

DRAWING NO.		REVISION	0
CUSTOMER	ENCANA CORPORATION	CUSTOMER REF	PO45862
AGENT	PRECISION ENGINEERING	JOB NO.	5076
PROJECT	HORIZONTAL SEPARATOR PACKAGE (LP)	QUOTATION NO.	5022
PREPARED BY	HARRY WONG	DATE ISSUED	2013-09-25

HORIZONTAL SEPARATOR PACKAGE (LP)

RED ROCK, ALBERTA
LSD 12-12-063-08 W6M

S-100	1	<p>STRUCTURAL STEEL SKID</p> <ul style="list-style-type: none"> - 14'0" wide x 25'0" long - W12 x 26 main members - 1/4" thick checkerplate floor - checkerplate perimeter to be stitch welded - checkerplate seams to be seal welded - four (4) lifting lugs - P.Eng stamped
B-100	1	<p>BUILDING</p> <ul style="list-style-type: none"> - 14'0" wide x 25'0" long x 11'0" eave (gable type roof, 4:12 slope) - self-framing metal building - 24 gauge galvalume - 24 gauge fluted aluminum interior liner (white) - R12 fiberglass insulation c/w 4 mil vapour barrier (roof) - R20 fiberglass insulation c/w 4 mil vapour barrier (walls) - two (2) 3' x 7' insulated mandoor (16 gauge) c/w IWG window, panic hardware, hydraulic closures, weather stripping, and canopy - door and door trim painted safety green - (2) - 38" x 36" horizontal double glazed sliding windows c/w bug screens and weatherstripping - (1) - 12" x 18" adjustable wall louvre c/w manual controls, birdscreen - (1) - 6" wide full length ridge vent c/w manual damper, chain operator, birdscreen - one (1) exhaust fan (ET12-2), 120/1/60, fanhood, XP312 thermostat - full length ice rakes, eavestroughs and downspouts (2) - P.Eng stamped building drawing
BH-3220/3230 BH-3240	3	<p>CATADYNE BUILDING HEATER (PROPANE)</p> <ul style="list-style-type: none"> - Model WX24x24 - Duty Rating: 16,000 BTU/hr - SSOV, TCV, PRV's - personnel protection grill, vent hood and piping to roof - 12 VDC start c/w cables

V-3250

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HORIZONTAL TEST SEPARATOR

- Size: 1067 mm OD x 4572 mm S/S (42" O.D. x 15'0" S/S)
- Design: 9930 kPag @ -45/54°C (1440 psig @ -50/129°F) MDMT
- C.A.: 1.6 mm (1/16")
- Radiography: full per RT-1
- P.W.H.T.: Yes (PER Code)

Vessel Specifics:

- Service: SWEET, 3 phase
- Internals: inlet deflector, removable weir (21" high), 6" thick 316 SS demister (9#/ft³), SS supports, vortex breakers
- saddles, lifting lugs
- Registered and inspected for use in Alberta,

Material:

Shell: 42" O.D. x 1.125" SA-516-70N (customer supplied)
Heads: 42" O.D. x 1.125" NOM 2:1 S.E. SA-516-70N (customer supplied)
Pipe: SA-106-B
Nozzles: SA-105N
Bolting: SA-193-B7/SA-194-2H
Gaskets: 1/8" thick 316SS

Nozzles:

Inlet:	(1) - 8" Class 600 RF
Gas Out:	(1) - 8" Class 600 RF
Drain:	(1) - 2" Class 600 RF
HC Liquid Out:	(1) - 3" Class 600 RF
Water Out:	(1) - 3" Class 600 RF
Bridle Connection:	(2) - 2" Class 600 RF
Water Bridle:	(2) - 2" Class 600 RF
PI:	(1) - 2" Class 600 RF
PSV:	(1) - 3" Class 600 RF
PSHH/PSLL:	(1) - 2" Class 600 RF
TI:	(1) - 2" Class 600 RF
Inspection:	(1) - 20" Class 600 RF c/w blind and davit assembly

NOTE: Manway to be left loose for field inspection upon arrival

V-3210	1	<p>FUEL GAS SCRUBBER (SWEET SERVICE)</p> <ul style="list-style-type: none"> - 12" OD x 5'0" s/s - 1965 kPag @ 38°C (285 psig @ -20/100°F) - 1.6 mm (1/16") corrosion allowance - Radiography: full per RT-2, P.W.H.T.: No <p>Vessel Specifics:</p> <ul style="list-style-type: none"> - Service: Sweet - internals: inlet deflector, 6" thick 316 SS demister (9#) with CS supports, vortex breaker - full diameter skirt - registered and inspected for use in Alberta. <p>Material:</p> <p>Shell: 12 3/4" O.D. sch 80 SA-106B Heads: 12 3/4" O.D. Pipe: SA-106-B, Nozzles: SA-105N Bolting: SA-193-B7/SA-194-2H Gaskets: 1/8" thick spiral wound 316 SS c/w flexible graphite filler and carbon steel centering ring</p> <p>Nozzles:</p> <p>Inlet: 2" 150# RF Gas Out: 2" 150# RF LSHH: 3" 150# RF Spare/Inspection: 3" 150# RF c/w blind Drain/Liquid Out: 1" NPT Inspection: 1 1/2" NPT 3000# NPT c/w plug</p>
P-3260 FC-3260	1	<p>WILLIAM PNEUMATIC CORROSION INHIBITOR PUMP</p> <ul style="list-style-type: none"> - model CRP500V400 (8.7 l/hr at 6300 psig capacity) - c/w MKX-IIA pneumatic controller (30 – 110 psi supply)
LG-3260	1	<p>KENCO 5700CVR-52 LEVEL/RATE GAUGE</p>
F-3210/3211	2	<p>1/2" NPT HEADLINE FUEL GAS COALESCING FILTERS</p> <ul style="list-style-type: none"> - aluminum housing c/w flow drain - 70c filter element (44 SCFM at 100 psig capacity) - 250 psig MAWP

F-3212	1	AIR PRODUCTS FUEL GAS CACTUS DRYER - model PC-1020 (ex-model # PPC-22-G) - 3/8" NPT connections - 300 psig at 150°F MAWP
FE-3250	1	2" CL. 600 SENIOR METER RUN (SWEET SERVICE) - 2" sch 80 SA-106B pipe, flanged both ends - AGA 2000 c/w flow conditioner (flanged style) - 3/4" and 1" NPT connection on the downstream - 10% X-ray and hydrotest - c/w one (1) 316SS orifice plate (3.0" bore) - 52" overall length
MVT-3210/3250 TE-3210/3250	2	SCHNEIDER ELECTRIC 4102 MULTIVARIABLE TRANSMITTER - model TBUT4102M2Y101U00A - Y span, 10 – 840" WC - mounting bracket (model TBUM298277) - 5 valve manifold - RTD assembly (model TBUM298258) 1.25" U length
FE/FQI-3251	1	2" 600# RF NUFLO EZ-IN TURBINE METER - 1 1/2" meter size (15-180 gpm range) - MC-III totalizer (4-20mA output, local display) - installation kit (pickup, extension)
FQI-3210	1	2" 150# FF ROMET RM-85 (RM-3000) FUEL GAS METER - 3000 cfh capacity, 175 psig MAWP - pulser output (4-20 mA)
LC-3251	1	2" 600# RF FISHER L2 LEVEL CONTROLLER - c/w vertical displacer and displacer extension - direct, snap acting - mount in bridle
PSHH-3250	1	CCS DUALSNAP ELECTRIC HIGH PRESSURE SWITCH - model 6900GZE18 (30 to 375 psig rising range) - set at 1965 kPag (285 psig) rising - 1/2" NPT process port
PSLL-3250	1	CCS DUALSNAP ELECTRIC LOW PRESSURE SWITCH - model 6900GZE14 (2 to 71 psig falling range) - set at 138 kPag (20 psig) falling - 1/2" NPT process port
LSHH-3210 LSHH-3250 LSLL-3251	3	1 1/2" NPT SOR ELECTRIC HIGH LEVEL SWITCH - model 1530C-G2A-C-W9-ES-CS-CV-MC - LSHH-3210, direct mount in fuel gas scrubber - LSHH-3250/LSLL-3251 mount in external level switch cage

LV-3251	1	2" 600# RF FISHER D4 LEVEL CONTROL VALVE - 1.0" trim, sweet service - fail closed, air to open
LCV-3210	1	1/2" NPT WHITEY CONTROL VALVE - 1/2" NPT Whitey SS-43GS8 series 40 ball valve - c/w Swagelok MS-131 SR actuator (fail closed, 80 psig supply) - c/w Swagelok SS-MB-43G mounting bracket
LG-3251	1	PENBERTHY REFLEX LEVEL GAUGE - model 3RL7 - 33 3/4" visible length, 1890 psig @ 200°F MAWP - c/w 3/4" NPT 330J gauge cocks (standard service)
BPCV-3250 PY-3250	1	3" 600# RF DYNAFLO 360 DIFFERENTIAL CONTROL VALVE - 2 5/16" reduced port, EQ% trim - fail OPEN, sweet trim - c/w Fisher i2P pressure transducer
PV-3251 ZSC-3251	1	2" 600# RF FISHER 667-D DIFFERENTIAL CONTROL VALVE - 1/2" port, EQ% trim, flow up - fail closed, sweet trim - c/w Topworx model 73-13524-A2 c/w Go switches (ZSC-3251) - SPDT, CSA, CL1, Div1, sst 36" leads
PSV-3250	1	FARRIS 26FA13-120 PRESSURE RELIEF VALVE (SWEET) - 1.5" 600# RF inlet x 2" 150# RF outlet - set at 9930 kPag (1440 psig) (blocked flow, gas)
PSV-3210	1	TAYLOR 82F4661311 PRESSURE RELIEF VALVE (SWEET) - 1" MNPT inlet x 1 1/2" FNPT outlet - "F" orifice, sized for PCV-3010 failure - set at 1034 kPag (150 psig) (blocked flow, gas)
PSV-3260	1	1/4" SWAGELOK SS-4R3A-C PRESSURE RELIEF VALVE - PURPLE spring (750 to 1500 psig range) - set at 9930 kPag (1440 psig) - Swagelok tubing connection
PCV-3210 PCV-3211	2	1" NPT FISHER 627 PRESSURE REGULATOR - ductile iron body - 1/4" orifice, 70 to 150 psig spring range - PCV-3210 set at 896 kPag (130 psig) - PCV-3211 set at 827 kPag (120 psig)
EY-3210 EY-3251 EY-3260	3	ASCO EF8314G301 SOLENOID VALVE - low power, - 24 VDC

PI-3251	1	4" WIKA 233.54 LIQUID FILLED PRESSURE GAUGE - 0 to 10,000 kPag, dual scale, SS case and bourdon tube - 1/2" NPT bottom connection * separator
PI-3218	1	4" WIKA 233.54 LIQUID FILLED PRESSURE GAUGE - 0 to 3,000 kPag, dual scale, SS case and bourdon tube - 1/2" NPT bottom connection * fuel gas scrubber
PIT-3250	1	ROSEMOUNT 3051T PRESSURE TRANSMITTER Model# 3051TG4A2B21AB4C6M5 G: Measurement Type: Gage 4: Pressure Upper Range Limit: TG: 4000 psi A: Transmitter Output: 4-20 mA (Digital Signal, HART Protocol) 2B: Process Connection Style: 1/2-14 NPT Female 2: Isolating Diaphragm: 316L SST 1: Sensor Fill Fluid: Silicone A: Polyurethane-covered Aluminum Housing: 1/2-14 NPT Entries B4: Bracket for 2-in. Pipe or Panel Mounting;All SST C6: CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe M5: LCD display
PCV/PI-3220 PCV/PI-3221 PCV/PI-3222 PCV/PI-3223 PCV/PI-3224 PCV/PI-3225 PCV/PI-3230 PCV/PI-spare	8	1/4" NPT FISHER 67CFR PRESSURE REGULATOR - 0 to 35 psig spring (5), 0 to 125 psig spring (3) - c/w 2.5" pressure gauge (1/4" NPT back connection, 0 to 100 psig)
RO-3200	1	2" 600# RF ORIFICE FLANGE - 5/8" orifice
RO-3210	1	1/2" NPT RESTRICTING NIPPLE - 4" long XXS pipe (SA-106B)
TI-3250 TW-3250	1	5" TREND MODEL 33 BIMETAL THERMOMETER - -40/200°F range - 15" stem length (1/2" back connection) - c/w 1/2" x 3/4" x 15" long 316 SS thermowell

VALVES MANUAL (as per Encana's ECA-PVF-S-04 (rev 1.2) and ECA-GEN-S- 05)

13-BT-20A00	3	1/4" NPT REG PORT 2000 WOG BALL VALVE
21-BT-20A00	18	3/4" NPT REG PORT 2000 WOG BALL VALVE
21-BT-20A20	2	1/2" NPT FULL PORT 2000 WOG BALL VALVE
27-BT-20A00	4	3/4" NPT REG PORT 2000 WOG BALL VALVE
33-BT-20A00	27	1" NPT REG PORT 2000 WOG BALL VALVE
60-BF-01A00	4	2" CL.150 RF REGULAR PORT BALL VALVE
60-BF-06A00	6	2" CL.600 RF REGULAR PORT BALL VALVE
60-BF-06A20	1	2" CL.600 RF FULL PORT BALL VALVE
60-DF-06A00	1	2" CL.600 RF REGULAR PORT BALL VALVE - double block and bleed (DBAB) Gas Service
60-DF-06A01	4	2" CL.600 RF REGULAR PORT BALL VALVE - double block and bleed (DBAB) Liquid Service
21-CT-08A00	2	1/2" NPT CL.800 CHECK VALVE
27-CT-08A00	1	3/4" NPT CL.800 CHECK VALVE
33-CT-08A00	1	1" NPT CL.800 CHECK VALVE
60-CF-01A00	1	2" CL.150 RF CHECK VALVE
60-CF-06A00	8	2" CL.600 RF CHECK VALVE
114-CF-06A00	1	4" CL.600 RF CHECK VALVE
33-TT-08A00	1	1" NPT GLOBE VALVE
60-TF-06A00	1	2" CL.600 RF GLOBE VALVE
60-YF-06A00	1	2" CL.600 RF Y-STRAINER - Alberta Strainer
27x21-NT-60A00	4	3/4" MNPT x 1/2" FNPT GAUGE NEEDLE VALVE - AGCO M5VIS-46
21-NT-60A03	4	1/2" MxF NPT GAUGE NEEDLE VALVE - AGCO H7VIC-44Q

CONSTRUCTIONS SPECIFICATIONS:

PIPING SPECIFICATIONS: ENCANNA'S PIPING SPECIFICATIONS.

PRESSURE TESTING

- 1) All pressure piping will be pressure tested in accordance with ASME B31.3 Pressure Piping Code.
- 2) All pressure piping will be either hydrotested to 1.5x the design pressure or pneumatically tested to 1.1x the design pressure per Pyramid Corporation's standard procedures.
- 3) DELETED
- 4) A 100 psi air and soap bubble test will be performed on the following:
 - all non-process threaded piping
 - instrument tubing
 - low pressure flare piping (D/S of PSV)
 - low pressure drain piping (D/S of last block valve)

TUBING SPECIFICATIONS

	Process 150# - 300#	Instruments	Vents	Drains
Size	1/2" (.035")	3/8" (.035")	3/8" (.035")	3/8" (.035")
Tubing Material	316 SS	316 SS	316 SS	316 SS
Fitting Material	316 SS Swagelok	316 SS Swagelok	316 SS Swagelok	316 SS Swagelok

NOTES

- 1) Swagelok compression type instrument fittings are to be provided for this project
- 2) Venting due to overpressure and/or diaphragm breakage is not included except when utilizing sour fuel gas.

PAINTING SPECIFICATIONS

- per Encana's painting specifications.

CLARIFICATIONS AND EXCEPTIONS

- 1) Equipment offered is based on Pyramid Corporation's in-house specifications and procedures for hydrotesting, welding, vessel calculations, etc. These will meet or exceed applicable Code requirements.
- 2) This offer was prepared using Pyramid Corporation's standard "General Specifications" as applicable to this equipment. Therefore the equipment offered may or may not meet 100% of your "General Specifications" included within the tender documents.
- 3) Process and instrumentation diagram and other drawings as applicable provided with the offer are for clarity only. Some equipment indicated may be at optional cost. The description found in the Equipment/Instrumentation List takes precedence over any and all drawings enclosed or attached.
- 4) Equipment offered is based on Pyramid Corporation's in-house specifications and procedures (if applicable) for hydrotesting, welding, vessel calculations, process and mechanical calculations, pipe stress / fatigue analysis, nozzle loadings, centre of gravity, etc. These calculations are considered proprietary and are not normally provided for review, approval or information. Should these calculations be required, we would be pleased to provide an optional cost for your consideration.
- 5) Valve manufacturer's as follows:
 - Ball Valves
 - (Flanged) : Nutron/WKM/Watts/KF/TK/Kitz/PBV
 - (Threaded) : Nutron/WKM/Watts/KF/TK/Kitz/PBV
 - (Socketweld) : Worcester/OMB
 - Check Valves
 - (Flanged) : Wheatley/Streamflo/Bonney Forge/Velan/DSI
 - (Wafer) : Wheatley/Streamflo
 - (SW/Threaded) : Bonney Forge/Velan/Crane/DSI/N.H./Newco
 - Gate/Globe Valves : DSI/Triangle/Newco/Bonney Forge
 - Needle Valves : AGCO/Century
- 6) Venting of instruments and controls are limited to those venting instrument gas during normal operations and which are provided with threaded vent ports only. Venting due to over pressure and/or diaphragm breakage are not included.

- 7) Three (3) hardcopy and one (1) CD of Pyramid Corporation's standard Maintenance Manual have been included which consist of the following:
- Equipment/Instrumentation List
 - Manufacturer's Product Literature
 - General Arrangement Drawing (As-Built)
 - Process and Instrument Drawing (As-Built)

NOTE: Additional hardcopy manuals can be provided at \$300.00 each

- 8) Two (2) hardcopy and one (1) CD standard Quality Control Manuals have been included which consist of the following:
- Piping Data Reports
 - Travel Sheets
 - Testing and NDE Reports
 - MTR's

Note: Material test reports for all pressure parts are kept on file at Pyramid Corporation for five (5) years. These reports are available; but are not normally included in the Q.C.manuals.

- 9) Three (3) copies of the following drawings will be "Issued for Approval":
- P&ID, Instrument List, General Arrangement

Only those drawings indicated will be submitted, **drawings of major components will not be submitted for approval**. Drawings provided will be supplied as hard paper copies. Electronic copies of drawings are not normally supplied but may be supplied upon request (P&ID, Skid and General Arrangement only).

- 10) The following has not been provided for:
- transportation, offloading and re-assembly
 - start-up assistance
 - electrical work / drawings
 - spare parts / spare parts list
 - instrument / equipment data sheets
 - chemical / lubricants & liquid charges
- 11) Standard temperature (-20°F) materials of construction have been included. The use of low temperature materials (-40°F) have been provided for piping and connections outside building limits.
- 12) Certain models numbers and description need clarification.