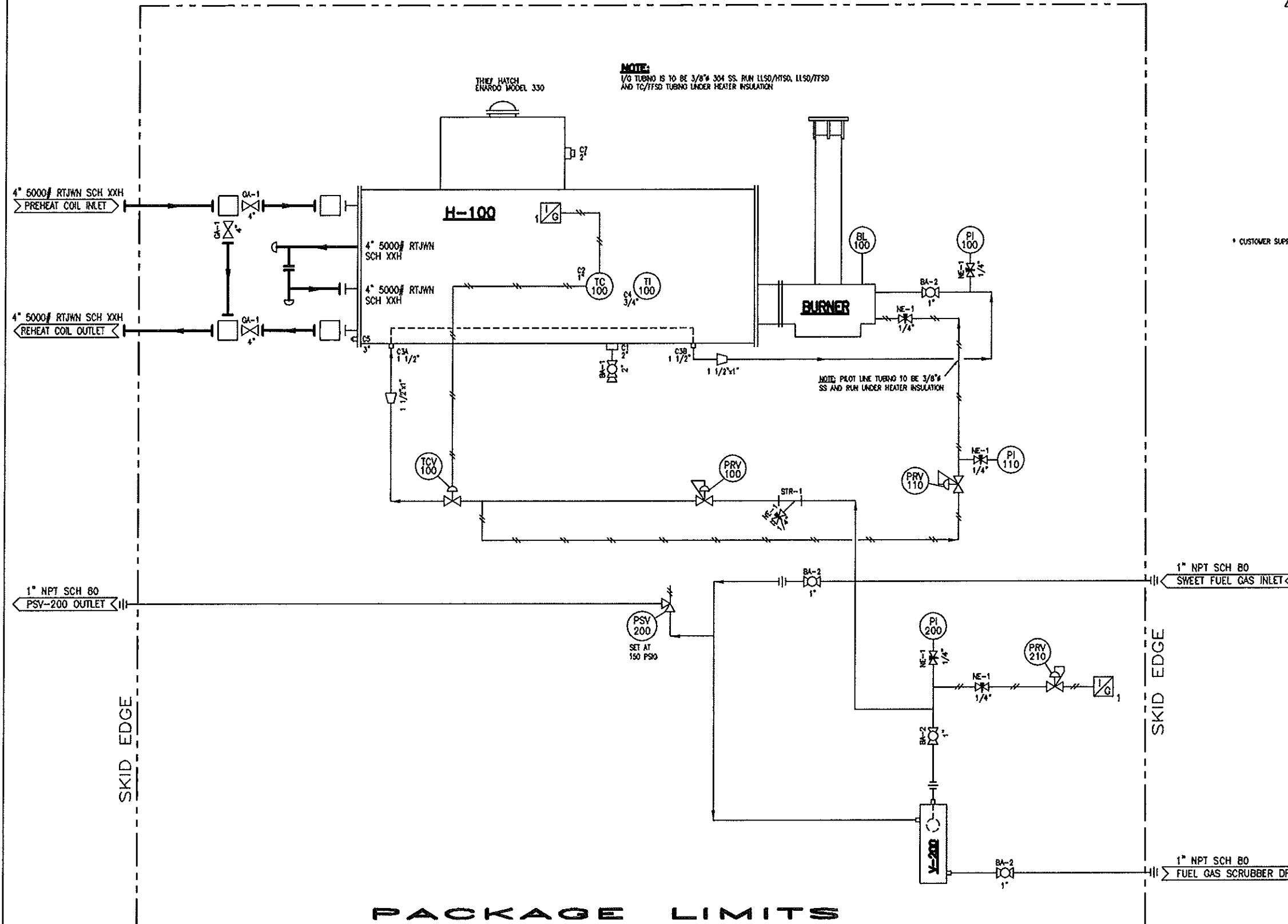


H-100
INDIRECT LINE HEATER
3.0 MM BTU/HR ABSORBED DUTY
3.3 MM BTU/HR 10% RATED DUTY
72" OD x 22'-8" F/F

V-200
FUEL GAS SCRUBBER
8 5/8" OD x 36" HIGH x 1/18" CA
DP/DT: 150 PSIO @ -20°F/200°F
L&O STANDARD c/w HLSO

BURNER
GAS BURNER c/w FLAME ARRESTOR
4,250,000 BTU/HR
24" OD FIRETUBE x 34" CORE (DUAL INTAKE)

NOTE:
1/2" TUBING IS TO BE 3/8" 304 SS. RUN HLSO/MISO, HLSO/TFSD
AND TC/TFSD TUBING UNDER HEATER INSULATION



* CUSTOMER SUPPLIED

NOTES:
FOR DESIGN NOTES SEE PIPING LAYOUT LD-4754-A2.

ITEM	QTY	DESCRIPTION
BL-100	1	BS & B WELL-LITE KNITOR c/w ENERGIZER
PI-100	1	0-30 PSIG, 2 1/2" FACE, 1/4" BM, DUAL SCALE, WKA 213.53 PRESSURE INDICATOR
PI-110	1	0-15 PSIG, 2 1/2" FACE, 1/4" BM, DUAL SCALE, WKA 213.53 PRESSURE INDICATOR
PI-200	1	0-160 PSIG, 2 1/2" FACE, 1/4" BM, DUAL SCALE, WKA 213.53 PRESSURE INDICATOR
PRV-100	1	1" NPT FISHER 627 REGULATOR, DUCTILE IRON BODY, 1/2" ORIFICE, 5-20/ SPRING
PRV-110	1	1/4" NPT FISHER 912 REGULATOR, ZINC BODY, 0.5-2.7 PSIG (912H-108)
PRV-210	1	FISHER 670CTR PRESSURE REGULATOR, ALUMINUM BODY, 0-35/ SPRING
PSV-200	1	CROSBY 981100MA 1/2" NPT x 1" NPT RELIEF VALVE, SET @ 150 PSIO
TC-100	1	KURRAY HT-12 THERMOSTAT c/w 1" NPT C.S. SEPARABLE SOCKET
TCV-100	1	1" NPT FISHER 119 CONTROL VALVE, CAST IRON BODY, 9/16" ORIFICE, 3-15/ SPRING
TI-100	1	0-250°F 3" DIAL, DUAL SCALE, TREND 30000 TEMPERATURE INDICATOR c/w 6" x 3/4" x 1/2" THERMOWELL, 304 SS
STR-1	1	1" NPT "Y" STRAINER, CAST IRON BODY, HIGH PRESSURE
BA-1	1	2"-2000# NPT RP NAYCO BALL VALVE, STD TRIM
BA-2	4	1"-2000# NPT RP NAYCO BALL VALVE, STD TRIM
NE-1	6	1/4" NPT MARSH K1512 NEEDLE VALVE, CS
GA-1	3	4"-5000# API RTJWN GATE VALVES

REQ'D (1)

TIME CARD#
4324-PP

CHK'D: _____ DATE: _____ BY: _____
PROJECT CO-ORDINATOR CHK'D: _____ DATE: _____ BY: _____
DO NOT SCALE FROM THIS DRAWING

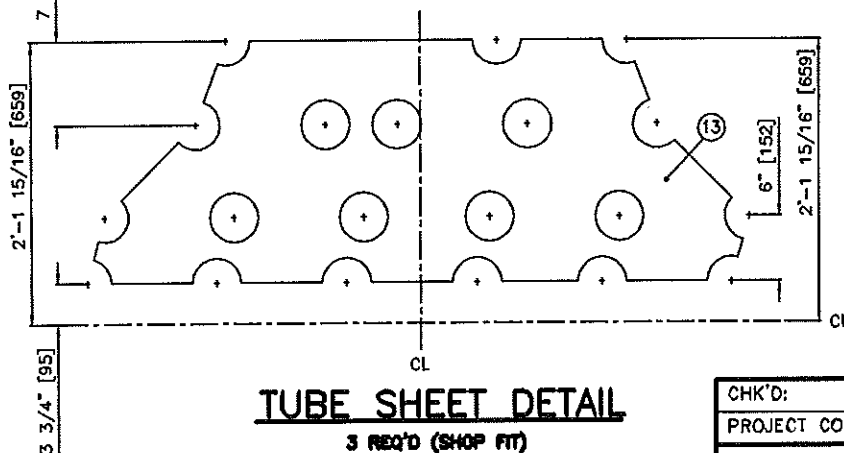
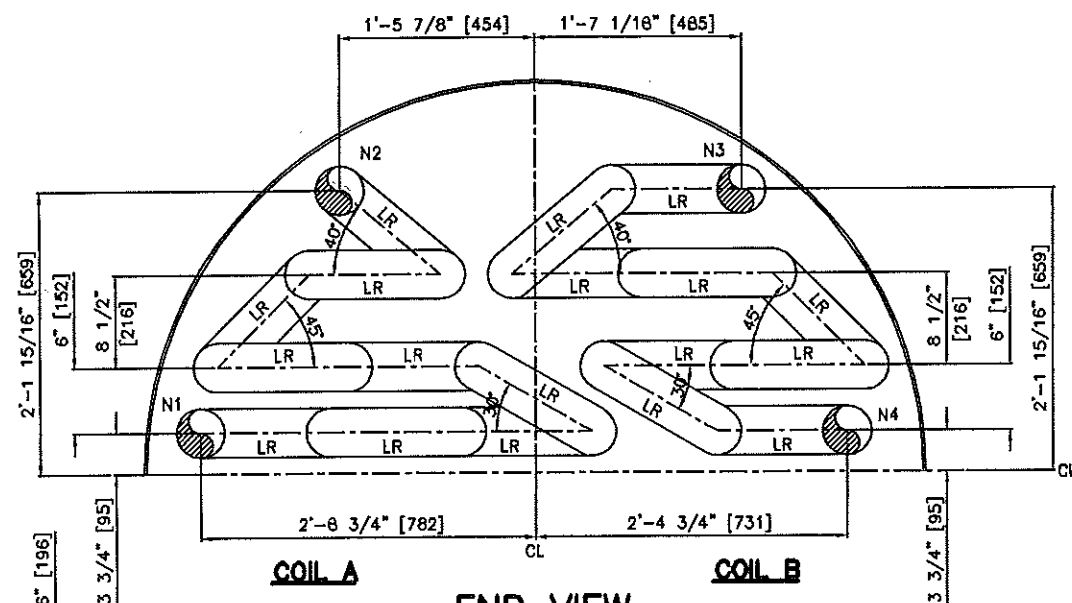
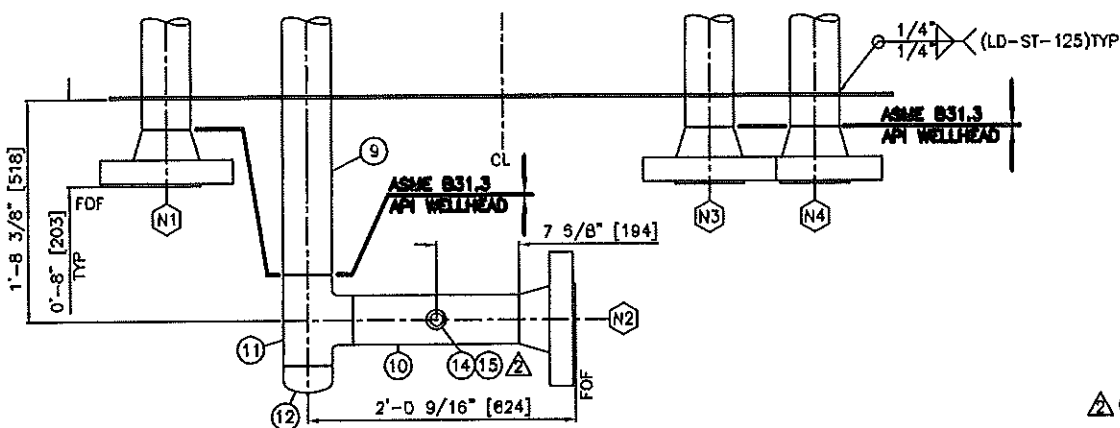
No. _____ SUBJECT _____
REFERENCE Dwg. _____

1 REVISED AS NOTED 02/04/22 TDU
0 ISSUED FOR APPROVAL 02/04/09 TDU
REV. _____ DESCRIPTION _____ DATE _____ BY _____

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LARSEN & D'AMICO MFG. LTD. EDMONTON, ALBERTA CANADA		
CUSTOMER: NORTHLANDS ENERGY CORPORATION LOCATION: PORTABLE-REF UNIT LH37		
DESCRIPTION: FLOW DIAGRAM FOR 72" OD x 22'-8" F/F x 3.8 MM BTU/HR ABSORBED, 3.3 MM BTU/HR 10% RATED INDIRECT LINE HEATER PACKAGE		
DWN D. UONG	CUSTOMER REVISION "A"	DRAWING No.
DATE 02/04/22	PURCHASE ORDER# RD 3518	LD-4754-A1
SCALE NTS		
SHOP ORDER No. 4324		
		REV.

-WELD PROCEDURE LD-ST-125 FOR SUPPORT BAFFLE
 -WELD 1/4" FILLET AROUND CORNER ON PARTIAL CIRCLE ON TUBE SHEET, STITCH WELD REMAINDER OF COIL TO TUBESHEET
 -SA-36 PLATE USED FOR END PLATES AND COIL TUBE SHEETS.



3 REQ'D (SHOP FIT)

REQ'D (1)

TIME CARD #

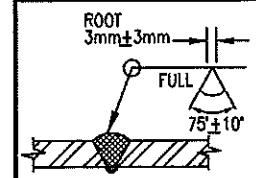
4324-CB

CHK'D:	DATE:	BY:
PROJECT CO-ORDINATOR CHK'D:	DATE:	BY:
DO NOT SCALE FROM THIS DRAWING		
2	REVISED AS NOTED	02/04/10 TDU
1	REVISED AS NOTED	02/04/04 TDU
0	ISSUED FOR APPROVAL	02/04/03 TDU
REV.	DESCRIPTION	DATE BY

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WELD DETAILS WP-573.2

1 LD-MIG/ST-121
 LD-ST-125



SERVICE: SOUR

GENERAL SPECIFICATIONS

COIL A PREHEAT

MATERIAL: (TO SPEC BREAK)
 PIPE: SA-106-B/SA-333-6
 RETURN BEND: SA-234-WPB

DESIGN DATA:

DESIGN PRESS & TEMP: 5000 PSIG @ 200°F
 (34475 kPaG @ 93.3°C)
 MDMT: B°F (-13.3°C) TO SPEC BREAK
 JOINT QUALITY FACTOR= 1.0
 STRESS RELIEVING: 60 MIN @ 1150°F(621.1°C)
 RADIOGRAPHY: 100%
 CORROSION ALLOWANCE: 1/16" (1.6 mm)
 HYDRO TEST PRESS: 7500 PSIG (51713 kPaG)

WEIGHT: 664B lb (3015 kg)
 VOLUME: 11.049 cu ft (0.313 cu m)
 HEATING SURFACE: 240 sq ft (22.3 sq m)

IMPACT TESTING EXEMPT AS PER ASME B31.3, 1999 EDITION (AUG 2001 ADDENDA), FIG 323.2.2A

CRN: D-4269.213 PER LD-508-A REV.2
 FOR ASME B31.3 ONLY

DESIGN TO ASME B31.3-1999 EDITION (AUG 2001 ADDENDA) PAR 304.1.2(a) FOR ASME B31.3 ONLY

WELD RADIOGRAPHS TO BE INTERPRETED FOR SEVERE CYCLIC FLUID SERVICE (PER TABLE 341.3.2, ASME B31.3-1999 EDITION, AUG 2001 ADDENDA) UNLESS OTHERWISE SPECIFIED.

MANUFACTURING NOTES:

- RETURN BENDS TO BE TESTED FOR BASE LINE UT ALONG OUTSIDE RESULTS TO SHOW MINIMUM & AVERAGE PER SAMPLE (MINIMUM WALL THICKNESS ACCEPTABLE 0.59")
- PIPE TO BE TESTED FOR BASE LINE UT, 2 SPOTS PER RUN 1 @ 2FT & 1 @ 10FT
- WELD MAP REQUIRED FOR COIL A AND COIL B
- HEAT NUMBER LOCATOR MAP IS REQUIRED FOR COIL A AND COIL B
- MTR'S ARE REQUIRED FOR ALL PRESSURE RETAINING MATERIAL AND PUT INTO THE QC FILE

ITEM	QNTY	DESCRIPTION	MATERIAL	REMARKS
1	8	4"-SCH XXH SMLS PIPE x 20'-0" LG	SA-106-B	COIL A
2	1	4"-SCH XXH SMLS PIPE x 21'-8 1/8" LG	SA-333-6	COIL A
3	8	4"-SCH XXH SMLS PIPE x 20'-0" LG	SA-106-B	COIL B
4	2	4"-SCH XXH SMLS PIPE x 21'-8 1/8" LG	SA-333-6	COIL B
5	2	4"-5000# API FLG w/SCH XXH BORE	SA-350-LF2	N1,N2 (COIL A)
6	2	4"-5000# API FLG w/SCH XXH BORE	SA-350-LF2	N3,N4 (COIL B)
7	9	4"-SCH XXH LRBW 180° RB	SA-234-WPB	COIL A
8	9	4"-SCH XXH LRBW 180° RB	SA-234-WPB	COIL B
9	1	4"-SCH XXH SMLS PIPE x 22'-7 9/16" LG	SA-333-6	COIL A
10	1	4"-SCH XXH SMLS PIPE x 1'-3 1/8" LG	SA-333-6	COIL A
11	1	4"-SCH XXH STRAIGHT TEE	SA-420-WPL8	COIL A
12	1	4"-SCH XXH BW CAP	SA-420-WPL8	COIL A
13	3	1/4" THK PLATE (CUT AS SHOWN)	SA-36	TUBE SHEET
14	1	1/2" NPT 8000# TOL	SA-350-LF2	PURGE CONNECTION
15	1	1/2" NPT HEX HEAD PLUG	SA-350-LF2	PURGE CONNECTION

LARSEN & D'AMICO MFG. LTD.

EDMONTON, ALBERTA
 CANADA

CUSTOMER: NORTHLAND ENERGY CORPORATION
 LOCATION: PORTABLE-REF UNIT LH37

DESCRIPTION 4"-5000# API, 4"-5000# API
 (20) TUBE (10-10) SPLIT COIL BUNDLE IN
 72" OD x 22'-6" F/F INDIRECT LINE HEATER

DWN D. UONG

CUSTOMER REVISION "A"

DRAWING No.

DATE 02/04/10

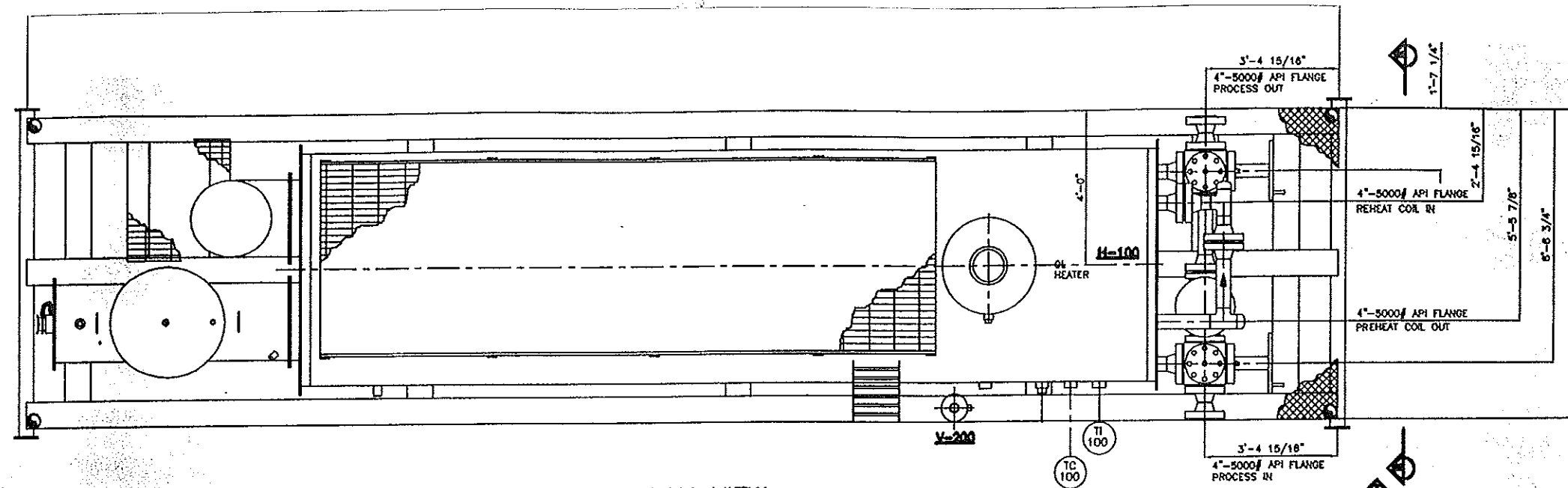
PURCHASE ORDER# RD 3516

LD-4751-B

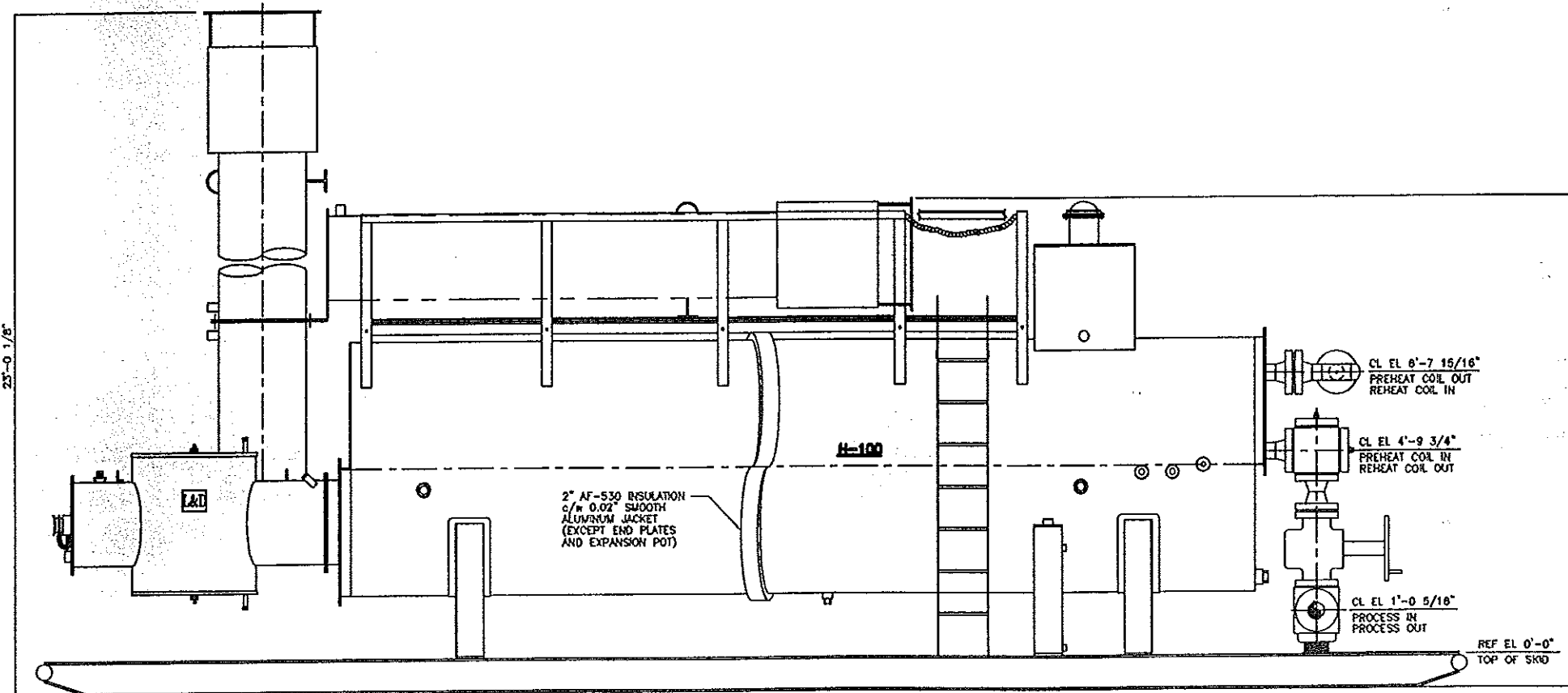
SCALE NTS

SHOP ORDER No. 4324

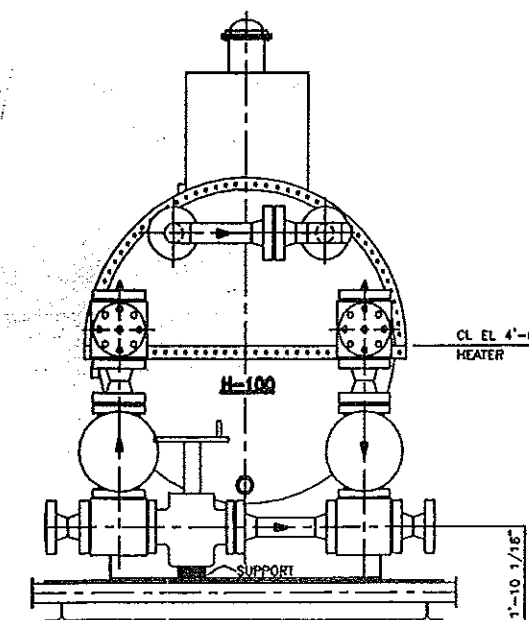
REV. 2



PLAN VIEW



ELEVATION VIEW 'A-A'



END VIEW 'B-B'

NOTES

1. MAIN PIPING TO BE BUILT IN ACCORDANCE WITH THE LATEST EDITION OF ANSI B31.3.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE MECHANICAL FLOW DIAGRAM (LD-4754-A1).
3. UNIT IS TO HAVE SOUR PROCESS INSIDE COIL c/w SHEET INSTRUMENT/FUEL GAS TO BE SUPPLIED FROM OFF SKID.
4. PREHEAT INLET PIPING TO BE SCH XXH, REHEAT OUTLET PIPING TO BE XXH, SA-333-8 SMLS PIPE w/SA-350-LF2 FLANGES & SA-420-WPL8 FITTINGS.
5. ALL THREADED PIPING TO BE AS FOLLOWS:
2\"/>
6. TUBING TO BE 3/8\"/>
7. BOLTING TO BE SA-193-B7M STUDS c/w SA-194-2HM NUTS WITH C.S RND TYPE GASKETS.
8. HYDROTESTING FOR BUTTWELDED PIPING:
API 5000 c/w 5000 PSIG
9. THREADED PIPING TO BE AIR TESTED @ 100 PSIG WITH JOINTS SOAPED FOR LEAKS.
10. COIL PIPING TO BE 100% RADIOGRAPHED FOR SOUR SERVICE.
11. ALL PIPING TO BE ADEQUATELY SUPPORTED.
12. ALL PIPING TO BE HELD AT DIMENSIONS AND ELEVATIONS SHOWN FOR CUSTOMER TIE-INS.
13. LINE HEATER SHELL ONLY (EXCEPT END PLATES AND EXPANSION POT) TO BE INSULATED WITH 2\"/>
14. PAINTING:
COMMERCIAL SANDBLAST TO SSPC-SP8 PRIOR TO:
(1) COAT ENDURA EP-521 EPOXY PRIMER, GREEN #24
3-4 MILS DRY THICKNESS
(1) COAT ENDURA EX-20 TOPCOAT, NORTHLAND-NORWARD GREEN METALLIC CLR24446
1.5-2.5 MILS DRY THICKNESS
(1) COAT ENDURA CLEAR 221 CLEAR COAT
1-1.5 MILS DRY THICKNESS
15. ESTIMATED SHIPPING WEIGHT: 34460 LBS (15637 KG)
16. CUBIC CONTENT:
472.38 CUFT (13.38 CU/M) HEATER W/FIRETUBE, COIL BUNDLE AND EXPANSION TANK IN PLACE
638.91 CUFT (18.09 CU/M) HEATER W/EXPANSION TANK IN PLACE ONLY

APR 09 2002

FOR REFERENCE ONLY

REQ'D (1)

TIME CARD
4324-PP

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CHK'D:	DATE:	BY:
PROJECT CO-ORDINATOR CHK'D:	DATE:	BY:
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LARSEN & D'AMICO MFG. LTD. EDMONTON, ALBERTA CANADA	
CUSTOMER: NORTHLAND ENERGY CORPORATION LOCATION: PORTABLE-REF UNIT LH37	
DESCRIPTION PIPING LAYOUT FOR 72\"/>	CUSTOMER REVISION "A" PURCHASE ORDER# RD 3518
DWN D. UONG DATE 02/04/09 SCALE NTS SHOP ORDER No. 4324	DRAWING No. LD-4754-A2 REV.