

LINE HEATER BUILDING EDGE

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|-------------|----------|-------------|--|
| DATE | 04/01/11 | CLIENT | ARC RESOURCES LTD. c/o XXL ENGINEERING LTD. |
| DESIGNED BY | M.E.W. | PROJECT | SUNRISE AREA DEVELOPMENT |
| DRAWN BY | TY | TITLE | MECHANICAL FLOW DIAGRAM |
| CHECKED BY | | | 2MM BTU/HR |
| APPROVED BY | | | SOUR SERVICE LINEHEATER PACKAGE |
| SCALE | N.T.S. | JOB # | EV-10310 |
| | | SHEET NO. | 1 OF 2 |
| | | DRAWING NO. | EV-10310-F-001 |
| | | REV. NO. | 0 |

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|-----|---|---------------------------------------|----|------|----------|-----|
| REV | 0 | ISSUED FOR CONSTRUCTION / P ENG STAMP | BY | APPR | 17/03/11 | MEW |
| | | REVISION | | | d/m/y | |

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BILL OF MATERIALS

| TAG | QTY | MAKE | DESCRIPTION |
|------------------|-----|--------------------|---|
| PSV-200 | 1 | TAYLOR | PRESSURE SAFETY VALVE, MODEL 8200-1, 1" NPT INLET x 1" NPT OUTLET, STD. PRESSURE SERVICE TRIM, WCB BODY, SET@150psig, 1.25MM CAPACITY |
| LSLL-100 | 1 | SOR | MODEL 1510B-G2A-C-W-ES-CS-CV, ELECTRIC LEVEL SWITCH, 2" NPT CONNECTION, STEM, 6" EXTENSION-ES-1500 (SS FLOAT) STD. SERVICE |
| PCV-200 | 1 | FISHER | 627 PRESSURE REGULATOR, 1" FNPT CONNECTIONS, WCB BODY, SST TRIM, NITRILE DISC, 75-150psig S.R., 1/4" ORIFICE, STD. SERVICE, 1500psig MAWP |
| PCV-150 | 1 | FISHER | 67CFR-362 INSTRUMENT GAS REGULATOR, 1/4" FNPT CONNECTIONS, STANDARD SERVICE TRIM, 0 TO 35psig SPRING RANGE, 250psig MAWP |
| TC-100 | 1 | KIMRAY | T-12T TEMPERATURE CONTROLLER, INDIRECT THROTTLING, CAT. No.: HA1, TEMP. RANGE -30F to 750F MAX |
| TSHE-100 | 1 | TELEMATIC CONTROLS | CCS 6900TE-14 TEMPERATURE SWITCH, 1/2" MNPT CONNECTION, XPROOF, 300°F MAX PROBE TEMP., 80°F-205°F ON INCR, 60°F-198°F ON DECR. TEMP. |
| TI-100 | 1 | WIKA | TEMPERATURE INDICATOR, 1/2" BCM x 3" FACE x 6" STEM, 0 TO 250°F TEMP. RANGE, DUAL SCALE, c/w 1/2" FNPT x 3/4" MNPT x 6" "U" DIMENSION LENGTH, 316SST THERMOWELL |
| PI-100 PI-110 | 2 | WIKA | PRESSURE GAUGE, LF, 1/4" NPT BTM x 2 1/2" FACE, 0-30psig RANGE, DUAL SCALE, STD. SERVICE |
| PI-200 | 1 | WIKA | PRESSURE GAUGE, LF, 1/2" NPT BTM x 4" FACE, 0-150psig RANGE, DUAL SCALE, MOUNTED ON FUEL GAS LINE, STD. SERVICE |
| PI-150 | 1 | WIKA | PRESSURE GAUGE, LF, 1/4" NPT BTM x 2 1/2" FACE, 0-150psig RANGE, DUAL SCALE, MOUNTED ON INSTRUMENT AIR LINE |
| LG-100 | 1 | ZIMCO | LEVEL GAUGE, QUES-TEC SIGHT GLASS, (1) ONE 1/2" NPT x 5/8" TUBE GLASS, ITC VALVE c/w INTERNAL BALL CHECK AND ACRYLIC SIGHT GLASS c/w GAUGE GLASS GAURDS |
| CSC-100 | 1 | ACL | 5100 COMBUSTION SAFETY CONTROLLER, 12/24 VDC c/w MOUNTING HARDWARE ACL M-50 PILOT MIXER AND NOZZLE, 10'-0" HIGH VOLTAGE GROUND WIRE, 6'-6" NONMETALLIC FLEX w/ CONNECTORS, IGNITOR FLAME/ROD c/w MOUNTING HARDWARE, SPEED CONTROL VALVE 1/2" CONDUIT SEALS, FLAME CURRENT TEST LEADS, OPERATIONS MANUALS, NIOXXLE B10016 VENTURI BARREL, M100 MIXER |

VALVE TRAIN BOM (by OTHERS)

| TAG | QTY | DESCRIPTION |
|----------|-----|--|
| CSC-1 | 1 | ACL-5100 or ACL-5500 COMBUSTION SAFETY CONTROLLER CSA C22.2 No. 199-M89 APPROVED CLASS 1 DIV 2 |
| PSHH-1 | 1 | UNITED ELECTRIC, UE-12SHSN9B (3-50psi) HIGH PRESSURE SHUT DOWN SWITCH, ELECTRIC, DRY CONTACTS, SWITCH TO BE CERTIFIED FOR APPROPRIATE ELECTRICAL AREA CLASS. |
| PSLL-1 | 1 | UNITED ELECTRIC, UE-12SHSN9A (1-15psi) LOW PRESSURE SHUT DOWN SWITCH, ELECTRIC, DRY CONTACTS, SWITCH TO BE CERTIFIED FOR APPROPRIATE ELECTRICAL AREA CLASS. |
| V-1/2 | 2 | 1" NPT MANUAL SHUTOFF VALVE, SOFT SEAT EMICO 720 SERIES UL/ULC OR EQUIVALENT |
| V-3/4 | 2 | 3/4" NPT MANUAL SHUTOFF VALVE, SOFT SEAT EMICO 720 SERIES UL/ULC OR EQUIVALENT |
| NV-1/2 | 2 | 1/2" MULTI PORT NEEDLE VALVE |
| YS-1 | 1 | 1" Y-STRAINER |
| PI-1/2/3 | 3 | WIKA 0-30 1/4" BM 2 1/2" LIQUID FILLED GAUGE OR EQUAL |
| PRV-1 | 1 | 1" PRESSURE REGULATOR SELF OPERATED POSITIVE SHUTOFF FISHER 627 OR EQUAL 1/2" YELLOW ORIFICE |
| PRV-2 | 1 | 1/4" PILOT GAS REGULATOR FISHER 67CFR OR EQUAL |
| SSV-1/2 | 2 | 1" NPT CERTIFIED GAS SAFETY SHUT OFF VALVE CSA 6.5-2005 C/I OR EQUIVALENT |
| SSV-3 | 1 | CERTIFIED PILOT GAS SAFETY SHUT OFF VALVE CSA 6.5-2005 C/I OR EQUIVALENT |
| BA-1 | 1 | ACL-HE-ON SERIES HIGH EFFICIENCY BURNER ASSY. DESIGN PRESSURE FROM 1 PSI TO 14 PSI. FIXED ORIFICE LIMITS BTU/H |
| BA-2 | 1 | ACL-M50 PILOT ASSEMBLY. FIXED ORIFICE LIMITS BTU TO UNDER 20,000. |
| LSLL-1 | 1 | FIELD SELECTION OF SUITABLE LOW LEVEL SWITCH IS ALLOWED |
| IA-1 | 1 | ACL-IGNITOR ASSEMBLY |
| CV-1 | 1 | 1" FISHER 119 OR EQUIVALENT FOR SLOW OPENING OPERATION |
| SCV-1 | 1 | SPEED CONTROL VALVE |



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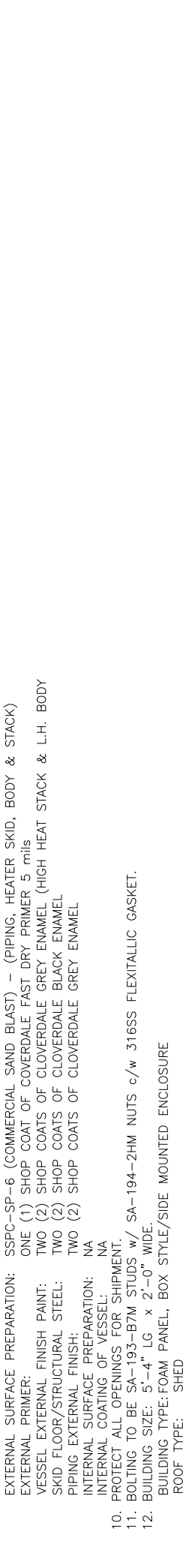
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| DESIGNED BY | M.E.W. | PROJECT: | SUNRISE AREA DEVELOPMENT |
| DRAWN BY | TY | TITLE | BILL OF MATERIALS - FLOW DIAGRAM |
| CHECKED BY | | | 2MM BTU/HR |
| APPROVED BY | | JOB #: | SOUR SERVICE LINEHEATER PACKAGE |
| SCALE | N.T.S. | SHEET NO.: | EV-10310 |
| | | DRAWING NO.: | EV-10310-F-001 |
| | | REV. NO.: | 0 |

LH-100
2MM BTU/HR LINEHEATER
SIZE: 66" O.D. x 20'-0" S/S
c/w 10 PASSES OF 4" 1500# SCH.160 RTJWN PREHEAT COIL
10 PASSES OF 4" 1500# SCH.160 RTJWN REHEAT COIL
DESIGN PRESSURE: 3212 psig
DESIGN TEMPERATURE: 200F
MDMT: -20F
PWHT: 1150F ± 50F FOR 1 HOUR MINIMUM
CORROSION ALLOWANCE: 1/8"
RADIOGRAPHY: 100%
c/w 405gal EXPANSION TANK
(32"O.D. x 120"lg)


BL-100
FLAME ARRESTOR
2-PIECE BURNER HOUSING
MODEL: FAH32/18-20A2
TWO PIECE ALUMINUM CONSTRUCTION
RATED FOR 2.0MM BTU/HR TO FIT A
20" FIRETUBE
c/w (1) 1/2" ELECTRICAL CONNECTION
(1) ACL-M200 MIXER
(1) ACL-B20016 VENTURI BARREL
(1) ACL-0N20018 HIGH EFFICIENCY
BURNER NOZZLE

GENERAL NOTES:
1. QUANTITIES IN B.O.M. ARE FOR (1) UNIT.
2. ALL PIPING TO BE IN ACCORDANCE WITH THE LATEST EDITION OF ASME B31.3 PRESSURE PIPING CODE.
3. VESSEL TO BE FABRICATED TO THE LATEST EDITION OF ASME SECTION VIII, DIVISION 1 PRESSURE VESSELS.
4. SPEC 'ES' SOCKETWELD PIPING: 1/2"-1 1/2" = SCH XXS
SPEC 'ES' WELDED PIPING: 2", 3" = SCH 160
4" = SCH 160min (CALC WT & MDMT)
6" = SCH XXSmin (CALC WT & MDMT)
SCRD/SW (ASTM A333 Gr.6 SMLS)
BW/RTJ (ASTM A333 Gr.6 SMLS)
4" = SCH 160min BW/RTJ (ASTM A333 Gr.6 SMLS)
6" = SCH XXSmin BW/RTJ (ASTM A333 Gr.6 SMLS)
5. ALL FORGED STEEL FITTINGS TO BE: SA-105N, 6000# (min) RATING (SPEC 'ES').
FUEL GAS COIL TO BE: SA-105N, 3000# (min) RATING.
ALL WELDED FITTINGS TO BE: SA-234-WPB NORMALIZED
6. SPEC 'ESL' TUBING: 1/4"-3/8" = 0.035" (min) ASTM A269 TP316/316L SMLS, FULLY ANNEALED
1/2" = 0.049" (min) ASTM A269 TP316/316L SMLS, FULLY ANNEALED
ALL TUBING FITTINGS: ASTM A182 F316/316L SWAGELOK
SPEC 'A' THREADED PIPING: 1/2"-2" = SCH 60
SPEC 'A' WELDED PIPING: 2"-10" = SCH 40
12" = STD
8. ALL FORGED STEEL FITTINGS TO BE: SA-105N, 3000# (min) RATING (SPEC 'A').
9. PAINTING SPEC:
EXTERNAL SURFACE PREPARATION: SSPO-SP-6 (COMMERCIAL SAND BLAST) - (PIPING, HEATER SKID, BODY & STACK)
EXTERNAL PRIMER: ONE (1) SHOP COAT OF COVERDALE FAST DRY PRIMER 5 mils
VESSEL EXTERNAL FINISH PAINT: TWO (2) SHOP COATS OF COVERDALE GREY ENAMEL (HIGH HEAT STACK & L.H. BODY
SKID FLOOR/STRUCTURAL STEEL: TWO (2) SHOP COATS OF COVERDALE BLACK ENAMEL
PIPING EXTERNAL FINISH: TWO (2) SHOP COATS OF COVERDALE GREY ENAMEL
INTERNAL SURFACE PREPARATION: NA
INTERNAL COATING OF VESSEL: NA
PROTECT ALL OPENINGS FOR SHIPMENT.
11. BOLTING TO BE SA-193-B7M STUDS w/ SA-194-2HM NUTS c/w 316SS FLEXITALLIC GASKET.
12. BUILDING SIZE: 5'-4" LG x 2'-0" WIDE.
BUILDING TYPE: FOAM PANEL, BOX STYLE/SIDE MOUNTED ENCLOSURE
ROOF TYPE: SHED
WALL HEIGHTS: 5'-6" EAVE
EXTERIOR: 22 GAUGE GALVALUME PRE-PAINTED COOL GREY 6.
INTERIOR: 22 GAUGE GALVALUME PRE-PAINTED WHITE
DOORS & TRIM PRE-PAINTED RED (PANTONE 186)
DOORS: ONE (1) 2'-6"x5'-4" DOUBLE DOOR WITH PANIC HARDWARE, CHECK CHAIN, WHITECOMB DOOR LATCH
WEATHER STRIP, SPRING LOADED BARREL BOLT.
VENTILATION: ONE (1) 8"x8" MANUAL LOUVER.
13. PACKAGE IS HYDRO TESTED @ 1.5 TIMES MAWP FOR ONE (1) HOUR AT ROOM TEMPERATURE.
14. VESSEL SHELL COVERED WITH 1 1/2" MINERAL WOOL HOT INSULATION, 0.20 STUCCO EMBOSSED ALUMINUM COVERING
WITH STEEL BANDING (HEADS NOT INCLUDED)
15. ALL INSTRUMENTS TO BE VENTED TO ATMOSPHERE.
16. ALL PIPE, VALVES AND FITTINGS IN SOUR PROCESS LINES, EXCEPT INSTRUMENT AIR, TO BE NACE/ISO, LATEST EDITION ACCEPTABLE.
17. ALL PIPING TO MEET ARC RESOURCES SPEC 'ES' AND 'A' PIPING SPECIFICATIONS.
18. RUN INSTRUMENT TUBING UNDER LINE HEATER INSULATION WHERE POSSIBLE.
19. ELECTRICAL INSTALLED BY 3RD PARTY CONTRACTOR.
20. 5-PIECE MITRE FIRETUBE AND COILS TO BE STRESS RELIEVED
21. ACL BURNER TO BE PRE-WIRED
22. ENGINEER STAMPED DRAWINGS ON FUEL TRAIN



VALVE LIST

| VALVE NUMBER | QTY. | MANUFACTURER | DESCRIPTION |
|--------------|------|--------------|---------------------------------------|
| 1"BA4M1 | 2 | WKM | 1" NPT WOG 3000# REG. PORT BALL VALVE |
| 1/2"BA4M1 | 2 | WKM | 1/2" NPT WOG 3000# R.P. BALL VALVE |
| 1/4"BA4M1 | 1 | WKM | 1/4" NPT WOG 3000# R.P. BALL VALVE |
| 1/4"NE4P1 | 1 | CENTURY | 1/2" NPT 6000# C.S. FxF NEEDLE VALVE |
| 1/4"NE4P1 | 3 | CENTURY | 1/4" NPT 6000# C.S. FxF NEEDLE VALVE |
| 2"GL4H1 | 1 | VELAN | 2" CL. 800# GLOBE VALVE |



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| | | DRAWING NO.: | EV-10310-F-001 |
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