



QUICKSILVER
RESOURCES

JOFFRE COMPRESSOR STATION LSD 04-22-039-25 W4M

**K-600 ADDITION
ISSUED FOR CONSTRUCTION**

GRB ENGINEERING Ltd.

1000, 707 - 7th AVENUE SW
CALGARY, ALBERTA

PROJECT NUMBER: 9424.03
MECHANICAL & CIVIL DRAWINGS
JUNE 2006

Service: REGULAR TEMPERATURE SWEET Hydrocarbon Liquid - Gas - Glycol - Process Drains - LP Flare Systems - Instrument Air	MSP – “A” Class 150
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Design Code: ASME B31.3	PWHT: >19.1mm W.T. only
Pressure Range: 1,965 to 1,379 kPa	NDE : 10% RT on Buttwelds
Temperature Range: - 29°C to 204°C	10% RT on Socket welds
Corrosion Allowance: 1.6mm	10% MT on Fillet welds

48mm and below Threaded or Socket welded. 60mm and above Butt Welded (see note 1)

Item	Size (mm)	Description	ASTM Spec	Notes
Pipe	21 - 48 60 - 273	Sch 80 smls PE, TE STD Wall smls BE Calc W.T. above 273mm	A106 Gr. B	1,4
Flanges	21 - 48 60 - 610	150 ASME FS RF SW, TE 150 ASME FS RFWN Bore to match pipe.	A105N	1,2,3,4
Orifice Flanges	60 - 324	300 ASME FS RFWN c/w 21mm pressure taps, jack bolts, gaskets. Bore to match pipe	A105N	2
Fittings	21 - 48 60 - 610	Class 3000 FS SW, TE BW Schedule to match pipe.	A105N A234 WPB	1,2,4
Unions	21 - 48	Class 3000 FS SW, TE GJ integral. Seat	A105N	1,2
Nipples	21 - 48	Sch 160 Smls PE, TE No close nipples. Min. length 100mm	A106 Gr. B	1
Swages	21 - 48	Sch 160 Smls PE, TE	A106 Gr. B	1
O'lets	21 - 48	Class 3000 FS SW, TE	A105N	1,2
Weldolets	60 - 273	Bore to match pipe	A105N	2
Paddle & Spec Blinds	60 - 610	150 ASME RF	A516 70N	
Bolting		Studs: continuous thread Nuts: 2 heavy hex	A193 Gr. B7M A194 Gr. 2HM	
Gaskets		Class 150 spiral wound non asbestos 3.2mm (1/8") TKS	304/316 SS	

Notes on Piping Material:

- 89mm to 60mm threaded or socket welded pipe and fittings may be approved by the Project Engineer for some services. Pipe W.T. to be calculated.
- All forgings shall be normalized.
- Flanges over 610mm may be slip-on type with prior approval from the Project Engineer.
- Pipe and fittings over 12.7mm wall thickness must be A333 Gr.6 and A420 WPL6 respectively to maintain MDMT of -29°C.
- MTR's to be supplied for all materials.

PIPING NOMENCLATURE:- BE = Beveled End; PE = Plain End; TE = Threaded; BW = Butt Weld; SW = Socket Weld; FL = Flanged; WN = Weld Neck; RF = Raised Face; RJ = Ring Joint; PWHT = Post Weld Heat Treatment; FS = Forged Steel; TKS = Thickness; W.T. = Wall Thickness
NDE = Non Destructive Examination; RT = Radiography; MT = Magnetic Particle Inspection; UT = Ultrasonic Testing

Service: REGULAR TEMPERATURE SWEET Hydrocarbon Liquid - Gas - Glycol - Process Drains - LP Flare Systems - Instrument Air	MSP – “A” Class 150
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Valves Associated with Specification MSP-“A” Class 150. For Tag Details see Section 5.4 Valve Tag Coding

BALL VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BODY	BALL/ OPERATOR	TRIM API/BALL/SEALS	BOLTS NUTS	NOTES
21-48	2000	BA2003RT	TE	NO	A105N	RP	SPLIT	FLT/L	607-CrPI/TFE	B7/2H	1,2
21-48	2000	BA2004RT	SW	NO	A105N	RP	SPLIT	FLT/L	607-CrPI/TFE	B7/2H	1,2
60-168	150	BA0101RT	FL/RF	NO	A216 WCB	RP	SPLIT	FLT/L	607-608/CrPI/TFE	B7/2H	1,2,4
60-168	150	BA0111RT	FL/RF	NO	A216 WCB	FP	SPLIT	FLT/L	607-608/CrPI/TFE	B7/2H	1,2,4
219-610	150	BA0161RT	FL/RF	NO	A216 WCB	RP	SPLIT	TR/G	607-608/CrPI/TFE	B7/2H	1,2
219-610	150	BA0171RT	FL/RF	NO	A216 WCB	FP	SPLIT	TR/G	607-608/CrPI/TFE	B7/2H	1,2

CHECK VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	TYPE	COVER	TRIM	BOLTS NUTS	NOTES
21-48	800	CH0813RT	TE	NO	A105N	RP	PISTON	BOLTED	API 602, trim #8	B7/2H	
21-48	800	CH0814RT	SW	NO	A105N	RP	PISTON	BOLTED	API 602, trim #8	B7/2H	
60-610	150	CH0101RT	FL/RF	NO	A216 WCB	RP	SWING	BOLTED	API 600, trim #1	B7/2H	4
60-610	150	CH0121RT	FL/RF	NO	A216 WCB	FP	SWING	BOLTED	API 600, trim #1	B7/2H	4

GATE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	BONNET/ OPERATOR	TRIM	BOLTS NUTS	NOTES
21-48	800	GA0803RT	TE	NO	A105N	RP	OS&Y	BOLT'D/H	API 602, trim #8	B7/2H	2
21-48	800	GA0804RT	SW	NO	A105N	RP	OS&Y	BOLT'D/H	API 602, trim #8	B7/2H	2
60-324	150	GA0101RT	FL/RF	NO	A216 WCB	RP	OS&Y	BOLT'D/H	API 600, trim #8	B7/2H	2,4
60-324	150	GA0111RT	FL/RF	NO	A216 WCB	FP	OS&Y	BOLT'D/H	API 600, trim #8	B7/2H	2,4
356-610	150	GA0121RT	FL/RF	NO	A216 WCB	RP	OS&Y	BOLT'D/G	API 600, trim #8	B7/2H	2
356-610	150	GA0131RT	FL/RF	NO	A216 WCB	FP	OS&Y	BOLT'D/G	API 600, trim #8	B7/2H	2

GLOBE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	BONNET/ OPERATOR	TRIM	BOLTS NUTS	NOTES
21-48	800	GL0803RT	TE	NO	A105N	-	OS&Y	BOLT'D/H	API 602, trim #8	B7/2H	
21-48	800	GL0804RT	SW	NO	A105N	-	OS&Y	BOLT'D/H	API 602, trim #8	B7/2H	
60-168	150	GL0101RT	FL/RF	NO	A216 WCB	-	OS&Y	BOLT'D/H	API 600, trim #8	B7/2H	3,4

NEEDLE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	STEM	TRIM	BOLTS NUTS	NOTES
≤ 27	6000	NE6003RT	TE	NO	316 SS	-	-	316 SS	TFE/ V	-	
≤ 27	6000	NE6007RT	MxF/TE	NO	316 SS	-	-	316 SS	TFE/ V	-	

Notes on Valves:

- Consult manufacturer for recommendations on ball valves operating above 38°C or use gate valves
- All gate and ball valves are regular port unless otherwise noted on the P&ID
- Globe valves 219 and up, use gate valves
- 89mm to 60mm threaded or socket welded valves may be approved by the project engineer for some services.
- MTR's to be supplied for all materials.

VALVE NOMENCLATURE:- SW = Socket Weld; TE = Threaded Ends; MxF = Male x Female; FL = Flanged; RF = Raised Face; RJ = Ring Joint; CS = Carbon Steel; FS = Forged Steel; SS = Stainless Steel; RP = Regular Port; FP Full Port; OS&Y = Outside Screw & Yoke; Stel = Stellite; CrPi = Chrome Plated; N = Nylon; TFE = Teflon; V = Viton; FLT = Floating; TR = Trunnion; ENC = Electroless Nickel Coating;
VALVE OPERATORS - G = Gear; L = Lever; H = Hand wheel

Service: LOW TEMPERATURE SWEET Hydrocarbon Liquid - Gas - Glycol - Process Drains - LP Flare Systems	MSP – “AL” Class 150
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Design Code: ASME B31.3

PWHT: >19.1mm W.T. only

Pressure Range: 1,965 to 1,379 kPa

NDE : 10% RT on Buttwelds

Temperature Range: - 45°C to 204°C

10% RT on Socket welds

Corrosion Allowance: 1.6mm

10% MT on Fillet welds

48mm and below Threaded or Socket Welded. 60mm and above Butt Welded (see note 1)

Item	Size (mm)	Description	ASTM Spec	Notes
Pipe	21 - 48 60 - 273	Sch 80 smls PE, TE STD Wall smls BE Calc. W.T. above 273mm	A333 Gr. 6	1
Flanges	21 - 48 60 - 610	150 ASME FS RF SW, TE 150 ASME FS RFWN Bore to match pipe.	A350 LF2 Cl. 1	1,2,3,5
Orifice Flanges	60 - 324	300 ASME FS RFWN c/w 21mm pressure taps, jack bolts, gaskets. Bore to match pipe	A350 LF2 Cl. 1	2,5
Fittings	21 - 48 60 - 610	Class 3000 FS SW, TE BW Schedule to match pipe.	A350 LF2 Cl. 1 A420 WP6	1,2,5
Unions	21 - 48	Class 3000 FS SW, TE GJ integral. Seat	A350 LF2 Cl. 1	1,2,5
Nipples	21 - 48	Sch 160 Smls PE, TE No close nipples. Min length 100 mm	A333 Gr. 6	1
Swages	21 - 48	Sch 160 Smls PE, TE	A333 Gr. 6	1
O'lets	21 - 48	Class 3000 FS SW, TE	A350 LF2 Cl. 1	1,2,5
Weldolets	60 - 273	Bore to match pipe	A350 LF2 Cl. 1	2,5
Paddle & Spec Blinds	60 - 610	150 ASME RF	A516 70N	
Bolting		Studs: continuous thread Nuts: 2 heavy hex	A193 Gr. B7M A194 Gr. 2HM	
Gaskets		Class 150 spiral wound non asbestos 3.2mm (1/8") TKS	304/316 SS	

Notes on Piping Material:

- 89mm to 60mm threaded or socket welded pipe and fittings may be approved by the Project Engineer for some services. Pipe W.T. to be calculated.
- All forgings shall be normalized.
- Flanges over 610mm may be slip-on type with prior approval from the Project Engineer.
- MTR's to be supplied for all materials.
- A350 LF2 forgings to be Class 1 impact tested to minus 45°C.

PIPING NOMENCLATURE:- BE = Beveled End; PE = Plain End; TE = Threaded; BW = Butt Weld; SW = Socket Weld; FL = Flanged; WN = Weld Neck; RF = Raised Face; RJ = Ring Joint; PWHT = Post Weld Heat Treatment; FS = Forged Steel; TKS = Thickness; W.T. = Wall Thickness
NDE = Non Destructive Examination; RT = Radiography; MT = Magnetic Particle Inspection; UT = Ultrasonic Testing

Service: LOW TEMPERATURE SWEET Hydrocarbon Liquid - Gas - Glycol - Process Drains - LP Flare Systems	MSP – “AL” Class 150
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Valves Associated with Specification MSP-“AL” Class 150. For Tag Details see Section 5.4 Valve Tag Coding

BALL VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BODY	BALL/ OPERATOR	TRIM API/BALL/SEALS	BOLTS NUTS	NOTES
21-48	2000	BA2003LT	TE	NO	A350 LF2	RP	SPLIT	FLT/L	607/CrPI/TFE	B7M/2HM	1,2
21-48	2000	BA2004LT	SW	NO	A350 LF2	RP	SPLIT	FLT/L	607/CrPI/TFE	B7M/2HM	1,2
60-168	150	BA0101LT	FLRF	NO	A352 LCC	RP	SPLIT	FLT/L	607-608/CrPI/TFE	B7M/2HM	1,2,4
60-168	150	BA0111LT	FLRF	NO	A352 LCC	FP	SPLIT	FLT/L	607-608/CrPI/TFE	B7M/2HM	1,2,4
219-610	150	BA0161LT	FLRF	NO	A352 LCC	RP	SPLIT	TR/G	607-608/CrPI/TFE	B7M/2HM	1,2
219-610	150	BA0171LT	FLRF	NO	A352 LCC	FP	SPLIT	TR/G	607-608/CrPI/TFE	B7M/2HM	1,2

CHECK VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	TYPE	COVER	TRIM	BOLTS NUTS	NOTES
21-48	800	CH0813LT	TE	NO	A350 LF2	RP	PISTON	BOLTED	API 602, trim #8	B7M/2HM	
21-48	800	CH0814LT	SW	NO	A350 LF2	RP	PISTON	BOLTED	API 602, trim #8	B7M/2HM	
60-610	150	CH0101LT	FLRF	NO	A352 LCC	RP	SWING	BOLTED	API 600, trim #1	B7M/2HM	4
60-610	150	CH0121LT	FLRF	NO	A352 LCC	FP	SWING	BOLTED	API 600, trim #1	B7M/2HM	4

GATE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	BONNET/ OPERATOR	TRIM	BOLTS NUTS	NOTES
21-48	800	GA0803LT	TE	NO	A350 LF2	RP	OS&Y	BOLT'D/H	API 602, trim #8	B7M/2HM	2
21-48	800	GA0804LT	SW	NO	A350 LF2	RP	OS&Y	BOLT'D/H	API 602, trim #8	B7M/2HM	2
60-324	150	GA0101LT	FLRF	NO	A352 LCC	RP	OS&Y	BOLT'D/H	API 600, trim #8	B7M/2HM	2,4
60-324	150	GA0111LT	FLRF	NO	A352 LCC	FP	OS&Y	BOLT'D/H	API 600, trim #8	B7M/2HM	2,4
356-610	150	GA0121LT	FLRF	NO	A352 LCC	RP	OS&Y	BOLT'D/G	API 600, trim #8	B7M/2HM	2
356-610	150	GA0131LT	FLRF	NO	A352 LCC	FP	OS&Y	BOLT'D/G	API 600, trim #8	B7M/2HM	2

GLOBE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	BONNET/ OPERATOR	TRIM	BOLTS NUTS	NOTES
21-48	800	GL0803LT	TE	NO	A350 LF2	-	OS&Y	BOLT'D/H	API 602, trim #8	B7M/2HM	
21-48	800	GL0804LT	SW	NO	A350 LF2	-	OS&Y	BOLT'D/H	API 602, trim #8	B7M/2HM	
60-168	150	GL0101LT	FLRF	NO	A352 LCC	-	OS&Y	BOLT'D/H	API 600, trim #8	B7M/2HM	3,4

NEEDLE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	STEM	TRIM	BOLTS NUTS	NOTES
≤ 27	6000	NE6003LT	TE	NO	316 SS	-	-	316 SS	TFE/ V	-	
≤ 27	6000	NE6007LT	MxF/TE	NO	316 SS	-	-	316 SS	TFE/ V	-	

Notes on Valves:

- Consult manufacturer for recommendations on ball valves operating above 38°C or use gate valves
- All gate and ball valves are regular port unless otherwise noted on the P&ID
- Globe valves 219 and up, use gate valves
- 89mm to 60mm threaded or socket welded valves may be approved by the project engineer for some services.
- MTR's to be supplied for all materials.

VALVE NOMENCLATURE:- SW = Socket Weld; TE = Threaded Ends; MxF = Male x Female; FL = Flanged; RF = Raised Face; RJ = Ring Joint; CS = Carbon Steel; FS = Forged Steel; SS = Stainless Steel; RP = Regular Port; FP Full Port; OS&Y = Outside Screw & Yoke; Stel = Stellite; CrPI = Chrome Plated; N = Nylon; TFE = Teflon; V = Vilon; FLT = Floating; TR = Trunnion; ENC = Electroless Nickel Coating;
VALVE OPERATORS - G = Gear, L = Lever, H = Hand wheel

Service: REGULAR TEMPERATURE SWEET Hydrocarbon Liquid - Gas - Glycol - MP Process Drains - MP Flare Systems	MSP – “B” Class 300
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Design Code: ASME B31.3	PWHT: >19.1mm W.T. only
Pressure Range: 5,102 to 4,378 kPa	NDE: 10% RT on Buttwelds
Temperature Range: -29°C to 204°C	10% RT on Socket welds
Corrosion Allowance: 1.6mm	10% MT on Fillet welds

48mm and below Threaded or Socket welded. 60mm and above Butt Welded (see note 1)

Item	Size (mm)	Description	ASTM Spec	Notes
Pipe	21 - 27	Sch 160 smls PE, TE	A106 Gr. B	1,4
	33 - 48	Sch 80 smls PE, TE		
	60 - 273	STD Wall smls BE Calc W.T. above 273mm		
Flanges	21 - 48	300 ASME FS RF SW, TE	A105N	1,2,3,4
	60 - 610	300 ASME FS RFWN Bore to match pipe.		
Orifice Flanges	60 - 324	300 ASME FS RFWN c/w 21mm pressure taps, jack bolts, gaskets. Bore to match pipe	A105N	2
Fittings	21 - 48	Class 3000 FS SW, TE	A105N	1,2,4
	60 - 406	BW Schedule to match pipe.	A234 WPB	
	457 - 610	BW Schedule to match pipe.	A420 WPL6	
Unions	21 - 48	Class 3000 FS SW, TE GJ integral. Seat	A105N	1,2
Nipples	21 - 48	Sch 160 Smls PE, TE No close nipples. Min. length 100mm	A106 Gr. B	1
Swages	21 - 48	Sch 160 Smls PE, TE	A106 Gr. B	1
O'lets	21 - 48	Class 3000 FS SW, TE	A105N	1,2
Weldolets	60 - 273	Bore to match pipe	A105N	2
Paddle & Spec Blinds	60 - 610	300 ASME RF	A516 70N	
Bolting	Studs: continuous thread		A193 Gr. B7M	
	Nuts: 2 heavy hex		A194 Gr. 2HM	
Gaskets	Class 300 spiral wound non asbestos 3.2mm (1/8") TKS		304/316 SS	

Notes on Piping Material:

- 89mm to 60mm threaded or socket welded pipe and fittings may be approved by the Project Engineer for some services. Pipe W.T. to be calculated.
- All forgings shall be normalized.
- Flanges over 610mm may be slip-on type with prior approval from the Project Engineer.
- Pipe and fittings over 12.7mm wall thickness must be A333 Gr.6 and A420 WPL6 respectively to maintain MDMT of -29°C.
- MTR's to be supplied for all materials.

PIPING NOMENCLATURE:- BE = Beveled End; PE = Plain End; TE = Threaded; BW = Butt Weld; SW = Socket Weld; FL = Flanged; WN = Weld Neck; RF = Raised Face; RJ = Ring Joint; PWHT = Post Weld Heat Treatment; FS = Forged Steel; TKS = Thickness; W.T. = Wall Thickness
NDE = Non Destructive Examination; RT = Radiography; MT = Magnetic Particle Inspection; UT = Ultrasonic Testing

Service: REGULAR TEMPERATURE SWEET Hydrocarbon Liquid - Gas - Glycol - MP Process Drains - MP Flare Systems	MSP – “B” Class 300
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Valves Associated with Specification MSP-“B” Class 300. For Tag Details see Section 5.4 Valve Tag Coding

BALL VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BODY	BALL/ OPERATOR	TRIM API/BALL/SEALS	BOLTS NUTS	NOTES
21-48	2000	BA2003RT	TE	NO	A105N	RP	SPLIT	FLT/L	607/CrPI/TFE	B7/2H	1,2
21-48	2000	BA2004RT	SW	NO	A105N	RP	SPLIT	FLT/L	607/CrPI/TFE	B7/2H	1,2
60-168	300	BA0301RT	FL/RF	NO	A216 WCB	RP	SPLIT	FLT/L	607-608/CrPI/TFE	B7/2H	1,2,4
60-168	300	BA0311RT	FL/RF	NO	A216 WCB	FP	SPLIT	FLT/L	607-608/CrPI/TFE	B7/2H	1,2,4
219-610	300	BA0361RT	FL/RF	NO	A216 WCB	RP	SPLIT	TR/G	607-608/CrPI/TFE	B7/2H	1,2
219-610	300	BA0371RT	FL/RF	NO	A216 WCB	FP	SPLIT	TR/G	607-608/CrPI/TFE	B7/2H	1,2

CHECK VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	TYPE	COVER	TRIM	BOLTS NUTS	NOTES
21-48	800	CH0813RT	TE	NO	A105N	RP	PISTON	BOLTED	API 602, trim #8	B7/2H	
21-48	800	CH0814RT	SW	NO	A105N	RP	PISTON	BOLTED	API 602, trim #8	B7/2H	
60-610	300	CH0301RT	FL/RF	NO	A216 WCB	RP	SWING	BOLTED	API 600, trim #1	B7/2H	4
60-610	300	CH0321RT	FL/RF	NO	A216 WCB	FP	SWING	BOLTED	API 600, trim #1	B7/2H	4

GATE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	BONNET/ OPERATOR	TRIM	BOLTS NUTS	NOTES
21-48	800	GA0803RT	TE	NO	A105N	RP	OS&Y	BOLT'D/H	API 602, trim #8	B7/2H	2
21-48	800	GA0804RT	SW	NO	A105N	RP	OS&Y	BOLT'D/H	API 602, trim #8	B7/2H	2
60-168	300	GA0301RT	FL/RF	NO	A216 WCB	RP	OS&Y	BOLT'D/H	API 600, trim #8	B7/2H	2,4
60-168	300	GA0311RT	FL/RF	NO	A216 WCB	FP	OS&Y	BOLT'D/H	API 600, trim #8	B7/2H	2,4
219-610	300	GA0321RT	FL/RF	NO	A216 WCB	RP	OS&Y	BOLT'D/G	API 600, trim #8	B7/2H	2
219-610	300	GA0331RT	FL/RF	NO	A216 WCB	FP	OS&Y	BOLT'D/G	API 600, trim #8	B7/2H	2

GLOBE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	BONNET/ OPERATOR	TRIM	BOLTS NUTS	NOTES
21-48	800	GL0803RT	TE	NO	A105N	-	OS&Y	BOLT'D/H	API 602, trim #8	B7/2H	
21-48	800	GL0804RT	SW	NO	A105N	-	OS&Y	BOLT'D/H	API 602, trim #8	B7/2H	
60-168	300	GL0301RT	FL/RF	NO	A216 WCB	-	OS&Y	BOLT'D/H	API 600, trim #8	B7/2H	3,4

NEEDLE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	STEM	TRIM	BOLTS NUTS	NOTES
≤ 27	6000	NE6003RT	TE	NO	316 SS	-	-	316 SS	TFE/ V	-	
≤ 27	6000	NE6007RT	MxF/TE	NO	316 SS	-	-	316 SS	TFE/ V	-	

Notes on Valves:

- Consult manufacturer for recommendations on ball valves operating above 38°C or use gate valves
- All gate and ball valves are regular port unless otherwise noted on the P&ID
- Globe valves 219 and up, use gate valves
- 89mm to 60mm threaded or socket welded valves may be approved by the project engineer for some services.
- MTR's to be supplied for all materials.

VALVE NOMENCLATURE:- SW = Socket Weld; TE = Threaded Ends; MxF = Male x Female; FL = Flanged; RF = Raised Face; RJ = Ring Joint; CS = Carbon Steel; FS = Forged Steel; SS = Stainless Steel; RP = Regular Port; FP Full Port; OS&Y = Outside Screw & Yoke; Stel = Stellite; CrPI = Chrome Plated; N = Nylon; TFE = Teflon; V = Viton; FLT = Floating; TR = Trunnion; ENC = Electroless Nickel Coating;
VALVE OPERATORS - G = Gear; L = Lever; H = Hand wheel

Service: LOW TEMPERATURE SWEET Hydrocarbon Liquid - Gas - Glycol - HP Process Drains - HP Flare Systems	MSP – “CL” Class 600
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Design Code: ASME B31.3

PWHT: >19.1mm W.T. only

Pressure Range: 10,205 to 8,757 kPa

NDE : 10% RT on Buttwelds

Temperature Range: - 45°C to 204°C

10% RT on Socket welds

Corrosion Allowance: 1.6mm

10% MT on Fillet welds

48mm and below Threaded or Socket Welded. 60mm and above Butt Welded (see note 1)

Item	Size (mm)	Description	ASTM Spec	Notes
Pipe	21 - 48	Sch 160 smls PE, TE	A333 Gr. 6	1
	60	Sch 80 smls BE		
	89	STD Wall smls BE		
	114 - 273	Sch 80 smls BE Calc W.T. above 273mm		
Flanges	21 - 48	600 ASME FS RF SW, TE	A350 LF2 Cl. 1	1,2,3,5
	60 - 610	600 ASME FS RFWN Bore to match pipe.		
Orifice Flanges	60 - 324	600 ASME FS RFWN c/w 21mm pressure taps, jack bolts, gaskets. Bore to match pipe	A350 LF2 Cl. 1	2,5
Fittings	21 - 48	Class 3000 FS SW, TE	A350 LF2 Cl. 1 A420 WPL6	1,2,5
	60 - 610	BW Schedule to match pipe.		
Unions	21 - 48	Class 3000 FS SW, TE GJ integral. Seat	A350 LF2 Cl. 1	1,2,5
Nipples	21 - 48	Sch 160 Smls PE, TE	A333 Gr. 6	1
		No close nipples. Min length 100 mm		
Swages	21 - 48	Sch 160 Smls PE, TE	A333 Gr. 6	1
O'lets	21 - 48	Class 3000 FS SW, TE	A350 LF2 Cl. 1	1,2,5
Weldolets	60 - 273	Bore to match pipe	A350 LF2 Cl. 1	2,5
Paddle & Spec Blinds	60 - 610	600 ASME RF	A516 70N	
Bolting		Studs: continuous thread Nuts: 2 heavy hex	A193 Gr. B7M A194 Gr. 2HM	
Gaskets		Class 600 spiral wound non asbestos 3.2mm (1/8") TKS	304/316 SS	

Notes on Piping Material:

- 60mm threaded or socket welded pipe and fittings may be approved by the Project Engineer for some services. Pipe W.T. to be calculated.
- All forgings shall be normalized.
- Flanges over 610mm may be slip-on type with prior approval from the Project Engineer.
- MTR's to be supplied for all materials.
- A350 LF2 forgings to be Class 1 impact tested to minus 45°C.

PIPING NOMENCLATURE:- BE = Beveled End; PE = Plain End; TE = Threaded; BW = Butt Weld; SW = Socket Weld; FL = Flanged; WN = Weld Neck;
RF = Raised Face; RJ = Ring Joint; PWHT = Post Weld Heat Treatment; FS = Forged Steel; TKS = Thickness; W.T. = Wall Thickness
NDE = Non Destructive Examination; RT = Radiography; MT = Magnetic Particle Inspection; UT = Ultrasonic Testing

Service: LOW TEMPERATURE SWEET Hydrocarbon Liquid - Gas - Glycol - HP Process Drains - HP Flare Systems	MSP – “CL” Class 600
---	--------------------------------

Valves Associated with Specification MSP-“CL” Class 600. For Tag Details see Section 5.4 Valve Tag Coding**BALL VALVES**

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BODY	BALL/ OPERATOR	TRIM API/BALL/SEALS	BOLTS NUTS	NOTES
21-48	3000	BA3003LT	TE	NO	A350 LF2	RP	SPLIT	FLT/L	607/CrPI/TFE	B7M/2HM	1,2
21-48	3000	BA3004LT	SW	NO	A350 LF2	RP	SPLIT	FLT/L	607/CrPI/TFE	B7M/2HM	1,2
60-89	600	BA0601LT	FL/RF	NO	A352 LCC	RP	SPLIT	FLT/L	607-608/CrPI/TFE	B7M/2HM	1,2,4
60-89	600	BA0611LT	FL/RF	NO	A352 LCC	FP	SPLIT	FLT/L	607-608/CrPI/TFE	B7M/2HM	1,2,4
114	600	BA0641LT	FL/RF	NO	A352 LCC	RP	SPLIT	TR/L	607-608/CrPI/TFE	B7M/2HM	1,2
114	600	BA0651LT	FL/RF	NO	A352 LCC	FP	SPLIT	TR/L	607-608/CrPI/TFE	B7M/2HM	1,2
168-610	600	BA0661LT	FL/RF	NO	A352 LCC	RP	SPLIT	TR/G	607-608/CrPI/TFE	B7M/2HM	1,2
168-610	600	BA0671LT	FL/RF	NO	A352 LCC	FP	SPLIT	TR/G	607-608/CrPI/TFE	B7M/2HM	1,2

CHECK VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	TYPE	COVER	TRIM	BOLTS NUTS	NOTES
21-48	800	CH0613LT	TE	NO	A350 LF2	RP	PISTON	BOLTED	API 602, trim #8	B7M/2HM	
21-48	800	CH0614LT	SW	NO	A350 LF2	RP	PISTON	BOLTED	API 602, trim #8	B7M/2HM	
60-610	600	CH0601LT	FL/RF	NO	A352 LCC	RP	SWING	BOLTED	API 600, trim #1	B7M/2HM	4
60-610	600	CH0621LT	FL/RF	NO	A352 LCC	FP	SWING	BOLTED	API 600, trim #1	B7M/2HM	4

GATE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	BONNET/ OPERATOR	TRIM	BOLTS NUTS	NOTES
21-48	800	GA0803LT	TE	NO	A350 LF2	RP	OS&Y	BOLT'D/H	API 602, trim #8	B7M/2HM	2
21-48	800	GA0804LT	SW	NO	A350 LF2	RP	OS&Y	BOLT'D/H	API 602, trim #8	B7M/2HM	2
60-114	600	GA0601LT	FL/RF	NO	A352 LCC	RP	OS&Y	BOLT'D/H	API 600, trim #8	B7M/2HM	2,4
60-114	600	GA0611LT	FL/RF	NO	A352 LCC	FP	OS&Y	BOLT'D/H	API 600, trim #8	B7M/2HM	2,4
168-610	600	GA0621LT	FL/RF	NO	A352 LCC	RP	OS&Y	BOLT'D/G	API 600, trim #8	B7M/2HM	2
168-610	600	GA0631LT	FL/RF	NO	A352 LCC	FP	OS&Y	BOLT'D/G	API 600, trim #8	B7M/2HM	2

GLOBE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	BONNET/ OPERATOR	TRIM	BOLTS NUTS	NOTES
21-48	800	GL0803LT	TE	NO	A350 LF2	-	OS&Y	BOLT'D/H	API 602, trim #8	B7M/2HM	
21-48	800	GL0804LT	SW	NO	A350 LF2	-	OS&Y	BOLT'D/H	API 602, trim #8	B7M/2HM	
60-168	600	GL0601LT	FL/RF	NO	A352 LCC	-	OS&Y	BOLT'D/H	API 600, trim #8	B7M/2HM	3,4

NEEDLE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	STEM	TRIM	BOLTS NUTS	NOTES
≤ 27	6000	NE6003LT	TE	NO	316 SS	-	-	316 SS	TFE/ V	-	
≤ 27	6000	NE6007LT	MxF/TE	NO	316 SS	-	-	316 SS	TFE/ V	-	

Notes on Valves:

- Consult manufacturer for recommendations on ball valves operating above 38°C or use gate valves
- All gate and ball valves are regular port unless otherwise noted on the P&ID
- Globe valves 219 and up, use gate valves
- 60mm threaded or socket welded valves may be approved by the project engineer for some services.
- MTR's to be supplied for all materials.

VALVE NOMENCLATURE:- SW = Socket Weld; TE = Threaded Ends; MxF = Male x Female; FL = Flanged; RF = Raised Face; RJ = Ring Joint;
CS = Carbon Steel; FS = Forged Steel; SS = Stainless Steel; RP = Regular Port; FP Full Port; OS&Y = Outside Screw & Yoke; Stel = Stellite;
CrPI = Chrome Plated; N = Nylon; TFE = Teflon; V = Viton; FLT = Floating; TR = Trunnion; ENC = Electroless Nickel Coating;
VALVE OPERATORS - G = Gear, L = Lever, H = Hand wheel

GRB ENGINEERING Ltd.

DRAWING INDEX

Company	QUICKSILVER RESOURCES INC.
Project	JOFFRE COMPRESSOR STATION K-600 ADDITION
Project Number	9424.03
Location	LSD 04-22-039-25 W4M
Revision	ISSUED FOR CONSTRUCTION
Date	June 16, 2006

Drawing Number	Model No.	Description	Date	Revision
9424-TIT		TITLE SHEET	2006/06/16	-
MSP-"A"		GRB MSP-A (CLASS 150 REG. TEMP. SWEET)	2006-01-25	5.03
MSP-"AL"		GRB MSP-AL (CLASS 150 LOW TEMP. SWEET)	2006-01-25	5.03
MSP-"B"		GRB MSP-B (CLASS 300 REG. TEMP. SWEET)	2006-01-25	5.03
MSP-"CL"		GRB MSP-CL (CLASS 600 LOW TEMP. SWEET)	2006-01-25	5.03
9424-CL-001		CAR SEAL/LOCKED VALVE LIST	2006/06/16	8
9424-LL-001		LINE LIST	2006/06/16	10
9424-LL-002		LINE LIST	2006/06/16	9
9424-PL-001		PSV LIST	2006/06/16	8
9424-TL-003		TIE-IN LIST	2006/06/16	0
9424-A-001		PROCESS FLOW DIAGRAM (1 OF 2)	2006/06/16	10
9424-A-002		PROCESS FLOW DIAGRAM (2 OF 2)	2006/06/16	7
9424-C-001		SITE PLAN	2006/06/16	12
9424-B-000		SYMBOLGY SHEET	2006/06/16	0
9424-B-003		V-110 INLET SEPARATOR P&ID	2006/06/16	6
9424-B-004B		K-600 COMPRESSOR P&ID	2006/06/16	0
9424-B-005		V-450 GLYCOL CONTACTOR P&ID	2006/06/16	6
9424-B-006		PW TANK/VENT AREA P&ID	2006/06/16	9
9424-B-007		MCC/OFFICE AREA P&ID	2006/06/16	6
9424-C-002		PIPING KEY PLAN	2006/06/16	9
9424-D-007		PIPING PLAN - K-420 COMPRESSOR AREA	2006/06/16	4
9424-D-011		PIPING PLAN & SECTION - K-600 COMPRESSOR AREA	2006/06/16	0
9424-H-001		PIPE SHOE & GUIDE DETAILS	2006/06/16	0
9424-L-008		PILE LOCATION PLAN - K-600 & PIPERACK	2006/06/16	0
9424-L-009		PILE SCHEDULE/PIPE SUPPORT & DETAILS	2006/06/16	0
9424-M-010		PLATFORM AND STAIR DETAILS	2006/06/16	4
9424-M-011		HANDRAIL DETAILS	2006/06/16	4

CAR SEAL/LOCKED VALVE LIST

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NOTES:

ENGINEERING STAMP

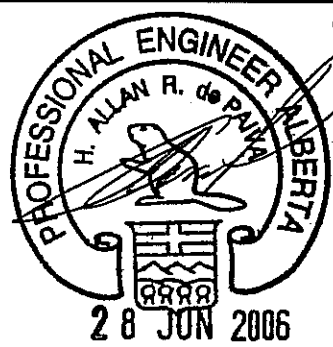
PERMIT TO PRACTICE
GRB ENGINEERING LTD.

Signature

Date _____

PERMIT NUMBER: P 7127

**The Association of Professional Engineers,
Geologists and Geophysicists of Alberta**



REVISIONS						
NO.	DESCRIPTION	PROJECT	DATE	BY	CHK	ENV
7	AS BUILT - K-500, V-918 ADDITION	9424.02	2005-10-20	NI		RS
8	ISSUED FOR CONSTRUCTION - K-600 ADDITION	9424.03	2006-06-16	SL		
2	ADDED CSC-9080/9081	9424.00	2004-03-09	DGR		
3	ISSUED FOR BID - V-110, K-420 ADDITION	9424.01	2004-06-29	RK	ACI	
4	ISSUED FOR CONSTN - V-110, K-420 ADDITION	9424.01	2004-07-05	RK	ACI	NV
5	AS BUILT - V-110, K-420 ADDITION	9424.01	2004-08-06	RK		
6	ISSUED FOR CONSTRUCTION- K-500 ADDITION	9424.02	2005-08-12	DB		

GRB ENGINEERING LTD.



QUICKSILVER

**JOFFRE COMPRESSOR STN.
LSD 04-22-039-25 W4M
CAR SEAL/LOCKED VALVE LIST**

PROJECT NO.	DWG. NO.
-------------	----------

9424.03

9424-CL-001

V.

8 |

PRESSURE SAFETY VALVE LIST

TAG NUMBER	P&ID DRAWING NUMBER	LINE NUMBER	LOCATION	MAKE	MODEL	SIZE (mm)	ORIFICE (sq. in.)	SET PRESSURE (kPag)	BACK PRESSURE (kPag)	CAPACITY	SIZING BASIS	REV
PSV-1000	9424-B-001	406-PG-A-106-38HE	INLET HEADER	CROSBY	4N6JQS-E-15J	114 RF x 168 RF	4.34	689 AT 10° C	0	18.458 MMSCFD	RELIEF	2
PSV-1100	9424-B-003	N/A	V-110 INLET SEPARATOR	FARRIS	26PA10-120	114-150 x 168-150	6.38	689 AT 10° C	0	26.087 MMSCFD	RELIEF	4
PSV-4250	9424-B-004	N/A	1 st stage compression discharge line	Farris	26JA10-120	60-150 x 89-150	1.287	1586 AT 149°C	0	9.33 MMSCFD	RELIEF	4
PSV-4251	9424-B-004	N/A	2 nd stage compression discharge line	Farris	26JA10-120	60-150 x 89-150	1.287	1586 AT 149°C	0	9.31 MMSCFD	RELIEF	4
PSV-4252	9424-B-004	N/A	3 rd stage compression discharge line	Farris	26FA12-120	48-300 x 60-150	0.307	4516 AT 149°C	0	6.67 MMSCFD	RELIEF	4
PSV-4253	9424-B-004	N/A	4 th stage compression discharge line	Farris	26EA13-120	33-600 x 60-150	0.196	9067 AT 149°C	0	8.15 MMSCFD	RELIEF	4
PSV-4370	9424-B-004	N/A	Fuel Gas Supply	Hydro-seal	#4FRV-00	33 x 33 NPT	0.196	1138 AT 16°C	0	0.41 MMSCFD	THERMAL RELIEF	4
PSV-4371	9424-B-004	N/A	Downstream of Fuel Gas Scrubber	Fisher	180S-13X1	33 x 33 NPT	N/A	379 AT 16°C	0	0.84 MMSCFD	REGULATOR FAILURE	4
PSV-4500	9424-B-005	N/A	V-450 GLYCOL CONTACTOR	Mercer	812882117	80 x 60 NPT	0.472	9653 AT 21°C	0	16.51 MMSCFD	RELIEF	4
PSV-4501	9424-B-005	N/A	Fuel Gas Scrubber (V-451)	Mercer	9117D511807E	33 x 33 NPT	0.122	1034 AT 21°C	0	0.47 MMSCFD	RELIEF	4
PSV-4600	9424-B-001	N/A	V-460 GLYCOL SEPARATOR	FARRIS	27FA45-M20	48 x 60 NPT	0.35	9928 AT 36° C	0	15.341 MMSCFD	RELIEF	2
PSV-5000	9424-B-007	60-FG-B-504	FUEL GAS SUPPLY FOR OFFICE FURNACE	FARRIS	27CA23-M20	27 x 33 NPT	0.068	552 AT 37° C	0	0.186 MMSCFD	REGULATOR FAILURE	4
PSV-9080	9424-B-006	N/A	V-908 AIR RECEIVER	FARRIS	27CA23-M70	27 x 33 NPT	0.068	1379 AT 16° C	0	0.36 MMSCFD	RELIEF	2
PSV-9080	9424-B-006	N/A	V-918 AIR RECEIVER	FARRIS	27CA23-M70	27 x 33 NPT	0.068	1379 AT 16° C	0	0.36 MMSCFD	RELIEF	7
PSV-5050	9424-B-004A	N/A	K-500 : 1 st stage compression discharge line	Consolidated	1905-00JC	60-150 x 89-150	1.287	1482 AT 177°C	0	6.332 MMSCFD	BLOCKED FLOW	6
PSV-5051	9424-B-004A	N/A	K-500 : 2 nd stage compression discharge line	Consolidated	1905-00JC	60-150 x 89-150	1.287	1482 AT 177°C	0	6.332 MMSCFD	BLOCKED FLOW	6
PSV-5052	9424-B-004A	N/A	K-500 : 3 rd stage compression discharge line	Consolidated	1910-00GC	48-300 x 89-150	0.503	4447 AT 177°C	0	7.181 MMSCFD	BLOCKED FLOW	6
PSV-5053	9424-B-004A	N/A	K-500 : 4 th stage compression discharge line	Consolidated	1912-00FC	48-600 x 60-150	0.307	8895 AT 177°C	0	8.680 MMSCFD	BLOCKED FLOW	6
PSV-5170	9424-B-004A	N/A	K-500 : Fuel Gas Supply	Mercer	-	33 x 33 NPT	-	1896 AT 43°C	0	Meets or exceeds required	THERMAL RELIEF	6
PSV-5171	9424-B-004A	N/A	K-500 : Downstream of Fuel Gas Scrubber	Mercer	-	33 x 48 NPT	0.307	517 AT 43°C	0	Meets or exceeds required	REGULATOR FAILURE	6
PSV-6050	9424-B-004B	N/A	K-600 : 1 st stage compression discharge line	Mercer	91-51J11T82U1	60-150 x 89-150	1.287 (J)	1448	7.3	9.8 MMSCFD	BLOCKED FLOW	8
PSV-6051	9424-B-004B	N/A	K-600 : 2 nd stage compression discharge line	Mercer	91-51J11T82U1	60-150 x 89-150	1.287 (J)	1482	7.3	10 MMSCFD	BLOCKED FLOW	8
PSV-6052	9424-B-004B	N/A	K-600 : 3 rd stage compression discharge line	Mercer	91-34G11T21U1	48-300 x 60-150	0.503 (G)	4447	7.3	9.5 MMSCFD	BLOCKED FLOW	8
PSV-6053	9424-B-004B	N/A	K-600 : 4 th stage compression discharge line	Mercer	91-18E11T1711	33-600 x 33-150	0.196 (E)	8694	7.3	8.5 MMSCFD	BLOCKED FLOW	8
PSV-6170	9424-B-004B	N/A	K-600 : Fuel Gas Scrubber Vent	Mercer	81-17151V09G111	33 x 33 NPT	0.212 (E)	1034	7.3	557 SCFM	THERMAL RELIEF	8

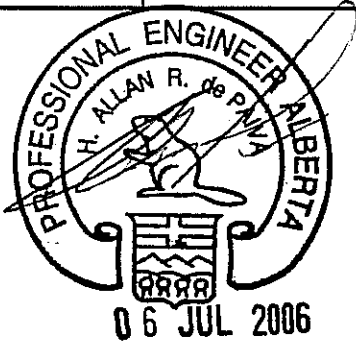
NOTES:

ENGINEERING STAMP

PERMIT TO PRACTICE
GRB ENGINEERING LTD.

Signature _____
Date **JUL 06 2006**

PERMIT NUMBER: P 7127
The Association of Professional Engineers,
Geologists and Geophysicists of Alberta



REVISIONS							
NO.	DESCRIPTION	PROJECT	DATE	BY	CHK	ENG	
7	AS BUILT - K-500, V-918 ADDITION	9424.02	2005-10-20	NI		RGW	
8	ISSUED FOR CONSTRUCTION - K-600 ADDITION	9424.03	2006-06-16	SL			
2	AS BUILT	9424.00	2004-03-09	DGR			
3	ISSUED FOR BID - V-110, K-420 ADDITION	9424.01	2004-05-25	RK	ACI		
4	ISSUED FOR CONST'N - V-110, K-420 ADD'N	9424.01	2004-07-06	RK	ACI	NW	
5	AS BUILT - V-110, K-420 ADDITION	9424.01	2004-08-06	RK			
6	ISSUED FOR CONSTRUCTION; K500 ADDITION	9424.02	2005-08-12	RGW	AP	RGW	



QUICKSILVER

JOFFRE COMPRESSOR STN.
LSD 04-22-039-25 W4M
PSV LIST

GRB ENGINEERING LTD.

PROJECT NO.
9424.03

DWG. NO.

9424-PL-001

REV.
8

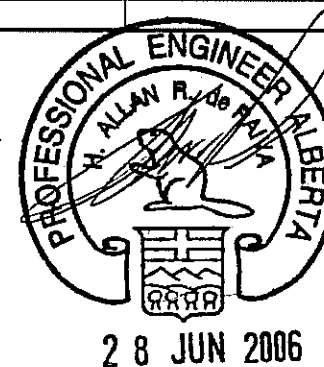
TIE-IN LIST

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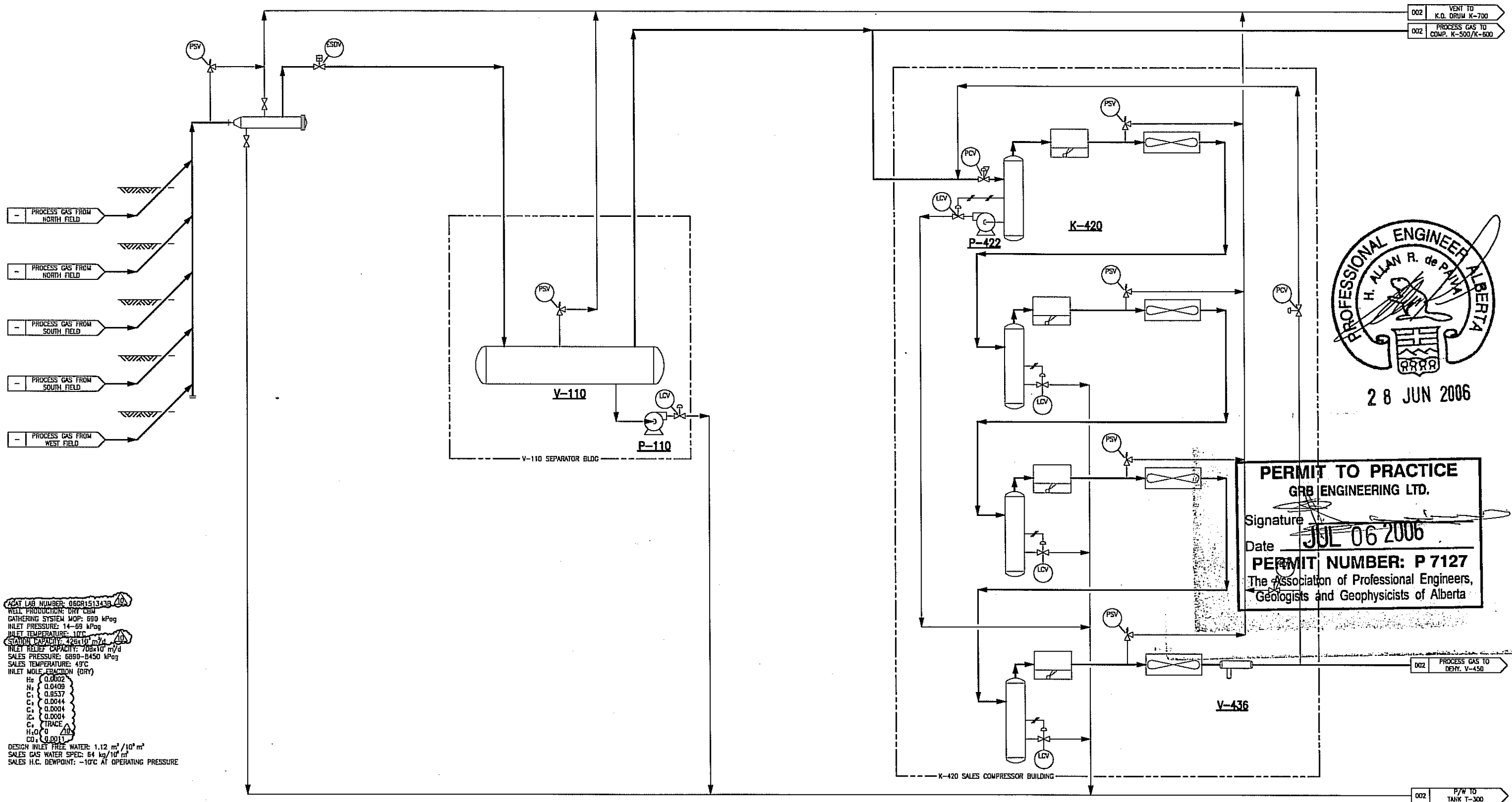
NOTES:

1. FIELD CONTRACTOR TO CONFIRM ALL TIE-INS PRIOR TO ANY CONSTRUCTION.

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 Signature _____
 Date **JUL 06 2006**
PERMIT NUMBER: P 7127
 The Association of Professional Engineers,
 Geologists and Geophysicists of Alberta



REVISIONS							 QUICKSILVER WATER SYSTEMS		
NO.	DESCRIPTION	PROJECT	DATE	BY	CHK	ENG	JOFFRE COMPRESSOR STN. LSD 04-22-039-25 W4M TIE-IN LIST		
A	ISSUED FOR REVIEW - K-600 ADDITION	9424.03	2006/5/23	EY					
O	ISSUED FOR CONS'N - K-600 ADDITION	9424.03	2006/6/16	YW					
GRB ENGINEERING Ltd.							PROJECT NO. 9424.03	DWG. NO. 9424-TL-003	REV. 0



V-110
HORIZONTAL SEPARATOR

P-110
PRODUCED WATER PUMP

P-422
LP WATER PUMP

K-420
SALES COMPRESSOR

V-436
FINAL DISCHARGE SEPARATOR

- NOTES:
1. THIS IS AN EXISTING SITE. SCOPE OF WORK LIMITED TO CLOUDED AREAS ONLY.
 2. GATHERING SYSTEM MOP TO BE PROTECTED BY UPSTREAM WELLSITE PSVS AND PIPELINE PSVS.
 3. DETAILED HEAT AND MATERIAL BALANCE NOT REQUIRED BY CLIENT.
 4. ENGINEERING STAMP APPLIES TO OFFSKID AND CLOUDED MODIFICATIONS ONLY.

REFERENCE DRAWINGS		REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
		6	ISSUED FOR BID - K-500 ADDITION	9424.02	05-08-04	DB		RW
		7	ISSUED FOR INFORMATION - K-500 ADDITION	9424.02	05-08-12	NI		RW
		8	AS BUILT PER FIELD MARK-UPS - K-500, V-918 ADD'N	9424.02	05-10-20	NI		RW
		9A	ISSUED FOR REVIEW - K-600 ADDITION	9424.03	06-05-12	EY		RW
		10	ISSUED FOR CONSTRUCTION - K-600 ADDITION	9424.03	06-06-18	YW		RW
		3	ISSUED FOR BID - V-110, K-420 ADDITION	9424.01	04-05-26	RK		RW
		4	ISSUED FOR CONST'N - V-110, K-420 ADDITION	9424.01	04-07-06	RK	ACI	NW
		5	AS BUILT - V-110, K-420 ADDITION	9424.01	04-08-06	RK		NW

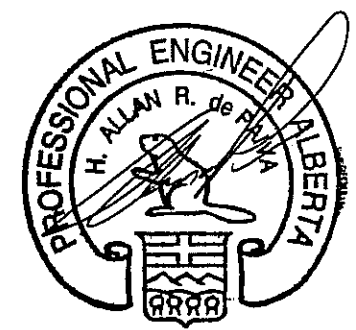
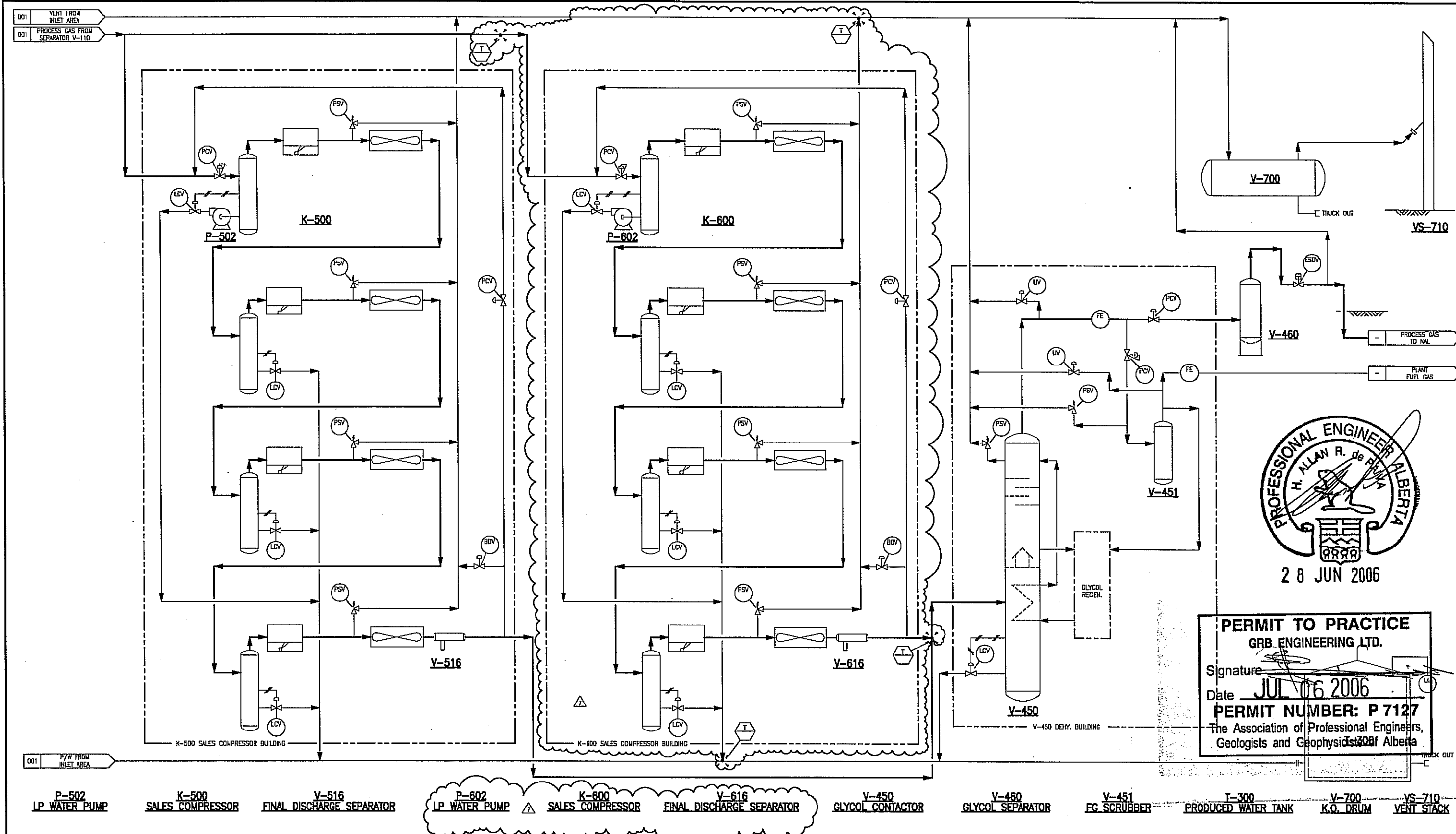
ENGINEERING STAMP

GRB Engineering Ltd.

QUICKSILVER

JOFFRE COMPRESSOR STATION
LSD 04-22-039-25 W4M
PROCESS FLOW DIAGRAM (1 OF 2)

PROJECT NO.	SCALE:	DWG. NO.	REV.
9424.03	NTS	9424-A-001	10



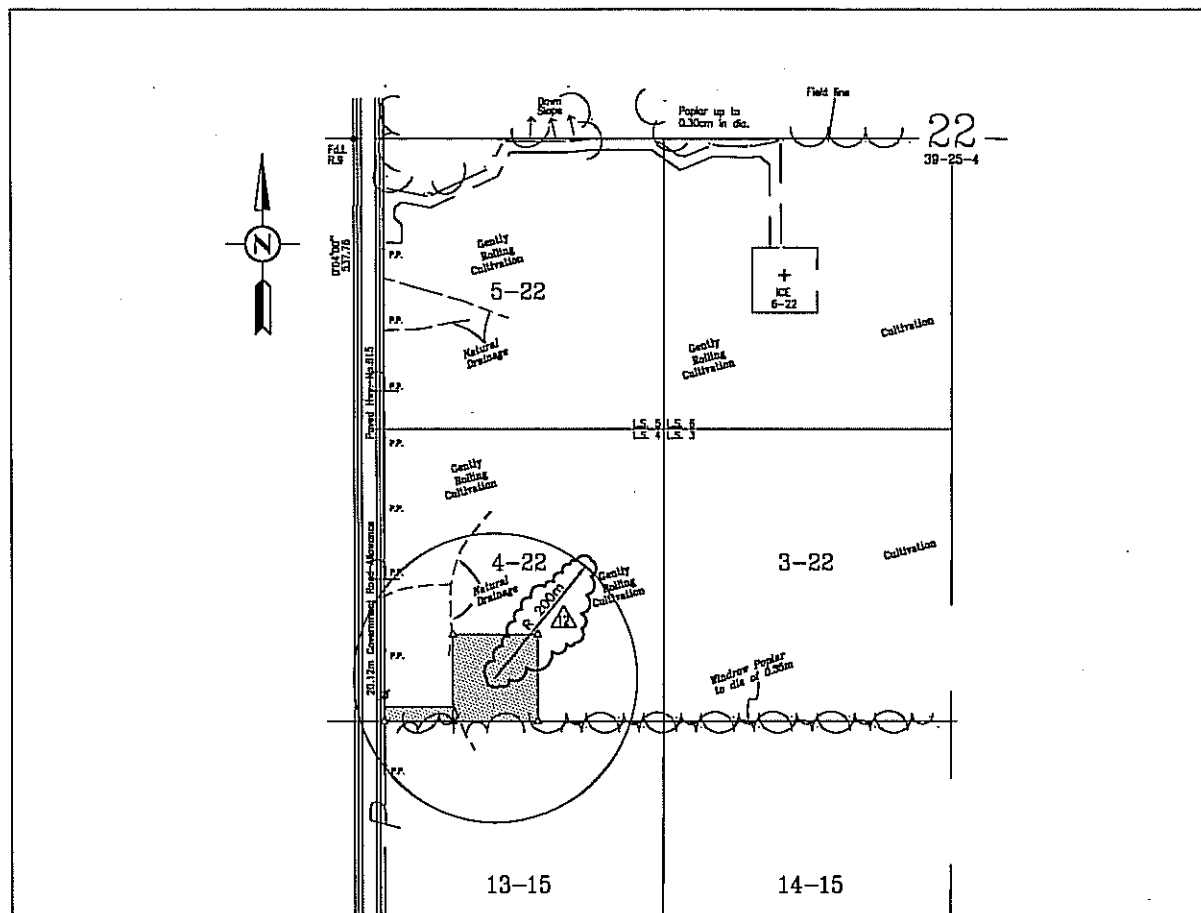
PERMIT TO PRACTICE
 GRB ENGINEERING LTD.
 Signature: *[Signature]*
 Date: **JUL 06 2006**
PERMIT NUMBER: P 7127
 The Association of Professional Engineers,
 Geologists and Geophysicists of Alberta

P-502 LP WATER PUMP K-500 SALES COMPRESSOR V-516 FINAL DISCHARGE SEPARATOR P-602 LP WATER PUMP K-600 SALES COMPRESSOR V-616 FINAL DISCHARGE SEPARATOR V-450 GLYCOL CONTACTOR V-460 GLYCOL SEPARATOR V-451 FG SCRUBBER T-300 PRODUCED WATER TANK V-700 K.O. DRUM VS-710 VENT STACK

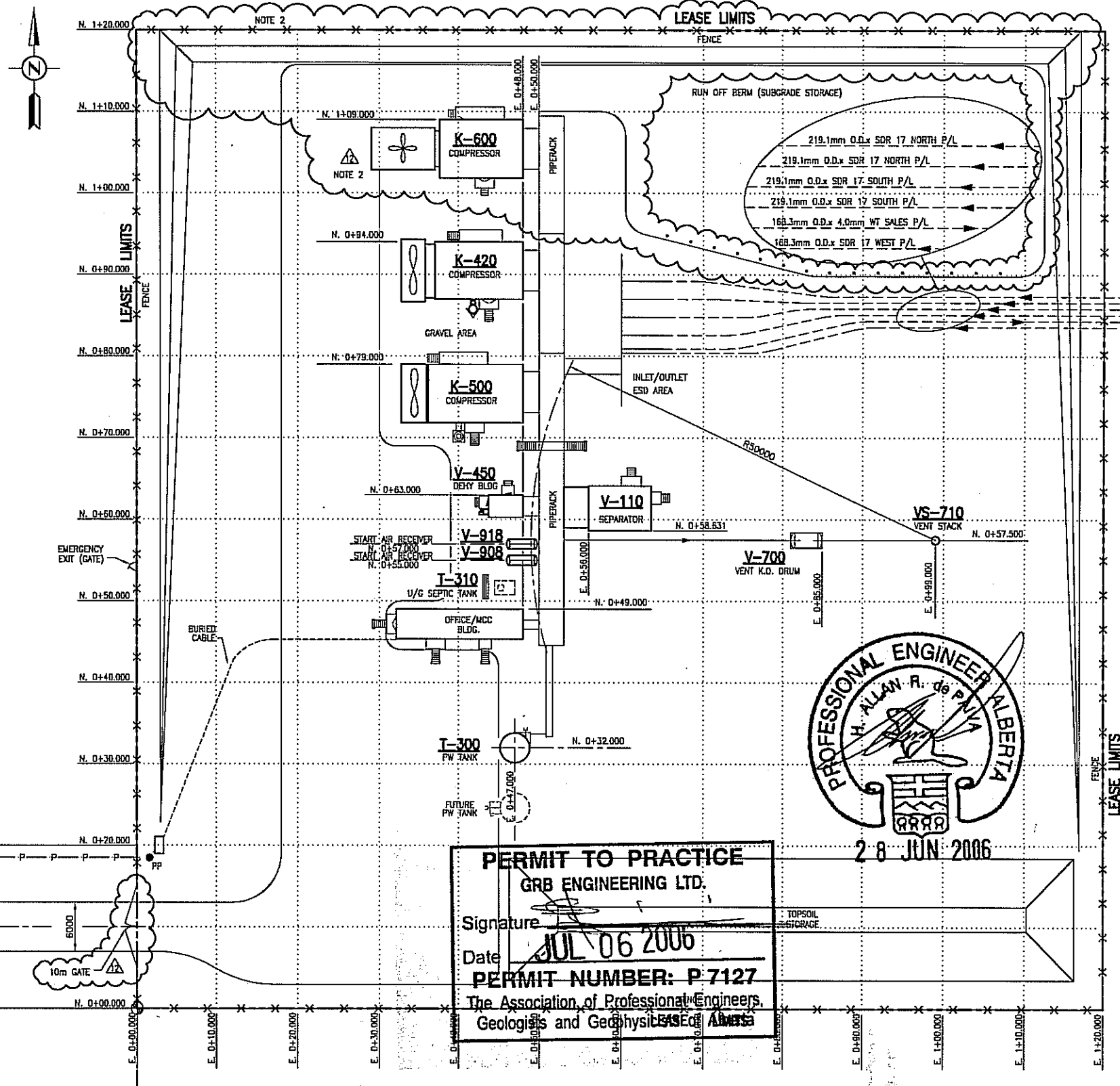
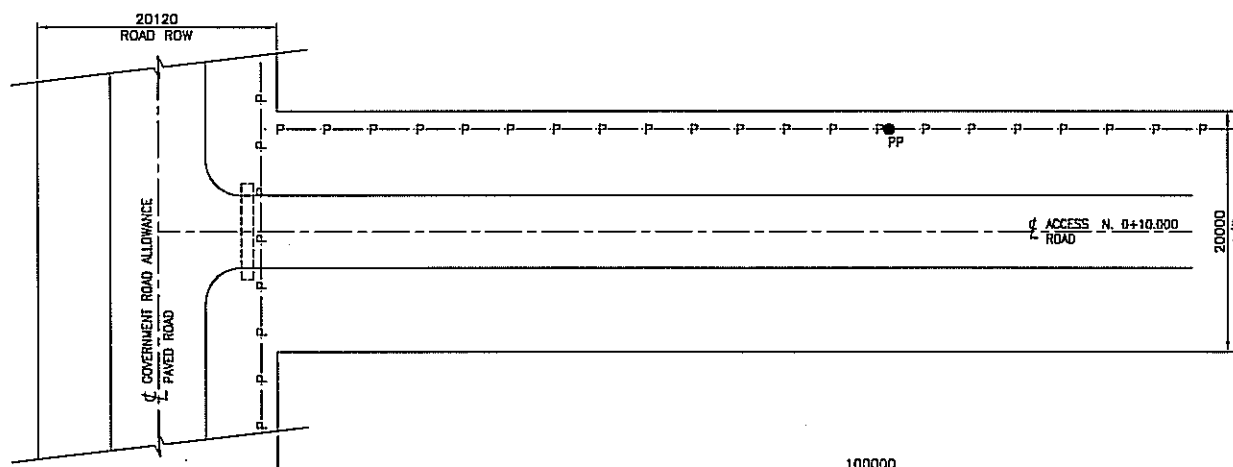
NOTES:
 1. THIS IS AN EXISTING SITE. SCOPE OF WORK LIMITED TO CLOUDED AREAS ONLY.
 2. CATERING SYSTEM WOP TO BE PROTECTED BY UPSTREAM WELLSITE PSV'S AND PIPELINE PSV'S.
 3. DETAILED HEAT AND MATERIAL BALANCE NOT REQUIRED BY CLIENT.
 4. ENGINEERING STAMP APPLIES TO OFFSKID AND CLOUDED MODIFICATIONS ONLY.

REFERENCE DRAWINGS		REVISIONS					
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK. ENG.
		0	ISSUED FOR BID - V-110, K-420 ADDITION	9424.01	04-05-26	RK	ACI
		1	ISSUED FOR CONST'N - V-110, K-420 ADDITION	9424.01	04-07-06	RK	ACI NW
		2	AS BUILT - V-110, K-420 ADDITION	9424.01	04-08-06	RK	
		3	ISSUED FOR BID - K-500 ADDITION	9424.02	05-08-04	DB	
		4	ISSUED FOR CONSTRUCTION - K-500 ADDITION	9424.02	05-08-12	NI	AP RW
		5	AS BUILT PER FIELD MARK-UPS - K-500, V-918 ADD'N	9424.02	05-10-20	NI	RW
		6A	ISSUED FOR REVIEW - K-600 ADDITION	9424.03	06-05-12	EY	
		7	ISSUED FOR CONSTRUCTION - K-600 ADDITION	9424.03	06-06-16	YW	

ENGINEERING STAMP QUICKSILVER JOFFE COMPRESSOR STATION LSJ 04-22-039-25 W4M PROCESS FLOW DIAGRAM (2 OF 2)			
PROJECT NO. 9424.03	SCALE: NTS	DWG. NO. 9424-A-002	REV. 7



LOCATION PLAN
SCALE: 1:5000



SITE PLAN

NOTES:
1. THIS IS AN EXISTING SITE. SCOPE OF WORK LIMITED TO CLOUDED AREAS ONLY.
2. LAND WORK MIGHT BE REQUIRED.
EXTEND LEASE & ROADWAY TO NORTH. (FIELD DETERMINED)
PLACE BARRIERS/GUARDS OVER CCS PIPING. (FIELD DETERMINED)

REFERENCE DRAWINGS		REVISIONS					
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK. ENG.
		6	ISSUED FOR BID - K-500 ADDITION	9424.02	05-08-04	DB	
		7	ISSUED FOR CONSTRUCTION - K-500 ADDITION	9424.02	05-08-12	NI	AP RW
		8	ISSUED FOR CONSTRUCTION - PHASE III	9436.04	05-08-18	TN	
		9	AS BUILT PER FIELD MARK-UPS - K-500, V-918 ADD'N	9424.02	05-10-20	NI	
		10	AS BUILT PER FIELD MARK-UPS	9436.04	06-04-05	ZR	RW
		11A	ISSUED FOR REVIEW - K-600 ADDITION	9424.03	06-05-12	EY	
		12	ISSUED FOR CONSTRUCTION - K-600 ADDITION	9424.03	06-06-16	YW	
		5	AS BUILT - V-110, K-420 ADDITION	9424.01	04-08-06	RK	

ENGINEERING STAMP
GRB ENGINEERING LTD.

QUICKSILVER
**JOFFRE COMPRESSOR STATION
LSD 04-22-039-25 W4M
SITE PLAN**
PROJECT NO. 9424.03 SCALE: 1:300 DWG. NO. 9424-C-001 REV. 12

- 10 BALL VALVE
- DOUBLE BLOCK AND BLEED VALVE
- CHECK VALVE
- PISTON CHECK VALVE
- GATE VALVE
- GLOBE VALVE
- BUTTERFLY VALVE
- ANGLE/CHOKE VALVE
- NEEDLE VALVE
- SCREWED VALVE
- SOCKET WELD VALVE
- SPECTACLE BLIND (NORMALLY CLOSED)
- SPECTACLE BLIND (NORMALLY OPEN)
- INSULATION KIT
- CHANGE IN PIPE SIZE
- CONICAL SCREEN
- Y STRAINER
- EXPANSION JOINT
- TIE-IN SYMBOL
- INSTRUMENT AIR/GAS SUPPLY
- SOLENOID VALVE WITH MANUAL RESET
- LOCKOUT LATCH WITH MANUAL RESET
- DIAPHRAGM ACTUATOR
- PISTON ACTUATOR
- PRESSURE REDUCING REGULATOR SELF-CONTAINED
- BACK-PRESSURE REGULATOR SELF-CONTAINED
- RUPTURE DISC
- PRESSURE SAFETY VALVE
- RESTRICTING ORIFICE
- RESTRICTING ORIFICE
- SENIOR ORIFICE METER
- RFWM, JUNIOR ORIFICE METER
- VENTURI TUBE
- VORTEX METER
- TURBINE METER
- POSITIVE DISPLACEMENT METER
- ROTAMETER

EQUIPMENT CODE

- B-BLOWER
- C-COOLER/CONDENSER
- D-DRIVER
- E-EXCHANGER
- F-FILTER
- H-FIRED HEATER
- K-COMPRESSOR
- P-PUMP
- T-STORAGE TANK
- U-UTILITY EQUIPMENT
- V-VESSEL
- Z-PACKAGES

COMMON ABBREVIATIONS

- A-ALARM
- CO-CHAIN OPERATED
- CSC-CAR SEAL CLOSED
- CSO-CAR SEAL OPEN
- ESD-EMERGENCY SHUT DOWN
- FC-FAIL CLOSED
- FO-FAIL OPEN
- FP-FULL PORT
- HPV-HIGH POINT VENT
- LC-LOCK CLOSED
- LO-LOCK OPEN
- LPD-LOW POINT DRAIN
- M 3/H-CUBIC METERS PER HOUR
- M 3/D-CUBIC METRES PER DAY
- MCC-MOTOR CONTROL CENTER
- NC-NORMALLY CLOSED
- NO-NORMALLY OPEN
- PLC-PROGRAMABLE LOGIC CONTROL
- RP-REDUCED PORT
- SC-SAMPLE CONNECTION
- SCFM-STANDARD CUBIC FEET PER MINUTE
- SD-SHUT DOWN (INDIVIDUAL EQUIPMENT)
- TH-THEFT HATCH

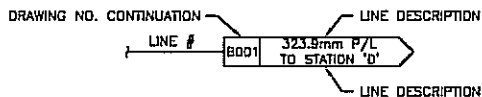
INSTRUMENT IDENTIFICATION EXAMPLES

- PSH PRESSURE SWITCH HIGH (A SINGLE MODIFIER LETTER INDICATES AN ALARM OR CONTROL FUNCTION)
- PSHH PRESSURE SWITCH HIGH-HIGH (A DOUBLE MODIFIER LETTER INDICATES A SHUTDOWN FUNCTION)
- PI PRESSURE INDICATOR
- ESDV EMERGENCY SHUTDOWN VALVE (NOT IDENTIFIED ABOVE)
- PIHH SHARED DISPLAY PRESSURE INDICATOR WITH HIGH PRESSURE PRE-ALARM AND HIGH HIGH PRESSURE SHUTDOWN AND ALARM FUNCTIONS
- PAAHH SHARED DISPLAY HIGH HIGH PRESSURE ALARM WITH SHUTDOWN FUNCTION

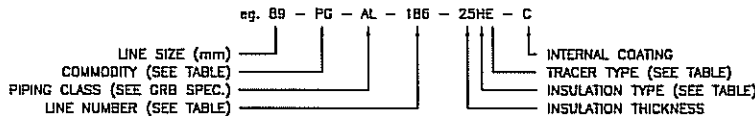
MISCELLANEOUS

- H/O/A HAND/OFF/AUTO MOTOR CONTROL WITH H.O.A. SWITCH LOCATED AT MOTOR
- L/O/R LOCAL/OFF/REMOTE MOTOR CONTROL WITH L.O.R. SWITCH LOCATED AT MOTOR
- VFD VARIABLE FREQUENCY DRIVE
- SF XXX NUMBERED PIPING SPECIALTY ITEM
- SS START/STOP
- ELECTRICALLY HEAT TRACED AND HOUSED
- ELECTRICALLY HEAT TRACED AND INSULATED
- RTU REMOTE TERMINAL UNIT

LINE CONTINUATION FLAG



LINE NUMBER DESIGNATION



NPS/METRIC O.D. PIPE SIZE CONVERSION

mm	NPS
14	1/4"
21	1/2"
27	3/4"
33	1"
42 **	1 1/4"
48	1 1/2"
60	2"
73 **	2 1/2"
89	3"
114	4"
141 **	5"
168	6"
219	8"
273	10"
324	12"
356	14"
406	16"
457	18"
508	20"
610	24"
** NON STANDARD SIZES	

NOTE:
ALL TUBING IS TO BE SPECIFIED IN IMPERIAL UNITS ONLY.

COMMODITY CODES

ABBREVIATION	DESCRIPTION
BD	BLOWDOWN
C	CONDENSATE
D	DRAIN
FG	FUEL GAS
GLR	GLYCOL RETURN
GLS	GLYCOL SUPPLY
IA	INSTRUMENT AIR
O	OIL
PG	PROCESS GAS
PGS	PROCESS GAS SOUR
PW	PRODUCED WATER
SG	START GAS
V	VENT

LINE NUMBERS

SERVICE CATEGORY	NUMBER SETS
MAJOR PROCESS FLUIDS	100-299
MINOR PROCESS FLUIDS (RECYCLE)	300-399
WATER	400-499
UTILITY VAPOURS (FG)	500-599
UTILITY LIQUIDS (GLYCOL)	600-699
RELIEF	700-799
DRAINS	800-899
MISC.	900-999

INSTRUMENT OR FUNCTION SYMBOLS

	MAIN PANEL OR CONTROL ROOM	FIELD MOUNTED	AUXILIARY LOCATION	PILOT LIGHT	PANEL MOUNTED PATCHBOARD POINT 12	PURGE OR FLUSHING DEVICE
DISCRETE INSTRUMENTS						
SHARED DISPLAY, SHARED CONTROL						
COMPUTER FUNCTION						
PROGRAMABLE LOGIC CONTROL (PLC)						

INSTRUMENT IDENTIFICATION LETTERS

FIRST LETTER		SUCCEEDING LETTERS		
MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A ANALYSIS		ALARM		
B BURNER, COMBUSTION		USERS CHOICE	USERS CHOICE	USERS CHOICE
C USERS CHOICE			CONTROL	
D USERS CHOICE	DIFFERENTIAL			
E VOLTAGE EMF EMERGENCY		SENSOR PRIMARY ELEMENT		
F FLOW RATE	RATIO (FRACTION)			
G USERS CHOICE		GLASS VIEWING DEVICE		
H HAND (MANUAL)				HIGH
I CURRENT (ELECTRICAL)		INDICATE		
J POWER	SCAN			
K TIME OR TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L LEVEL		LIGHT (PILOT)		LOW
M USERS CHOICE	MOMENTARY			MIDDLE OR INTERMEDIATE
N USERS CHOICE		USERS CHOICE	USERS CHOICE	USERS CHOICE
O USERS CHOICE		ORIFICE RESTRICTION		
P PRESSURE OR VACUUM		POINT (TEST CONNECTION)		
Q QUANTITY	INTEGRATE OR TOTALIZE			
R RADIATION		RECORD OR PRINT		
S SPEED, FREQUENCY, SHUTDOWN	SAFETY		SWITCH	
T TEMPERATURE			TRANSMIT	
U MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V VIBRATION MECH. ANALYSIS			VALVE DAMPER OR LOUVER	
W WEIGHT OR FORCE		WELL		
X UNCLASSIFIED	X-AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y EVENT STATE OR PRESENCE	Y-AXIS		RELAY, COMPUTE, OR CONVERT	
Z POSITION, DIMENSION	Z-AXIS		DRIVE ACTUATE OR UNCLASSIFIED	

INSULATION TYPE

25	INSULATION THICKNESS (mm)
H	HOT INSULATION
C	COLD INSULATION
PP	PERSONNEL PROTECTION

TRACER TYPE

S	STEAM TRACED & INSUL.
E	ELECTRIC TRACE & INSUL.
G	GLYCOL TRACE & INSUL.

LINE LEGEND

- MAIN PROCESS PIPING
- SECONDARY PIPING
- INSTRUMENT SENSING (PIPE OR TUBING)
- FUTURE PIPING
- SOFTWARE SIGNAL (FOR MMI CONFIGURATION)
- HIDDEN LINES
- INSTRUMENT LINE
- CAPILLARY TUBING
- HYDRAULIC SIGNAL
- ELECTRIC SIGNAL
- PACKAGE BOUNDARY LIMITS

NOTES:

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION

REVISIONS

NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
A	ISSUED FOR PROJECT	9424	03-12-12	KL		
B	GENERAL REVISION	9424	04-03-09	DGR		
C	ISSUED FOR PROJECT	9424.02	05-08-12	NI		
D	ISSUED FOR PROJECT - K-600 ADDITION	9424.03	06-06-16	SL		

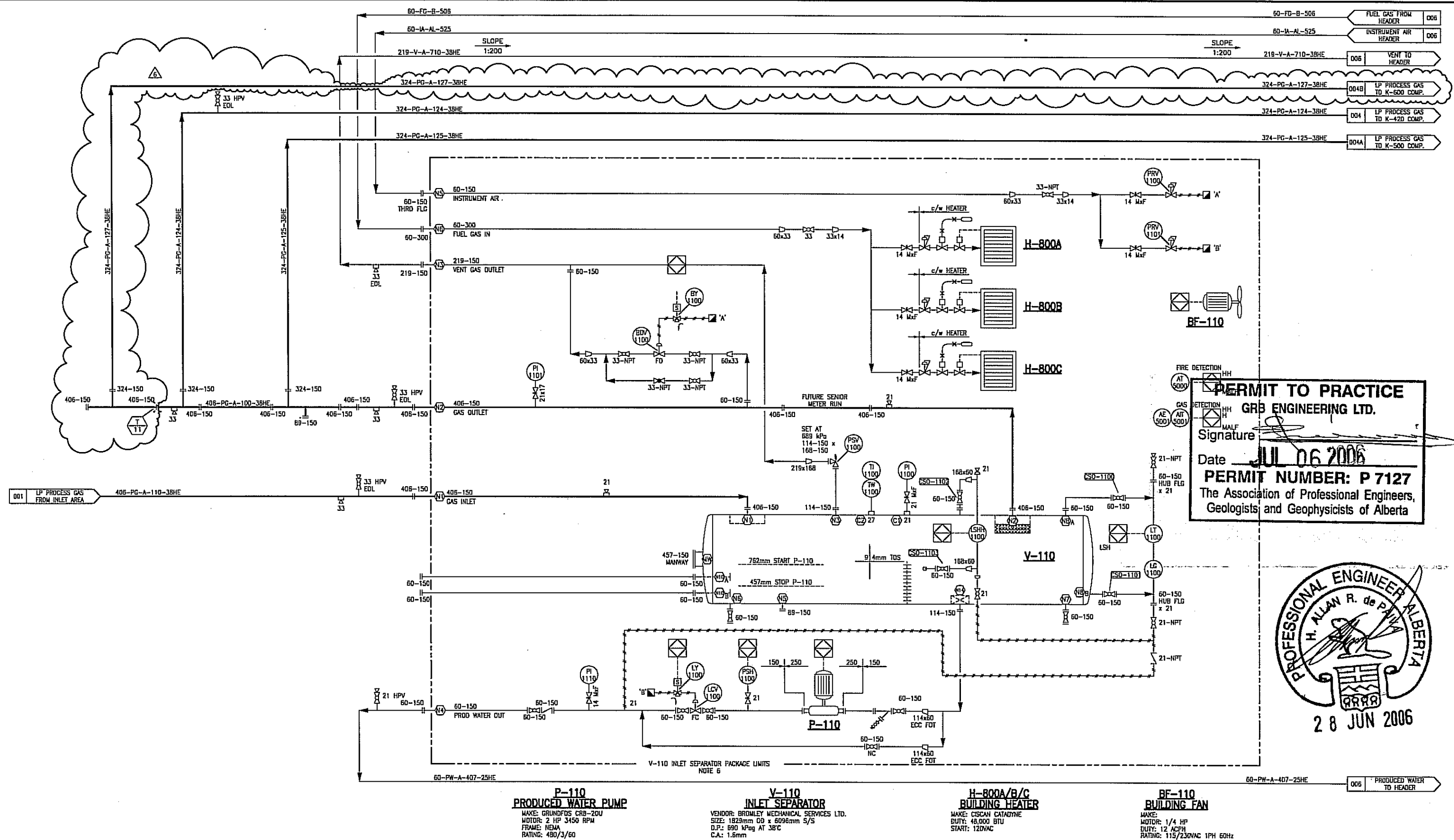
ENGINEERING STAMP

QUICKSILVER

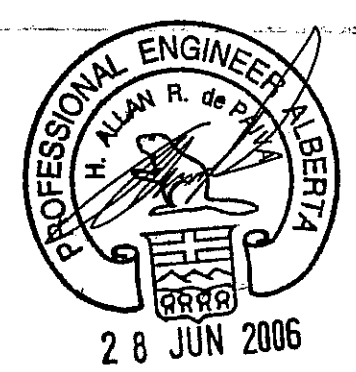
JOFFE COMPRESSOR STATION
LSD 04-22-039-25 W4M
SYMBOLGY SHEET

GRB Engineering Ltd.

PROJECT NO. 9424.03
SCALE: NTS
DWG. NO. 9424-B-000
REV. 0



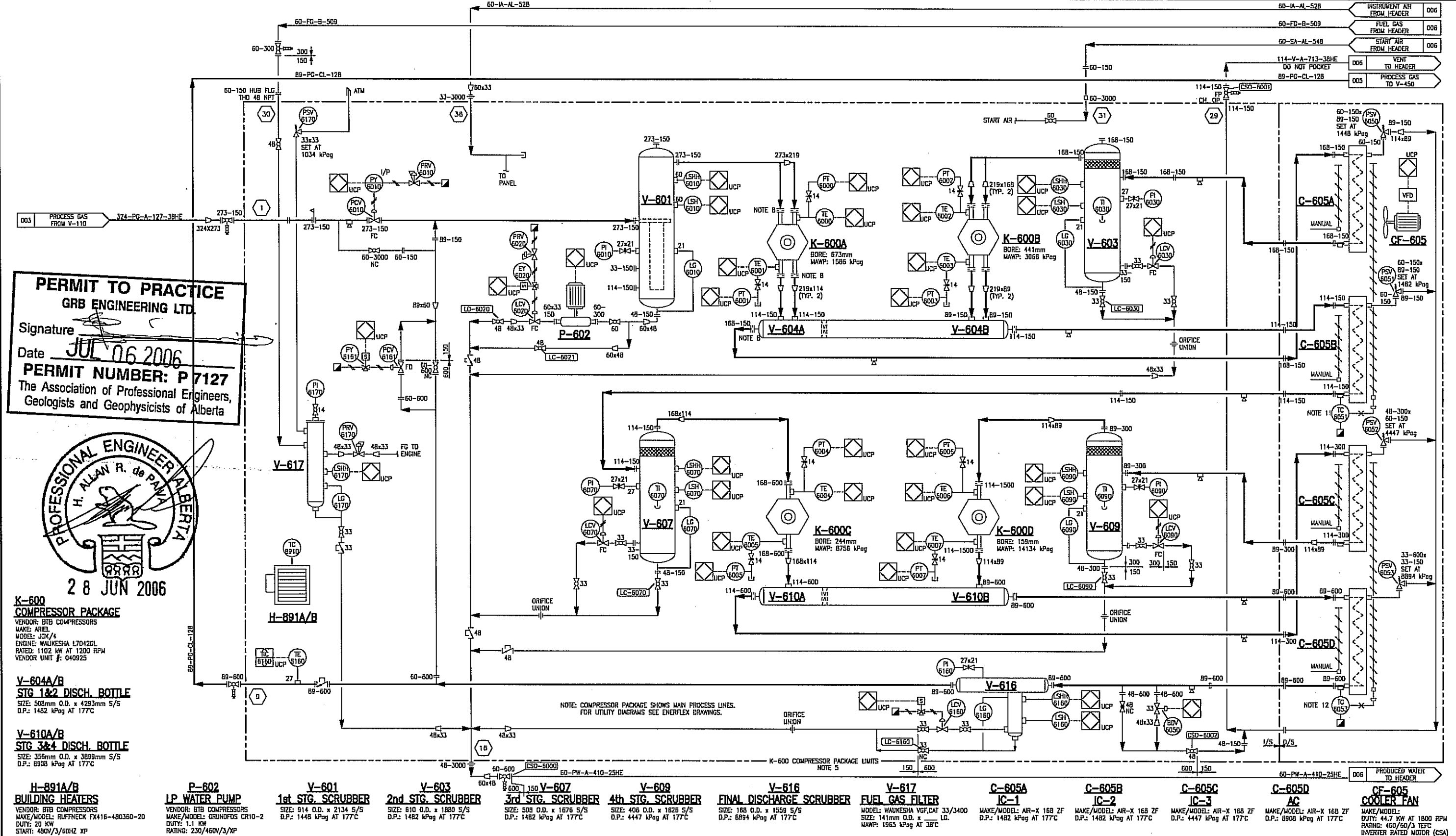
PERMIT TO PRACTICE
GRB ENGINEERING LTD.
Signature _____
Date JUL 06 2006
PERMIT NUMBER: P 7127
The Association of Professional Engineers,
Geologists and Geophysicists of Alberta



- NOTES:**
1. CONFINED SPACE OPERATING PROCEDURE TO BE UTILIZED DURING COMPRESSOR INLET VALVE OPERATION.
 2. THIS IS AN EXISTING SITE. SCOPE OF WORK LIMITED TO CLOUDED AREAS ONLY.
 3. GATHERING SYSTEM MOP TO BE PROTECTED BY UPSTREAM WELLSITE PSVS AND PIPELINE PSVS.
 4. DETAILED HEAT AND MATERIAL BALANCE NOT REQUIRED BY CLIENT.
 5. ENGINEERING STAMP APPLIES TO OFFSKID AND CLOUDED MODIFICATIONS ONLY.
 6. SEE VENDOR P&ID AND BOM FOR COMPLETE PACKAGE DESCRIPTION.
 7. CONTRACTOR TO SUPPLY/INSTALL HIGH POINT VENTS AND LOW POINT DRAINS AS REQUIRED.

REFERENCE DRAWINGS		REVISIONS					
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK. ENG.
		0	ISSUED FOR BID - V-110, K-420 ADDITION	9424.01	04-05-19	RK	ACI
		1	ISSUED FOR CONST'N - V-110, K-420 ADDITION	9424.01	04-07-08	RK	ACI
		2	AS BUILT - V-110, K-420 ADDITION	9424.01	04-08-06	RK	NW
		3	ISSUED FOR CONSTRUCTION - K-500 ADDITION	9424.02	05-08-12	DB	AP
		4	AS BUILT PER FIELD MARK-UPS - K-500, V-91B ADD'N	9424.02	05-10-20	NI	RW
		5A	ISSUED FOR REVIEW - K-600 ADDITION	9424.03	08-05-12	EY	
		6	ISSUED FOR CONSTRUCTION - K-600 ADDITION	9424.03	06-06-16	YW	

ENGINEERING STAMP				QUICKSILVER			
GRB ENGINEERING Ltd.				JOFFRE COMPRESSOR STATION			
				LSD 04-22-039-25 W4M			
				V-110 INLET SEPARATOR P&ID			
PROJECT NO.	SCALE:	DWG. NO.	REV.	PROJECT NO.	SCALE:	DWG. NO.	REV.
9424.03	NTS	9424-B-003	6				



- NOTES:
1. CONFINE SPACE OPERATING PROCEDURE TO BE UTILIZED DURING VALVE OPERATION.
 2. GATHERING SYSTEM MOP TO BE PROTECTED BY UPSTREAM WELLSITE PSV'S AND PIPELINE PSV'S.
 3. SEE VENDOR P&ID AND BOM FOR COMPLETE PACKAGE DESCRIPTION.
 4. CONTRACTOR TO SUPPLY/INSTALL HIGH POINT VENTS AND LOW POINT DRAINS AS REQUIRED (OFF SKD).
 5. PRESSURE INSTRUMENTS ARE EQUIPPED WITH ISOLATION VALVES.
 6. PSV'S INSIDE COMP. SKID ARE SIZED BY VENDOR. SEE PSV LIST FOR DETAILS.
 7. UCV - UNIT CONTROL PANEL.
 8. RESTRICTION ORIFICE DETAIL AS PER VENDOR'S DETAIL DRAWINGS.
 9. IC1 & IC2 CONTROLLED BY STAGE 2 DISCHARGE.
 10. IC3 & AC CONTROLLED BY STAGE 4 DISCHARGE.

REFERENCE DRAWINGS			REVISIONS				
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK. ENG.
9424-03	ISSUED FOR REVIEW - K-600 ADDITION	A		9424-03	06-05-12	EY	
9424-03	ISSUED FOR CONSTRUCTION - K-600 ADDITION	D		9424-03	06-06-16	YW	

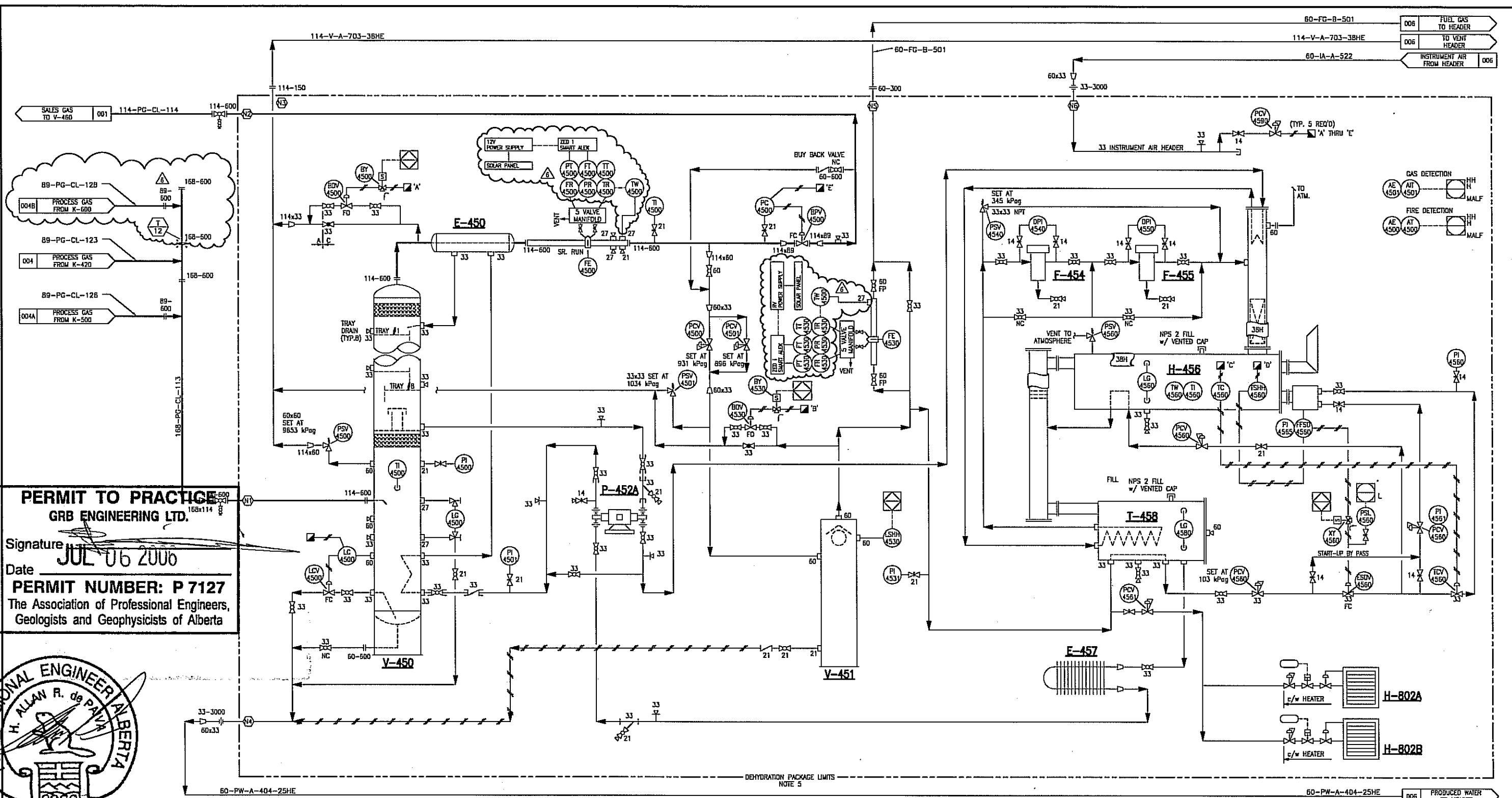
ENGINEERING STAMP

QUICKSILVER

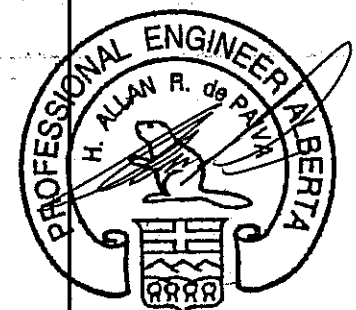
JOFFRE COMPRESSOR STATION
LSD 04-22-039-25 W4M
K-600 COMPRESSOR P&ID

PROJECT NO.	SCALE	DWG. NO.	REV.
9424-03	NTS	9424-B-004B	0

GRB ENGINEERING Ltd.



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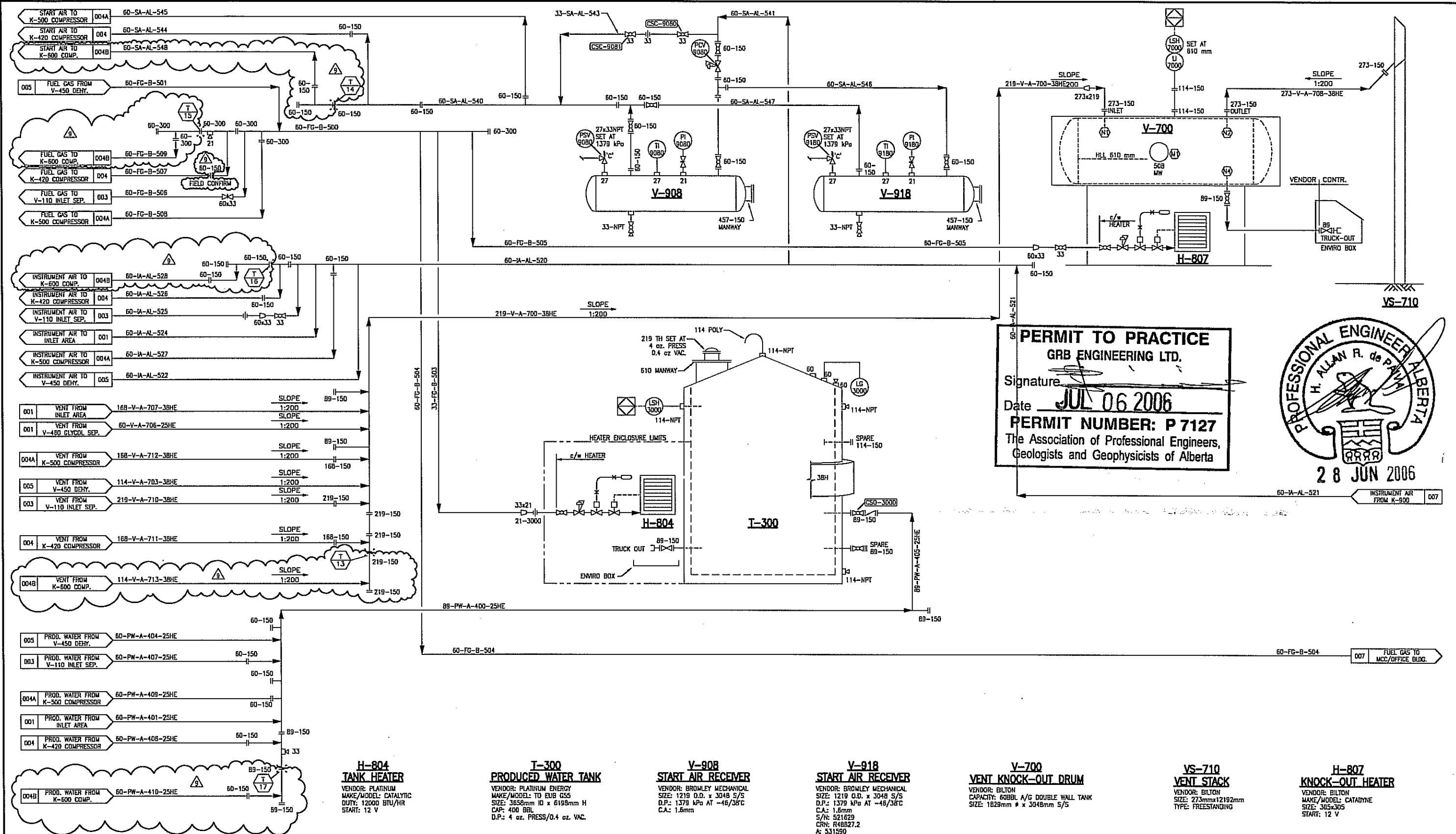
- | | | | | | | | | | |
|---|---|--|---|---|--|---|--|--|--|
| V-450
GLYCOL CONTACTOR
VENDOR: ASPIRE ENERGY
SIZE: 762mm OD x 8534mm S/S
D.P.: 9653 kPag at 66°C | E-450
GAS/GLYCOL EXCHANGER
VENDOR: ASPIRE ENERGY
SIZE: 168mm OD x 2438mm LG | P-452A/B
GLYCOL PUMP
VENDOR: ASPIRE ENERGY
MAKE: KIMRAY 21015
CAP.: 210 GPH | V-451
F/G FILTER SCRUBBER
VENDOR: ASPIRE ENERGY
SIZE: 273mm OD x 762mm S/S
D.P.: 1034 kPag at 38°C | F-454
GLYCOL FILTER
VENDOR: ASPIRE ENERGY
MAKE: CUNO I82
FILTER: (1) 25 MICRON ELEMENT | F-455
GLYCOL FILTER
VENDOR: ASPIRE ENERGY
MAKE: CUNO I82
FILTER: (1) CHARCOAL ELEMENT | H-456
GLYCOL REGENERATOR
DUTY: 250000 BTU/HR
SIZE: 610mm OD x 2108mm LONG | E-457
AIR/GLYCOL EXCHANGER
VENDOR: ASPIRE ENERGY
SIZE: (4) 114x114x32mm FIN TUBE
MAKE: TRANE FINS 3048mm LONG | I-458
GLYCOL SURGE TANK
VENDOR: ASPIRE ENERGY
SIZE: 508mm OD x 1459mm LG | H-802A/B
BUILDING HEATER
VENDOR: ASPIRE ENERGY
MAKE: CATADYNE
DUTY: 24000 BTU/HR
START: 120WAC |
|---|---|--|---|---|--|---|--|--|--|

NOTES:
1. THIS IS AN EXISTING SITE. SCOPE OF WORK LIMITED TO CLOUDED AREAS ONLY.
4. ENGINEERING STAMP APPLIES TO OFFSKID AND CLOUDED MODIFICATIONS ONLY.
5. SEE VENDOR PAID AND BOM FOR COMPLETE PACKAGE DESCRIPTION.

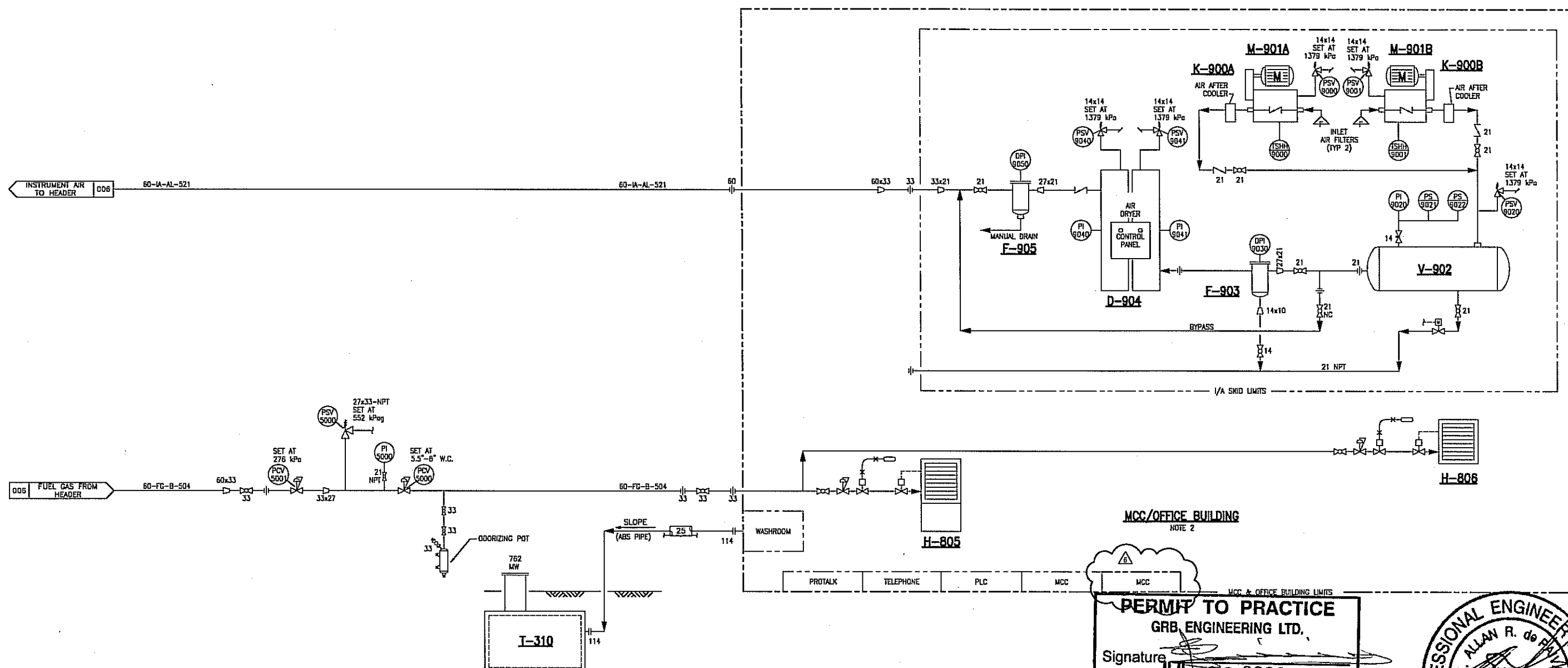
REFERENCE DRAWINGS		REVISIONS					
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK. ENG.
		0	ISSUED FOR BID - V-110, K-420 ADDITION	9424.01	04-05-19	RK	ACI
		1	ISSUED FOR CONST'N - V-110, K-420 ADDITION	9424.01	04-07-06	RK	ACI NW
		2	AS BUILT - V-110, K-420 ADDITION	9424.01	04-08-06	RK	
		3	ISSUED FOR CONSTRUCTION - K-500 ADDITION	9424.02	05-08-12	DB	AP RW
		4	AS BUILT PER FIELD MARK-UPS - K-500, V-918 ADD'N	9424.02	05-10-20	NI	RW
		5A	ISSUED FOR REVIEW - K-600 ADDITION	9424.03	06-05-12	EY	
		6	ISSUED FOR CONSTRUCTION - K-600 ADDITION	9424.03	06-06-16	YW	

ENGINEERING STAMP
GRB Engineering Ltd.

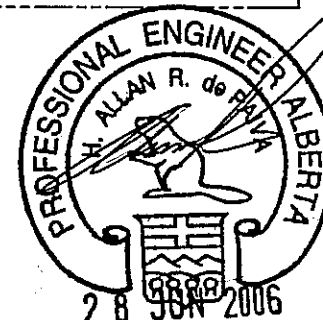
QUICKSILVER			
JOFFRE COMPRESSOR STATION LSD 04-22-039-25 W4M V-450 GLYCOL CONTACTOR P&ID			
PROJECT NO. 9424.03	SCALE NTS	DWG. NO. 9424-B-005	REV. 6



NOTES: 1. THIS IS AN EXISTING SITE. SCOPE OF WORK LIMITED TO CLOUDED AREAS ONLY. 2. ENGINEERING STAMP APPLIES TO OFFSKID AND CLOUDED MODIFICATIONS ONLY. 3. SEE VENDOR PAID AND BOM FOR COMPLETE PACKAGE DESCRIPTION. 4. CONTRACTOR TO SUPPLY/INSTALL HIGH POINT VENTS AND LOW POINT DRAINS AS REQUIRED.	REFERENCE DRAWINGS		REVISIONS					ENGINEERING STAMP		QUICKSILVER JOFFRE COMPRESSOR STATION LSD 04-22-039-25 W4M PW TANK/VENT AREA P&ID			
	DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	PROJECT NO.	SCALE	DWG. NO.	REV.
			7	AS BUILT PER FIELD MARK-UPS - K-500, V-918 ADD'N	9424.02	05-10-20	NI		RW	9424.03	NTS	9424-B-006	9
			8A	ISSUED FOR REVIEW - K-600 ADDITION	9424.03	06-05-12	EY						
			9	ISSUED FOR CONSTRUCTION - K-600 ADDITION	9424.03	06-06-16	YW						
			2	AS BUILT PER FIELD MARK UPS	9424	04-03-09	DCR						
			3	ISSUED FOR BID - V-110, K-420 ADDITION	9424.01	04-05-19	RK	ACI					
			4	ISSUED FOR CONST'N - V-110, K-420 ADDITION	9424.01	04-07-06	RK	ACI	NW				
			5	AS BUILT - V-110, K-420 ADDITION	9424.01	04-08-05	RK						
			6	ISSUED FOR CONSTRUCTION - K-500 ADDITION	9424.02	05-08-12	DB	AP	RW				



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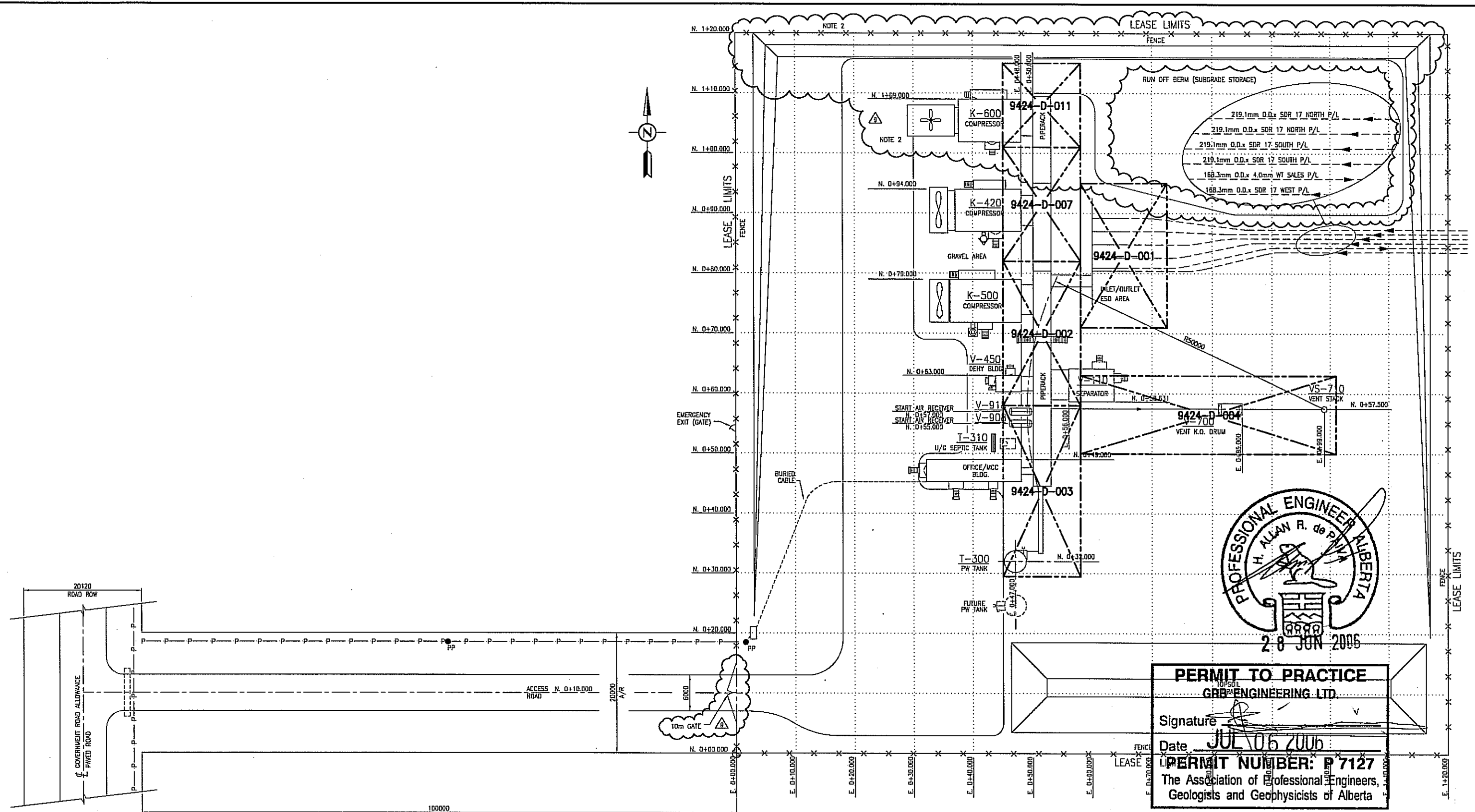


T-310 SEPTIC TANK VENDOR: BURNCO CAP: 1000 GAL SIZE: 1889mm H x 2520mm L x 1728mm W	H-805 OFFICE FURNACE VENDOR: C & V PORTABLE MAKE/MODEL: "INTERTECH" M1GB 077 AGW DUTY: 62000 BTU/HR VOLTAGE:	H-806 OFFICE HEATER VENDOR: C & V PORTABLE MAKE/MODEL: OVERHEAD HEATER DUTY: 3 kW 208V 1/3 PHASE	T-907 DRAIN TANK VENDOR: EAGLE PUMP AND COMP. MAKE/MODEL: DELTECH D-0050-PF C/W SIGHT GLASS DIFFERENTIAL INDICATOR CAP.: 50 SCFM	F-905 AFTER FILTER VENDOR: EAGLE PUMP AND COMP. MAKE/MODEL: DELTECH D-0050-CC C/W SIGHT GLASS DIFFERENTIAL INDICATOR CAP.: 50 SCFM	F-903 PRE FILTER VENDOR: EAGLE PUMP AND COMP. MAKE/MODEL: DELTECH D-0050-CC C/W SIGHT GLASS DIFFERENTIAL INDICATOR CAP.: 50 SCFM	D-904 HEATLESS AIR DRYER VENDOR: EAGLE PUMP AND COMP. MODEL: EADR 40 C/W MICROPROCESSOR 120VAC/NEMA 1 CAP.: 40 SCFM AT 38°C AT 680 kPag	K-900A/B INSTRUMENT AIR COMPRESSOR VENDOR: EAGLE PUMP AND COMP. MAKE/MODEL: RORA NOVA SCI-7 SPEED: 2400 RPM CAP.: 17 CFM AT 1034 kPag	V-902 WET AIR RECEIVER VENDOR: EAGLE PUMP AND COMP. SIZE: 610mm O.D. x 1727mm S/S MAWP: 1379 kPag AT 232°C CAP.: 120 GAL	M-901A/B COMPRESSOR MOTOR VENDOR: EAGLE PUMP AND COMP. MAKE/MODEL: WESTINGHOUSE 184T TEFC DUTY: 7.5 HP 3600 RPM 230-480/3/60
--	---	--	---	---	---	--	--	---	--

NOTES:
 1. ENGINEERING STAMP APPLIES TO OFFSKID AND CLOUDED MODIFICATIONS ONLY.
 2. PLEASE REFER TO ELECTRICAL DRAWINGS FOR CHANGES.

REFERENCE DRAWINGS			REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	
		0	ISSUED FOR BID - V-110, K-420 ADDITION	9424.01	04-05-19	RK	ACI		
		1	ISSUED FOR INFORMATION	9424.01	04-07-06	RK	ACI	NW	
		2	AS BUILT - V-110, K-420 ADDITION	9424.01	04-08-06	RK			
		3	ISSUED FOR INFORMATION - K-500 ADDITION	9424.02	05-08-12	DB			
		4	AS BUILT PER FIELD MARK-UPS - K-500, V-918 ADD'N	9424.02	05-10-20	NI		RW	
		5A	ISSUED FOR REVIEW - K-600 ADDITION	9424.03	06-05-12	EY			
		6	ISSUED FOR CONSTRUCTION - K-600 ADDITION	9424.03	06-06-16	YW			

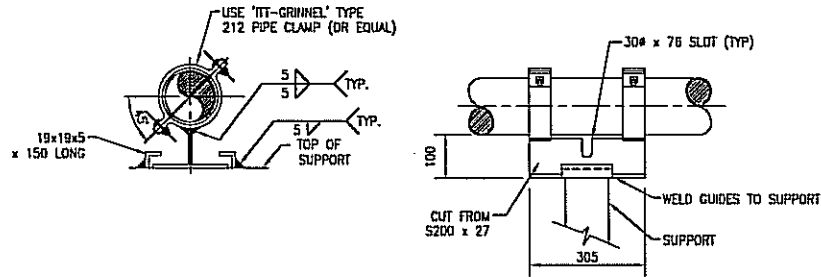
ENGINEERING STAMP				QUICKSILVER			
GRB Engineering Ltd.				JOFFRE COMPRESSOR STATION			
				LSD 04-22-039-25 W4M MCC/OFFICE AREA P&ID			
PROJECT NO. 9424.03	SCALE NTS	DWG. NO. 9424-B-007	REV. 6				



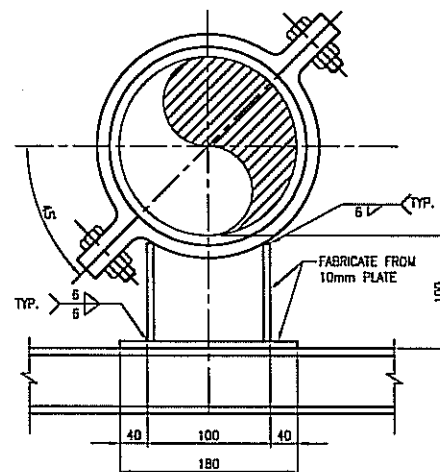
NOTES:
1. THIS IS AN EXISTING SITE, SCOPE OF WORK LIMITED TO CLOUDED AREAS ONLY.
2. LAND WORK MIGHT BE REQUIRED.
EXTEND LEASE & ROADWAY TO NORTH. (FIELD DETERMINED)
PLACE BARRIERS/GUARDS OVER GAS PIPING. (FIELD DETERMINED)

REFERENCE DRAWINGS		REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
		8A	ISSUED FOR REVIEW - K-600 ADDITION	9424.03	06-05-23	EY		
		9	ISSUED FOR CONSTRUCTION - K-600 ADDITION	9424.03	06-06-16	YW		
		2	AS BUILT PER FIELD MARK UPS	9424	04-03-09	DGR		
		3	ISSUED FOR BID - V-110, K-420 ADDITION	9424.01	04-05-26	RK	ACI	
		4	ISSUED FOR CONST'N - V-110, K-420 ADDITION	9424.01	04-07-05	RK	ACI	NW
		5	AS BUILT - V-110, K-420 ADDITION	9424.01	04-08-06	RK		
		6	ISSUED FOR CONSTRUCTION - K-500 ADDITION	9424.02	05-08-12	DB		
		7	AS BUILT PER FIELD MARK-UPS - K-500, V-91B ADD'N	9424.02	05-10-20	NI		RW

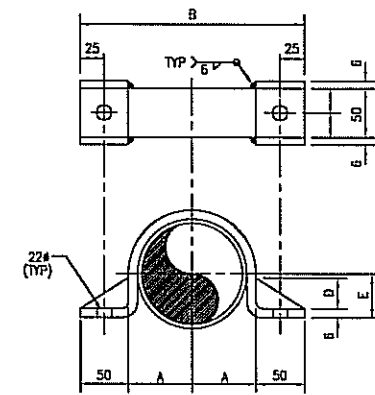
ENGINEERING STAMP				QUICKSILVER			
GRB ENGINEERING LTD.				JOFFRE COMPRESSOR STATION LSD 04-22-039-25 W4M PIPING KEY PLAN			
PROJECT NO.	SCALE:	DWG. NO.	REV.	PROJECT NO.	SCALE:	DWG. NO.	REV.
9424.03	1:300	9424-C-002	9	9424.03	1:300	9424-C-002	9



SYMBOL ON DWG. (SG)
PIPE SHOE WITH GUIDES
 (60.3# THRU 168.3#)



SYMBOL ON DWG. (SL)
STANDARD PIPE SHOE
 (219.1# THRU 609.6#)

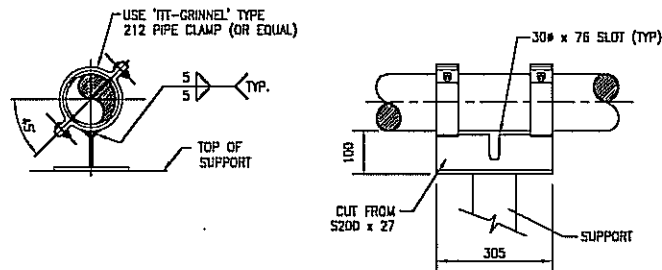


PIPE CLAMP & SUPPORT DETAIL

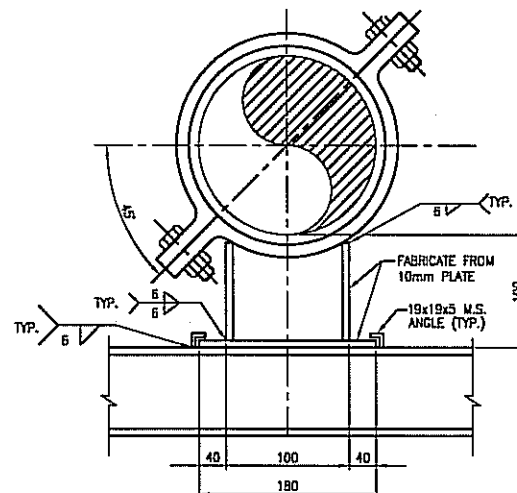
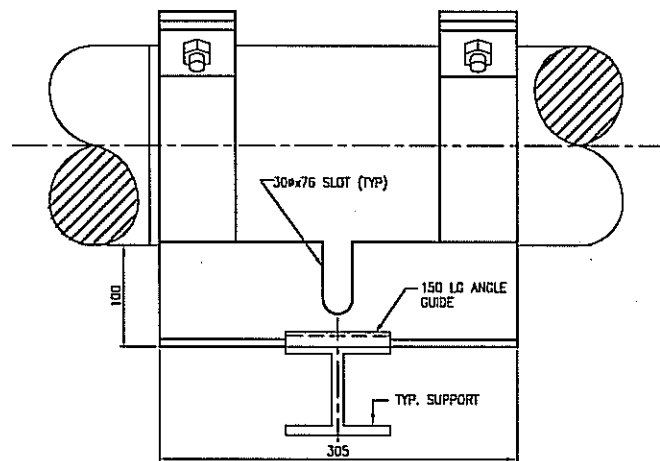
NOM. SIZE	METRIC			
	A	B	D	E
60	38	175	12	18
89	52	204	26	32
114	65	229	39	45
158	92	283	66	72
219	117	334	92	96
273	144	388	118	125
324	169	439	144	150
356	185	471	160	166
406	211	521	185	191

PIPE CLAMP

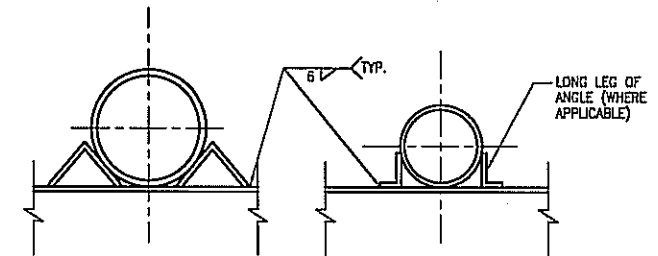
SYMBOL ON DWG. (CB)



SYMBOL ON DWG. (SP)
PIPE SHOE WITHOUT GUIDES
 (60.3# THRU 168.3#)



SYMBOL ON DWG. (SD)
STANDARD PIPE SHOE w/ GUIDES
 (219.1# THRU 609.6#)



NPS 6 & LARGER PIPE ANCHOR

NPS 4 & SMALLER PIPE ANCHOR

PIPE SIZE (NPS)	ANGLE SIZE
2,3,4	45 x 30 x 5 - 80 LG
6,8	65 x 65 x 6 - 80 LG
10	75 x 75 x 8 - 80 LG
12,14	100 x 100 x 8 - 80 LG
16,18	125 x 125 x 10 - 80 LG
20,24	150 x 150 x 10 - 80 LG

PIPE GUIDE

SYMBOL ON DWG. (CG)

NOTES:

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION

REVISIONS

NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
A	ISSUED FOR PROJECT	9424	03-12-12	KL	SO	
B	GENERAL REVISION	9424	04-03-09	DGR		
C	ISSUED FOR PROJECT	9424.01	04-05-10	RK		
D	ISSUED FOR PROJECT	9424.03	06-06-16	EY		

ENGINEERING STAMP

GRB ENGINEERING Ltd.

QUICKSILVER

JOFFRE COMPRESSOR STATION
 LSD 04-22-039-25 W4M
 PIPE SHOE AND GUIDE DETAILS

PROJECT NO.	SCALE	DWG. NO.	REV.
9424.03	N/A	9424-H-001	0

[illegible]

- 1 PILES SHALL BE OPEN END DRIVEN STEEL PIPE AS SPECIFIED HEREIN U.N.O.
- 2 PILES SHALL BE DRIVEN CONTINUOUSLY WITHOUT INTERRUPTION TO LENGTH INDICATED ON PILE SCHEDULE OR UNTIL PRACTICAL REFUSAL IS REACHED. IN NO CASE SHALL THE PILE EMBEDMENT BE LESS THAN 7000mm U.N.O.
- 3 PRACTICAL REFUSAL IS DEFINED AS 10 BLOWS PER 25mm IN THE LAST 150mm OF EMBEDMENT WHEN SUBJECT TO DRIVING ENERGY OF 24,400 JOULES (18,000 FT. LBS.)
- 4 THE DRIVING HAMMER SHALL STRIKE SQUARELY OVER CENTER OF PILE. AN OFF CENTER OR WOBBLING HAMMER SHALL NOT BE PERMITTED.
- 5 PILES SHALL BE SECURED AGAINST LATERAL MOVEMENT DURING DRIVING BY LEADS OR OTHER SUITABLE MEANS.
- 6 DAMAGE TO PILE ENDS SHALL BE PREVENTED BY USING AN APPROVED PILE DRIVING CAP, SHOE AND/OR TIP REINFORCEMENT.
- 7 THE CONTRACTOR SHALL KEEP ACCURATE RECORDS OF HAMMER DATA ENERGY, STROKE, ANVIL AND CUSHION DETAILS, DRIVING TIME AND PENETRATION PER BLOW FOR EACH PILE. ONE COPY OF THESE RECORDS SHALL BE SUBMITTED TO GRB ENGINEERING LTD. FOR REVIEW.
- 8 PILES SHALL BE PLACED TO THE FOLLOWING TOLERANCES
 - a. NOT MORE THAN 2% OF LENGTH OUT OF PLUMB
 - b. NOT MORE THAN 50mm OFF CENTER
 - c. WHERE PILES DEVIATE FROM THE REQUIRED ANGLE ALIGNMENT OR PLAN LOCATION BY MORE THAN THE ABOVE TOLERANCES, THE CONDITIONS OF FOUNDATION SHALL BE ASSESSED BY THE ENGINEER AND WHERE REQUIRED CORRECTIONS SHALL BE MADE ACCORDING TO THE OWNERS INSTRUCTIONS.
- 9 STEEL PIPE PILE MATERIAL SHALL BE ASTM A252 GRADE 2 OR 3 AND SHALL BE SEAMLESS.
- 10 PILE SPICE WELDS, IF REQUIRED SHALL BE FULL PENETRATION WELDS BE GROUND FLUSH AND CONFORM TO CSA W59. WELDING ELECTRODES SHALL BE LOW HYDROGEN TYPE 480X. CONTRACTOR SHALL ENSURE COMPATIBILITY OF WELDING ELECTRODES WITH PILE MATERIAL.
- 11 MINIMUM PILE WALL THICKNESS SHALL BE AS FOLLOWS UNLESS SPECIFICALLY NOTED OTHERWISE:

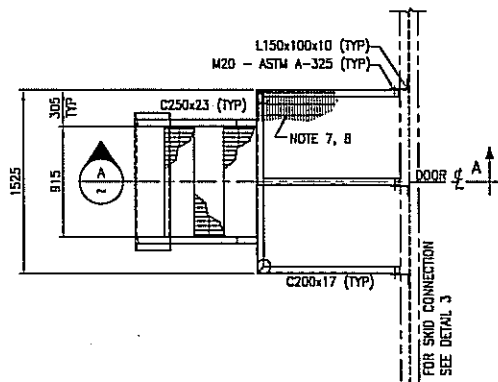
114# PIPE -	6.02mm WALL THICKNESS
168# PIPE -	7.11mm WALL THICKNESS
219# PIPE -	8.18mm WALL THICKNESS
273# PIPE -	9.27mm WALL THICKNESS
324# PIPE -	9.53mm WALL THICKNESS
- 12 PILE SHALL BE TERMINATED APPROXIMATELY 450mm ABOVE TOP OF PILE ELEVATION.
- 13 PILING CONTRACTOR SHALL PROVIDE ALL SAFETY SERVICES UNLESS REQUIRED OTHERWISE.
- 14 SPLIT RING (TYPE 3 PILE) TO BE USED WHERE PILE IS NOT IN FULL CONTACT WITH U/S OF SKID BEAMS. (GAP > 2mm)
- 15 SPLIT RING TO BE FABRICATED FROM PILE MATERIAL.
- 16 ALIGN SEAMS IN SPLIT RING AT 90° TO LONGITUDINAL AXIS OF BEAM.
- 17 ANY PORTION OF A PILE NOT COVERED BY SKID BEAMS AND EXPOSED TO WEATHER SHOULD BE CAPPED WITH 6mm PLATE.
- 18 PILE EMBEDMENT SHOWN FOR U/G PIPE SUPPORTS IS FROM ASSUMED GRADE EL. 100.000
- 19 BEDROCK IS EXPECTED TO BE ENCOUNTERED AT APPROX. 2000mm DEPTH. PILES SHALL BE DRIVEN TO THE DEPTH SHOWN OR PRACTICAL REFUSAL (NOTE 3). MINIMUM ACCEPTABLE PILE DEPTH IS 5000mm.
- 20 PRE-DRILL ALL PILES TO 4500mm DEPTH AT 95% OF PILE DIAMETER. DRIVE PILES TO PRACTICAL REFUSAL (NOTE 3)



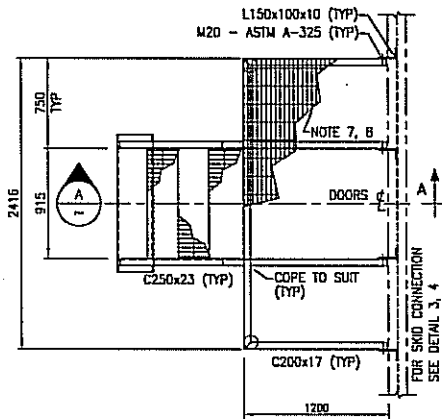
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PS-45	104.352
PS-46	104.375

PS-44 TO PS-46
(LOOKING NORTH)

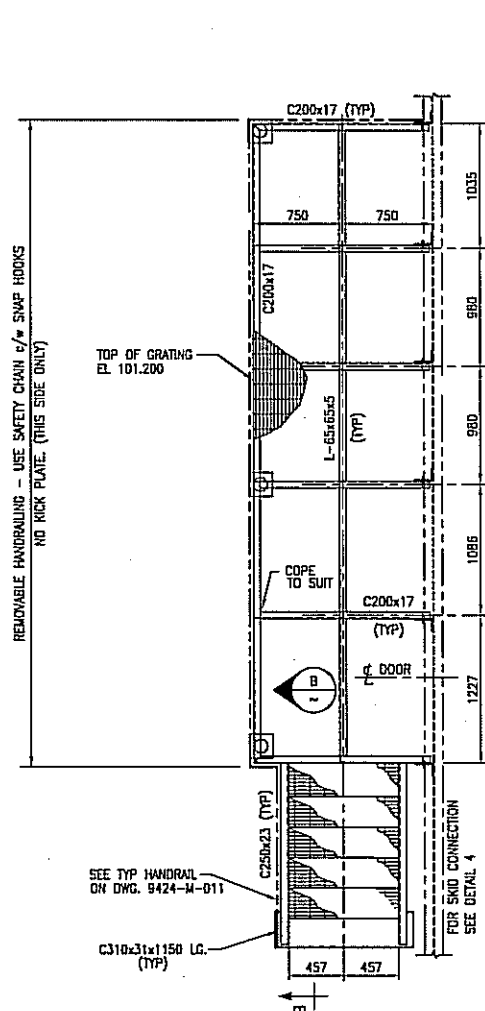
PROJECT NO.	SCALE:	DWG. NO.	REV.
9424.03	NTS	9424-L-009	



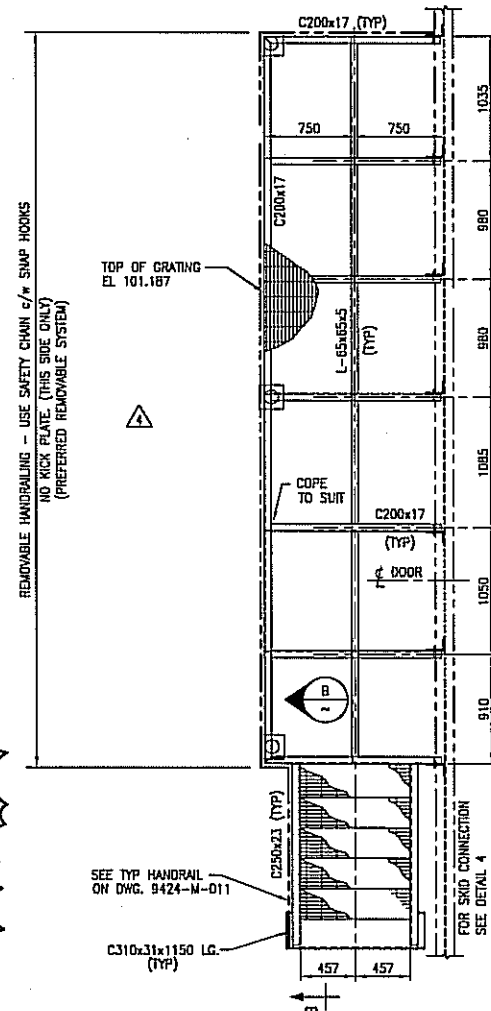
SINGLE DOOR PLATFORM-TYPE 1



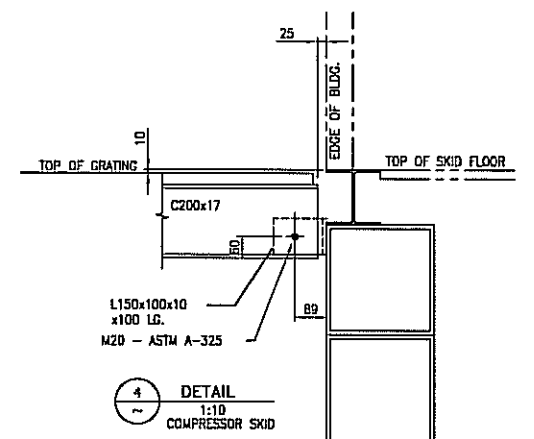
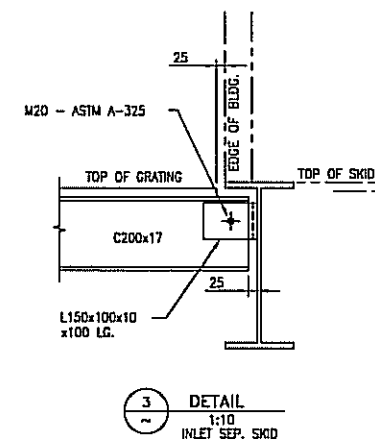
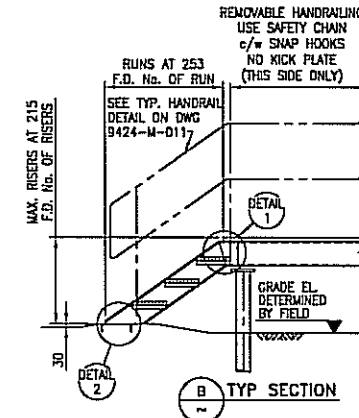
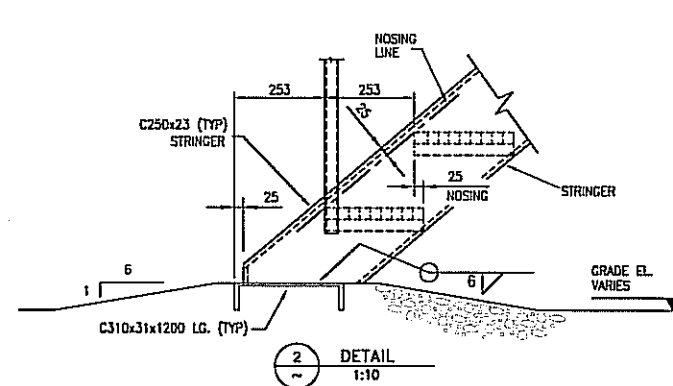
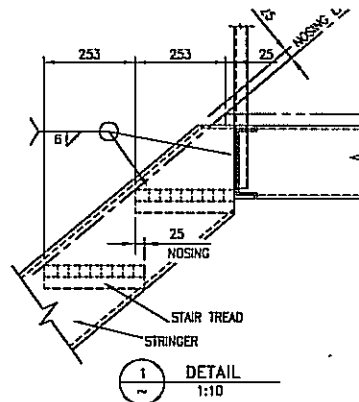
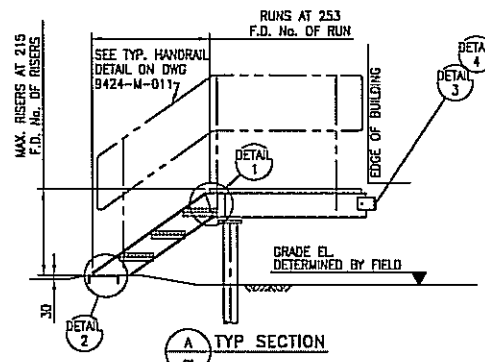
DOUBLE DOOR PLATFORM-TYPE 2



SINGLE DOOR PLATFORM WITH BARREL STORAGE - TYPE 3



SINGLE DOOR PLATFORM WITH BARREL STORAGE - TYPE 4



STAIR SCHEDULE

BUILDING	TYPE	No. OF STAIRCASE	No. OF RISERS PER STAIRCASE	No. OF TREADS PER STAIRCASE	T.O. GRATING ELEVATION	ORIENTATION
V-110 INLET SEP. BLDG.	1	1	4	3	100.780	AS SHOWN
V-110 INLET SEP. BLDG.	2	1	4	3	100.780	AS SHOWN
K-420 COMP. BLDG.	2	1	6	5	101.200	AS SHOWN
K-420 COMP. BLDG.	3	1	6	5	101.200	AS SHOWN
K-500 COMP. BLDG.	2	1	6	5	101.187	AS SHOWN
K-500 COMP. BLDG.	4	1	6	5	101.187	AS SHOWN
K-600 COMP. BLDG.	2	1	5	4	101.035	AS SHOWN
K-600 COMP. BLDG.	4	1	5	4	101.035	AS SHOWN

FIELD CHECK NUMBER OF TREADS AND RISERS PRIOR TO CONSTRUCTION.

NOTES

- ALL DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH CAN/CSA-S16.1-M "LIMIT STATES DESIGN OF STEEL STRUCTURES AND THE CANADIAN INSTITUTE OF STEEL CONSTRUCTION HANDBOOK OF STEEL CONSTRUCTION (CISC).
- ALL STRUCTURAL STEEL SHALL CONFORM TO CAN/CSA-G40-21.M 300W.
- ALL BOLTS EXCEPT ANCHOR BOLTS AND BOLTS USED IN HANDRAILS AND LADDERS SHALL BE M20 OR 3/4" ASTM A325M COMPLETE WITH NUTS AND WASHERS.
- ALL NUTS, BOLTS AND WASHERS SHALL BE CADMIUM PLATED.
- ALL WELDING SHALL BE IN ACCORDANCE WITH CSA W59-M "WELDED STEEL CONSTRUCTION (METAL ARC WELDING)".
- ALL GRATING SHALL BE FLOWFORGE OR APPROVED EQUAL, WELDED STEEL GRATING TO HAVE A SERRATED TOP EDGE (TYPE 30-102M). BEARING BAR SIZE SHALL BE 32x4.8 AT 30 CENTRES. TWISTED CROSS RODS SHALL BE AT 102 CENTRES.
- BANDING BAR OF SAME SECTION AS GRATING LOAD BARS SHALL BE WELDED ACROSS THE ENDS OF ALL LOAD BARS.
- GRATING SHALL BE FIXED BY TACK WELDING END BARS, EDGE BARS AND EVERY 5th LOAD BAR TO SUPPORTING STEELWORK.
- ALL TREADS SHALL BE 278 WIDE x 914 LONG WELDED STEEL GRATING AND HAVE A SERRATED TOP EDGE AND CHECKER PLATE NOSING. (TYPE 30-102M) BEARING BAR SIZE SHALL BE 25x4.8 (FLOWFORGE OR APPROVED EQUAL).
- TREADS SHALL BE WELDED TO STRINGERS WITH CONTINUOUS 4mm FILLET WELDS ALL AROUND THE TREAD END PLATE.
- CONTRACTOR TO CONFIRM ALL DIMENSIONS AND ELEVATIONS PRIOR TO ANY CONSTRUCTION.
- COMMERCIAL BLAST TO SSPC-SP-6.
- PRIME WITH ONE COAT OF ZINC CHROMATE PRIMER.
- FINAL PAINT AS PER OWNER'S SPECIFICATIONS.
- BASE CHANNEL AND GRATING SHALL BE PAINTED WITH NON-SUP PAINT.

NOTES:

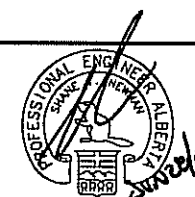
REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION
9424-C-001	SITE PLAN

REVISIONS

NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
A	PRELIMINARY	9424.01	04-07-05	RK		
1	ISSUED FOR CONSTRUCTION	9424.01	04-07-06	RK		
2	ISSUED FOR CONSTRUCTION - K-500 ADDITION	9424.02	05-08-12	NI		SIN
3A	ISSUED FOR REVIEW - K-600 ADDITION	9424.03	06-05-23	EY		
4	ISSUED FOR CONSTRUCTION - K-600 ADDITION	9424.03	06-06-16	YW		

ENGINEERING STAMP

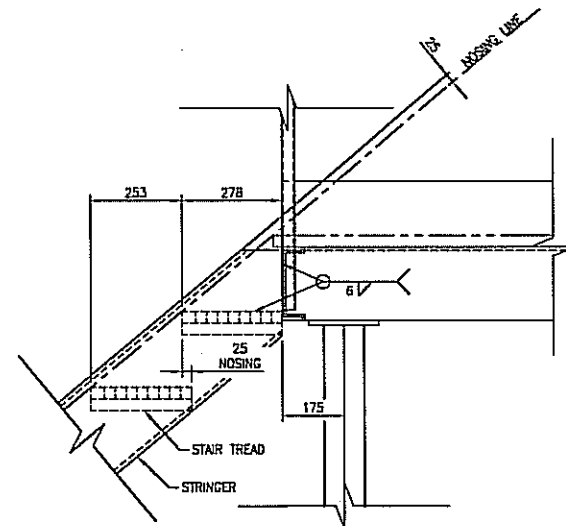


QUICKSILVER

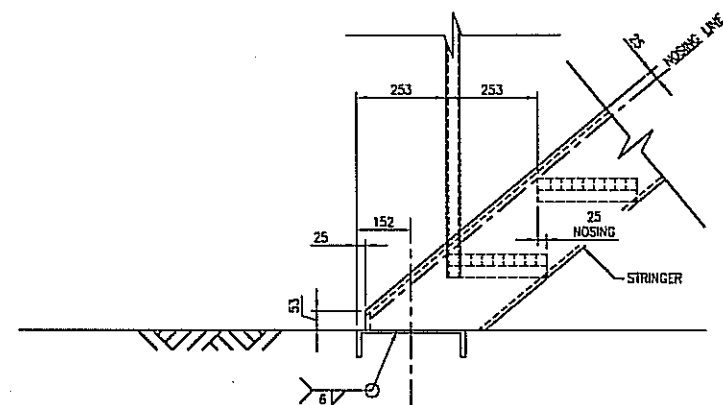
JOFFE COMPRESSOR STATION
LSD 04-22-039-25 W4M
PLATFORM & STAIR DETAILS

GRB ENGINEERING Ltd.

PROJECT NO.	SCALE	DWG. NO.	REV.
9424.03	1:30	9424-M-010	4



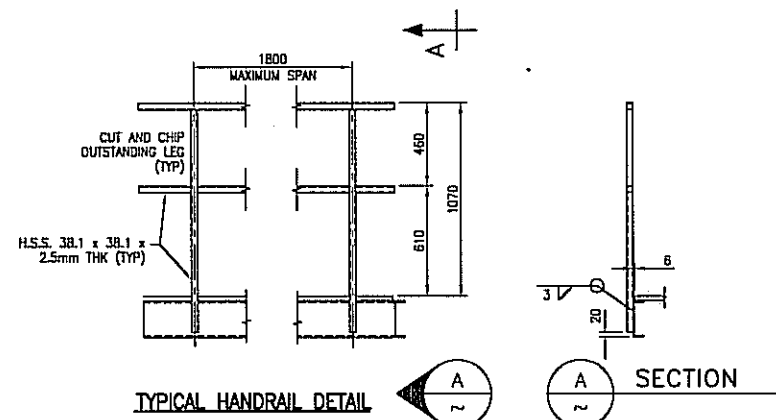
1
~
DETAIL
SCALE 1:10



2
~
DETAIL
SCALE 1:10

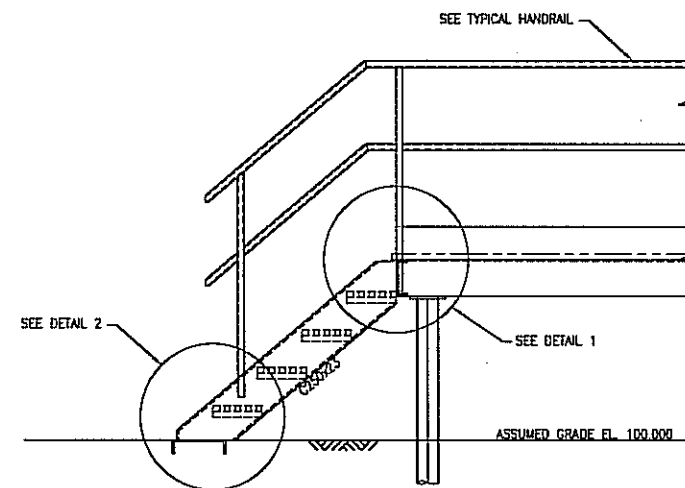
NOTES

1. ALL DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH CAN/CSA-S16.1-M "LIMIT STATES DESIGN OF STEEL STRUCTURES AND THE CANADIAN INSTITUTE OF STEEL CONSTRUCTION HANDBOOK OF STEEL CONSTRUCTION (CISC).
2. ALL STRUCTURAL STEEL SHALL CONFORM TO CAN/CSA-C40-21.M 300W
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11. CONTRACTOR TO CONFIRM ALL DIMENSIONS AND ELEVATIONS PRIOR TO ANY CONSTRUCTION.
12. COMMERCIAL BLAST TO SSPC-SP-6
13. PRIME WITH ONE COAT OF ZINC CHROMATE PRIMER.
14. FINAL PAINT AS PER OWNER'S SPECIFICATIONS.
15. BASE CHANNEL AND GRATING SHALL BE PAINTED WITH NON-SLIP PAINT.



TYPICAL HANDRAIL DETAIL

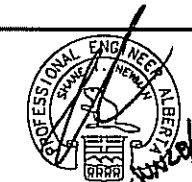
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SECTION



TYPICAL STAIR HANDRAIL DETAIL

NOTES:

REFERENCE DRAWINGS		REVISIONS						ENGINEERING STAMP	
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	
		A	PRELIMINARY	9424.01	04-07-05	RK			
		1	ISSUED FOR CONSTRUCTION	9424.01	04-07-08	RK			
		2	ISSUED FOR INFORMATION ONLY	9424.02	05-08-12	NI		SIN	
		3A	ISSUED FOR INFORMATION - K-600 ADDITION	9424.03	06-05-23	EY			
		4	ISSUED FOR CONSTRUCTION - K-600 ADDITION	9424.03	06-06-16	YW			

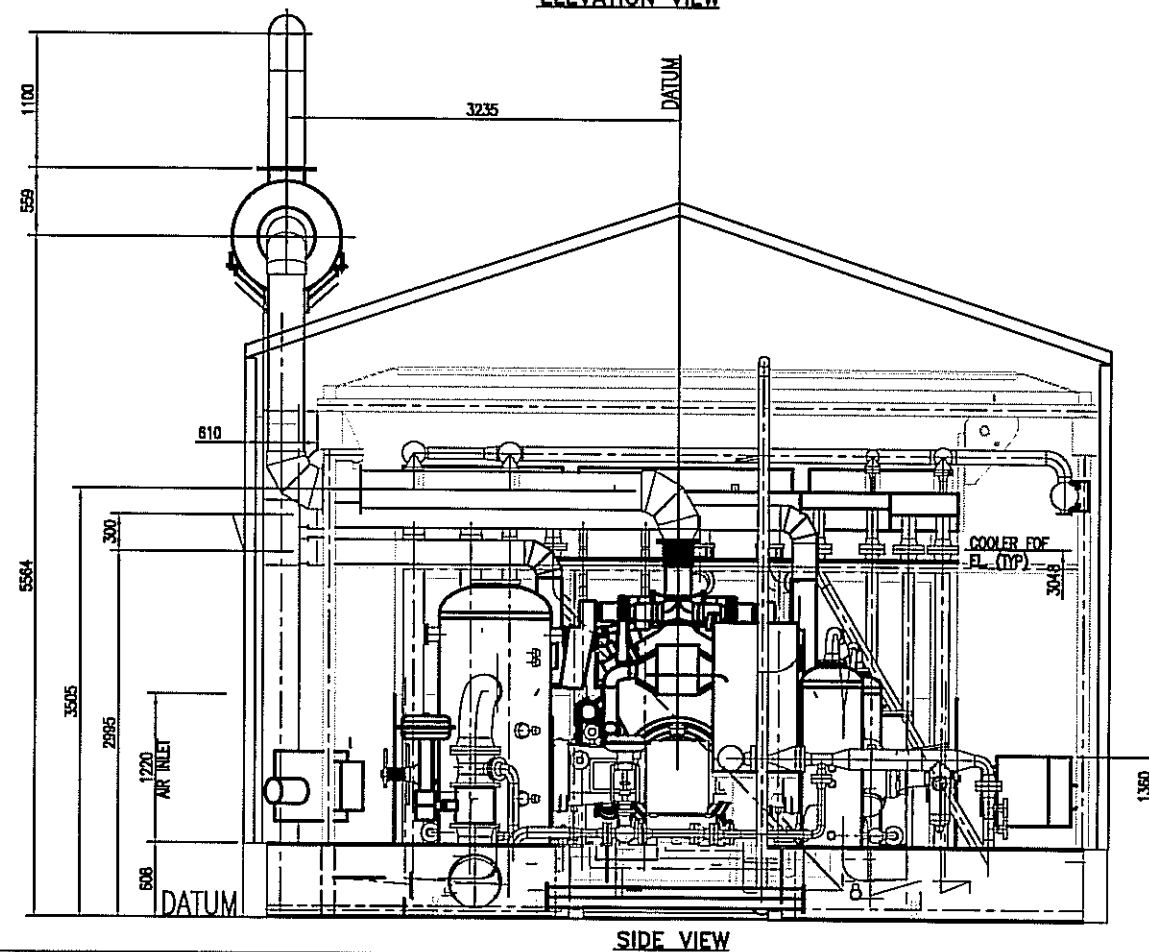
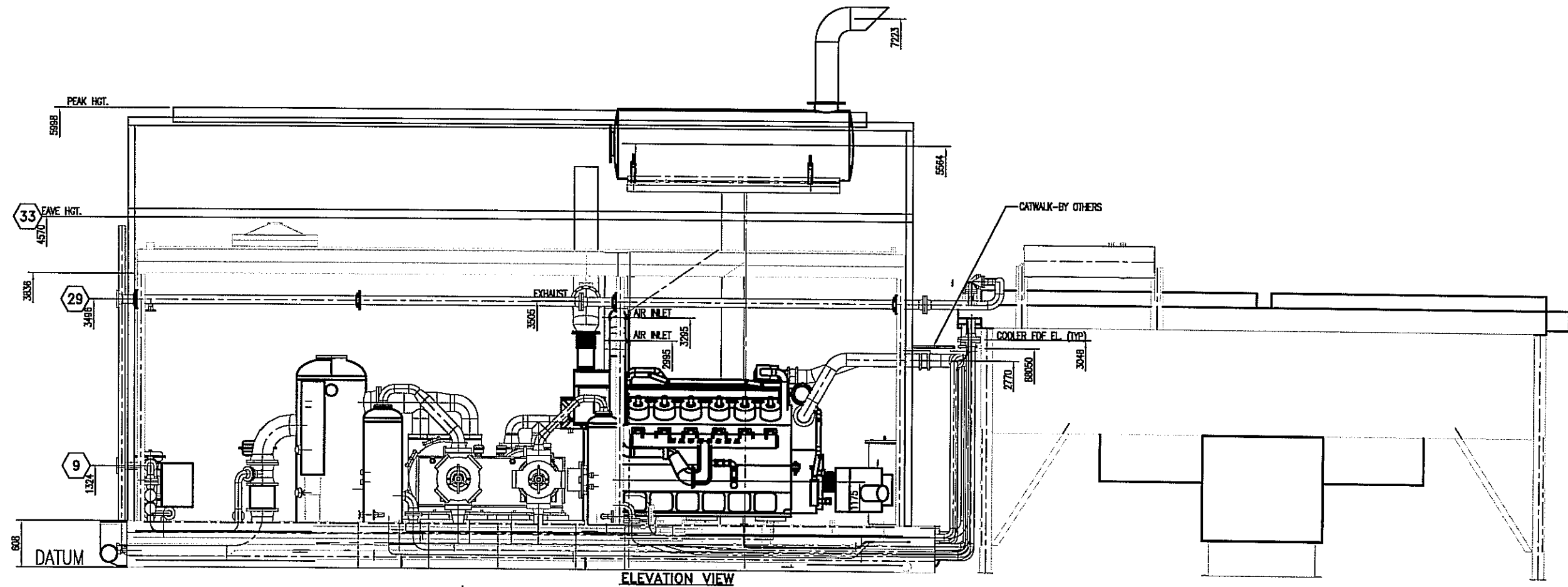


GRB Engineering Ltd.

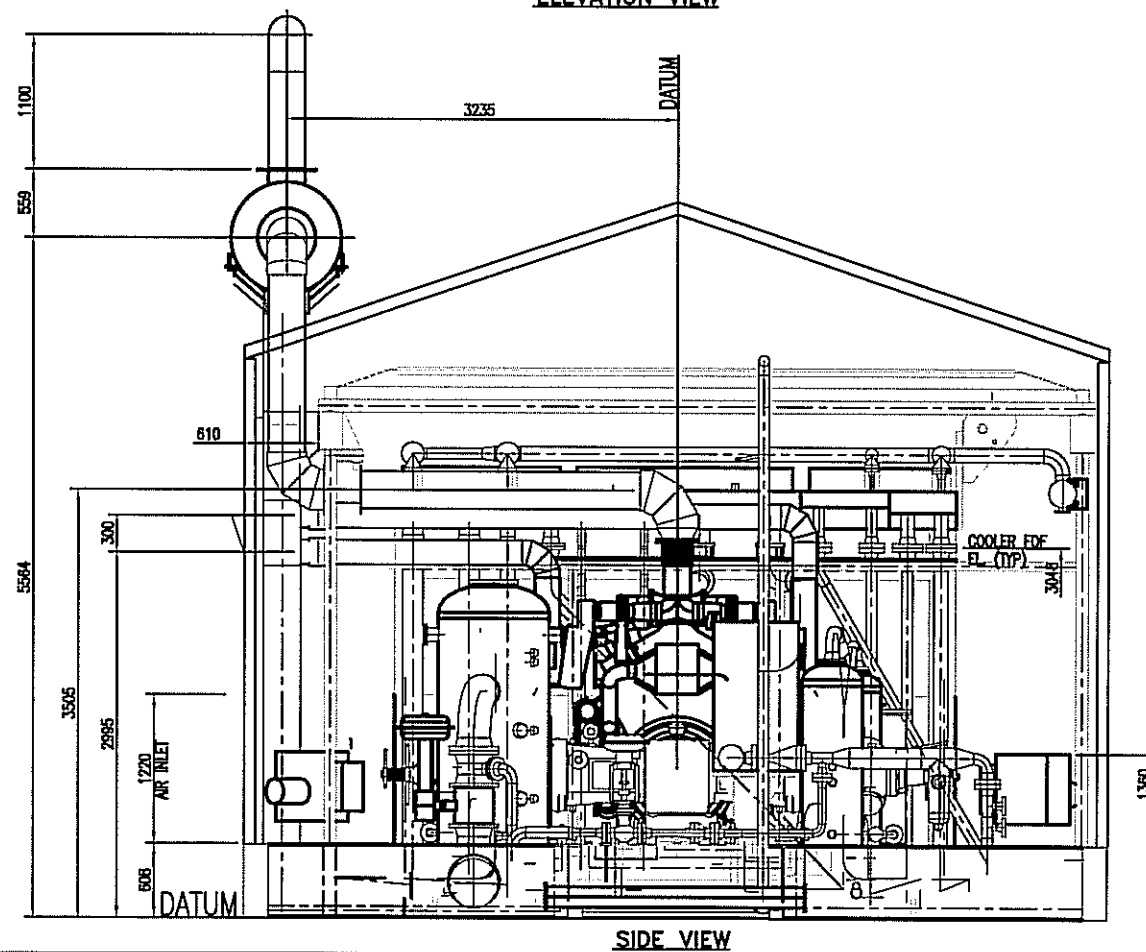
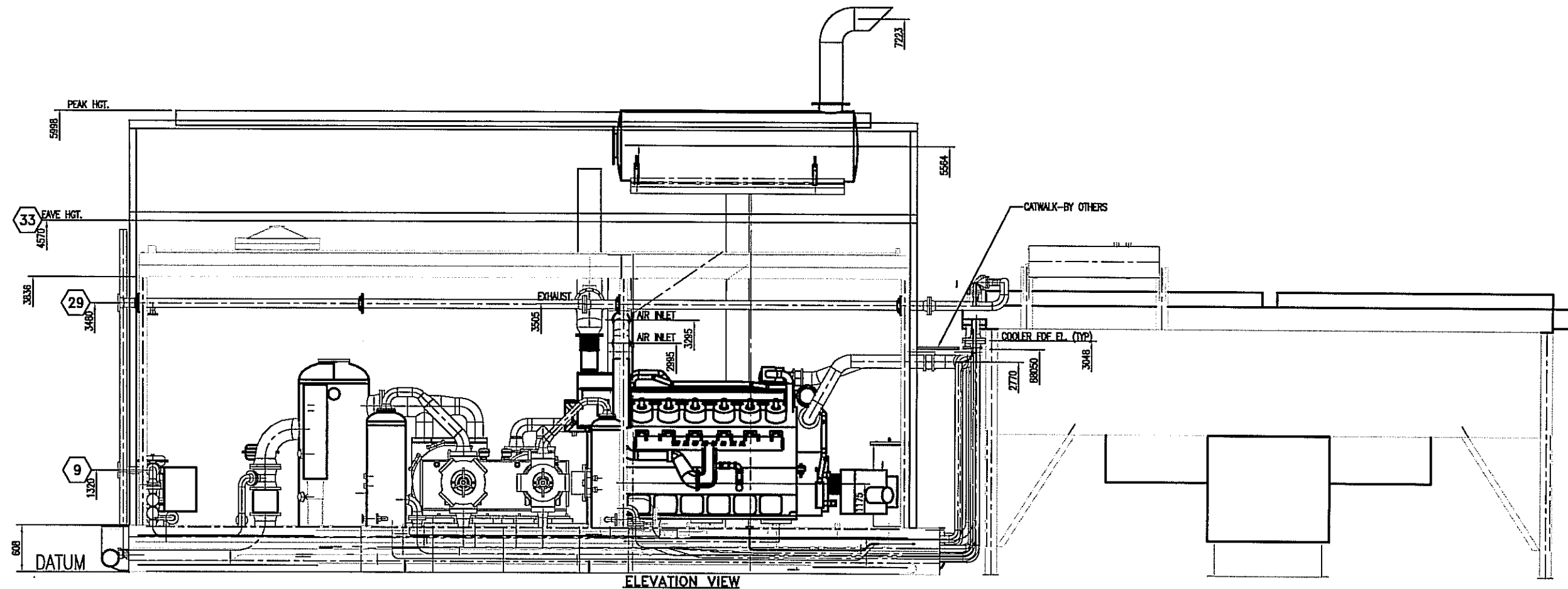
QUICKSILVER

JOFFRE COMPRESSOR STATION
LSD 04-22-039-25 W4M
HANDRAIL DETAILS

PROJECT NO.	SCALE	DWG. NO.	REV.
9424.03	1:20	9424-M-011	4

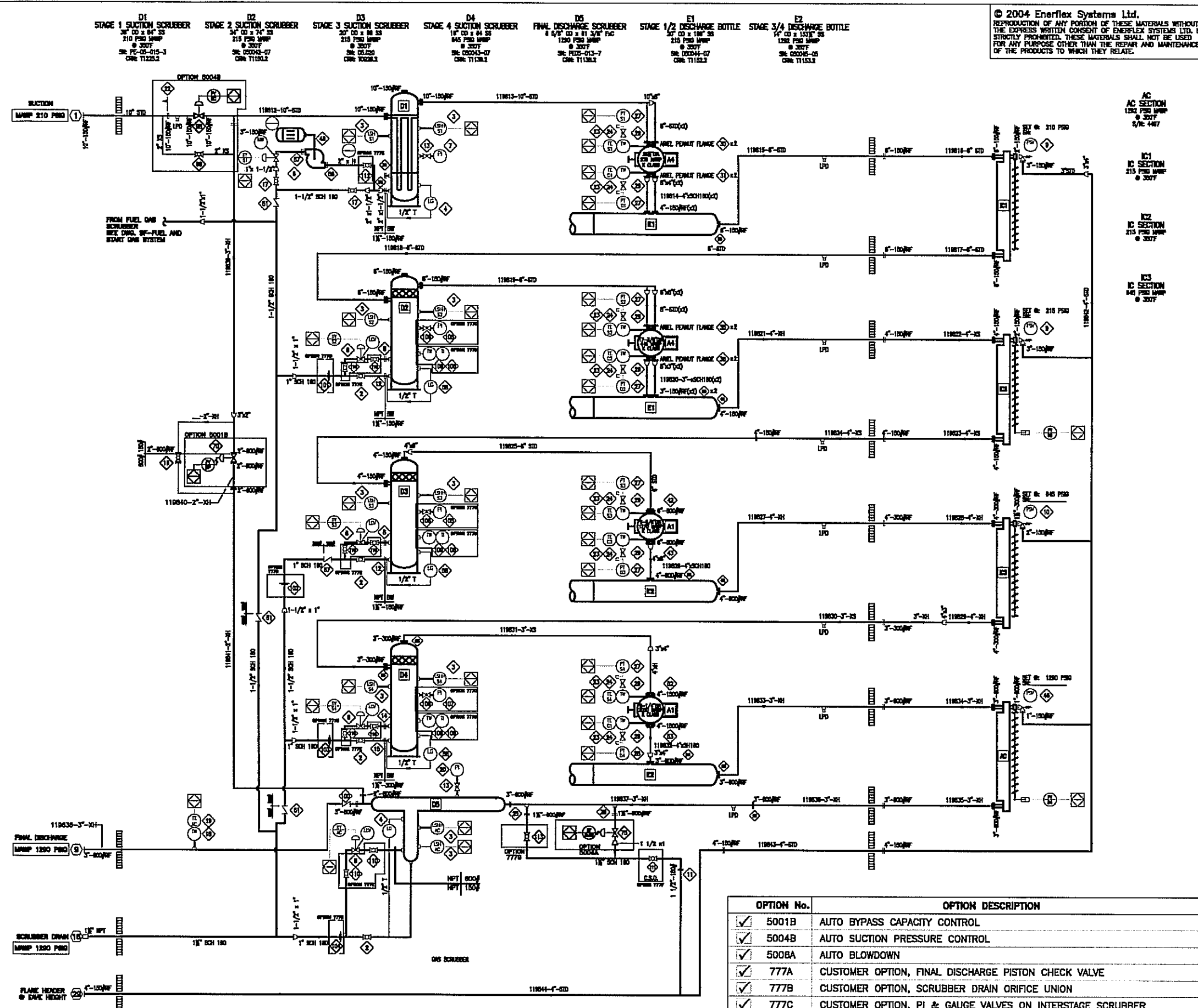


REV	DESCRIPTION	DATE	DRAWN BY	CHECKED BY
3	AS BUILT	05/11/16	LHC	
2	REVISED LOCATION SUCTION CONTROL VALVE	05/08/24	DRO	
1	FOR CONSTRUCTION	05/03/09	DRO	ABT
0	FOR APPROVAL	05/02/10	DRO	ABT
REV	DESCRIPTION	DATE	DRAWN BY	CHECKED BY
BTB Compressors				
ENERFLEX				
4700 47 ST. SE. CALGARY AB, CANADA. T2B 3R1 TEL: 1 (403) 236-6800 FAX 1 (403) 279-0367 www.enerflex.com				
TITLE: GENERAL ARRANGEMENT ARIEL JOK/4, WAUKESHA L7042QL, AIR-X-HEMPHILL 168-ZF COMPRESSOR PACKAGE				
FOR: MGV ENERGY INC. (MGV-C-028)				
CONSULTANT: ORB ENGINEERING LTD. (TBA)				
P.O.: LSD: (TBA)				
JOB No.: 040925				
DRAWN BY: DRO	DESIGN BY: BSC/JOK	DATE: 05/02/01	DWG. No.	DP#
DATE: 05/02/10	CHECK BY:	DATE:	GA040925 PG. 2/3	10
SCALE: 1:30	APPROV BY:	DATE:		



REV	DESCRIPTION	DATE	DRAWN BY	CHECKED BY
4	AS BUILT -REVISED PAGE 2 CONN. # 9 AND #20 ELEV.	06/05/17	HJZ	LB
3	AS BUILT	05/11/18	LHC	
2	REVISED LOCATION SUCTION CONTROL VALVE	05/06/24	DRO	
1	FOR CONSTRUCTION	05/03/09	DRO	ABT
0	FOR APPROVAL	05/02/10	DRO	ABT

BTB Compressors		ENERFLEX	
4700 47 ST. SE CALGARY AB, CANADA T2B 3R1 TEL 1 (403) 238-8800 FAX 1 (403) 270-0367 www.enerflex.com			
TITLE: GENERAL ARRANGEMENT ARIEL JOK/4, WAUKESHA L7042GL, AIR-X-HEMPHILL 168-ZF COMPRESSOR PACKAGE			
FOR: MGV ENERGY INC. (MGV-C-026) (TBA)			
CONSULTANT: ORB ENGINEERING LTD.		LSD: (TBA)	
P.O.:		JOB No.: 040925	
DRAWN BY: DRO	DESIGN BY: HMC/KMK	DATE: 05/02/01	DWG. No.
DATE: 05/02/10	CHKD BY:	DATE:	GA040925 PG. 2/2
SCALE: NTS	APPVD BY:	DATE:	OP# 10



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REPRODUCTION OF ANY PORTION OF THESE MATERIALS WITHOUT THE EXPRESS WRITTEN CONSENT OF ENERFLEX SYSTEMS LTD. IS STRICTLY PROHIBITED. THESE MATERIALS SHALL NOT BE USED FOR ANY PURPOSE OTHER THAN THE REPAIR AND MAINTENANCE OF THE PRODUCTS TO WHICH THEY RELATE.

BILL OF MATERIAL				
ITEM	QTY	EFX CODE	DESCRIPTION	
FRAME				
2	4	112801	VALVE, BALL, 1" NPT, 3000# WOG, RP, CS C/W LOGGING HANDLE [NUTRON, T3-F105308]	
3	10	104499	SWITCH, LEVEL, 2" NPT, XP, CSA, SPOT C/W BUOYALAS FLOYD [MURPHY, L1200]	
4	2	103656	GAUGE, LEVEL, CS WITH REFLEX FLAT GLASS, 1820# [DANIEL, 718]	
6	8	104854	VALVE, DUMP, 1" NPT, LOC. FLOW ADJUSTER, FC, NACE, 6-30# [FISHER/FLOPRO, D2-X1]	
7	1	107910	GAUGE, PRESSURE, BM, 4" LF, 0-300 PSI DUAL, 1/2" NPT [WKA, 2]	
8	2	106472	FLANGE, RF SCRD, 1" 150# SA105H	
12	2	106336	FLANGE, RF RED HUB, 1-1/2" 150# X 1" NPT SA105	
13	2	108017	VALVE, GAUGE, 3/4" NPTM X 1/2" NPTF, CS, A105, NACE, [CENTURY, CM11-2-M44T-CN-1]	
14	1	106474	FLANGE, RF SCRD, 1" 300# SA105H	
15	1	106348	FLANGE, RF RED HUB, 1-1/2" 300# X 1" NPT SA105H	
16	1	102913	VALVE, BALL, 2" 600# RF, FP, CS C/W HANDLE [NUTRON, T3-F20808]	
17	2	112861	VALVE, BALL, 1-1/2" NPT, 3000# WOG, FP, CS C/W LOGGING HANDLE [NUTRON, T3-F105308]	
18	1	105168	THERMOWELL, 316SS, BTB STYLE B, 1/2" X 3/4" NPTM, U-2.5", 280° BORE	
19	1	123380	THERMOCOUPLE, K TYPE 316SS, 1/4" [THERMOMONITORS, K250-316-S-0100-B-82X-YM4-72]	
20	1	107897	GAUGE, PRESSURE, BM, 4" LF, 0-2000 PSI DUAL, 1/2" NPT [WKA, 233.54]	
25	1	106487	FLANGE, RF SCRD, 1-1/2" 800# SA105H	
29	1	106354	FLANGE, RF RED HUB, 1-1/2" 800# X 1" NPT SA105H	
4 STAGE				
9	2	122800	VALVE, PSV, 2" 150# RF X 3" 150# RF, 1.43 OR (C), STD. TRM [MERCEUR, 91-5111782U1]	
10	1	122801	VALVE, PSV, 1-1/2" 300# RF X 2" 150# RF, .472 OR (D), STD. TRM [MERCEUR, 91-34011721U1]	
11	1	106482	FLANGE, RF SCRD, 1-1/2" 150# SA105H	
22	1	104228	STRAINER, CONE, 10" 150# CS, 40 MESH, 1000 FLOW AREA	
23	6	1179108	THERMOCOUPLE, K TYPE, 316SS [THERMOMONITORS, K125-316SS0007.5862000-0046-99]	
24	6	1141890	THERMOCOUPLE, K TYPE, 316SS, 1/8" X 1/2" NPT, 1/4" NPT PRESSURE PORT, U-2.5", 1650 WAMP	
27	7	124343	TRANSMITTER, GAUGE PRESSURE, 0-800 PSIG, NACE, CSA [ROSEMOUNT, 2060C4322A1C6]	
28	1	123353	TRANSMITTER, GAUGE PRESSURE, 0-4000 PSIG, NACE, CSA [ROSEMOUNT, 2060C4322A1C6]	
29	5	102802	VALVE, PLUG, 1/4" TUBE, 316SS [NUPRO, SS-4P41]	
30	2	NPN-REQ	ORIFICE PLATE, TYPE 520, 316SS, 3/8" THK, AREL 28X K PEANUT FLANGE, BORE 125 mm ID	
31	2	NPN-REQ	ORIFICE PLATE, TYPE 520, 316SS, 3/8" THK, AREL 28X K PEANUT FLANGE, BORE 100mm ID	
35	2	NPN-REQ	ORIFICE PLATE, TYPE 520, 316SS, 3/8" THK, AREL 17-3/8" K PEANUT FLANGE, BORE 85mm ID	
36	2	NPN-REQ	ORIFICE PLATE, TYPE 520, 316SS, 3/8" THK, AREL 17-3/8" K PEANUT FLANGE, BORE 203mm ID	
42	1	113543	ORIFICE GASKET, TYPE CCL, 316SS, 1/8" THK, 6" 800# RF C/W STAMPED HANDLE, BORE 75mm ID	
43	1	113543	ORIFICE GASKET, TYPE CCL, 316SS, 1/8" THK, 6" 800# RF C/W STAMPED HANDLE, BORE 75mm ID	
48	1	122802	VALVE, PSV, 1" 600# RF X 1" 150# RF, .212 OR (D) STD. TRM [MERCEUR, 91-1051171U1]	
51	3	103072	PUMP, VERTICAL, MULTI-STAGE C/W 1.5 HP XP MOTOR [CHARNIKOS, CR10-2]	
52	1	113534	ORIFICE GASKET, TYPE CCL, 316SS, 1/8" THK, 4" 1500# RF C/W STAMPED HANDLE, BORE 97mm ID	
53	1	113534	ORIFICE GASKET, TYPE CCL, 316SS, 1/8" THK, 4" 1500# RF C/W STAMPED HANDLE, BORE 97mm ID	
54	1	108231	FLANGE, RF BLIND, 1" 150# SA105H	
55	1	106482	FLANGE, RF SCRD, 1-1/2" 150# SA105H	
56	1	106481	FLANGE, RF SCRD, 2" 300# SA105H	
57	1	106398	FLANGE, RF RED HUB, 2" 300# X 1" NPT SA105H	
58	3	103681	GAUGE, LEVEL, CS WITH REFLEX FLAT GLASS, 1820# [DANIEL, 728]	
59	1	113541	ORIFICE GASKET, TYPE CCL, 316SS, 1/8" THK, 6" 150# RF C/W STAMPED HANDLE, BORE 95 mm ID	
60	2	113529	ORIFICE GASKET, TYPE CCL, 316SS, 1/8" THK, 3" 150# RF C/W STAMPED HANDLE, BORE 50 mm ID	
61	1	113530	ORIFICE GASKET, TYPE CCL, 316SS, 1/8" THK, 3" 150# RF C/W STAMPED HANDLE, BORE 70 mm ID	
62	2	113532	ORIFICE GASKET, TYPE CCL, 316SS, 1/8" THK, 4" 800# RF C/W STAMPED HANDLE, BORE 80 mm ID	
63	2	NPN-REQ	ORIFICE GASKET, TYPE CCL, 316SS, 1/8" THK, 3"-300#, BORE 50mm ID	
64	1	113527	ORIFICE GASKET, TYPE CCL, 316SS, 1/8" THK, 3"-800# C/W STAMPED HANDLE, BORE 80 mm ID	
65	2	113527	ORIFICE GASKET, TYPE CCL, 316SS, 1/8" THK, 3"-800# C/W STAMPED HANDLE, BORE 40 mm ID	
67	1	103080	VALVE, CHECK, PISTON, 1-1/2" SW, 800# WOG, CS [NEWCO, 485-F52]	

OPTIONS				
ITEM	QTY	EFX CODE	DESCRIPTION	
70	1	114049	OPTION 5001B - AUTO BYPASS CAPACITY CONTROL	
			VALVE, CONTROL, 2" 600# RF, LOC. 3/4" OR, FC, NACE, 0-35PSI [FISHER, 857-D-40]	
75	1	122782	OPTION 5008A - AUTO BLOWDOWN	
			VALVE, CONTROL, 1" NPT, LOC. 3/8" OR, FC, 0-33 PSI, [FISHER, D4]	
95	1	122821	OPTION 5004B - AUTO SUCTION PRESSURE CONTROL	
			VALVE, CONTROL, 10" 150# RF WOG, FC, POT/LEET HANDMOUNT, SIZE 80 ACTUATOR, 0-35PSIG, C/W 610 G [FISHER, 1051-V2006]	
99	1	103081	VALVE, BALL, 2" NPT, 3000# WOG, RP, CS C/W LOGGING HANDLE [WOL, RB136-CS-43-CS/14]	
100	1	122870	VALVE, CHECK, PISTON, 3"-800# RF, CS, SWEET, STYLE PDC [DFT-31-800-4453200PH]	
101	1	108156	UNION, ORIFICE, SCRD, 1" 3000# SA 105H, C/W 316SS ORIFICE PLATE FULL BORE ID	
102	1	108156	UNION, ORIFICE, SCRD, 1" 3000# SA 105H, C/W 316SS ORIFICE PLATE BORE 3/8" ID	
103	1	108156	UNION, ORIFICE, SCRD, 1" 3000# SA 105H, C/W 316SS ORIFICE PLATE BORE 1/4" ID	
104	1	108156	UNION, ORIFICE, SCRD, 1" 3000# SA 105H, C/W 316SS ORIFICE PLATE BORE 1/4" ID	
105	2	107910	GAUGE, PRESSURE, BM, 4" LF, 0-300 PSI DUAL, 1/2" NPT [WKA, 233.54]	
106	3	106017	VALVE, GAUGE, 3/4" NPTM X 1/2" NPTF, CS, A105, NACE, [CENTURY, CM11-2-M44T-CN-1]	
107	1	107894	GAUGE, PRESSURE, BM, 4" LF, 0-1000 PSI DUAL, 1/2" NPT [WKA, 233.54]	
108	3	107943	GAUGE, TEMP, 3" DIAL, LF, 4" STD, 0-250 DEEF DUAL, 1/2" NPT [TRENDS, S30040]	
109	3	107977	THERMOWELL, 304SS, 1/2" X 3/4" NPTM X 1/2" LONG, U-2.5", 280° BORE STEPPED	
110	6	112801	VALVE, BALL, 1" NPT, 3000# WOG, RP, CS C/W LOGGING HANDLE [NUTRON, T3-F105308]	
111	1	112861	VALVE, BALL, 1-1/2" NPT, 3000# WOG, FP, CS C/W LOGGING HANDLE [NUTRON, T3-F105308]	
112	1	110037	VALVE, BALL, 2" NPT, 3000# WOG, FP, CS C/W LOGGING HANDLE [WOL, RB136-CS-43-CS/14]	
113	1	102866	VALVE, GLOBE, 1-1/2" NPT, 800# WOG, CS [NEWCO, 28T-F52]	

REV	DESCRIPTION	DATE	DRWN BY	CHKD BY
6	AS BUILT	05/10/31	HJZ	KK
5	FOR ABSA REGISTRATION	05/10/11	MV	AM
4	REVISED SCRUBBER DRAIN ANSI RATING	05/07/19	MV	KK
3	CUSTOMER REVISIONS	05/06/23	TL	KK
2	ITEMS 52, 53 ADDED	05/04/20	MV	ABT
1	FOR CONSTRUCTION	05/04/15	MV/ARJ	ABT
0	FOR APPROVAL	05/04/01	MV/ARJ	ABT

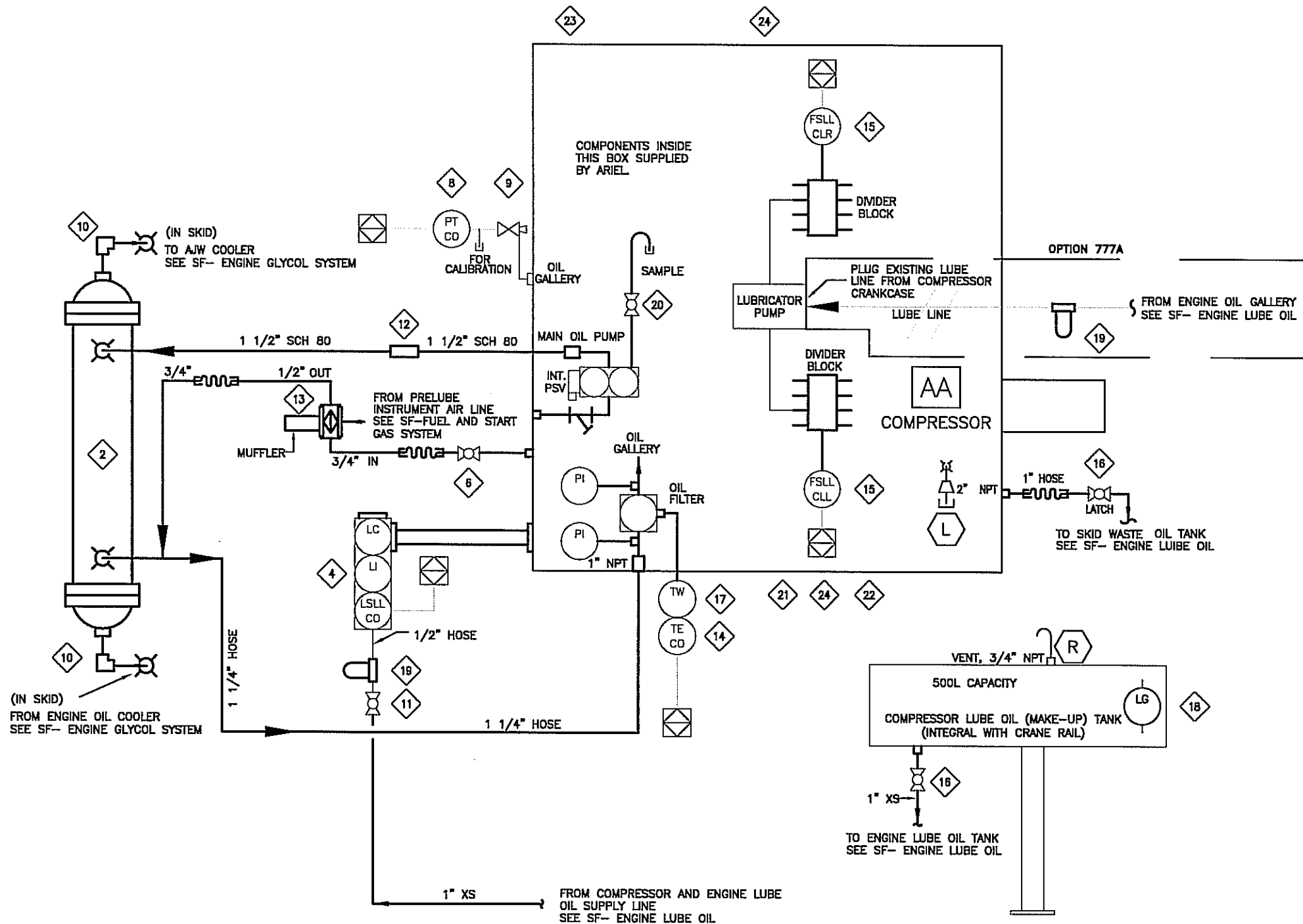
BTB Compressors

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www.enerflex.com

PROCESS & INSTRUMENTATION DIAGRAM 4 STAGE GEN III COMPRESSOR PACKAGE A1478 (OP 50)

MGV ENERGY INC. (MGV-C-024)

CONSULTANT:	GRB ENGINEERING LTD.	LSB:	-
P.O.:	X	JOB No.:	040925
DRWN BY:	S M B	DESIGN BY:	X
DATE:	Jan 11 05	CHKD BY:	X
SCALE:	N T S	APPRD BY:	X
DATE:	X	DATE:	X
DATE:	X	DATE:	X
DWG No.:	PF-040925-50	OP. #	50



BILL OF MATERIAL				
ITEM	QTY	EFX CODE	DESCRIPTION	
2	1	104866	COOLER, LUBE OIL [THERMAL TRANSFER, EK-1024-0]	
4	1	107966	CONTROLLER, OIL LEVEL C/W ELECTRIC SWITCH, XP, CSA & BRACKET [KEMCO, LCE-24]	
6	1	102973	VALVE, BALL, 3/4" NPT, 2000# WOG, RP, 316SS, NACE C/W [NAVCO, C1-R07520A]	
8	1	112319	TRANSMITTER, GAUGE PRESSURE, 0-150 PSIG, CSA, [ROSEMOUNT, 2088G2522A1C6]	
9	1	102802	VALVE, PLUG, 1/4" TUBE, 316SS [MUPRO, SS-4P4T]	
10	2	101244	COUPLING, ELBOW, 90 DEG, 2", STYLE 90 [DRESSER, 0090-0245-082]	
11	1	102949	VALVE, BALL, 1/2" NPT, 2000# WOG, RP, 316SS, NACE C/W [NAVCO, C1-R05520A]	
12	1	101240	COUPLING, ELBOW, 90 DEG, 1-1/2", STYLE 90 [DRESSER, 0090-0244-082]	
13	1	107477	PUMP, DIAPHRAGM, 1/2" NPT, ALUMINUM, BUNA, #01-10001 [WILDEX, TI/ANYB/BN/ABN]	
14	1	113106	THERMOCOUPLE, K TYPE, 316SS C/W [THERMOKINETICS, K125-316S-0006-B-R2S-000-0018S]	
15	2	112860	SWITCH, DIGITAL NO-FLOW, PROGRAMMABLE, WHITLOCK DNFT-LED-PRG [ARIEL, A-10754]	
16	2	102937	VALVE, BALL, 1" NPT, 2000# WOG, RP, 316SS, NACE C/W LOCKING [NAVCO, C1-R10520A]	
17	1	105185	THERMOWELL, 316SS, BTB STYLE 4, 1/4" X 1/2", U=2", 2" BORE	
18	1	115052	INDICATOR, LEVEL, SIGHT GLASS WINDOW, 10" BOLT CENTERS, [MP FILTRI, LVA 30 TA]	
19	1	121735	FILTER, ASSEMBLY, OIL, 1/2" NPT, 25 MICRON C/W SF-6510 [KINECOR, SAF-05-00-0]	
20	1	102950	VALVE, BALL, 1/4" NPT, 2000# WOG, RP, 316SS, NACE C/W [NAVCO, C1-R02520A]	
21	1	117547	WIRE SUPPORT, COMPRESSOR VIBRATION SENSOR [AGS, W13750153482001]	
22	1	117546	WIRE SUPPORT, COMPRESSOR SIDE DOOR [AGS, W11350346452001]	
23	1	123306	BRACKET, COMPRESSOR OIL TRANSMITTER MOUNT	
24	2	1136758	SUPPORT, TRANSMITTER, WAUKESHA SERIES L-VHP, A1445/A1478 [AGS, W12500164882001B]	

BILL OF MATERIAL:			: ASSEMBLY, COMPRESSOR OIL, A1445/A1478	
DATE-TIME EXPORTED:			2004-08-25-11.10	

OPTIONS				
ITEM	QTY	EFX CODE	DESCRIPTION	
19	1	121735	FILTER, ASSEMBLY, OIL, 1/2" NPT, 25 MICRON C/W SF-6510 [KINECOR, SAF-05-00-0]	

REV	DESCRIPTION	DATE	DRAWN BY	CHECKED BY
2	AS BUILT	05/10/31	HJZ	KK
1	ISSUED FOR CONSTRUCTION	05/04/15	MV	ABT
0	ISSUE FOR APPROVAL	05/04/01	MV	ABT

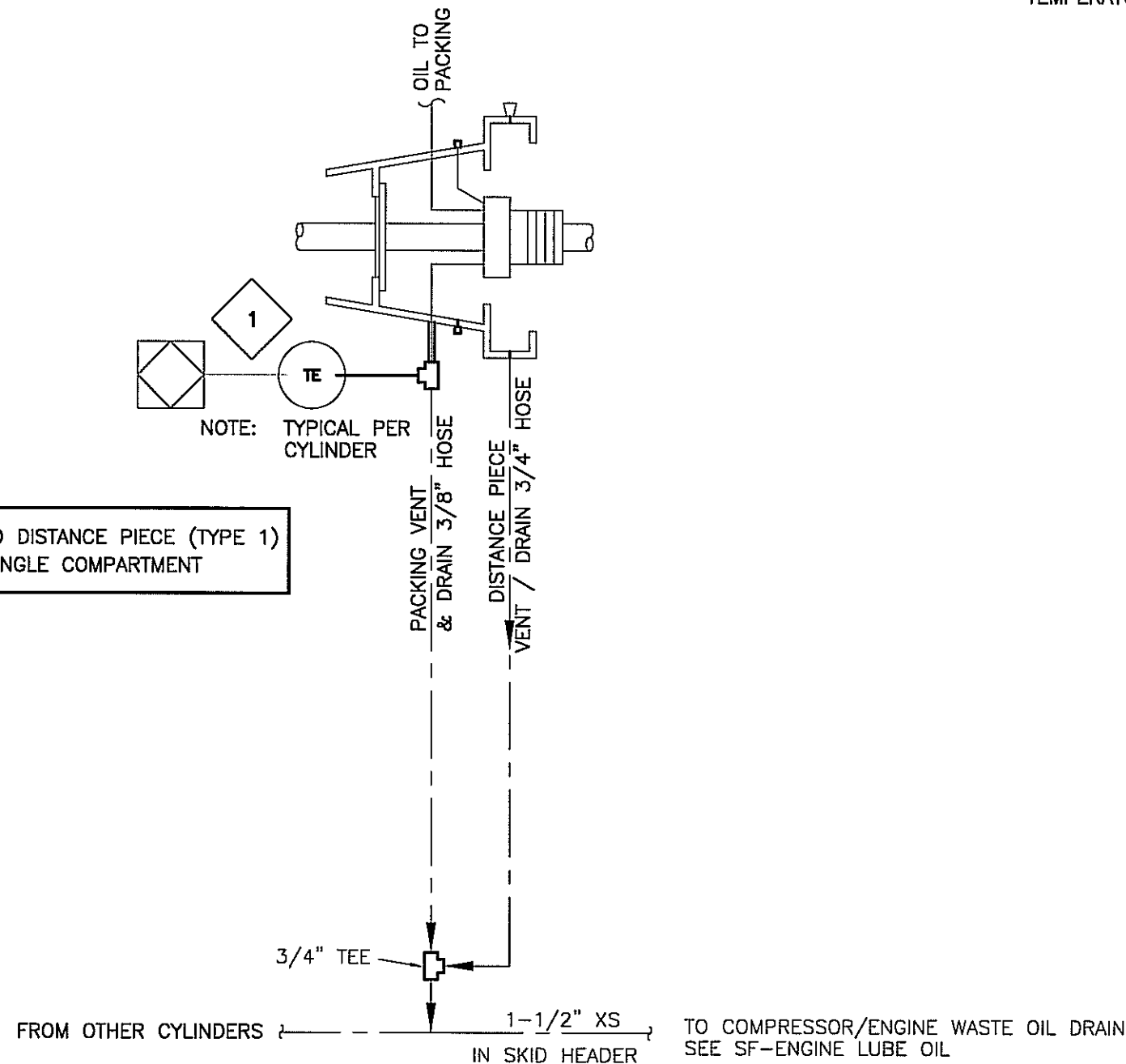
BTB COMPRESSORS

EFX Compression

4700 47 ST. SE. CALDWAY AVE, DUNDAS, ONT. L9H 3R1 TEL 1 (403) 238-8800 FAX 1 (403) 279-0367. www.btbinc.com

TITLE:		SERVICE FLOW COMPRESSOR OIL SYSTEM - JGK/4 FRAME A1478 4STG (OP 20)		
FOR:		<u>MGV ENERGY INC. (MGV-C-026)</u> -		
CONSULTANT: GRB ENGINEERING LTD.		LSD: - JOB No.: 040925		
P.O.: -				
DRWN BY: DW	DESIGN BY: -	DATE: -	DWG. No.	REV
DATE: 04/03/12	CHKD BY: -	DATE: -	SF-040925-20	2
SCALE: NTS	APPVD BY: -	DATE: -		

OPTION SELECTION	OPTION NUMBER	OPTION DESCRIPTION
☒	777A	CUSTOMER OPTION, CYLINDER LUBE FROM ENGINE CRANKCASE
☐		
☐		
☐		
☐		
☐		



NOTE

1. PACKING FAILURE SENSOR(S), SHOULD BE SET TO 200°F SHUTDOWN FOR NEW PACKING. AFTER PACKING IS BROKEN IN, SHUTDOWN TEMPERATURE IS TO BE ADJUSTED TO 150% (OR 200°F MAX) OF NORMAL OPERATING TEMPERATURE. (ONE PER CYLINDER)

BILL OF MATERIAL

ITEM	QTY	EFX CODE	DESCRIPTION
1	4	113106	THERMOCOUPLE, K TYPE, 316SS C/W [THERMOKINETICS, K125-316S-0006-B-82S-000-0018S]

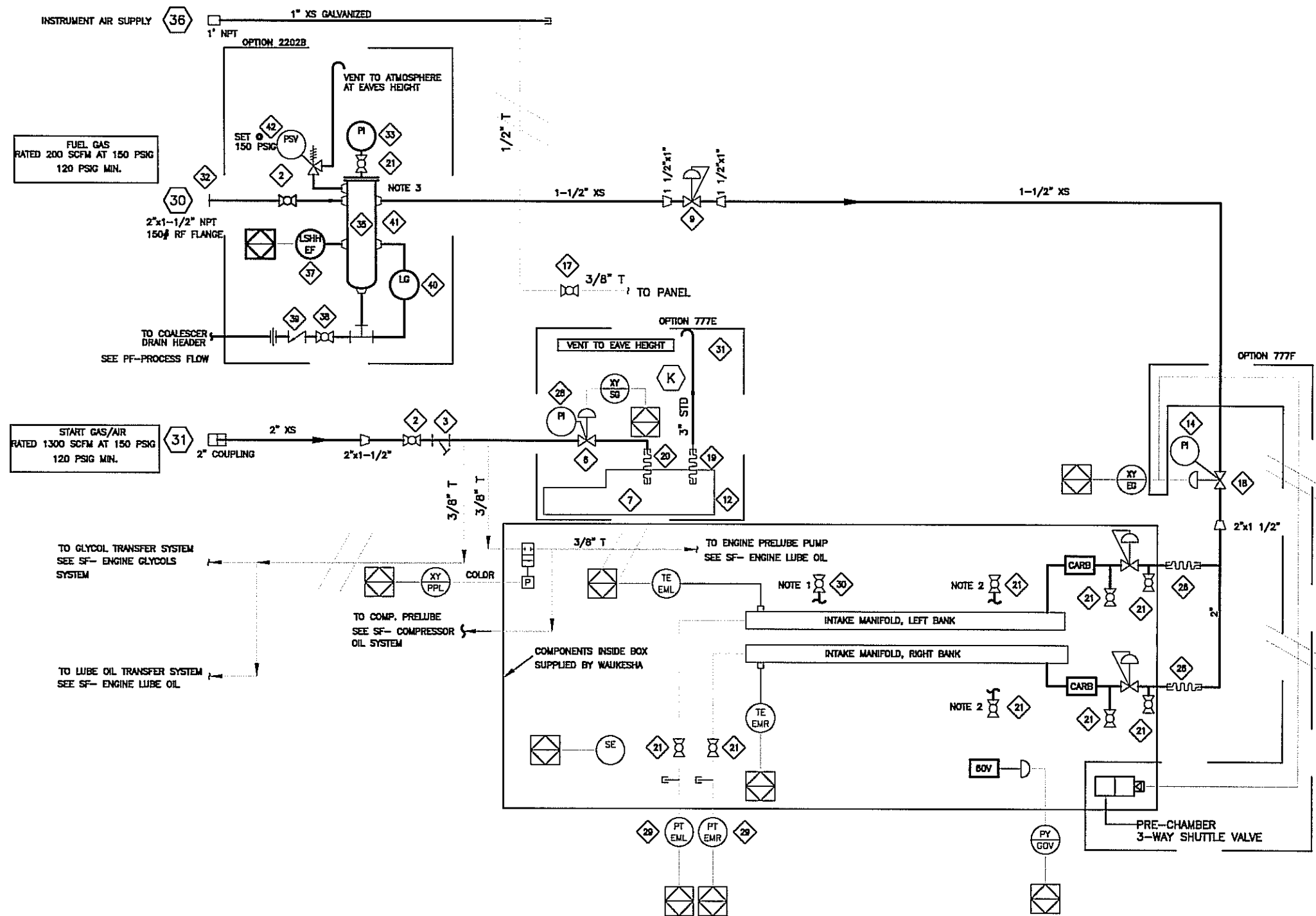
			BILL OF MATERIAL: PACKING VENT & DRAIN - 0% H2S

REV	DESCRIPTION	DATE	DRAWN BY	CHECKED BY
2	AS BUILT	05/10/31	HJZ	KK
1	ISSUED FOR CONSTRUCTION	05/04/15	MV	ABT
0	ISSUED FOR APPROVAL	05/04/01	MV	ABT

BTB Compressors

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TITLE:		SERVICE FLOW PACKING VENT & DRAIN - 0% H2S A1478 4STG (OP 21)		
FOR:		MGV ENERGY INC. (MGV-C-026)		
CONSULTANT: GRB ENGINEERING LTD.		LSD: - JOB No.: 040925		
P.O.: -				
DRWN BY:	DESIGN BY: -	DATE: -	DWG. No.	REV
DATE:	CHKD BY: -	DATE: -	SF-040925-21	2
SCALE: NTS	APPVD BY: -	DATE: -		



NOTE 1 : CRANK CASE SAMPLE POINT
 NOTE 2 : AIR PRESSURE SAMPLE POINT
 NOTE 3 : FUEL SCRUBBER FILTER PART NO. 111843

OPTION SELECTION	OPTION NUMBER	OPTION DESCRIPTION
☒	2202B	UTILITY GAS FILTER SEP. & LEVEL GAUGE & SHUTDOWN A1478
☐	777C	CUSTOMER OPTION, ELECTRIC ENGINE STARTER
☒	777E	CUSTOMER OPTION, INSTRUMENT AIR
☒	777F	CUSTOMER OPTION, PRE-CHAMBER FOR WAUKESHA L7042GL
☐		
☐		

BILL OF MATERIAL			
ITEM	QTY	EFX CODE	DESCRIPTION
9	1	104863	REGULATOR, 1" NPT, DI, 3/8" OR, 35-80# SPR RING, SET @ 50 PSIG [FISHER, 627-494]
14	1	107911	GAUGE, PRESSURE, BM, 2-1/2" LF, 0-300 PSI DUAL, 1/4" NPT [WKA, 233.53]
18	1	103782	VALVE, RELAY, GAS, 1-1/2" NPT, MAWP 450 PSI [TDI, RLVA25683001201]
21	8	102950	VALVE, BALL, 1/4" NPT, 2000# WOG, RP, 316SS, NACE C/W [NAVCO, C1-R02S20A]
28	2	104683	HOSE, BRAIDED STEEL, 1-1/2" NPTM ENDS X 8" LONG
29	2	107994	TRANSMITTER, PRESSURE, -30" HG/30 PSIG, SWEET, 1/4" NPT [WKA, B92.13.500]
32	1	106382	FLANGE, RF RED HUB, 2" 150# X 1-1/2" NPT SA105N
BILL OF MATERIAL: M 114237-1 : FUEL GAS			

2	1	102933	VALVE, BALL, 1-1/2" NPT, 2000# WOG, RP, 316SS, NACE C/W [NAVCO, C1-R15S20A]
3	1	102830	STRAINER, Y, 1-1/2" NPT, 1480 PSIG MAWP, CS, 1/32" SS SCREEN [ALTA, YS-800]
6	1	103782	VALVE, RELAY, GAS, 1-1/2" NPT, MAWP 450 PSI [TDI, RLVA25683001201]
7	1	103758	STARTER, AIR/GAS, STD 150-60 PSIG, INERTIA DUAL [TDI TURBOSTART, T112-60001-B1F]
12	1	103741	ELBOW, STARTER EXHAUST, 90 DEG, SR, 3" NPTM, CS [TDI, T100-27900]
17	1	102974	VALVE, BALL, 3/8" NPT, 2000# WOG, RP, A105 BODY, NACE C/W [NAVCO, H1-R03S20S]
19	1	114197	HOSE, 3-1/2" ID, SOFTWALL MARINE COOLANT & EXHAUST, MAWP 60 PSI [GREENLINE,
20	1	122884	HOSE, BRAIDED STEEL, 1-1/2" MNPT X 15" OAL, CGA [MAGIC SPAN, MCX1.5X15CGA]
28	1	107911	GAUGE, PRESSURE, BM, 2-1/2" LF, 0-300 PSI DUAL, 1/4" NPT [WKA, 233.53]
30	1	102950	VALVE, BALL, 1/4" NPT, 2000# WOG, RP, 316SS, NACE C/W [NAVCO, C1-R02S20A]
31	1	123400	EXHAUST LINE, STARTER TO EAVE, A1478
BILL OF MATERIAL: M 114237-2 : ASSEMBLY, DRIVER, AIR/EXHAUST, A1445/A1478			

OPTIONS			
ITEM	QTY	EFX CODE	DESCRIPTION
2	1	102933	VALVE, BALL, 1-1/2" NPT, 2000# WOG, RP, 316SS, NACE C/W [NAVCO, C1-R15S20A]
21	1	102950	VALVE, BALL, 1/4" NPT, 2000# WOG, RP, 316SS, NACE C/W [NAVCO, C1-R02S20A]
33	1	107911	GAUGE, PRESSURE, BM, 2-1/2" LF, 0-300 PSI DUAL, 1/4" NPT [WKA, 233.53]
35	1	109487	VESSEL, FUEL GAS SCRUB, 5-9/16" OD, 285 MAWP, 100 DEG F, WALK VHP/VGF, CAT. 33/3400
37	1	104493	SWITCH, LEVEL, 1-1/2" NPT, XP, CSA, SPOT (H) C/W BUOYGLAS FLOAT [MURPHY, L1100]
38	1	102938	VALVE, BALL, 1" NPT, 2000# WOG, RP, A105 BODY, NACE C/W [NAVCO, H1-R10S20S]
39	1	103069	VALVE, CHECK, PISTON, 1" NPT, 800# WOG, CS [NEWCO, 48T-FS2]
40	1	103659	GAUGE, LEVEL, CS WITH REFLEX FLAT GLASS, 1820# [DANIEL, 71RL]
41	1	123277	SUPPORT, VERTICAL FUEL GAS SCRUBBER, A1478, SN: 040820-08
42	1	115778	VALVE, PSV, 1" MNPT X 1" FNPT, .212 OF (E) STD TRIM [MERCER, 61-17151V09G11]
BILL OF MATERIAL: M 113617-3 : OPTION 2202B, UTILITY GAS FILTER SEPARATOR			
BILL OF MATERIAL: M BASE TEMPLATE: OPTION 777C, ELECTRIC STARTER			

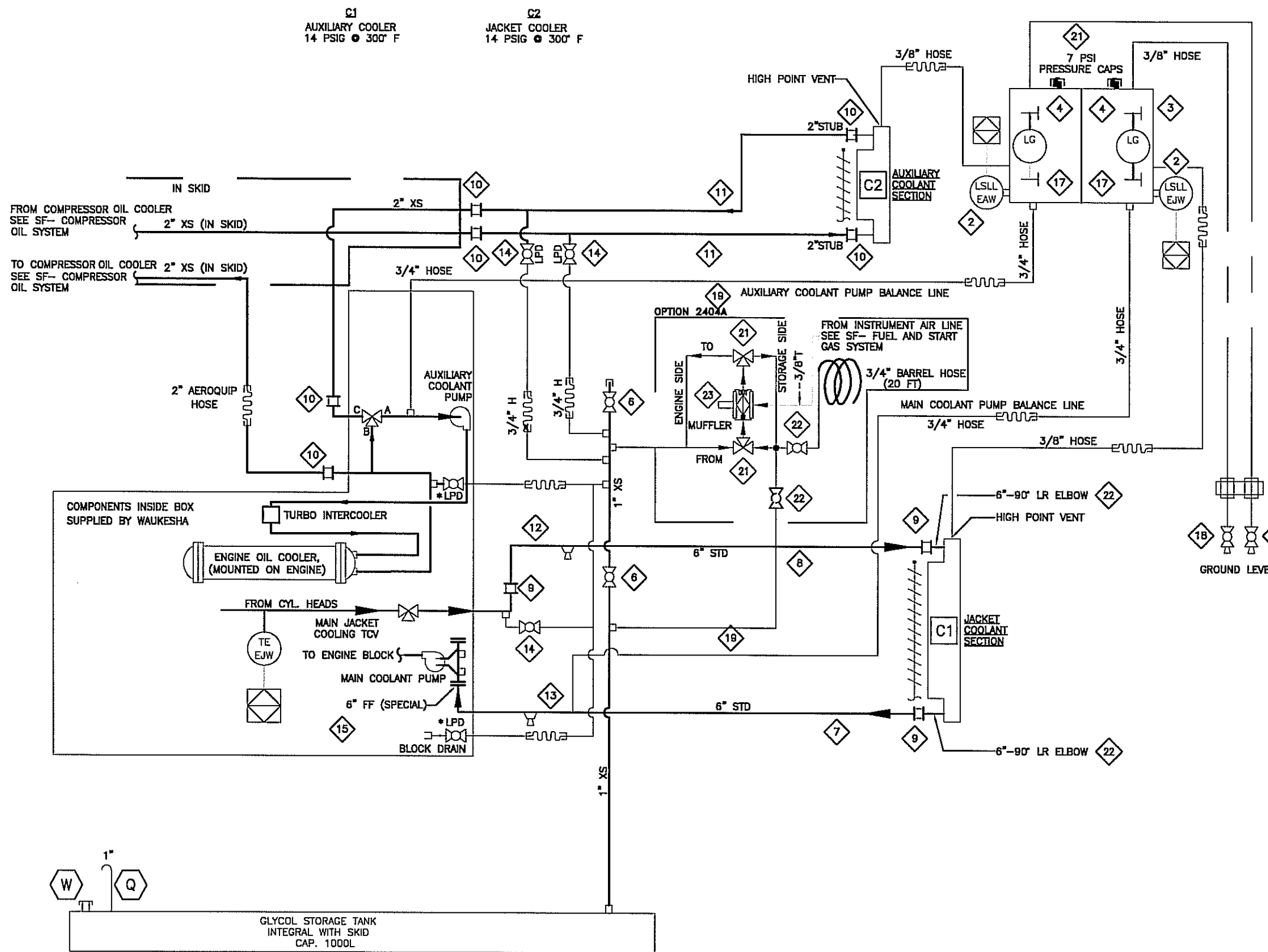
REV	DESCRIPTION	DATE	DRAWN BY	CHECKED BY
6	AS BUILT	05/10/31	HJZ	KK
5	ADDED OPTION 777F	05/05/13	TL	KK
4	AS BUILT	05/05/03	ARJ	KK
3	UPDATED INSTRUMENT TAGGING	05/03/29	ARJ	KK
2	CUSTOMER REVISIONS	05/03/29	ARJ	KK
1	ISSUED FOR CONSTRUCTION	05/03/07	ARJ	KK
0	FOR APPROVAL	05/01/26	ARJ	KK

BTB COMPRESSORS

EFX Compression

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TITLE:		SERVICE FLOW/AIR FUEL AND START GAS SYSTEM A1478 4 STG (OP22)		
FOR:		MGV ENRGY INC (MGV-C-026)		
CONSULTANT: GRB ENGINEERING LTD		LSD:-		
P.O.:-		JOB No.: 040925		
DRWN BY: TTS	DESIGN BY: -	DATE: -	DWG. No.	REV
DATE: 2002/07/23	CHKD BY: -	DATE: -	SF-040925-22	6
SCALE: NTS	APPVD BY: KK	DATE: 05/03/07		



BILL OF MATERIAL				
ITEM	QTY	EFX CODE	DESCRIPTION	
6	2	102937	VALVE, BALL, 1" NPT, 2000# WOG, RP, 316SS, NACE C/W LOCKING [NAVCO, C1-R10520A]	
9	1	101238	COUPLING, STRAIGHT, 6", STYLE 38 [DRESSER, 0038-0057-011]	
10	2	101245	COUPLING, STRAIGHT, 2", STYLE 90 [DRESSER, 0090-0005-082]	
12	1	122668	PIPE, BENT, BASE, JACKET WATER, ENGINE/SKID EDGE, JW4, CBM	
13	1	122665	PIPE, BENT, BASE, JACKET WATER, SKID EDGE/ENGINE, JW1, CBM	
14	3	102973	VALVE, BALL, 3/4" NPT, 2000# WOG, RP, 316SS, NACE C/W [NAVCO, C1-R07520A]	
15	1	106318	FLANGE, FF SLIP-ON, 6" 150# SA105N STD	
19	2	NPN	BALANCE LINES, SURGE TANK, A1478	
			BILL OF MATERIAL: M 114234 : ASSEMBLY, DRIVER, ENGINE COOLING SYSTEM, A1445/A1478	
2	2	104493	SWITCH, LEVEL, 1-1/2" NPT, XP, CSA, SPOT (H) C/W BUOYGLAS FLOAT [MURPHY, L1100]	
3	1	113683C	TANK, SURGE, 2-COMPARTMENT, 150/59L, A1445/A1478 AS PER DRAW	
4	2	103698	VALVE, SET GAUGE, SWEET, 5/8" OD TUBULAR X 1/2" MNPT, CS, 400# [DANIEL, 1TC]	
7	1	122667	PIPE, BENT, BASE, JACKET WATER, COOLER OUTLET/SKID EDGE, JW3, CBM	
8	1	122666	PIPE, BENT, BASE, JACKET WATER, SKID EDGE/COOLER INLET, JW2, CBM	
9	2	101238	COUPLING, STRAIGHT, 6", STYLE 38 [DRESSER, 0038-0057-011]	
10	4	101245	COUPLING, STRAIGHT, 2", STYLE 90 [DRESSER, 0090-0005-082]	
11	2	122669	PIPE, BENT, AUXILIARY WATER, SKID/COOLER, AW1, CBM	
17	2	101257	GAUGE, ACRYLIC SIGHT GLASS, 5/8" OD X 3/8" ID, 1/4" WALL THK	
18	2	102904	VALVE, BALL, 3/8" NPT, 2000# WOG, RP, A105 BODY, NACE C/W [NAVCO, H1-R03520S]	
20	1	123318	SURGE TANK VENT VALVE SUPPORT, A1478	
21	1	115156	COOLANT, 50/50 GLYCOL/WATER (BULK) [UCATHERM, 1277853]	
22	2	105483	ELBOW, 90 DEG, BW LR, 6" NOM SCH STD SA234-WPB	
			BILL OF MATERIAL: M 121974 : ASSEMBLY, DRIVER, ENGINE COOLING, COMPLETION, A1478	

OPTIONS				
ITEM	QTY	EFX CODE	DESCRIPTION	
23	1	107477	PUMP, DIAPHRAGM, 1/2" NPT, ALUMINUM, BUNA, #01-10001 [WILDEN, T1/AYTB/BN/BN/ABN]	
21	2	121379	VALVE, BALL, 3-WAY, 3/4" NPT FULL SS, 800 PSI C/W LOCKING HANDLE (MAS, G4)	
22	2	102973	VALVE, BALL, 3/4" NPT, 2000# WOG, RP, 316SS, NACE C/W LOCKING [NAVCO, C1-R07S20A]	
BILL OF MATERIAL: M 113825 : OPTION 2404A, GLYCOL COOLANT TRANSFER SYSTEM, A1478				

NOTE:
1.*SUPPLIED BY VENDOR.
2. ITEM 30 - GLYCOL FILTER KIT CONTAINS THE FILTER AND TWO BALL VALVES.

REV	DESCRIPTION	DATE	DRAWN BY	CHECKED BY
2	AS BUILT	05/10/31	HJZ	KK
1	ISSUED FOR CONSTRUCTION	05/04/15	MV	ABT
0	ISSUED FOR APPROVAL	05/04/01	MV	ABT

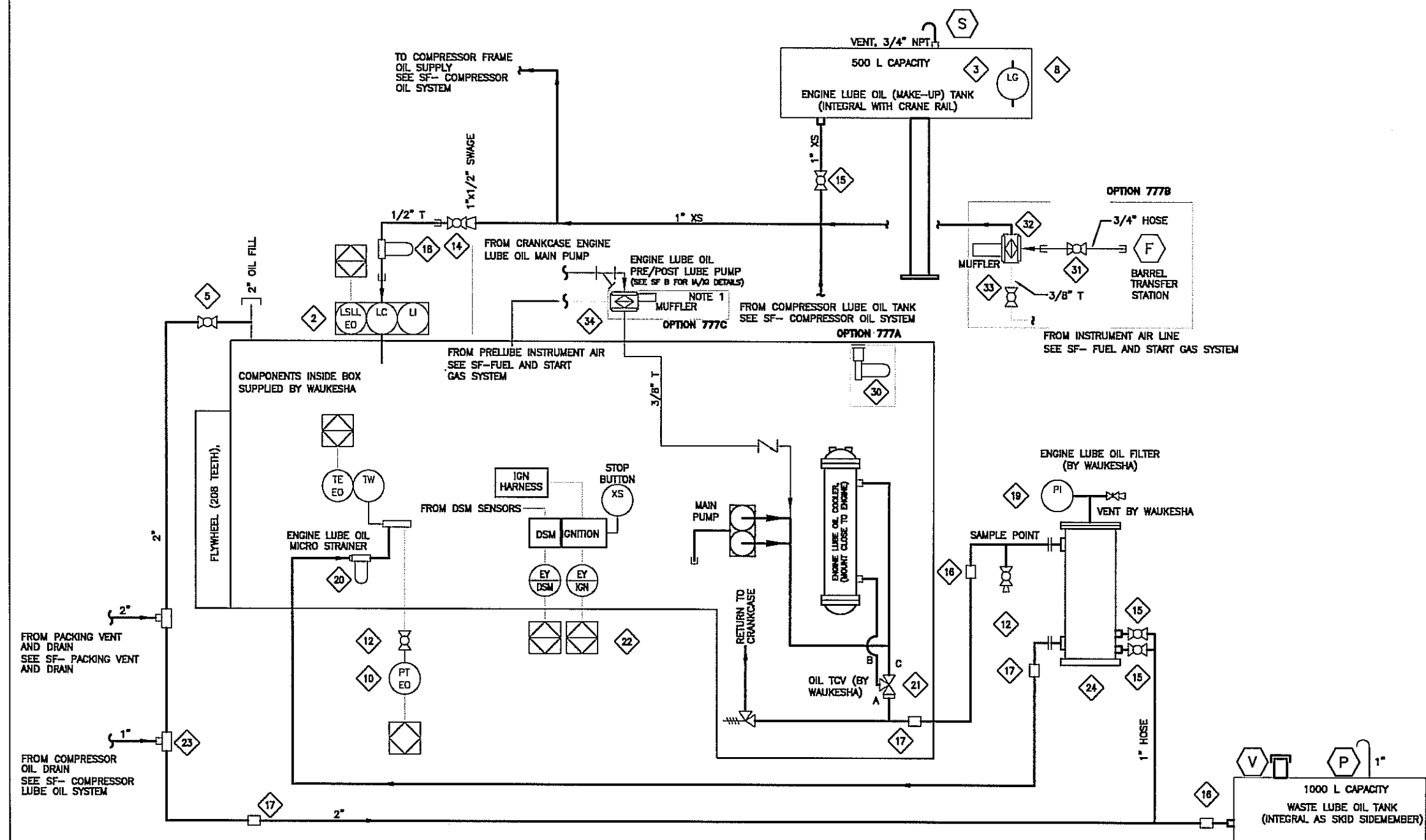
BTB COMPRESSORS

ENERFLEX

4700 47 ST. SE. CALDWAY AB, CANADA T2B 3R1 TEL: 1 (403) 238-8823 FAX: 1 (403) 279-0367. www.bttb.com

TITLE:		SERVICE FLOW ENGINE GLYCOL SYSTEM A1478 (OP24)		
FOR:		<u>MGV ENERGY INC (MGV-C-026)</u>		
CONSULTANT: GRB ENGINEERING LTD		LSD: -		
P.O.: -		JOB No.: 040925		
DRWN BY: TTS	DESIGN BY: -	DATE: -	DWG. No.	OP.#
DATE: 2002/07/23	CHKD BY: -	DATE: -	SF-040925-24	24
SCALE: NTS	APPVD BY: -	DATE: -		

OPTION SELECTION	OPTION NUMBER	OPTION DESCRIPTION
☒	2404A	GLYCOL COOLANT TRANSFER SYSTEM, A1478
☐	2405A	GLYCOL FILTER, A1478
☐		
☐		
☐		
☐		



NOTE:
1. REMOVE EXISTING ENGINE GEAR PUMP
AND REPLACE WITH ITEM 32.

OPTION SELECTION	OPTION NUMBER	OPTION DESCRIPTION
☒	777A	CUSTOMER OPTION, MICRO SPINNER FOR WAUKESHA VHP
☒	777B	CUSTOMER OPTION, LUBE OIL TRANSFER SYSTEM
☒	777C	CUSTOMER OPTION, ENGINE DIAPHRAGM PUMP
☐		
☐		
☐		

BILL OF MATERIAL

ITEM	QTY	EFX CODE	DESCRIPTION
2	1	107968	CONTROLLER, OIL LEVEL C/W ELECTRIC SWITCH, XP, CSA C/W DOOR MT [KEMCO, LCE-17]
3	1	115052	INDICATOR, LEVEL, SIGHT GLASS WINDOW, 10" BOLT CENTERS, [MP FILTR, LVA 30 TA]
5	1	102951	VALVE, BALL, 2" NPT, 2000# WOG, RP, 316SS, NACE C/W LOCKING [NAVCO, C1-R20S20A]
10	1	112319	TRANSMITTER, GAUGE PRESSURE, 0-150 PSIG, CSA, [ROSEMOUNT, 2088G2S22A1C6]
12	2	102950	VALVE, BALL, 1/4" NPT, 2000# WOG, RP, 316SS, NACE C/W [NAVCO, C1-R20S20A]
14	1	102948	VALVE, BALL, 1/2" NPT, 2000# WOG, RP, 316SS, NACE C/W [NAVCO, C1-R05S20A]
15	3	102937	VALVE, BALL, 1" NPT, 2000# WOG, RP, 316SS, NACE C/W LOCKING [NAVCO, C1-R10S20A]
16	2	101245	COUPLING, STRAIGHT, 2", STYLE 90 [DRESSER, 0090-0005-082]
17	3	101244	COUPLING, ELBOW, 90 DEG, 2", STYLE 90 [DRESSER, 0090-0245-082]
18	1	121735	FILTER, ASSEMBLY, OIL, 1/2" NPT, 25 MICRON C/W SF-6510 [KINECOR, SAF-05-00-0]
19	1	107895	GAUGE, PRESSURE, BM, 2-1/2" LF, 0-200 PSI DUAL, 1/4" NPT [WKA, 233.53]
20	1	108931	FLANGE, FF SQ, 2" NPT C/W RECESS FOR WAUK 12VHP OIL FILTER
21	1	108932	FLANGE, FF SQ, 2" NPT FOR WAUKESHA 12VHP OIL FILTER COOLER
22	1	123293C	BRACKET, ENGINE OIL AND MANFOLD PRESSURE TRANSMITTER
23	1	123318	DRIVER/COMPRESSOR OIL DRAIN, A1478
24	1	123315	MOUNTING BLOCK, ENGINE, WAUKESHA FILTER, A1478

BILL OF MATERIAL: M 114236 : ASSEMBLY, DRIVER, ENGINE OIL, A1445/A1478			
DATE-TIME EXPORTED: 2004-06-25-13.52			

8	340	104080	OIL, LUBE, BULK (1,600 LITRE CUBE) [PETRO CANADA, SENTINAL 445]

BILL OF MATERIAL: M 121978 : ASSEMBLY, DRIVER, ENGINE OIL, COMPLETION, A1478			
DATE-TIME EXPORTED: 2004-06-28-13.21			

OPTIONS

ITEM	QTY	EFX CODE	DESCRIPTION
31	1	102973	VALVE, BALL, 3/4" NPT, 2000# WOG, RP, 316SS, NACE C/W [NAVCO, C1-R07S20A]
32	1	107477	PUMP, DIAPHRAGM, 1/2" NPT, ALUMINUM, BUNA, #01-10001 [WILDEN, T1/AY1B/BN/BN/ABN]
33	1	102974	VALVE, BALL, 3/8" NPT, 2000# WOG, RP, A105 BODY, NACE C/W [NAVCO, H1-R03S20S]

BILL OF MATERIAL: M 124572 : OPTION 2708A, ALFA LAVAL FILTER ASSEMBLY			
DATE-TIME EXPORTED: 2005-01-05-13.21			
30	1	113203	FILTER, OIL, CENTRIFUGAL BYPASS, MICROSPIN, VHP SERIES [WAUKESHA, OPTION #51143]

BILL OF MATERIAL: M BASE TEMPLATE : OPTION 777A, MICRO SPINNER FOR WAUKESHA VHP			
DATE-TIME EXPORTED: 2005-01-05-13.21			
34	1	114896	PUMP, DIAPHRAGM, 1" NPT, ALUMINUM, VITON, # 02-10033 [WILDEN, T2/AAAB/VT/UT/AT]

REV	DESCRIPTION	DATE	DRAWN BY	CHECKED BY
2	AS BUILT	05/10/31	HJZ	KK
1	ISSUED FOR CONSTRUCTION	05/04/15	MV	ABT
0	ISSUED FOR APPROVAL	05/04/01	MV	ABT

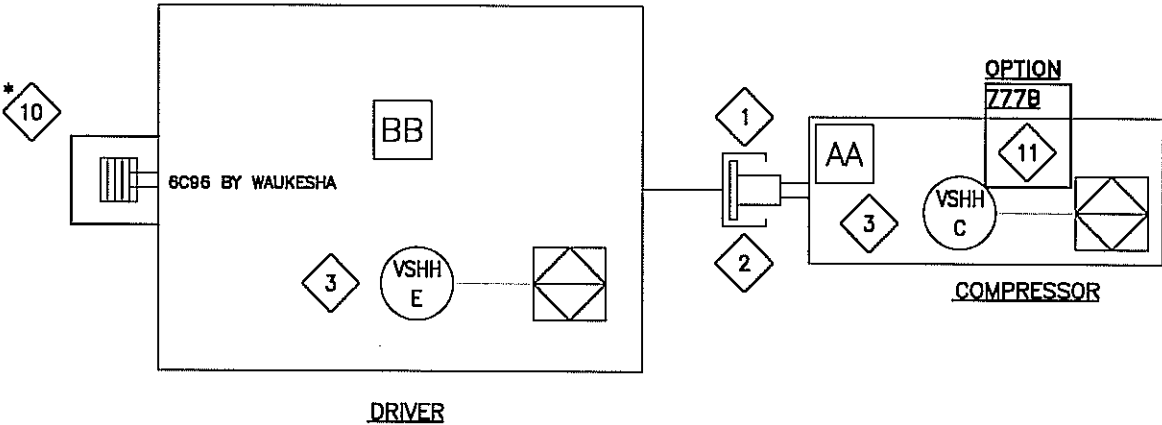
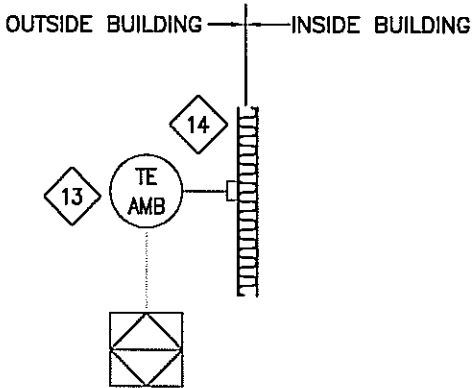
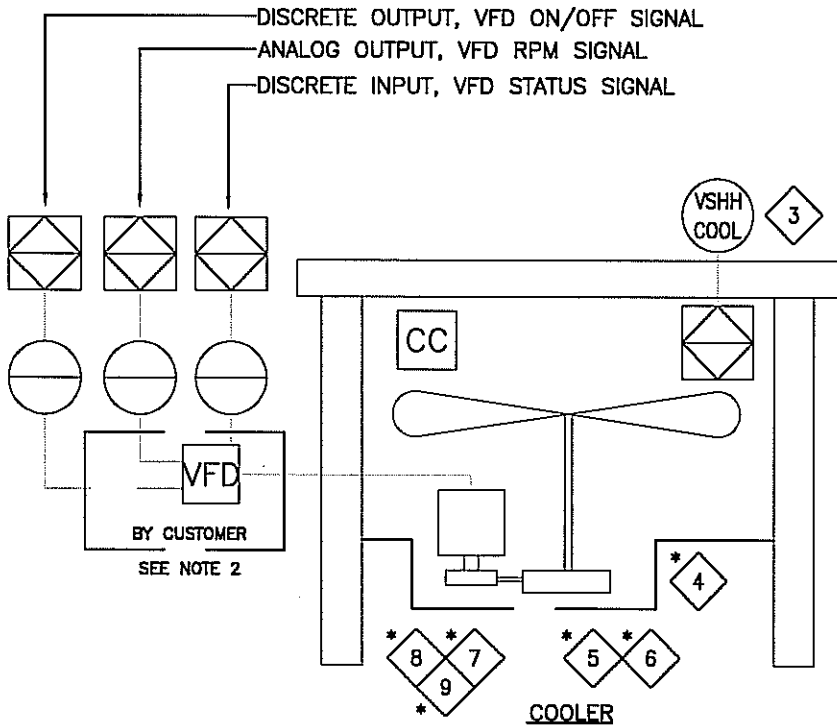
BTB COMPRESSORS
EPX Compression
ENERFLEX

4700 47 ST. SE. CALGARY AB, CANADA T2B 3R1 TEL: 1 (403) 238-8800 FAX: 1 (403) 278-0267. www.enertflex.com

TITLE:		SERVICE FLOW ENGINE LUBE OIL		
FOR:		<u>MGV ENERGY INC (MGV-C-026)</u>		
CONSULTANT: GRB ENGINEERING LTD		LSD: -		
P.O.: -		JOB No.: 040925		
DRWN BY: TTS	DESIGN BY: -	DATE: -	DWG. No.	REV
DATE: 2002/07/23	CHKD BY: -	DATE: -	SF-040925-27	2
SCALE: NTS	APPVD BY: -	DATE: -		

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DESCRIPTION	SHEAVE PICTH Ø	RPM
ENGINE SHAFT	9.6"	1200
JACK SHAFT	N/A	N/A
ENGINE END	N/A	N/A
COOLER END	N/A	N/A
IDLER	N/A	N/A
COOLER END	N/A	N/A
COOLER SHAFT	50	220
MOTOR SHAFT	6.30	1750



BILL OF MATERIAL			
ITEM	QTY	EFX CODE	DESCRIPTION
1	1	122559	COUPLING, ADAPTER PLATE 22.5" OD HD C/W STEEL HUB [FORMFLEX, FSH70-22B-X00X-HD]
2	1	115047	GUARD, COUPLING, FIBERGLASS, ENERFLEX RED, PMS 188 AS PER QUOTE #01-143
3	3	104524	SWITCH, VIBRATION, ELECTRIC C/W MANUAL RESET [MURPHY, VS2]
4	1	NPN	COOLER DRIVE BELT GUARD
5	1	NPN	SHEAVE, 6 GROOVE (TB WOODS, OD 6/5V 50.0)
6	1	NPN	BUSHING, 3-7/16" BORE (TB WOODS, M 3-7/16")
7	1	NPN	V-BELT, Banded, (GATES, 6-SVX 1800)
8	1	NPN	SHEAVE, 6 GROOVE (TB WOODS, OD 6/5V 30)
9	1	NPN	BUSHING, 2-3/8" BORE (TB WOODS, SK 2-3/8")
10	1	NPN	ENGINE DRIVE BELT GUARD
11	1	113106	THERMOCOUPLE, K TYPE, 318SS C/W [THERMOKINETICS, K125-318S-0006-B-825-000-001BS]
12	1	105184	FITTING, COMPRESSION FOR BTB STYLE 8 THERMOCOUPLE, 1/2" NPT [THERMOKINETICS]

BILL OF MATERIAL: M 124585 : SERVICE FLOW, DRIVE TRAIN, A147B, 4STG			
DATE-TIME EXPORTED: 2005-01-24-15.25			

BILL OF MATERIAL			
ITEM	QTY	EFX CODE	DESCRIPTION
11	1	124515	CRANKSHAFT MATERIAL, 4140 [ARIEL]

BILL OF MATERIAL: M BASE TEMPLATE : OPTION 777B, COMPRESSOR CRANKSHAFT 4140			
DATE-TIME EXPORTED: 2005-01-24-15.25			

NOTE:
 1. * SUPPLIED BY VENDOR
 2. WIRING FROM PANEL TO CUSTOMER VFD BY CUSTOMER.

REV	DESCRIPTION	DATE	DRAWN BY	CHECKED BY
2	AS BUILT	05/10/31	HJZ	KK
1	ISSUED FOR CONSTRUCTION	05/04/15	MV	ABT
0	ISSUED FOR APPROVAL	05/04/01	MV	ABT

BTB Compressors

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www.enerflex.com

TITLE:

SERVICE FLOW DRIVE TRAIN
ARIEL JGK/4, WAUKESHA SERIES L VHP, AIR X
A147B 4STG (OP 28)

FOR:

MGV ENERGY INC. (MGV-C-026)

CONSULTANT: GRB ENGINEERING LTD.

LSD: -
JOB No.: 040925

DRWN BY:

DATE:

SCALE: NTS

DESIGN BY: -

CHKD BY: -

APPVD BY: -

DATE: -

DATE: -

DATE: -

DWG. No.

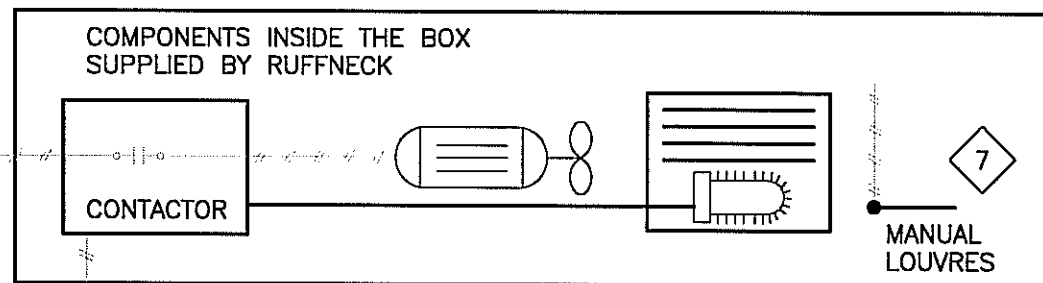
SF-040925-28

REV

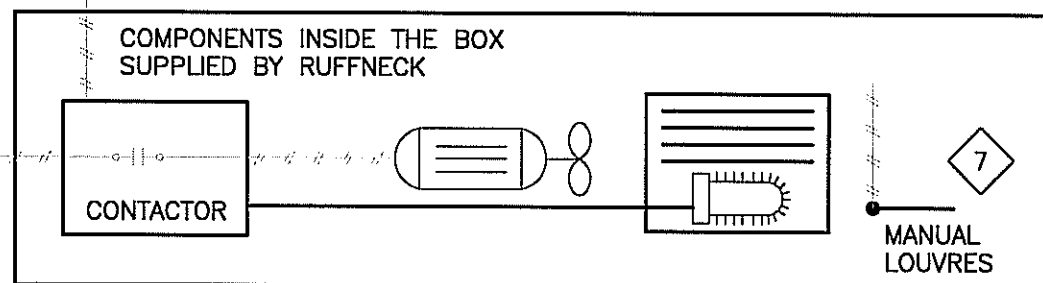
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OPTION SELECTION	OPTION NUMBER	OPTION DESCRIPTION
☒	777B	CUSTOMER OPTION, 4140 COMPRESSOR CRANKSHAFT
☐	777C	CUSTOMER OPTION, VIBRATION TRANSMITTER
☐		
☐		
☐		
☐		

480/3/60
WIRING BY
CUSTOMER



480/3/60
WIRING BY
CUSTOMER



BUILDING EQUIPMENT AND CONTROLS

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BILL OF MATERIAL

ITEM	QTY	EFX CODE	DESCRIPTION
7	2	104647	HEATER, ELECTRIC, 20 KW, 480V/3/60HZ, XP, CSA, [RUFFNECK, FX418-480360-20]
8	1	104651	THERMOSTAT, 5-25 DEGREE RANGE, 120/240V, XP, CSA, WALL MOUNT, [DEFENDER, XT-311]
			BILL OF MATERIAL: M BASE TEMPLATE : ASSEMBLY, HEATERS, A1478

REV	DESCRIPTION	DATE	DRAWN BY	CHECKED BY
2	AS BUILT	05/10/31	HJZ	KK
1	ISSUED FOR CONSTRUCTION	05/04/15	MV	ABT
0	ISSUED FOR APPROVAL	05/04/01	MV	ABT

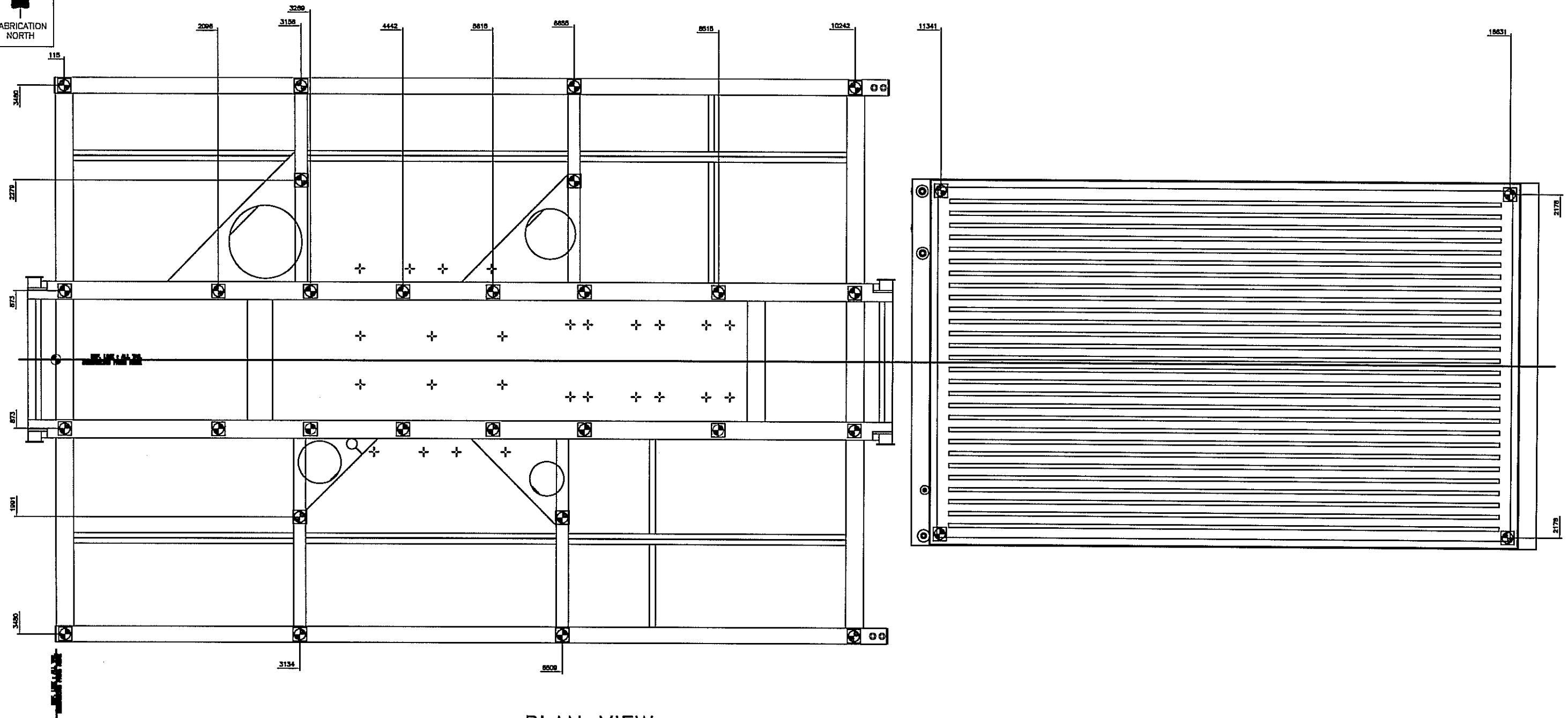
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ENERFLEX
BFX Compression

4700 47 ST. SE CALGARY AB, CANADA, T2B 3N1 TEL: 1 (403) 238-9800 FAX: 1 (403) 279-0367. www.enerflex.com

TITLE:		SERVICE FLOW BUILDING HEATERS A1478-4 STG (OP 72)		
FOR:		MGV ENERGY INC (MGV-C-026)		
CONSULTANT: GRB ENGINEERING LTD		LSD: - JOB No.: 040925		
P.O.: -				
DRWN BY: WAT	DESIGN BY: -	DATE: -	DWG. No.	REV
DATE: 03/03/10	CHKD BY: -	DATE: -	SF-040925-72	2
SCALE: NTS	APPVD BY: -	DATE: -		



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PLAN VIEW

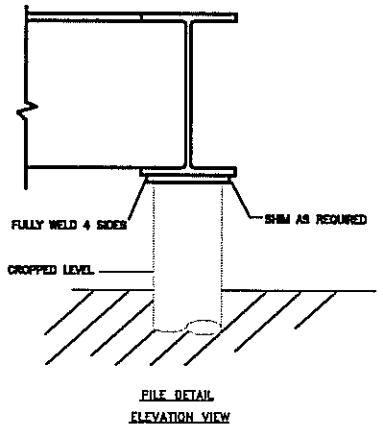


RECOMMENDED SUPPORT LOCATIONS

NOTES:

1. UNIT WEIGHTS ARE APPROXIMATE AND MAY BE SUBJECT TO CHANGE UPON COMPLETION OF FABRICATION DRAWINGS.
2. PILE QUANTITY AND PLACEMENTS ARE THE MINIMUM RECOMMENDED TO SECURE EQUIPMENT. THE END USER MUST ENSURE ADEQUATE LOAD BEARING CAPACITY OF THE PILES.
3. FOUNDATION DESIGN IN GENERAL, PILE DESIGN AND QUANTITY IN PARTICULAR, ARE THE RESPONSIBILITY OF THE CUSTOMER.

NOTE:
REFER TO GA DRAWING FOR UNBALANCED
FORCES AND WEIGHTS.



A		FOR STANDARDS	05/08/14	TL	-
REV		DESCRIPTION	DATE	DRAWN BY	CHECKED BY
BTB Compressors 4780 47 ST. SE. CALGARY, AB. CANADA, T2B 3H1 TEL: 1 (403) 278-5825 FAX: 1 (403) 278-5827 www.btb.com					
TITLE: RECOMMENDED PILE SUPPORT LOCATION A1478 FOUR STAGE					
FOR: CUSTOMER (LOCATION)					
CONSULTANT: ENERFLEX			LSD: JOB No.:		
CONSULTANT PO:			DWG. No. 126785		
DRAWN BY: AJM	DESIGN BY: JRM	DATE: 05/08/14	DWG. No. 126785	REV #:	
DATE: 05/07/14	CHECK BY:	DATE:		A	
SCALE: 1:25	APPROVED BY:	DATE:			