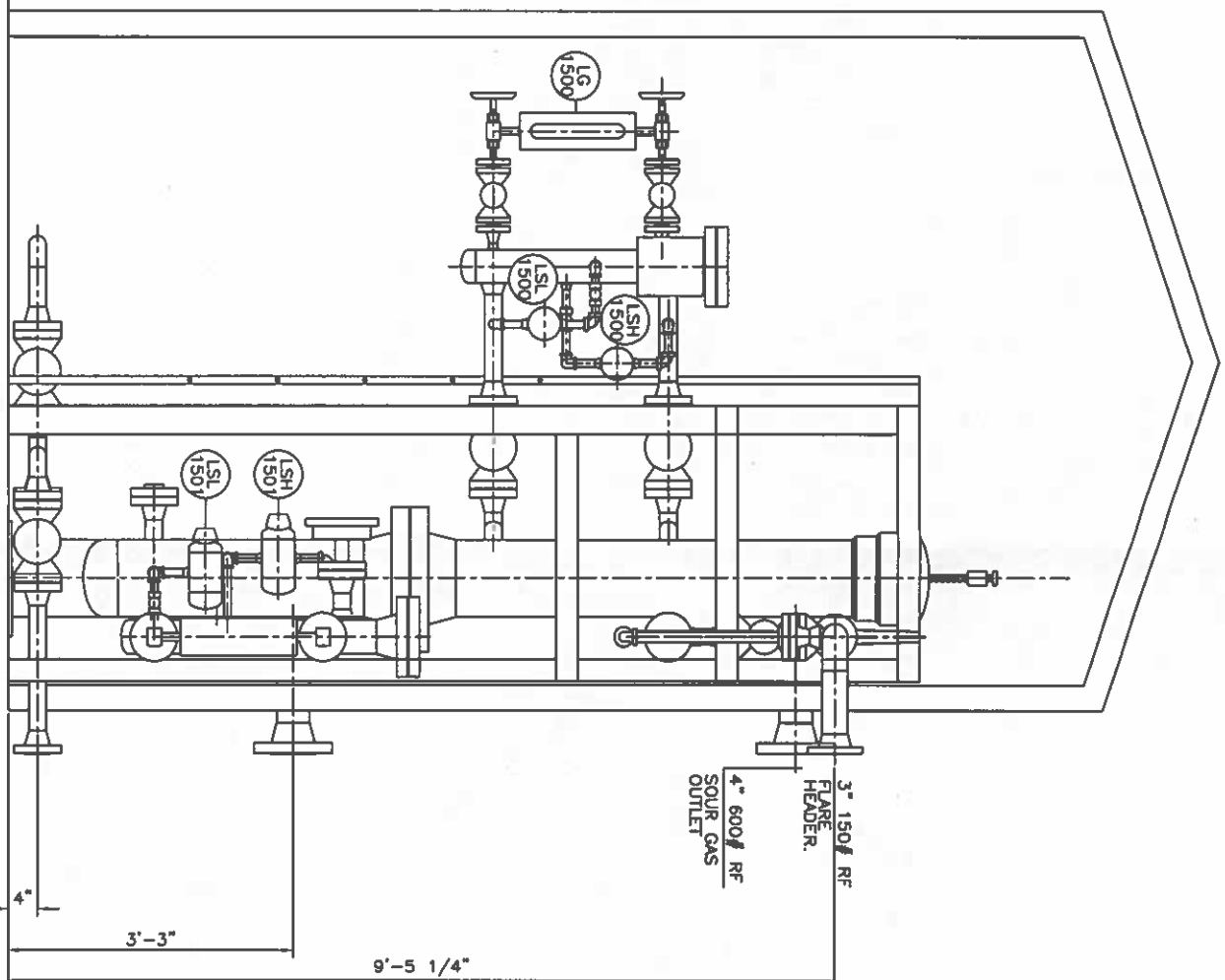
GAS & OIL EQUIPMENT LTD



DETAIL 1
RUNG DETAIL



SECTION "B-B"



SECTION "A-A"

(1) REQ'D
TIME CARD
C-2981-PP

REV	DESCRIPTION	DATE	BY
A	REVISED BUILDING TO 8'-0" x 10'-0". ADDED LSL-1500/1501.	08/13/08	V.P.
A	REMOVED AS PER CUSTOMER MARK-UP	08/23/08	M.C.
A	CHANGED TO BALANCED INTAKE LOUVERS c/w STORM HOODS	10/16/08	V.P.
A	REVISED TAGGING AS PER CUSTOMER MARK-UP, REVISED AS PER BUILT		

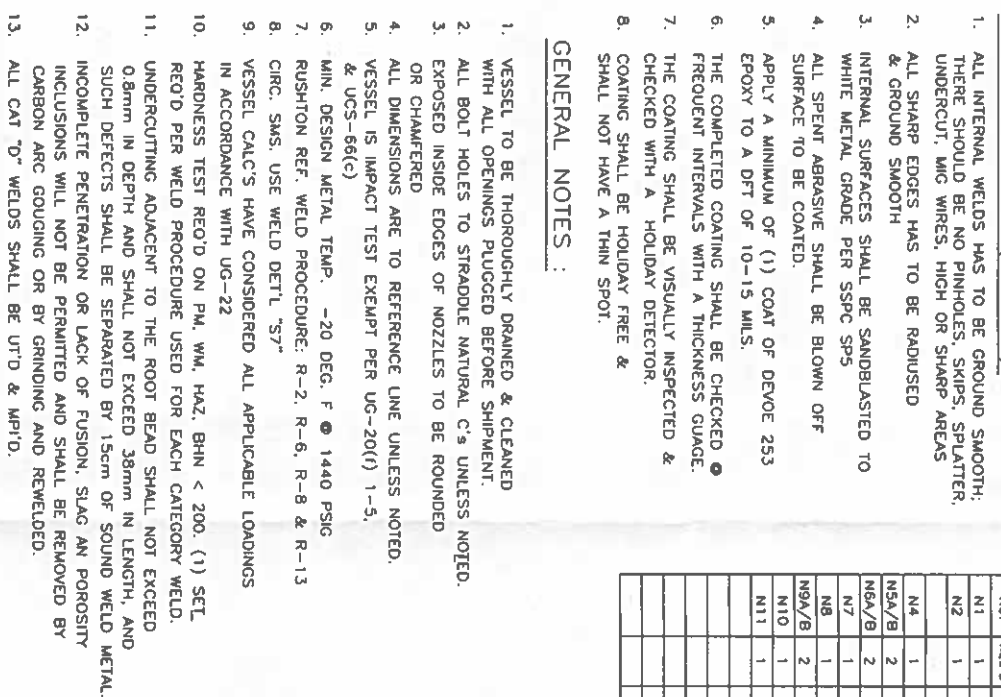
DATE:	08/04/08	DWN BY:	V.P.	SCALE:	1"=1'-0"	CHD BY:		APPRD BY:		DWG NO:	C-2981-C2	REV:	3
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CUSTOMER:	DUVERNAY OIL CORP.	LOCATION:	08-13-054-19 W5
c/o TUNDRA ENGINEERING ASSOCIATES LTD.			
SECTION VIEWS			
10 3/4" OD FILTER SKID PACKAGE (SOUR)			





N4	1	FLG- 2" CL 600 RFWN SCH 160	SA-105N
	1 PC	NECK- 2" SCH 160 SML'S PIPE	SA-106B
	1	ELBOW- 2" SCH 160 x 90° LR	SA-235- WB
N6A/B	2	FLG- 2" CL 600 RFWN SCH 160	SA-105N
	2 PCS	NECK- 2" SCH 160 SML'S PIPE	SA-106B
	2	ELBOW- 2" SCH 160 x 45° LR	SA-235- WB
N6A/B	2	FLG- 2" CL 600 RFWN SCH 160	SA-105N
	2 PCS	NECK- 2" SCH 160 SML'S PIPE	SA-106B
	2	ELBOW- 2" SCH 160 x 45° LR	SA-235- WB
N2	1	FLG- 2" CL 600 RFWN SCH 160	SA-105N
	1 PC	NECK- 2" SCH 160 SML'S PIPE	SA-106B
	1	ELBOW- 2" SCH 160 x 45° LR	SA-235- WB
N8	1	FLG- 2" CL 600 RFWN SCH 160	SA-105N
	1 PC	NECK- 2" SCH 160 SML'S PIPE	SA-106B
N9A/B	2	FLG- 2" CL 600 RFWN SCH 160	SA-105N
	2 PCS	NECK- 2" SCH 160 SML'S PIPE	SA-106B
N10	1	FLG- 2" CL 600 RFWN SCH 160	SA-105N
	1 PC	NECK- 2" SCH 160 SML'S PIPE	SA-106B
N11	1	FLG- 2" CL 600 RFWN SCH 160	SA-105N
	1 PC	NECK- 2" SCH 160 SML'S PIPE	SA-106B



1. VESSEL TO BE THOROUGHLY DRAINED & CLEANED WITH ALL OPENINGS PLUGGED BEFORE SHIPMENT.
2. ALL BOLT HOLES TO STRADDLE NATURAL C'S UNLESS NOTED.
3. EXPOSED INSIDE EDGES OF NOZZLES TO BE ROUNDED OR CHAMFERED
4. ALL DIMENSIONS ARE TO REFERENCE LINE UNLESS NOTED.
5. VESSEL IS IMPACT TEST EXEMPT PER UG-20(f) 1-5, & UCS-66(c)
6. MIN. DESIGN METAL TEMP. -20 DEG. F @ 1440 PSIG
7. RUSHFORTH REF. WELD PROCEDURE: R-2, R-6, R-8 & R-13
8. CIRC. SMS. USE WELD DET'L "57"
9. VESSEL CALCS HAVE CONSIDERED ALL APPLICABLE LOADINGS IN ACCORDANCE WITH UG-22
10. HARDNESS TEST RECD ON PM, WM, HAZ, BHN < 200. (1) SETL RECD PER WELD PROCEDURE USED FOR EACH CATEGORY WELD.
11. UNDERCUTTING ADJACENT TO THE ROOT BEAD SHALL NOT EXCEED 0.8mm IN DEPTH AND SHALL NOT EXCEED 38mm IN LENGTH, AND SUCH DEFECTS SHALL BE SEPARATED BY 15cm OF SOUND WELD METAL.
12. INCOMPLETE PENETRATION OR LACK OF FUSION, SLAG AN POROSITY INCLUSIONS WILL NOT BE PERMITTED AND SHALL BE REMOVED BY CARBON ARC GROUTING OR BY GRINDING AND REMELED.
13. ALL CAT "D" WELDS SHALL BE UTD & MPID.

ELEMENT	WT. (MAX.)
1. 1000	1000
2. 1000	1000
3. 1000	1000
4. 1000	1000
5. 1000	1000
6. 1000	1000
7. 1000	1000
8. 1000	1000
9. 1000	1000
10. 1000	1000
11. 1000	1000
12. 1000	1000
13. 1000	1000
14. 1000	1000
15. 1000	1000
16. 1000	1000
17. 1000	1000
18. 1000	1000
19. 1000	1000
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21. 1000	1000
22. 1000	1000
23. 1000	1000
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89. 1000	1000
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91. 1000	1000
92. 1000	1000
93. 1000	1000
94. 1000	1000
95. 1000	1000
96. 1000	1000
97. 1000	1000
98. 1000	1000
99. 1000	1000
100. 1000	1000

CARBON	0.23
MANGANESE	1.20 ^c
SULPHUR	.025
CU + NI + Cr + Mo + V	0.60
CARBON EQUIVALENT	0.43

9. CARBON EQUIVALENT SHALL BE CALCULATED AS FOLLOWS:

$$CE = C + \frac{MN}{6} + \frac{(Cr + Mo + V)}{5} + \frac{(Ni + Cu)}{15}$$

b. THE FOLLOWING SHORT FORM CARBON EQUIVALENT MAY BE USED IF VALUES FOR CERTAIN ALLOY ELEMENTS ARE NOT REPORTED.

$$CE = C + \frac{MN}{6} + 0.05 \text{ FOR ASTM MATERIALS}$$

c. FOR EVERY 0.01% REDUCTION OF CARBON BELOW 0.20%, MANGANESE MAY BE INCREASED BY 0.06% BUT SHALL

NOT EXCEED THE LIMIT OF THE GOVERNING ASTM STANDARD

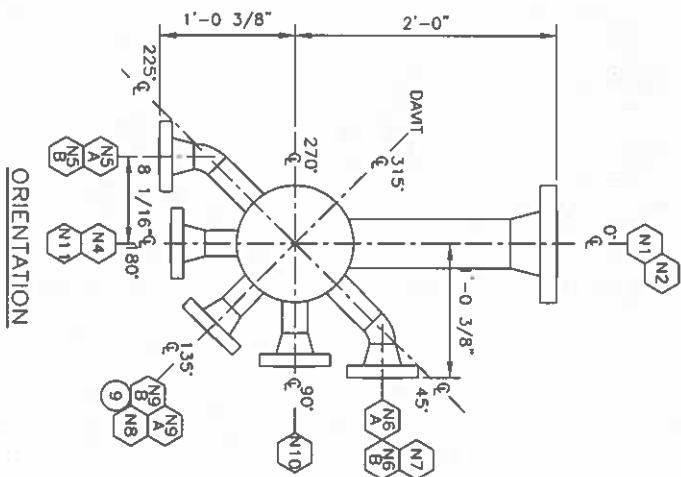
d. PIPE, FLANGES & FITTINGS TO HAVE A MAX. YIELD STRENGTH OF 550 MPa

g. PIPE, FLANGES & FITTINGS TO HAVE A

a.) SA-105N FITTINGS TO HAVE A MAX. HARDNESS OF 22 HRC (237 HB) EXCEPT

b.) SA-234-WPB FITTINGS TO HAVE A MAX. HARDNESS OF 197 HB

REV	DESCRIPTION	DATE	BY
A	ADDED GENERAL NOTE "1"	06/20/08	V.P.
A	DESIGN PRESSURE WAS 1440 PSIG. HYDROTEST PRESSURE WAS 2160 PSIG. IT#11 CRN WAS CH2362.213	12/09/08	O.L.



ORIENTATION

SPECIFICATIONS

VESSEL TO BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE ASME CODE
SECTION VIII, DIVISION 1, PARA UW-11(o), 2007 EDITION

CODE STAMP REQ'D. C.R.N. U652421 C.A.-SHELL 0.125" HEAD 0.125"

DESIGN PRESSURE $\frac{2}{1.420}$ PSIG @ $\frac{-20/130}{1.30}$ °F WEIGHT EMPTY 1780 LBS.

WORKING PRESSURE _____ **WEIGHT FLOODED** 2170 LBS.

RADIOGRAPHY RT-1 (INCL. ALL NOZ. BW) LONG 100% CIRC. 100% VOLUME 6.24 FT³

STRESS RELIEVE	60	JT. EFF.	JT. EFF.	HYDRO TEST	2130	PSIG
MIN.	1150F					

HEAD SPEC.	SA-518-70N 0.500" MIN. (0.625" NOM.)	"NEW & COLD"

SHELL SPEC. SA-106B (0.718" NOM) SCH 100 SML's

SEE PIPING PLAN NOTES

[illegible]

LOCATION: 08-13-054-19 W

ERING ASSOCIATES LTD.

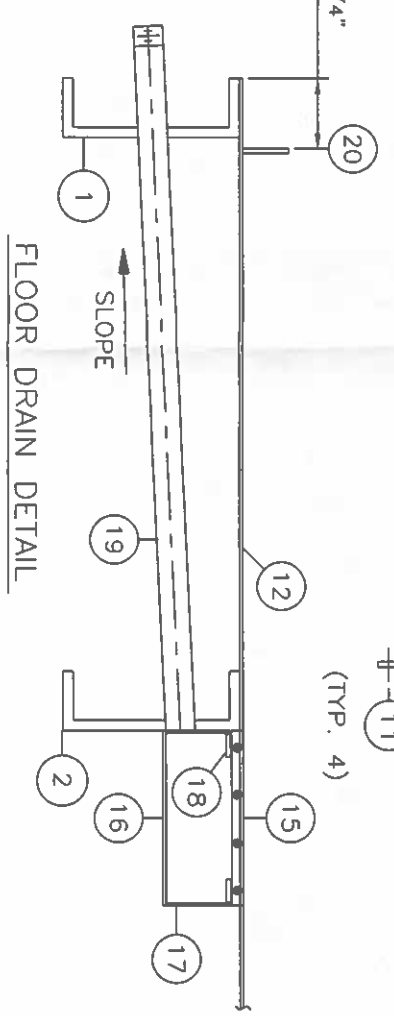
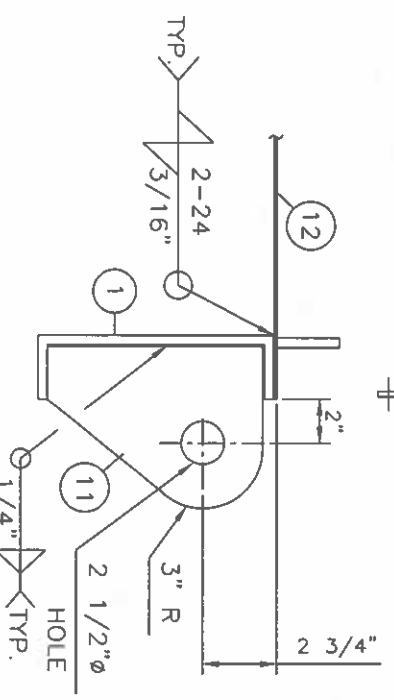
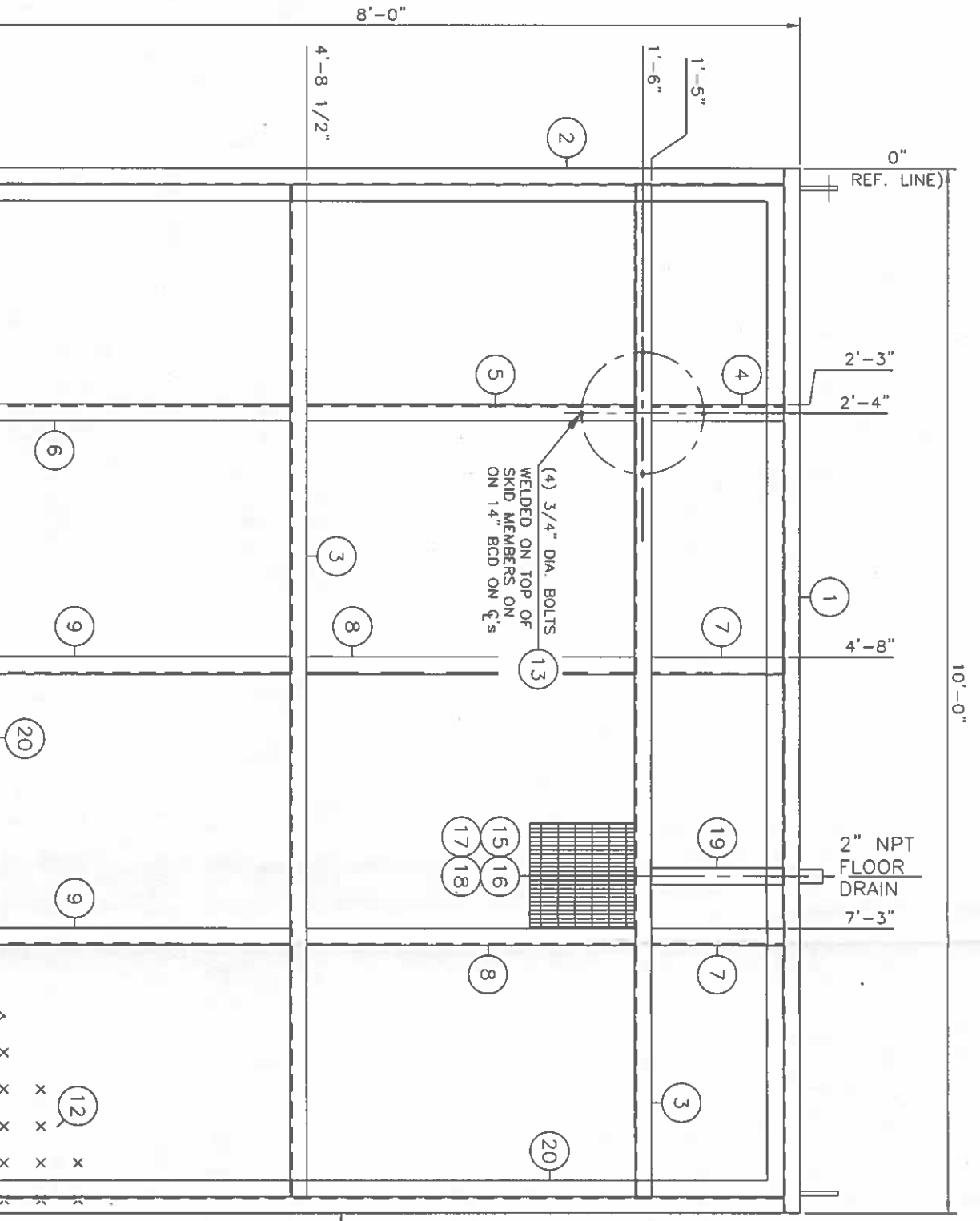
VERTICAL FILTER SEPARATOR

8'-4" s/s x 1420 PSIG x -20/130 °F 1/8" C

100

SCALE: 1 1/2"=1'-0"	CHKD BY:	APPRO BY:	DMG NO:	REV:
			C-2981-A	

[illegible]



BILL OF MATERIALS			
TAC NO.	QNTY.	DESCRIPTIONS	MAT'L SPEC.
1	2	C6 x 8.2# (10'-0")	G40.21 -W44
2	2	C6 x 8.2# (7'-8 1/4")	G40.21 -W44
3	2	C6 x 8.2# (9'-8 1/4")	G40.21 -W44
4	1	C6 x 8.2# (1'-4 13/16")	G40.21 -W44
5	1	C6 x 8.2# (3'-3 5/16")	G40.21 -W44
6	1	C6 x 8.2# (2'-11 3/4")	G40.21 -W44
7	2	2" x 2" x 3/16" ANGLE (1'-4 13/16")	G40.21 -W44
8	2	2" x 2" x 3/16" ANGLE (3'-3 5/16")	G40.21 -W44
9	2	2" x 2" x 3/16" ANGLE (2'-11 3/4")	G40.21 -W44
10			
11	4	LIFTING LUG- 1" THK PLATE	G40.21 -W44
12	80 FT ²	3/16" THK. CHK'D. PLATE	SA-36
13	4	3/4" DIA. x 2 1/2" LG BOLTS c/w NUT	GR-5
14			
15	1	1" x 1/8" GRATING (12" x 12" SQ.)	G40.21-44W
16	1	12" SCH 40 ERW PIPE x 12" LG (CUT IN HALF)	SA-53B
17	2	1" x 1/4" THK. FLAT BAR x 12" LG	G40.21-44W
18	2	1/4" THK. PLATE x 6" x 12" LG	G40.21-44W
19	1	DRAIN PIPE - 2" SCH 80 SML'S	SA-106B
20	1	DRIP LIP- 3" x 1/4" THK. F.B.	G40.21-44W

NOTES:

1. ALL WELDS TO BE 1/4" ALL AROUND UNLESS OTHERWISE NOTED.
2. CROSS MEMBERS TO BE COPED TO MAIN MEMBERS AND FULLY WELDED.
3. CHK'D PLATE SEAMS TO BE 100% SEAL WELDED AND STITCH WELDED TO MAIN MEMBERS.
4. UNDERSIDE OF SKID TO BE INSULATED WITH 3" THK. POLYURETHANE SPRAY FOAM c/w FIRE RETARDANT COATING
5. ESTIMATED SHIPPING WT : 1,500 LBS.

(1) REQ'D		TIME CARD		C-2981-SK	
DWG. NO.	REFERENCE DRAWINGS	REV	DESCRIPTION	DATE	BY
		A	REVISED BUILDING/SKD SIZE TO 8'-0" x 10'-0"	08/12/08	Y.P.
CUSTOMER: DUVERNAY OIL CORP.			LOCATION: 08-13-054-19 WSM		
c/o TUNDRA ENGINEERING ASSOCIATES LTD.					
10 3/4" OD FILTER SKID PACKAGE (SOUR)					
STRUCTURAL SKID					
DATE: 08/05/08	ORN BY: Y.P.	SCALE: 1 1/2"=1'-0"	CHK'D BY:	APPRO BY:	DWG NO: C-2981-D
					REV: A

