

ASSET TYPE	DUAL ZONE LINE HEATER
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QUANTITY	1
CITY/LOCATION	NISKU
PROVINCE	ALBERTA
LOCATION NAME	ENERFLEX (2103-8st)

MANUFACTURE	Presson Manufacturing Ltd
DATE OF MANUFACTURE	1994
SERIAL NUMBER	5551-50
PRN	3034242
CRN	E9886.213
SIZE	3.04 MMscfd
INLET / OUTLET TEMP	50 F / 50 F
RATING	1500 ANSI (RTJ Connections, 3")
MAWP	4503 PSI @ 250 F
PREHEAT COIL	3", 1500#, 3375psi @ 200F (Sched XXH)
REHEAT COIL	3", 1500#, 1350psi @ 200F (Sched XH)
TYPE OF SERVICE	Sour
C.A.	.125
SHELL THICKNESS	.674 (SA 333-GR6)
ORIENTATION	Horizontal
VESSEL SIZE	54" X 20'
BURNER	Presson
BURNER MODEL	IFH-1000
BURNER SIZE	1.0MM BTU
FUEL GAS SCRUBBER	Yes
U-1A FORM AVAILABLE	Yes
DRAWINGS	Yes

COMMENTS

- Asset is set up for a Dual Zone tie in and metering
- Dual 2" Inlet Control Value and Williams injection pumps
- 3" Sr Daniel MR, Sched 80, ANSI 600
- Honey Well Smart Transmitters (ST 3Q00)
- Never used package

DRAWING NO. B5551-010 REVISION AS BUILT PAGE
 1
 CUSTOMER AMOCO CANADA PETROLEUM CO. LTD. CUSTOMER REF. T.B.A.
 AGENT TARTAN ENGINEERING CORP. LTD. JOB NO. B5551-01
 PROJECT PINE CREEK OFFER NO. VERBAL
 PREPARED BY HARRY WONG DATE 94 08 05 CHECKED
 BY HSW TYPE DESIGN CONDITIONS DATE
 ISSUED/REVISED* 1994 10 31

<u>MARK</u>	<u>/</u>	<u>QTY.</u>	<u>/</u>	<u>DESCRIPTION</u>
				DUAL ZONE HEATER PACKAGE PINE CREEK LSD 02-17-57-19 W5M

DESIGN CONDITIONS: (LINE HEATER - BLUESKY)

	CASE 1	CASE 2
FLOWRATE - H ₂ O	0.60 m ³ /d (3.8 bbl/d)	.20 m ³ /d (1.28 bbl/d)
- Cond.	12.90 m ³ /d (81.2 bbl/d)	4.35 m ³ /d (27.4 bbl/d)
- Gas	86,000 m ³ /d (3.04 MMscfd)	29,000 m ³ /d (1.02 MMscfd)
DESIGN TEMPERATURE	-29/93`C (-20/200`F)	-29/93`C (-20/200`F)
DESIGN PRESSURE (PREHEAT)	23,275 kPag (3375 psi) 1500# ANSI RTJ	23,275 kPag (3375 psi) 1500# ANSI RTJ
PIPE SPECIFICATION	HH-3	HH-3
DESIGN PRESSURE (REHEAT)	9310 kPag (1350 psi) 600# ANSI RF	9310 kPag (1350 psi) 600# ANSI RF
PIPE SPECIFICATION	HE-3	HE-3
INLET TEMPERATURE	10`C (50`F)	10`C (50`F)

OUTLET TEMPERATURE	50` C (122`F)	50` C (122`F)
INLET PRESSURE	9000 kPa (1306 psi)	15,400 kPa (2234 psi)
OUTLET PRESSURE	8895 kPa (1291 psi)	9000 kPa (1306 psi)
GAS SPECIFIC GRAVITY	0.63	0.63
PROCESS	SOUR	SOUR

TYPE DESIGN CONDITIONS DATE ISSUED/REVISED*
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MARK / QTY. / DESCRIPTION
DESIGN CONDITIONS: (LINE HEATER - NORDEGG)

	CASE 1	CASE 2
FLOWRATE - H ₂ O	1.0 m ³ /d (6.2 bbl/d)	.3 m ³ /d (2.1 bbl/d)
- Cond.	21.0 m ³ /d (132.1 bbl/d)	7.1 m ³ /d (44.3 bbl/d)
- Gas	140,000 m ³ /d (4.94 MMscfd)	47,000 m ³ /d (1.66 MMscfd)
DESIGN TEMPERATURE	-29/120`C (-20/248`F)	-29/120`C (-20/248`F)
DESIGN PRESSURE (PREHEAT)	23,275 kPag (3375 psi)	23,275 kPag (3375 psi)
ANSI RTJ PIPE SPECIFICATION	1500# ANSI RTJ HH-3	1500# HH-3
DESIGN PRESSURE (REHEAT)	9310 kPag (1350 psi)	9310 kPag (1350psi)
RF PIPE SPECIFICATION	600# ANSI RF HE-3	600# ANSI HE-3
INLET TEMPERATURE	10`C (50`F)	10`C (50`F)
OUTLET TEMPERATURE	50` C (122`F)	50` C (122`F)
INLET PRESSURE	9000 kPa (1306 psi)	15,400 kPa (2234)

TYPE MAJOR EQUIPMENT DATE ISSUED/REVISED*
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MARK / QTY. / DESCRIPTION

B-100 1 BUILDING

- 12'0" wide x 15'0" long x 10'6" to eave; gable type roof
- self-framing building
- R12 fiberglass insulation c/w 4 mil vapour barrier
- 24 gauge fluted aluminum interior/22 gauge baked on enamel exterior
- walls and doors: Dofasco Gold 5M-QC276
- trim and roof: Dofasco White 5M-QC317
- 2 - 3' x 7' insulated manddoors c/w lock set, threshold, panic hardware, door closure, check chains, 24" x 24" IWG windows and canopies extending 2'0" from door and 1'0" on either side of door
- full length ridge vent with 9" throat c/w chain operated dampner and bird screens
- 2 - 36" x 32" horizontal double glazed sliding window c/w bug screens and weather stripping
- 2- 12"x 12" louvred vents c/w manually adjustable sliding covers c/w bug screens and filters
- interior liner joints to be sealed with caulking
- eavetroughs and downspouts
- openings flashed
- cadmium plated building screws
- erected on skid

S-100 1 SKID

- 12'0" wide x 29'0" long with 10" WF main members
- 12'0" wide x 15'0" long section to be covered with 1/4" checkerplate decking (seal welded)
- 12'0" wide x 14'0" long section to be covered with DB grating (except for the section under the heater)
- grating extension over tow bars in

walkway area

- 2" thick Safethane 40 foam insulation
c/w fire retardant
- 4" NPS tow bar ends (9" projection)
- cross members, "not" full depth beams
- 12" X 12" X 4" deep floor sump c/w
grating cover
- 2" NPT drain piping to skid edge

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H-100 1 PROCESS DUAL ZONE LINE HEATER
- PRESSON IFH-1000
- Size: 54" O.D. x 20'0" long
- Duty: Nominal: 1,000,000 BTU/hr

Materials:

- Shell: 3/16" thick A-36 plate
- Ends: 3/8" thick A-36 plate
- Couplings: 3000# F.S. NPT
- Firetube: 14" O.D. sch std (0.375") SA-106-B pipe U-shaped removable firetube (100% radiography on mitre welds)
- Stack: 14" O.D. sch std (0.365") A-53B ERW pipe c/w downdraft diverter and rain cap
- Supports: 1/4" thick wear plates A-36 plate
3/8" thick saddles A-36 plate
- Flame Cell: housing: 3/16" thick A-36 plate
arrestor: 4" thick x 27" O.D.
- Expansion tank: 24" O.D. x 5'0" long
- Insulation: 1 1/2" thick AF-530 fibreglass insulation c/w aluminum jacket outside of the building limits. No insulation on end plates.
- Drain: 2" 150# RF

Preheat Coil: (Bluesky)

- four (4) passes of 3" sch XXH SA-106-B pipe c/w 180 degree LRRB's SA-234-WPB (or 90 degree ells as available) and 3" 1500# RTJWN flanges SA-105N
- Design: 3375 psig (23,275 kPa) @ 200` F (93` C)
- C.A.: 1/8"
- Radiography: 100%
- P.W.H.T.: yes

Reheat Coil: (Bluesky)

- four (4) passes of 3" sch 80 SA-106-B

pipe c/w 180 degree LRRB's SA-234-
WPB (or 90 degree ells as
available) and 3" 600# RFWN
flanges SA-105N

- Design: 1350 psig (9310 kPa) @ 200` F
(93` C)
- C.A.: 1/8"
- Radiography: 100%
- P.W.H.T.: yes

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MARK / QTY. / DESCRIPTION
 H-100 cont....

Preheat Coil: (Nordegg)

- four (4) passes of 3" sch XXH SA-106-B pipe c/w 180 degree LRRB's SA-234-WPB (or 90 degree ells as available) and 3" 1500# RTJWN flanges SA-105N
- Design: 3375 psig (23,275 kPa) @ 200` F (93` C)
- C.A.: 1/8"
- Radiography: 100%
- P.W.H.T.: yes

Reheat Coil: (Nordegg)

- six (6) passes of 3" sch 80 SA-106-B pipe c/w 180 degree LRRB's SA-234-WPB (or 90 degree ells as available) and 3" 600# RFWN flanges SA-105N
- Design: 1350 psig (9310 kPa) @ 200` F (93` C)
- C.A.: 1/8"
- Radiography: 100%
- P.W.H.T.: yes

Fuel Gas Preheat Coil:

- U-tube style coil consisting of 1" sch 80 SA-106-B pipe with formed bend

P-106	1	METHANOL INJECTION PUMP - WILLIAMS MODEL CP-1000D600 - supplied by customer * refer to customer supplied equipment page 18
P-107	1	CHEMICAL INJECTION PUMP - WILLIAMS MODEL CP-250D225 - supplied by customer * refer to customer supplied equipment page 18

V-110

- 1 FUEL GAS SCRUBBER
- 8 5/8" O.D. x 3'0" S/S (PRESSON standard)
 - 250 psig @ 200` F
 - 1/16" corrosion allowance
 - float type LSDH

TYPE FLOW DATE ISSUED/REVISED* 1994

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MARK	/ QTY. /	DESCRIPTION
FE-100 FE-200	2	3" SCH 80 DANIEL METER RUNS - 600# ANSI Simplex style fitting - built to AGA Fig 3C - NACE trim - one 3/4" and one 1" 600# RF flanged connections on downstream - one (1) orifice plate, 316 SS (1 1/4") - both ends flanged - NOTE: 2 - 1/2" NV-050 isolation valves at meter
MV-5	2	AGCO M6AVDC-4 FIVE VALVE MANIFOLDS (NACE) - transmitters
DP-30	1	KIMRAY DP-30 DRIP POT - MAWP 300 psi - carbon steel - pilot gas line
FCV-100 FCV-200	2	FISHER 667-D FLOW CONTROL VALVES - 2" 1500# RTJ connections - 1" microform port (FCV-100) - 1 1/4" microform port (FCV-200) - 6 to 30 psi, fail closed - NACE trim - mounting bracket - size 46 actuator
FI-110	1	KING MODEL K7510-22-4A-09 FLOW INDICATOR - 0 to 60 scfh range - 125 psi @ 130°F maximum - 316 SS connections - Viton seal rings - purge gas flow indicator

<u>TYPE</u>	<u>PRESSURE</u>	<u>DATE ISSUED/REVISED*</u>	<u>1994</u>
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<u>MARK</u>	<u>/ QTY. /</u>	<u>DESCRIPTION</u>	
PC-101	1	FISHER 4150 PRESSURE CONTROLLER (NACE) - 6 to 30 psi proportional output, reverse acting - 0 to 1500 psi bourdon tube	
PI-101	4	4" WIKA 233.54 LIQUID FILLED PRESSURE GAUGES	
PI-102		- NACE	
PI-201		- dual scale	
PI-202		- 1/2" NPT bottom connection, 316 SS bourdon tube - range 0 to 35,000 kPa (5000 psi) PI- 101/201 - range 0 to 10,000 kPa (1450 psi) PI- 102/202	
PI-110	1	4" WIKA 233.53 LIQUID FILLED PRESSURE GAUGE - dual scale - 1/2" NPT bottom connection, 316SS bourdon tube - 0 to 1400 kPa range (200 psi) - located downstream of fuel gas scrubber	
PI-111	2	2 1/2" WIKA 232.53 DRY PRESSURE GAUGE	
PI-112		- dual scale - PI-111 range 0 to 100 kPa on pilot gas line - PI-112 range 0 to 200 kPa on fuel gas line	
PRV-100	1	1" NPT FISHER TYPE 627 CS REGULATOR - range 90 to 150 psi - 3/16" orifice - steel body - set at 690 kPa (100 psi)	
PY-100	2	FAIRCHILD MODEL 90 LOW PRESSURE RELAYS	
PY-200		- aluminum alloy body, brass trim - 1/4" NPT connection - located between PC-101 and PC-102	

PRV-101	1	1" NPT FISHER TYPE 627 CS REGULATOR - 10 to 25 psi range, 1/4" orifice - steel body - fuel gas regulator
PRV-102	1	1/4" NPT FISHER TYPE 912N-523 GAS REGULATOR - pilot gas regulator - range 2.7 to 5 psi
PRV-103	1	1/4" NPT FISHER 67AFR INSTRUMENT GAS REGULATOR - 0 to 35 psi range
PRV-104	2	1/4" NPT FISHER 67AFR INSTRUMENT GAS REGULATORS
PRV-110		- 0 to 100 psi range

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MARK	/ QTY. /	DESCRIPTION
PSV-100 PSV-200	2	1" x 1" NPT FARRIS 2740UL RELIEF VALVE - plain cap; NACE trim (primary zone only) - set at 9310 kPa (1350 psig) - located downstream of FE-100, FE-200 - mounted to a reducing hub flange
PSV-106 PSV-107	2	NUPRO R3A RELIEF VALVES - Model SS-4R3A5-E - 2250 to 3000 psi spring range (Brown) - set at 2610 psi
PSV-110	1	1" x 1" NPT FARRIS 2740UL RELIEF VALVE - plain cap; NACE trim (primary zone only) - set at 150 psig, 0.06 orifice - located upstream of fuel gas scrubber
TH-101	1	ENARDO THIEF HATCH - 16 ounces pressure/4 ounce vacuum - located on top of heater expansion tank
I/G	5	1/4" NPT FISHER TYPE 67FR INSTRUMENT GAS REGULATORS - 5 to 35 psi range - c/w PI
PV-101 PV-102 PV-103	3	AMOT 4057D027E6 THREE WAY LATCHING VALVES - type SB c/w valve overlap (13 psi) - manual reset
PSL-101 PSL-102 PSL-110	3	ASCO MODEL SB22D/TE20A42 LOW PRESSURE SWITCHES - 1.5 to 36 psi adjustable range - explosion proof - 316 SS and Viton trim transducer - fixed deadband, manual reset - set at 5 psi falling
PSHL-102	1	FISHER 4660 HI-LO PRESSURE PILOT - NACE trim, 316SS bourdon tube

- 125 - 2375 psi range
- set at 1350 psi (9310 kPa) rising
- set at 145 psi (1000 kPa) falling

PCV-101 2 1/4" NPT FISHER 67AFR INSTRUMENT GAS
REGULATORS

PCV-102 - 0 to 35 psi range
 - c/w handwheel, PI
 - manual loading station

TYPE FIRE LOOP STYLE ESD CIRCUIT DATE ISSUED/REVISED* 1994
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MARK / QTY. / DESCRIPTION

We will install a fire loop utilizing 3/8" 316 SS tubing
c/w fusible plugs. The line will run on the inside of the
building near the peak of the ceiling.

The line will include three (3) 3/8" CAJON #SS-6-FSP-281
fusible plugs. These plugs are designed to melt at 281°F

TYPE SAFETY DATE ISSUED/REVISED* 1994
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MARK	/ QTY. /	DESCRIPTION
FFSD-101	1	KIMRAY HT-12 PG PILOT GUARD
TCV-101	2	1" NPT FISHER 119 CS CONTROL VALVES
SDV-101		- 3 to 15 psi air to open - taper trim - steel body
TSDH-101	1	KIMRAY T12-DA BASE ASSEMBLY - SS-12 separable socket
LSH-110	1	WELLMARK FLOAT TYPE HIGH LEVEL SHUTOFF - on fuel gas scrubber
EY-102	1	1/4" ASCO EF8320G200 THREE WAY SOLENOID VALVE - 24 VDC

TYPE _____ TEMPERATURE _____ DATE ISSUED/REVISED* 1994

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MARK	/ QTY. /	DESCRIPTION
TC-101	1	KIMRAY T12-DA BASE ASSEMBLY - SS-12 separable socket
TI-100	1	3" BIMETAL THERMOMETER 0 TO 150` C RANGE (DUAL SCALE) - 1/2" x 3/4" NPT x 6" long T316 SS thermowell - located on heater bath
TW-100	2	1/2" X 3/4" NPT X 6" LONG T316 SS THERMOWELLS
TW-200		- transmitters
TI-101	2	3" TREND MODEL 33 BIMETAL THERMOMETERS
TW-101		- -40 to 70`C range
TI-201		- dual scale
TW-201		- 1/2" x 3/4" x 6" long 316 SS thermowell - mounted on a threaded hub flange
TI-102	2	3" TREND MODEL 33 BIMETAL THERMOMETERS
TW-102		- -40 to 70`C range
TI-202		- dual scale
TW-202		- 1/2" x 3/4" x 4" long 316 SST thermowell - mounted on a threaded hub flange

TYPE _____ TRANSMITTERS _____ DATE ISSUED/REVISED* 1994
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<u>MARK</u>	<u>/ QTY. /</u>	<u>DESCRIPTION</u>
FT-100	2	HONEYWELL DIFFERENTIAL PRESSURE TRANSMITTERS
FT-200		MODEL STD130-G1H-00000-S2CRMBC1C3 - SMART circuitry NOTE: customer supplied
PT-100	2	HONEYWELL GAGE PRESSURE TRANSMITTERS
PT-200		MODEL STG170-GLG-000-CRMBC1C3 - SMART circuitry NOTE: customer supplied
TT-100	2	HONEYWELL TEMPERATURE TRANSMITTERS
TT-200		MODEL STT-300-00-0-EP-DE-MB-C1C3 - SMART circuitry - remote RTD probe assembly - Model RA11-D1001A3-60-XB3-ATW - thermowell - Model W21-12-316-045-DD NOTE: customer supplied

TYPE HAND VALVES DATE ISSUED/REVISED* 1994

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<u>MARK</u>	<u>/ QTY. /</u>	<u>DESCRIPTION</u>
BA-025	1	1/4" NPT 2000 WOG REGULAR PORT NUTRON BALL VALVE - sweet trim
BA-050	3	1/2" NPT 2000 WOG FULL PORT NUTRON BALL VALVES - sweet trim
BA-100	8	1" NPT 2000 WOG REGULAR PORT NUTRON BALL VALVES - sweet trim
CH-050	3	1/2" NPT CLASS 800 CHECK VALVE
GAF-201	1	2" 150# RF GATE VALVE - sweet trim - heater drain
NV-025	13	1/4" NPT AGCO H7VC-2 NEEDLE VALVES
NV-050	14	1/2" NPT AGCO H7VC-4Q SG NEEDLE VALVES - NACE trim
NV-075	3	3/4" NPT X 1/2" NPT AGCO M5VIS-46-SG NEEDLE VALVES - multi-port, NACE trim

TYPE PIPING SPECIFICATIONS DATE ISSUED/REVISED* 1994
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PIPING MATERIAL

	150# ANSI	600# ANSI	1500# ANSI
AMOCO			
PIPE SPEC	GC-2	HE-2	HH-3
	<u>WELDED</u>	SELECT CHEM	SELECT CHEM
	sch 40	2" sch 80	2" sch 160
		3" & 4" sch 80	3" to 4" sch
XXH			
Piping	A-106-B smls	A-106-B smls	A-106-B smls
Flanges	A-105	A-105N	A-105N
Fittings	A-234-WPB	A-234-WPB	A-234-WPB
Boltings	B7 studs, 2H nuts	B7M studs, 2HM nuts	B7M studs, 2HM nuts
Gaskets	T304SS flexitallic	T316SS flexitallic	soft iron
Corrosion Allowance	1/16"	1/8"	1/8"

Note: Select Chemistry flanges and fittings to be Amoco approved.

$$CE = C + \frac{Mn}{6} + \frac{(Cr+Mo+V)}{5} + \frac{(Ni+Cu)}{15} \leq .45$$

THREADED

	GC-2	HE-2, HH-3
Pipes	A-106-B sch 80	A-106-B sch 160
Fittings	3000# F.S. A-105	6000# F.S. A-105
Nipples	sch 80 A-106	sch 160 A-106

Note: Threaded piping does not include provision for additional corrosion allowance.

SOCKETWELD - We have not included socketwelding of any piping.

RADIOGRAPHY

2" and larger butt welded	150# ANSI 5%	600# ANSI 100%	1500# ANSI 100%
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PWHT

NO

YES

YES

AIR TEST

- air and soap bubble test at 100 psig will be provided only for threaded piping and process and instrument tubing only

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HYDROTEST

- hydrotesting of 2" and larger butt welded process piping only has been included

TUBING

	Process	Instruments	Vents
Size	3/8" (.035")	1/4" (.035")	3/8" (.035")
Tubing Mtl	316 stainless steel	316 stainless steel	316 stainless steel
Fitting Mtl	Swagelok 316 SS	Swagelok 316 SS	Swagelok 316 SS

VENTING

- all venting instruments and equipment will be vented outside of building via a vent header

- 1) All instruments, regulators, equipment, gauges, and valves to be provided are explicitly detailed, numbered and tagged in the main body of Equipment/Instrumentation List. Only items specifically described will be included in the final product.
- 2) Process and instrumentation diagram and other drawings as applicable provided are for clarity only. Some equipment indicate may be at optional cost. The description found takes precedence over any and all drawings enclosed or attached.
- 3) Equipment is based on PRESSON's in-house specifications and procedures for hydrotesting, welding, vessel calculations etc. These will meet or exceed applicable Code requirements.
- 4) Threaded and socket weld gate, globe and check valves not otherwise specifically outlined may, at the option of PRESSON, be supplied from any one of the following Manufacturers:
 - Crane
 - OMB
 - Velan
- 5) Threaded ball valves not otherwise specifically outlined may at the option of PRESSON, be supplied from any one of the following Manufacturers:
 - Nutron T3
- 6) Threaded needle valves not otherwise specifically outlined may at the option of PRESSON, be supplied from any one of the following Manufacturers:
 - AGCO
- 7) Swagelok compression type instrument fittings are provided for this project.

- 8) 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.