

Table 1 Pneumatic Instrumentation
Gauge/Indicator Units: Dual Scale (psig/kPa & F/C) Instrument Medium: Fuel Gas Impulse (Sensing) Tubing: 1/4" OD, 316SS Instrument Supply Tubing: 3/8" OD, 316SS Instrument Vent Tubing: 3/8" OD, 316SS Tubing Pneumatic Test: Refer to Pneumatic Testing Sheet Additional Notes: 1.1 Tubing runs in traffic areas to be protected with removable covers.

<u>Table 2 Tubing Details</u>	
<u>Wall Thicknesses</u>	<u>Fittings</u>
1/4": 0.065"	Manufacturer: Swagelok
3/8": 0.083"	Fitting Material: 316SS
1/2": 0.065"	Ferrule Material: 316SS
3/4": 0.065"	<u>Additional Notes:</u>
1": 0.083"	2.1 All tubing to be of seamless construction.
1-1/4": 0.120"	2.2 Where thicknesses are not specified on drawings, use those specified in this table. Thicknesses should never be less than those specified here.
1-1/2": 0.134"	
2": 0.188"	

Table 7 Skid, Crane & Steel Details
Overall Trailer Dimensions: 13'-6"W x 52'-7"L x 18'-06"Eave, See Note 7.3 Skid Style: Trailer Mounted Main Beams: 21"@62 Stringer Beams: N/A Seal Pan: Spill containment sill provided around building/trailer perimeter. Checker Plate: Checker-plated flooring with anti-slip paint Drip Lip: Provided around the compressor and engine with drain connection tied into the main drain header. Under-Skid Insulation: Bottom of trailer to be sprayed with fire retardant insulation. Grating: 3/16" x 1", Smooth, Carbon Steel Skid Surface Prep: SSPC-SP2/SP3 (Hand/Power Tools) Skid Lifting Devices (Center Section): N/A Skid Lifting Devices (Wings): N/A Skid Steel MTRs: Not required Other Structural Steel MTRs: Not required Integral Skid Tanks: 2 x 100 Gallon Tanks (Waste Oil & Spare Holding) Crane: None Crane Certification: N/A Day Tanks: 2 x 36 Gallon Day Tanks (Crankcase Oil & Force Feed Lube Oil) Concrete Type: None Concrete Pour Location: N/A Skid Foundation: N/A Additional Notes: 7.1 Skid to be constructed in accordance with CWB standards. 7.2 Integral skid tanks have primary containment only. 7.3 Shipping limitations: Height 20', Weight 75 tonnes, Width 20'

Table 11 Package Fluids
Engine Coolant: Ethylene Glycol / Water, 50/50 Mix Engine Lubricant: SAE 40 Engine Oil (ISO 150) Compressor Crankcase Lubricant: SAE 40 Engine Oil (ISO 150) Compressor Force Feed Lubricant: Synthetic PAG (ISO 100) Additional Notes: 11.1 Compressor Crankcase to ship with single fill

Table 12 Shipping Preparation
Driver: On-Skid Compressor: On-Skid Coupling: Remove spyder Cooler: On-Trailer Skid Assembly: Trailer Additional Notes: 12.1 Remove the following: scrubber level instrument floats & displacers

Table 3 Electrical Details
Component Electrical CSA Class 1, Div 1 or Div 2, or CSA Zone 1 or Certification: Zone 2 Package Electrical Not Certified as Full Package in Bidell Shop Certification: On-Skid Wire Protection: Rigid Aluminium Conduit Additional Notes: 3.1 All on-skid equipment to meet component electrical certification requirements.

Table 5 Piping Assembly & Supports
Studs: Full Thread, B7M, <1": UNC, 1"+UN Nuts: Heavy Hex Nuts, 2HM, <1": UNC, 1"+UN Bottle Fasteners: As per studs & nuts Gaskets: • Up to 900 Class: CGI, Carbon Steel Outer Ring, 316L Inner Ring, 316L Winding, Graphite (Flexicarb) Filler • 2500 Class: Oval Ring Type, Type D Soft Iron, (RTJ) Process Pipe Clamps (<6"NPS): 2-Bolt (No u-bolt style) Process Pipe Clamps (≥6"NPS): 2-Bolt (No u-bolt style) Utility Piping Clamps: 2-Bolt (No u-bolt style) Additional Notes 5.1 Refer to BES-CLAMP-01/02 for pipe clamp details.

Table 4 Pressure Piping Details
Fabrication Code: ASME B31.3-2016 Piping Classes: ENG-STD-0001 (Bidell Standard) Hydrotest Pressure: 1.5 x Design Pressure at Ambient Temperature Flanged PSV Gussets: Refer to DFT-STD-0007 Flanged Instrument Gussets: Refer to DFT-STD-0007 Registration: ABSA Process Piping See Note 4.2 External Prep: SSPC-SP2/SP3 (Hand/Power Tools) Internal Prep: Flushed & Rust Protected Corrosion Allowance: 0.125" BW Radiography: 100% Coverage of 100% of welds, per welder, per day. Severe Criteria. (Note 4.4) SW Radiography: 100% (Gap Check) MPI Examination: 100% Coverage of 100% of -olet and SW fillet welds, per welder, per day LPI Examination: none UT Examination: none Hardness Testing: none PWHT: 1150±25F FOR 60 Minutes / Inch, Min 60 Minutes Utility Piping External Prep: SSPC-SP2/SP3 (Hand/Power Tools) Internal Prep: Flushed & Rust Protected (Welded Piping Only) Corrosion Allowance: 0.0625" BW Radiography: 100% Coverage of 10% of welds, per welder, per day. Normal Criteria. SW Radiography: none MPI Examination: 100% Coverage of 10% of -olet and SW fillet welds, per welder, per day LPI Examination: none UT Examination: none Hardness Testing: none PWHT: none (Except if required by code) Additional Notes 4.1 Non-code piping (Pipe Class NC) is designed and built to B31.3, but it is not registered, and NDE is not required. 4.2 All process piping connections to be flanged. 4.3 A-106C Pipe required for final discharge. Impact testing required for low temp service. See 18-1157-700 for details. 4.4 Severe, cyclic criteria used for sour service NDE. Piping system is not severe cyclic design.

Table 6 Pressure Vessel Details
Fabrication Code: ASME Section VIII Div 1 (2017) Hydrotest Pressure: 1.3 x Design Pressure at Ambient Temperature Registration: AB, BC & SK Process Vessels Corrosion Allowance: 0.125" Radiography: Full RT Per UW-11(a) (RT-1 + 100% of Nozzle Butt welds) MPI Examination: none LPI Examination: none UT Examination: none Impact Testing: none Hardness Testing: none HIC Testing: none PWHT: 1150±25F FOR 60 Minutes / Inch, Min 60 Minutes External Prep: SSPC-SP2/SP3 (Hand/Power Tools) Internal Prep: Flushed & Rust Protected NPT Connections: All vessel connections to be flanged. Utility Vessels Corrosion Allowance: 0.0625" Radiography: Spot per UW-11(a)(5)(b), RT-2 MPI Examination: none LPI Examination: none UT Examination: none Hardness Testing: none PWHT: None External Prep: SSPC-SP2/SP3 (Hand/Power Tools) Internal Prep: Flushed & Rust Protected NPT Connections: Threadolets/couplings to be minimum CL3000 Additional Notes: 6.1 Review PWHT for each vessel to Section VIII requirements. 6.2 Process vessel scope is all process scrubbers & pulsation bottles. 6.3 Utility vessel scope is fuel gas scrubber.

Table 8 Paint Details
Primer: One Coat Bidell Standard Water-Based Top Coat: One Coat Bidell Standard Water-Based Paint Colour: Warm Grey Paint Engine: OEM Finish Paint Compressor: OEM Finish Additional Notes: none

Table 9 Customer, Inspection, & Tagging
Unit Destination: HP ReInjection Compressor Customer AB-10 Contact: TBD 3rd Party Inspection: TBD Shop Test Run: Unloaded Physical Instrument Tagging: Stainless steel tagged instruments. Physical Equipment Tagging: none

Table 10 Engineering Studies & Stamping
Torsional: None Acoustical/Mechanical: API618 DA3 (M2/M3, M4, M5/M6, M7) Flexibility: API618 Thermal Analysis (M11) Crane: N/A Fugitive Emissions: Bidell Noise: By Others Nozzle Loads (Vessels): Yes Nozzle Loads (Skid Edge): By Others P.Eng Stamped Documents: P&IDs: Yes General Arrangements: No BOMs: No Line List: No Skid Drawing: Yes Vessel Drawings: No Building Drawing: Yes, by Warwick Crane Drawing: N/A Shutdown Key: No Operating Philosophy: No

 Canadian Natural BIDELL™ GAS COMPRESSION					
Rev	Issued For	By	Reviewed	Approved	Date
A	Review	BT	GW/GTM	JS	11-Oct-18
0	Issued For Construction	BT	GW/GTM	JS	Dec 20, 2018
1	Reissued For Construction	BT	GW/GTM	JS	Feb 04, 2019
2	As Built	BT	GW/GTM	JS	Apr 29, 2019
Package Name: Re-Injection Trailer Mounted Compressor Bidell Unit Number(s): 18-1157 Customer Tag Number(s): K-101 Customer: CNRL Destination: Trailer LSD: Trailer Document Title: Scope Summary Document Number: 18-1157-000					

INSTRUMENTATION
TAGGING LEGEND

- LOCAL MOUNTED DEVICE
- PANEL MOUNTED DEVICE
- OFF-SKID MOUNTED DEVICE
- SIGNAL TO PANEL
- SIGNAL TO SITE

LINETYPE
LEGEND

- PROCESS PIPING
- UTILITY PIPING
- SEAMLESS TUBING
- ELECTRICAL WIRING
- INTERNAL LOGIC
- OEM SUPPLIED
- ASSEMBLY BOUNDARY
- BUILDING WALL
- DRIVETRAIN
- CUSTOMER SUPPLIED
- EXISTING EQUIPMENT

LOW POINT
DRAIN DETAIL

1" NPT

PLUGGED NPT DRAINS
TO BE PROVIDED AT ALL LOW
POINTS IN UTILITY PIPING.

PROCESS LPDS AS SHOWN ON
INDIVIDUAL DRAWINGS.

PNEUMATIC
TERMINATIONS

- INSTRUMENT GAS
- PANEL GAS (SEE 18-1157-720)
- VENTED TO EAVE
- VENTED TO PROCESS GAS HEADER
- VENTED TO INSTRUMENT GAS HEADER

INSTRUMENT GAS VENT HEADER

VENT AT EAVE

3/8"

VH-1"-XS-AU-NPT

EAVE VENT

VENT AT EAVE

DO NOT MANIFOLD
VENTS. EACH VENTED
ITEM TO HAVE
INDEPENDANT
TUBING TO EAVE.

BY OTHERS c/w PANEL

FROM PANEL
HEADER

NOTES:
1. REFER TO BIDE LL DOCUMENT DFT-STD-0001 FOR FULL SYMBOLOLOGY.

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1	19-04-29	BT	GW	GTM	JS	AS BUILT
0	19-02-19	BT	GW	GTM	JS	ISSUED FOR CONSTRUCTION

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CALGARY, AB T2C 4Z1
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FAX: (403) 272-7749

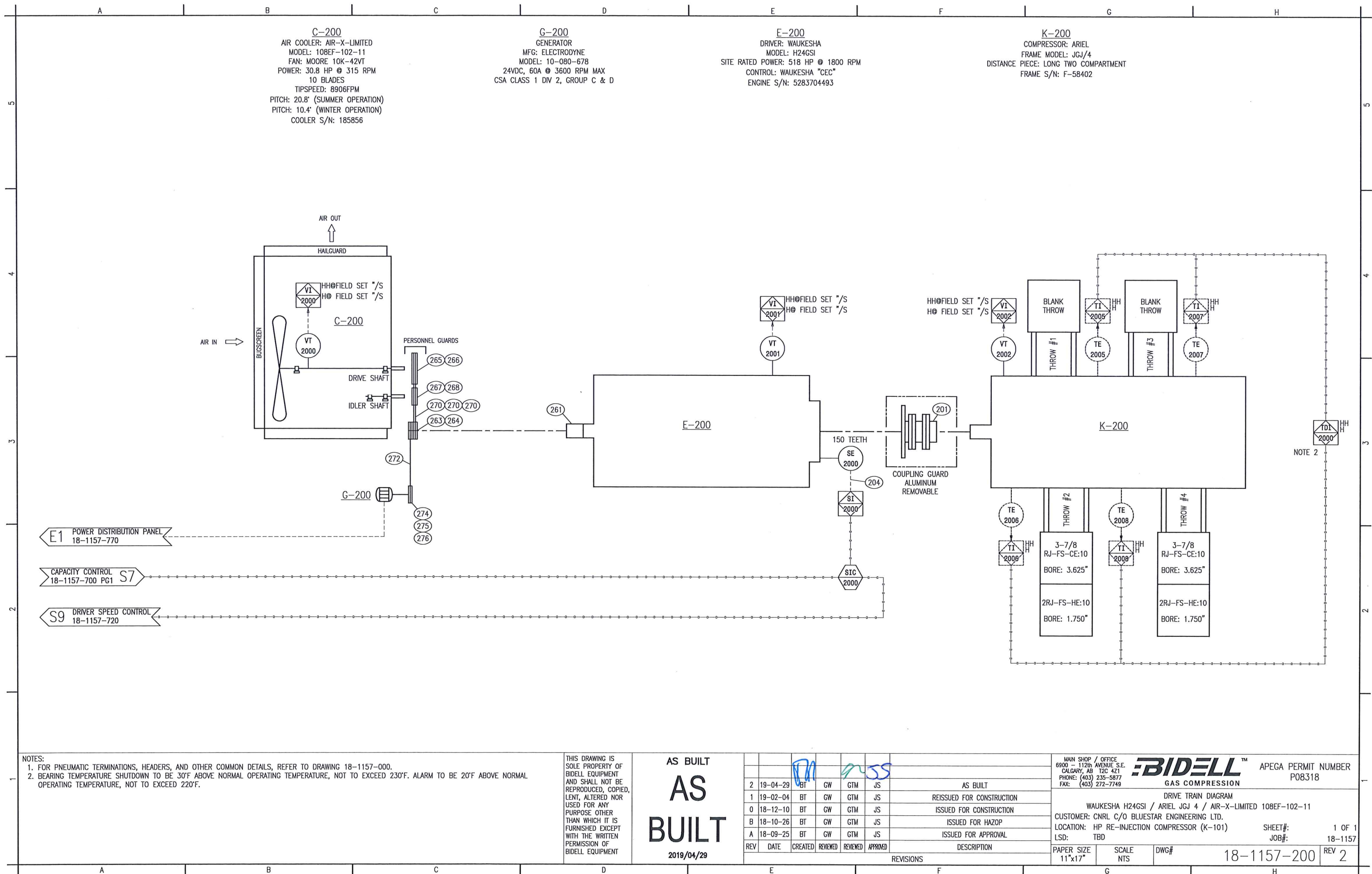
BIDE LL™
GAS COMPRESSION

APEGA PERMIT NUMBER
P08318

SYMBOLOLOGY, VENT HEADERS AND CONTROL PANEL
WAUKESHA H24GSI / ARIEL JGJ 4 / AIR-X-LIMITED 108EF-102-11
CUSTOMER: CNRL C/O BLUESTAR ENGINEERING LTD.
LOCATION: HP RE-INJECTION COMPRESSOR (K-101)
LSD: TBD

SHEET#: 1 OF 1
JOB#: 18-1157

PAPER SIZE 11"x17"
SCALE NTS
DWG# 18-1157-001
REV 1



NOTES:
1. FOR PNEUMATIC TERMINATIONS, HEADERS, AND OTHER COMMON DETAILS, REFER TO DRAWING 18-1157-000.
2. BEARING TEMPERATURE SHUTDOWN TO BE 30°F ABOVE NORMAL OPERATING TEMPERATURE, NOT TO EXCEED 230°F. ALARM TO BE 20°F ABOVE NORMAL OPERATING TEMPERATURE, NOT TO EXCEED 220°F.

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0	18-12-10	BT	GW	GTM	JS	ISSUED FOR CONSTRUCTION
B	18-10-26	BT	GW	GTM	JS	ISSUED FOR HAZOP
A	18-09-25	BT	GW	GTM	JS	ISSUED FOR APPROVAL
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APEGA PERMIT NUMBER
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DRIVE TRAIN DIAGRAM
WAUKESHA H24GSI / ARIEL JGJ 4 / AIR-X-LIMITED 108EF-102-11
CUSTOMER: CNRL C/O BLUESTAR ENGINEERING LTD.
LOCATION: HP RE-INJECTION COMPRESSOR (K-101)
LSD: TBD

SHEET#:
JOB#:

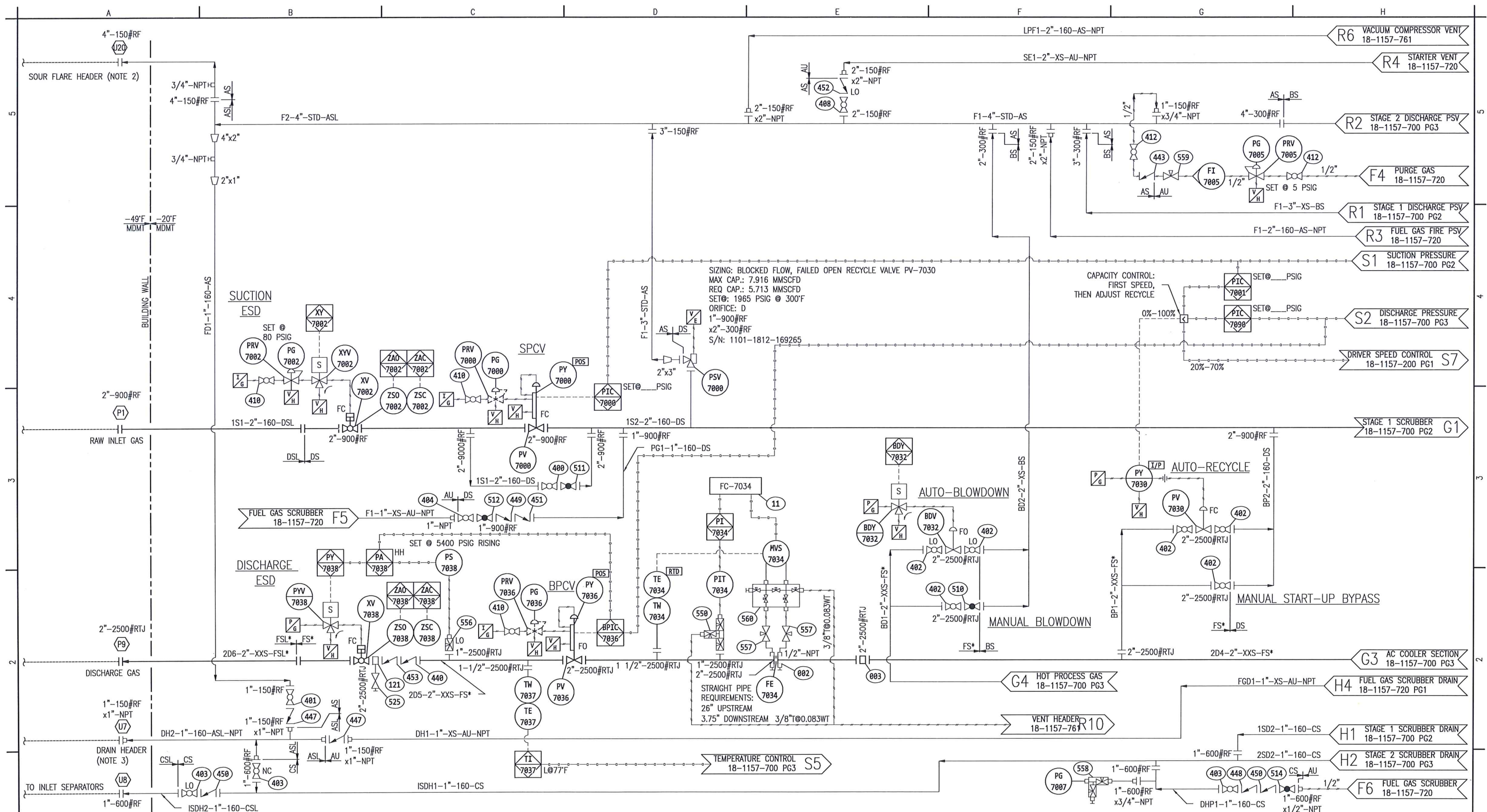
1 OF 1
18-1157

PAPER SIZE
11"x17"

SCALE
NTS

DWG#
18-1157-200

REV 2



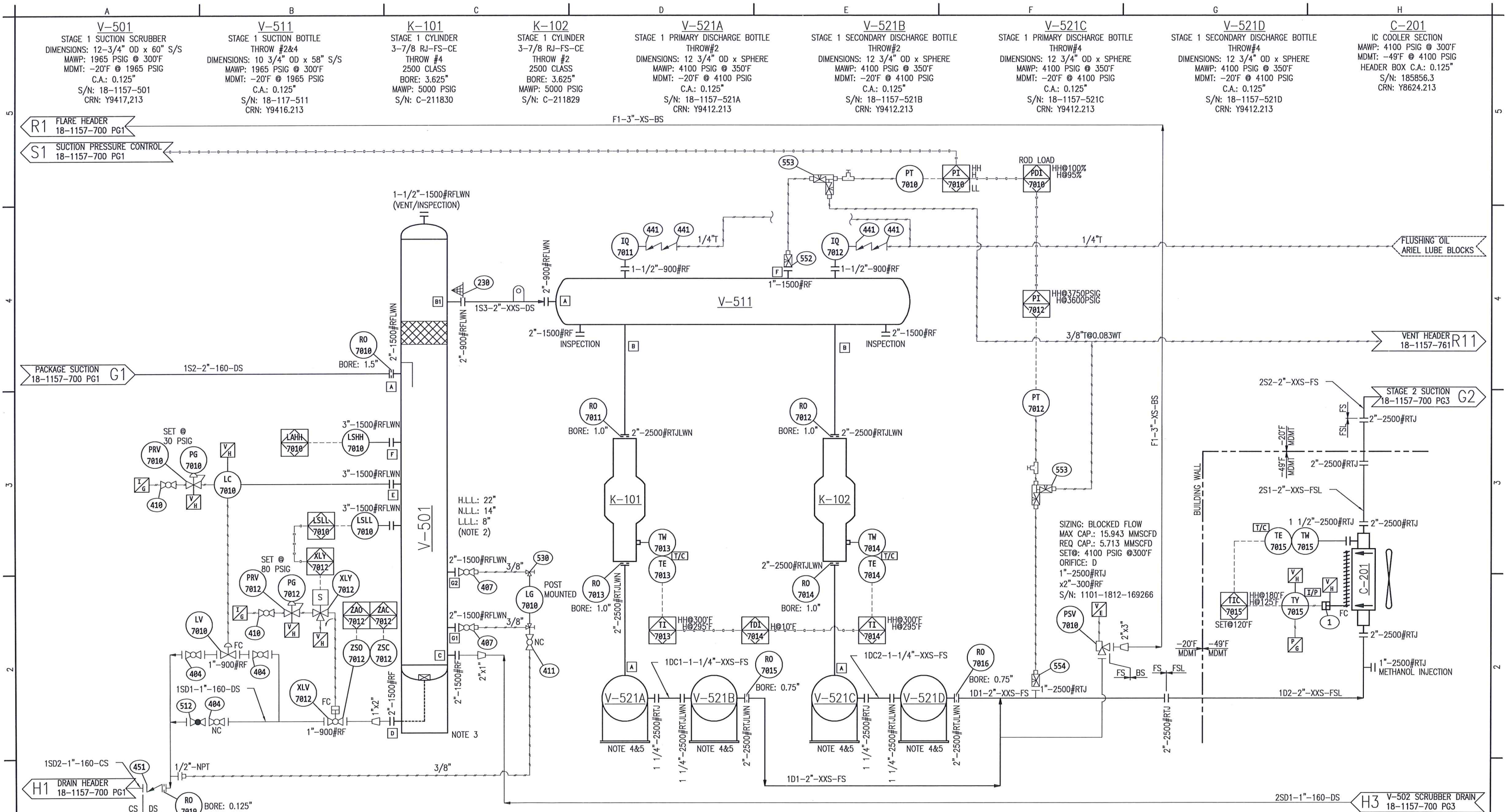
- NOTES:
- FOR PNEUMATIC TERMINATIONS, HEADERS, AND OTHER COMMON DETAILS, REFER TO DRAWING 18-1157-000.
 - FLARE SIZING BASIS:
 - SUPERIMPOSED BACKPRESSURE: 20 PSIG
 - BUILT-UP BACKPRESSURE: CUSTOMER TO CONFIRM BACKPRESSURE PER PSV. PRELIMINARY HEADER SIZING IS TWO NPS SIZES LARGER THAN THE LARGEST PSV OUTLET NOZZLE.
 - DRAIN SIZING BASIS: DRAIN SYSTEM, NORMALLY OPERATING AT 0 PSIG.
 - PIPE CLASSES FOLLOWED BY AN * INDICATE THAT PIPE MATERIAL MUST BE A-106C. FLANGES REMAIN AS PER ENG-STD-0001.

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A	18-09-25	BT	GW	GTM	JS	ISSUED FOR APPROVAL

MAIN SHOP / OFFICE 6900 - 112th AVENUE S.E. CALGARY, AB T2C 4Z1 PHONE: (403) 235-5877 FAX: (403) 272-7749		BIDELL ™ GAS COMPRESSION		APEGA PERMIT NUMBER P08318	
SOUR PROCESS FLOW WAUKESHA H24GSI / ARIEL JGJ 4 / AIR-X-LIMITED 108EF-102-11 CUSTOMER: CNRL C/O BLUESTAR ENGINEERING LTD. LOCATION: HP RE-INJECTION COMPRESSOR (K-101) LSD: TBD					
PAPER SIZE 11"x17"		SCALE NTS	DWG# 18-1157-700	SHEET#: JOB#:	1 OF 3 18-1157



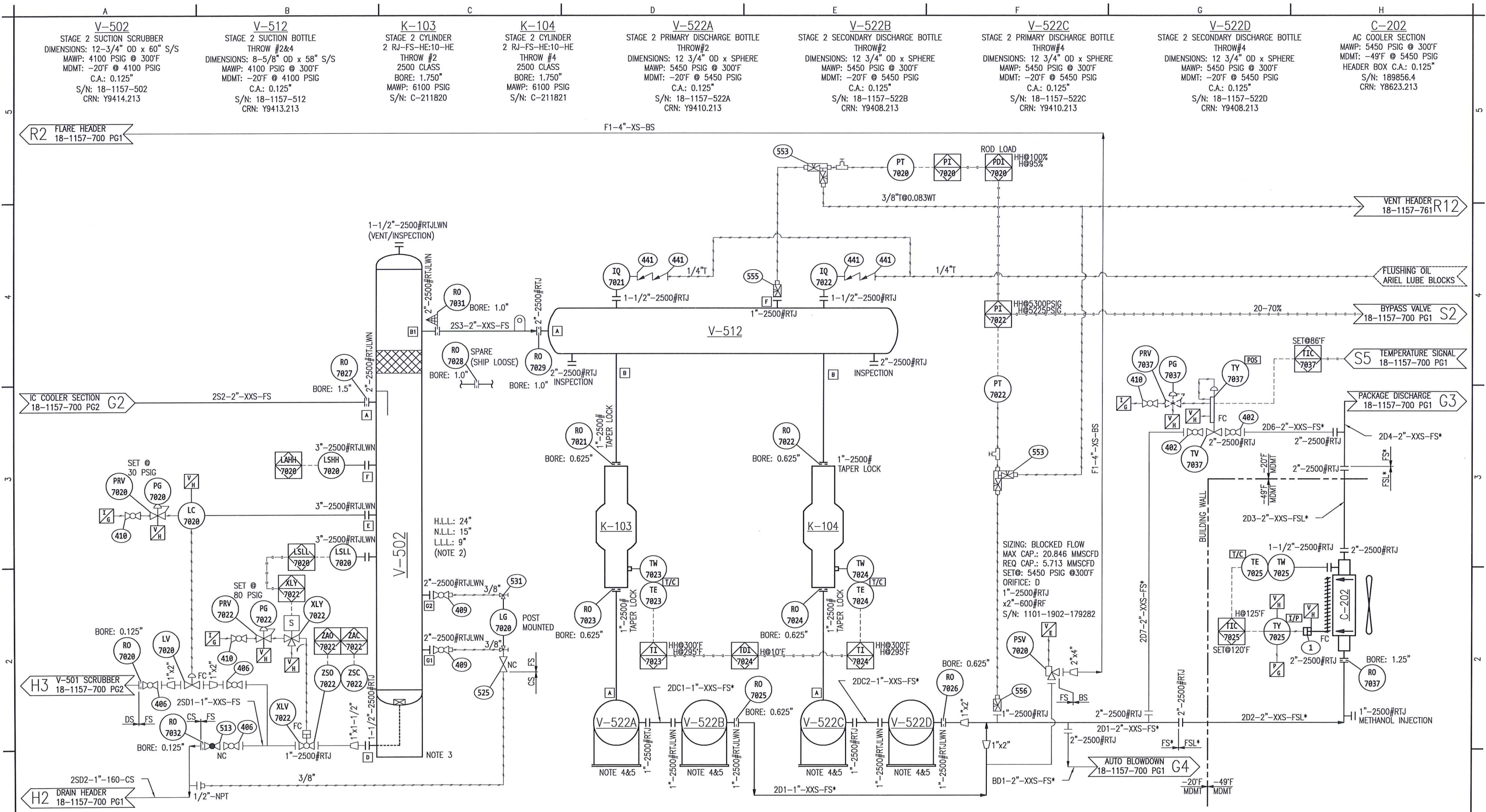
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 2. ALL LIQUID LEVELS ARE FROM VESSEL DATUM. REFER TO VESSEL DRAWINGS FOR MORE DETAILS.
 3. SCRUBBER TO BE WELDED TO SKID.
 4. SHIM BETWEEN BASE PLATE & MOUNTING PLATE AS REQUIRED FOR PROPER ALIGNMENT.
 5. FINAL ALIGNMENT MUST BE DONE WITH SPHERES AT OPERATION TEMPERATURE.
 6. PRESSURE VESSELS DESIGNED FOR FULL VACUUM.

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A	18-09-25	BT	GW	GTM	JS	ISSUED FOR APPROVAL

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SOUR PROCESS FLOW WAUKESHA H24GSI / ARIEL JG 4 / AIR-X-LIMITED 108EF-102-11		
CUSTOMER: CNRL C/O BLUESTAR ENGINEERING LTD.		
LOCATION: HP RE-INJECTION COMPRESSOR (K-101)		
LSD: TBD	SHEET#: 2 OF 3	JOB#: 18-1157
PAPER SIZE 11"x17"	SCALE NTS	DWG# 18-1157-700
REV 2		



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 4. SHIM BETWEEN BASE PLATE & MOUNTING PLATE AS REQUIRED FOR PROPER ALIGNMENT.
 5. FINAL ALIGNMENT MUST BE DONE WITH SPHERES AT OPERATION TEMPERATURE.
 6. PIPE CLASSES FOLLOWED BY AN * INDICATE THAT PIPE MATERIAL MUST BE A-106C. FLANGES REMAIN AS PER ENG-STD-0001.
 7. PRESSURE VESSELS DESIGNED FOR FULL VACUUM.

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SOUR PROCESS FLOW
WAUKESHA H24GSI / ARIEL JG4 / AIR-X-LIMITED 108EF-102-11
CUSTOMER: CNRL C/O BLUESTAR ENGINEERING LTD.
LOCATION: HP RE-INJECTION COMPRESSOR (K-101)
LSD: TBD

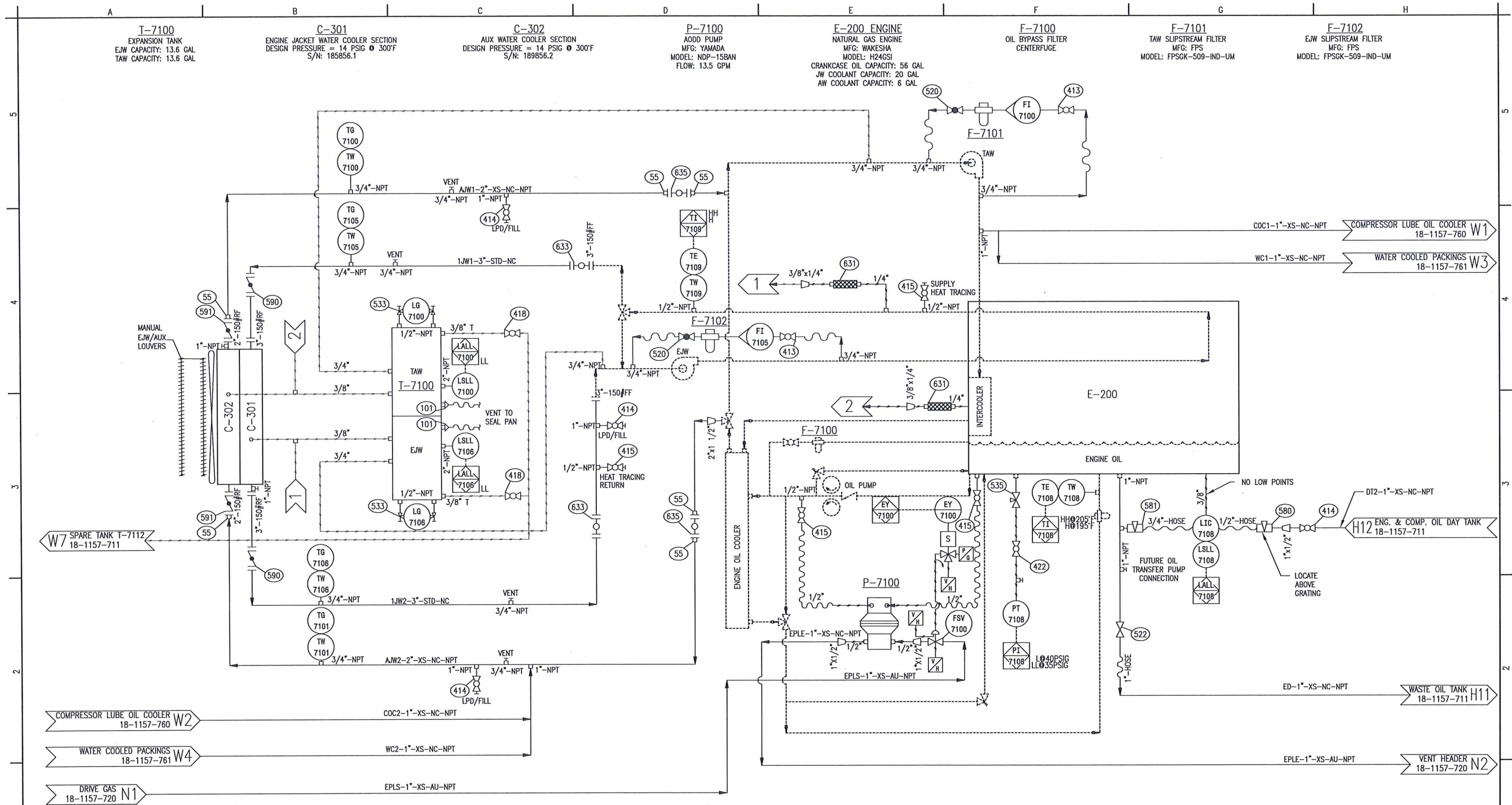
SHEET#: 3 OF 3
JOB#: 18-1157

PAPER SIZE 11"x17"

SCALE NTS

DWG# 18-1157-700

REV 2



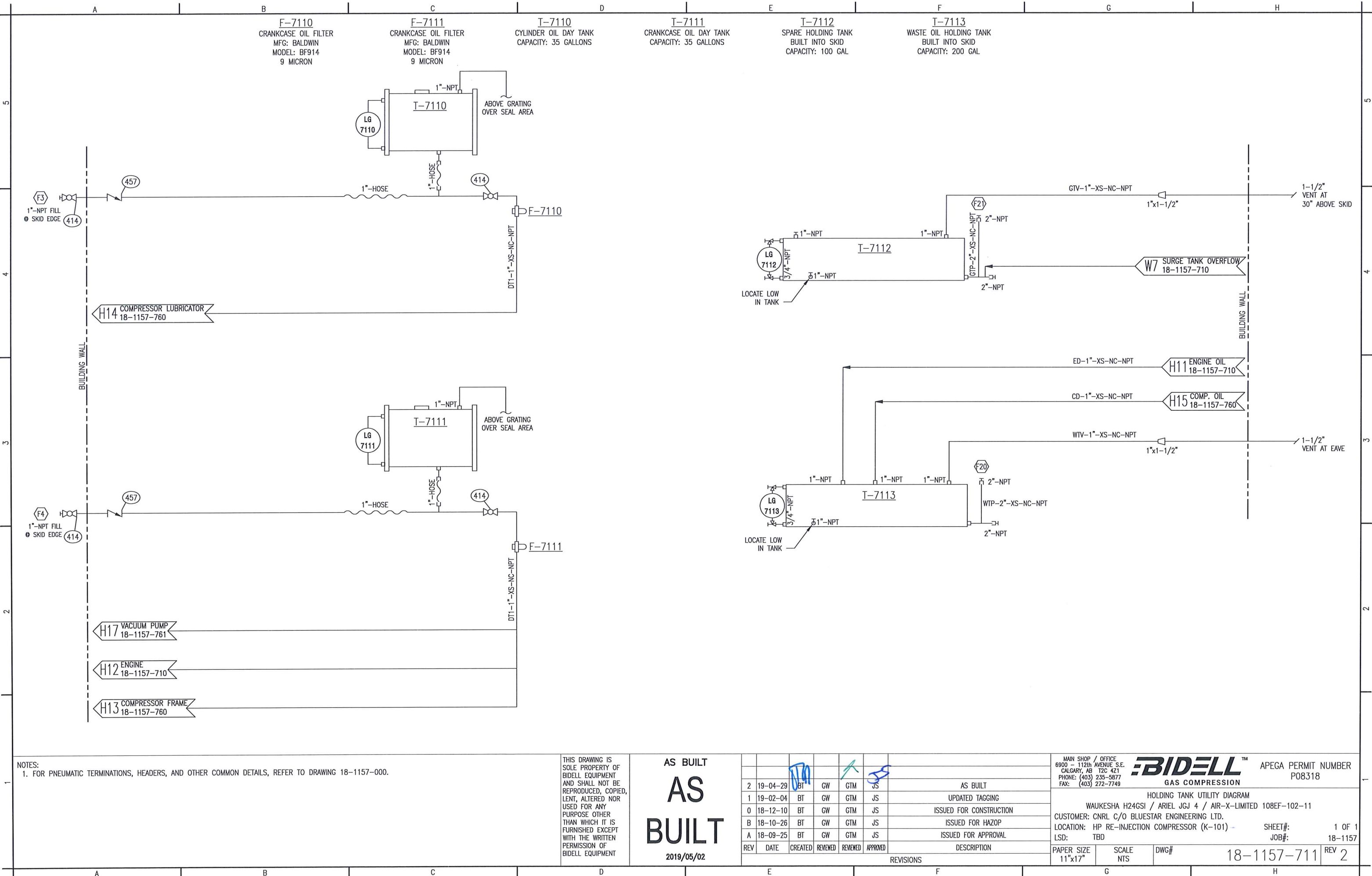
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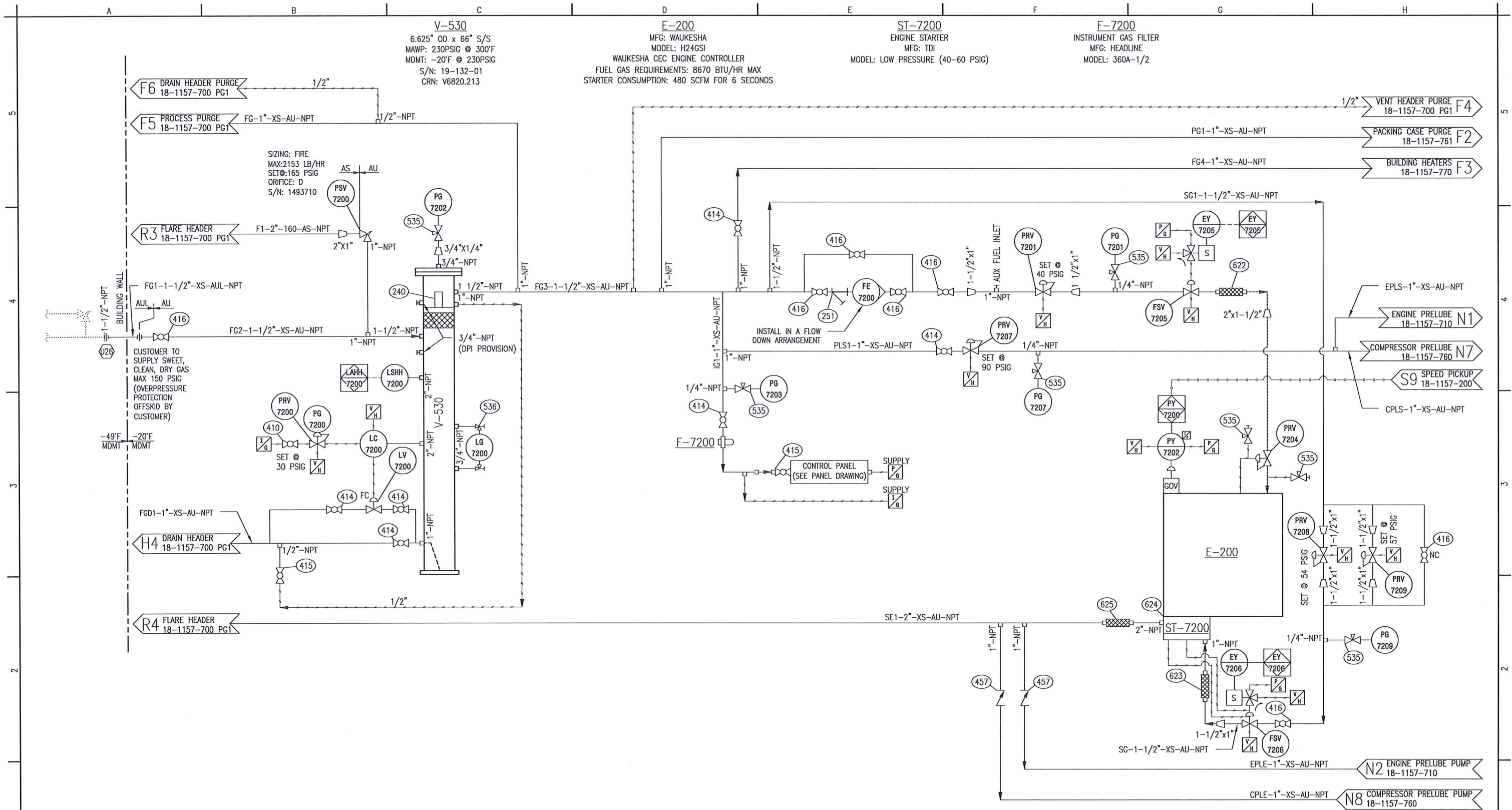
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ENGINE OIL AND COOLING UTILITY FLOW DIAGRAM WAUKESHA H24GSI / ARIEL JGJ 4 / AIR-X-LIMITED 108EF-102-11 CUSTOMER: CNRL C/O BLUESTAR ENGINEERING LTD. LOCATION: HP RE-INJECTION COMPRESSOR (K-101) LSD: TBD					
PAPER SIZE 11"x17"		SCALE NTS		DWG# 18-1157-710	
				SHEET#: 1 OF 1 JOB#: 18-1157	
				REV 2	





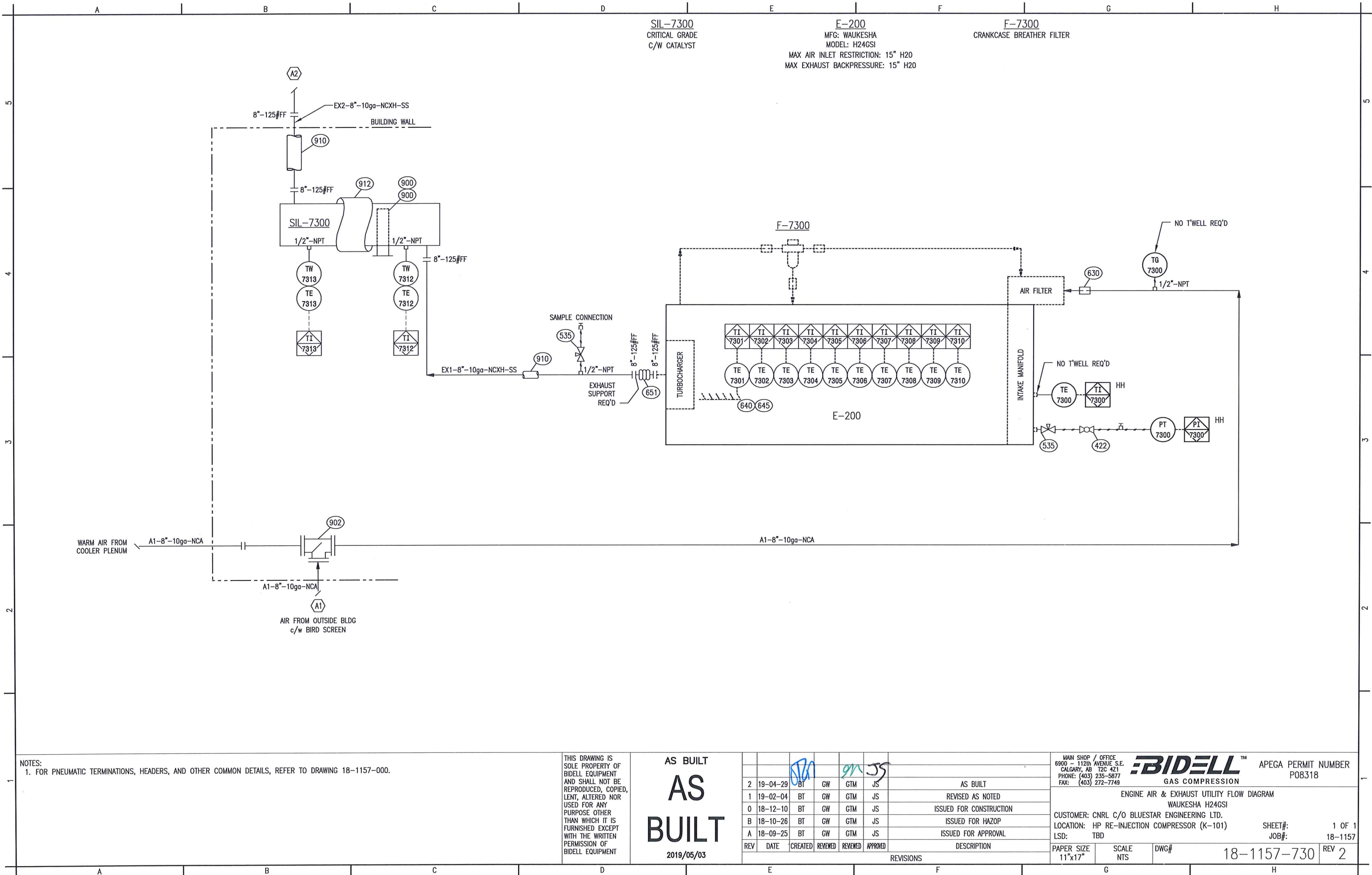
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REV	DATE	CREATED	REVIEWED	REVIEWED	APPROVED	DESCRIPTION
REVISIONS						

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FUEL/START GAS & INSTRUMENT GAS SUPPLY FLOW SHEET WAUKESHA H24GSI / ARIEL JGJ 4 / AIR-X-LIMITED 108EF-102-11 CUSTOMER: CNRL C/O BLUESTAR ENGINEERING LTD. LOCATION: HP RE-INJECTION COMPRESSOR (K-101) LSD: TBD					
PAPER SIZE 11"x17"		SCALE NTS		SHEET#: JOB#:	
18-1157-720		DWG#		1 OF 1 18-1157	
				REV 2	



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GAS COMPRESSION

APEGA PERMIT NUMBER
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ENGINE AIR & EXHAUST UTILITY FLOW DIAGRAM
WAUKESHA H24GSI

CUSTOMER: CNRL C/O BLUESTAR ENGINEERING LTD.
LOCATION: HP RE-INJECTION COMPRESSOR (K-101)
LSD: TBD

PAPER SIZE
11"x17"

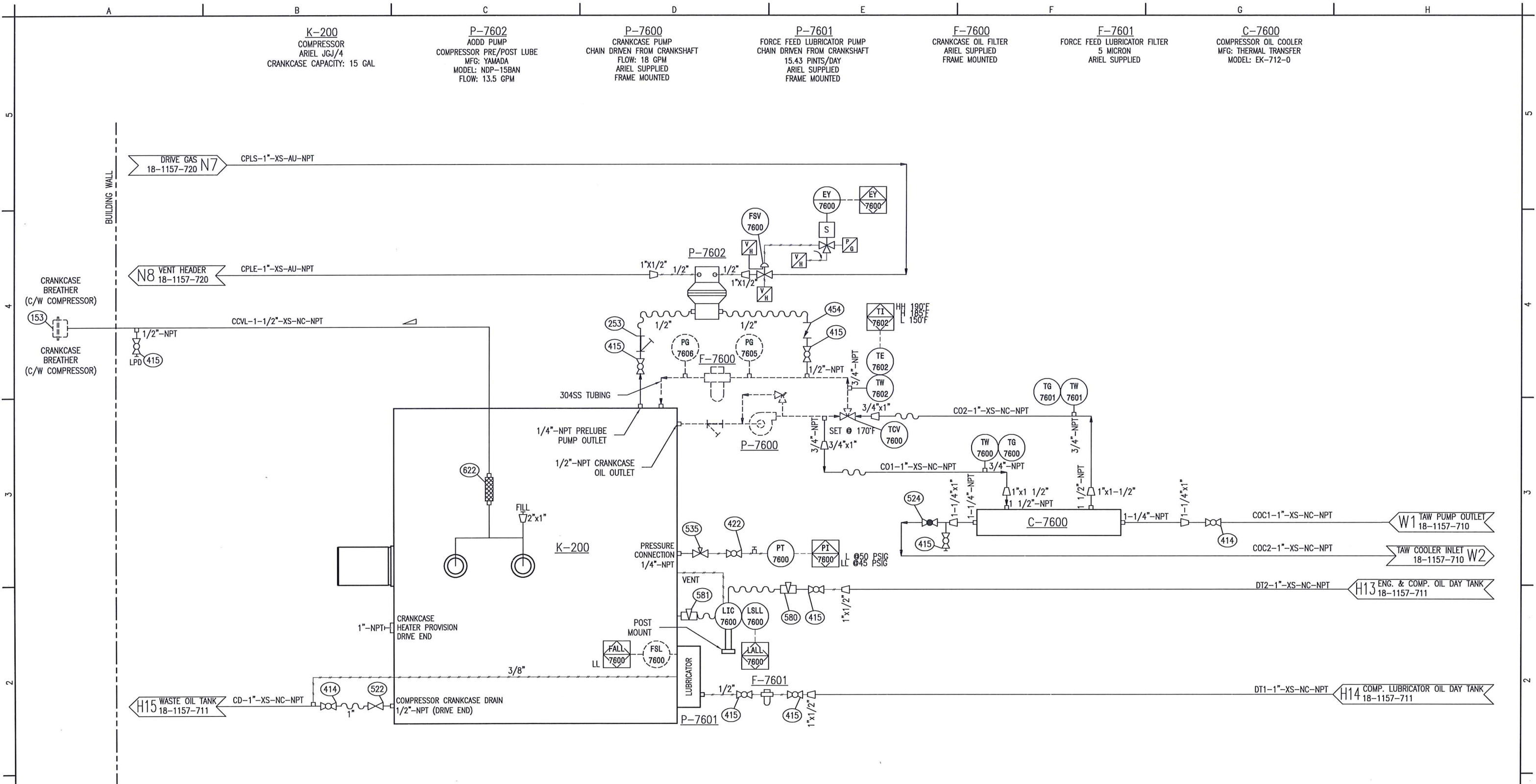
SCALE
NTS

DWG#
18-1157-730

SHEET#
1 OF 1

JOB#
18-1157

REV
2



NOTES:
1. FOR PNEUMATIC TERMINATIONS, HEADERS, AND OTHER COMMON DETAILS, REFER TO DRAWING 18-1157-000.

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PERMISSION OF
BIDELL EQUIPMENT

AS BUILT
**AS
BUILT**
2019/05/02

REV	DATE	CREATED	REVIEWED	REVIEWED	APPROVED	DESCRIPTION
2	19-04-29	BT	GW	GTM	JS	AS BUILT
1	19-02-04	BT	GW	GTM	JS	REVISED AS NOTED
0	18-12-10	BT	GW	GTM	JS	ISSUED FOR CONSTRUCTION
B	18-10-26	BT	GW	GTM	JS	ISSUED FOR HAZOP
A	18-09-25	BT	GW	GTM	JS	ISSUED FOR APPROVAL
REV	DATE	CREATED	REVIEWED	REVIEWED	APPROVED	DESCRIPTION

MAIN SHOP / OFFICE
6900 - 112th AVENUE S.E.
CALGARY, AB T2C 4Z1
PHONE: (403) 235-5877
FAX: (403) 272-7749

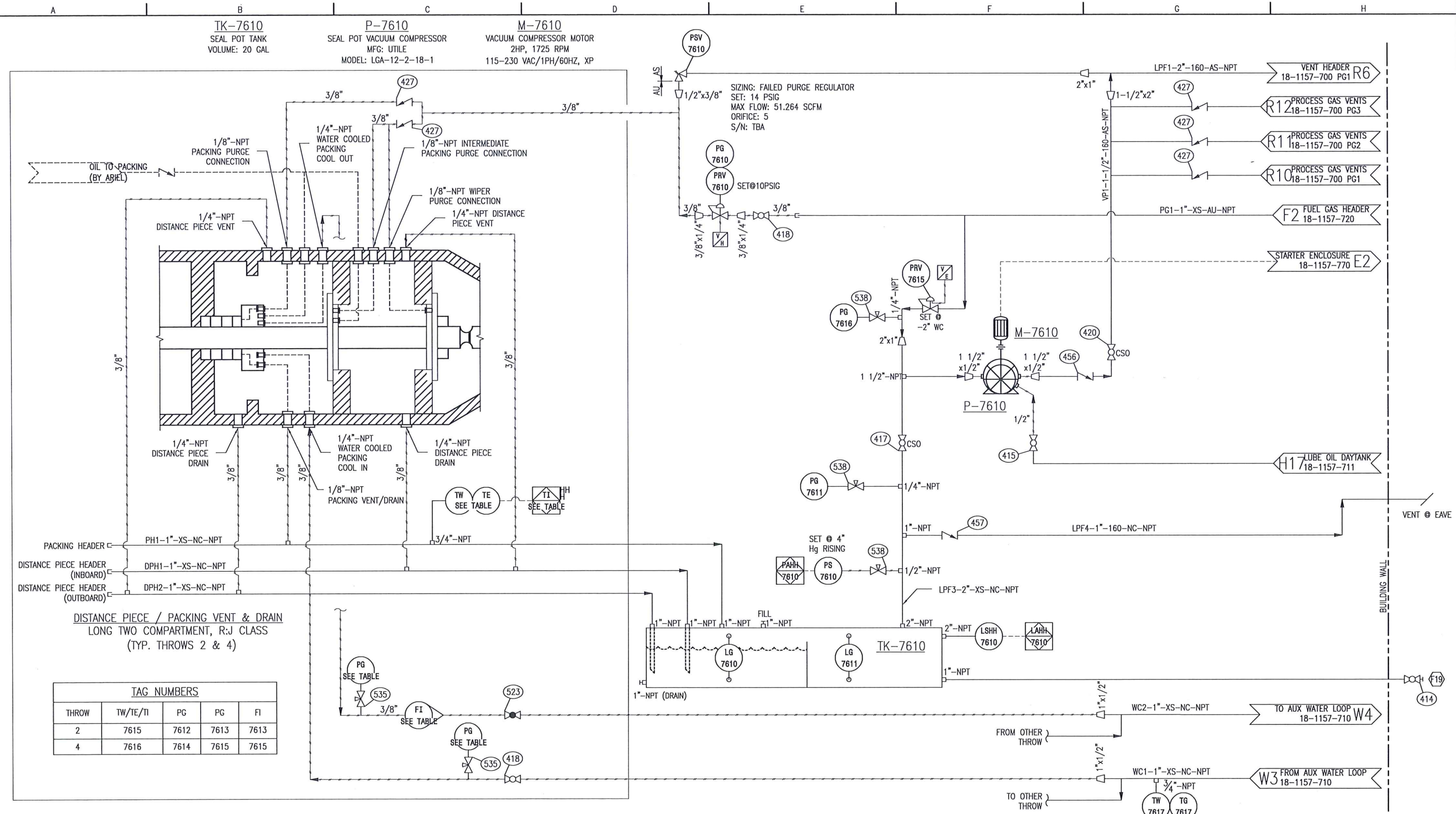
BIDELL
GAS COMPRESSION

APEGA PERMIT NUMBER
P08318

COMPRESSOR OIL UTILITY
WAUKESHA H24GSI / ARIEL JGJ 4 / AIR-X-LIMITED 108EF-102-11
CUSTOMER: CNRL C/O BLUESTAR ENGINEERING LTD.
LOCATION: HP RE-INJECTION COMPRESSOR (K-101)
LSD: TBD

SHEET#: 1 OF 1
JOB#: 18-1157

PAPER SIZE 11"x17"
SCALE NTS
DWG# 18-1157-760
REV 2



- NOTES:
1. FOR PNEUMATIC TERMINATIONS, HEADERS, AND OTHER COMMON DETAILS, REFER TO DRAWING 18-1157-000.
 2. THERMOCOUPLES PROVIDED FOR PACKING HEALTH MONITORING. TEMPERATURE TO BE TAKEN AT INITIAL UNIT START-UP. RISE IN TEMPERATURE INDICATES PACKING WEAR.
 3. TEMPERATURE READINGS TO BE AVERAGED OVER 60 SECONDS (OIL DROPS IN LINE CAN CAUSE ANOMALOUS TEMPERATURE SPIKES)
 4. FILL SEALPOT WITH OIL BEFORE UNIT STARTUP.

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BIDELL EQUIPMENT

AS BUILT
AS BUILT
2019/04/29

REV	DATE	CREATED	REVIEWED	REVIEWED	APPROVED	DESCRIPTION
3	19-04-29	BT	GW	GTM	JS	AS BUILT
2	19-02-07	BT	GW	GTM	JS	REVISED AS NOTED
1	19-02-04	BT	GW	GTM	JS	REVISED AS NOTED
0	18-12-10	BT	GW	GTM	JS	ISSUED FOR CONSTRUCTION
B	18-10-26	BT	GW	GTM	JS	ISSUED FOR HAZOP
A	18-09-25	BT	GW	GTM	JS	ISSUED FOR APPROVAL

MAIN SHOP / OFFICE
6900 - 112th AVENUE S.E.
CALGARY, AB T2C 4Z1
PHONE: (403) 235-5877
FAX: (403) 272-7749

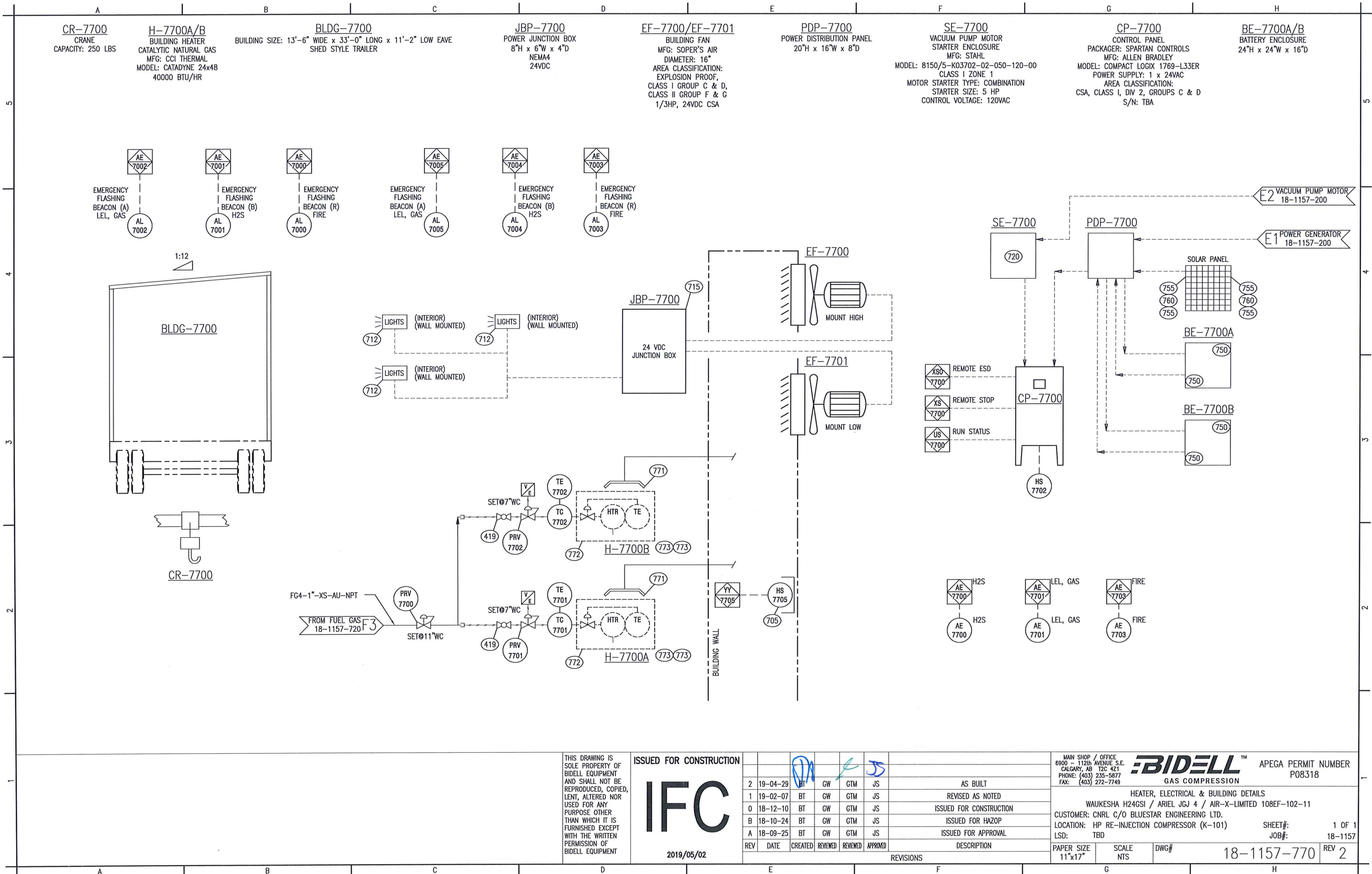
BIDELL™
GAS COMPRESSION

APEGA PERMIT NUMBER
P08318

DISTANCE PIECE PACKING VENT & DRAIN UTILITY FLOW DIAGRAM
WAUKESHA H24GSI / ARIEL JGJ 4 / AIR-X-LIMITED 108EF-102-11
CUSTOMER: CNRL C/O BLUESTAR ENGINEERING LTD.
LOCATION: HP RE-INJECTION COMPRESSOR (K-101)
LSD: TBD

SHEET#: 1 OF 1
JOB#: 18-1157

PAPER SIZE 11"x17"
SCALE NTS
DWG# 18-1157-761
REV 3



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BIDELL EQUIPMENT

ISSUED FOR CONSTRUCTION

IFC

2019/05/02

REV	DATE	CREATED	REVIEWED	REVIEWED	APPROVED	DESCRIPTION
2	19-04-29	BT	GW	GTM	JS	AS BUILT
1	19-02-07	BT	GW	GTM	JS	REVISED AS NOTED
0	18-12-10	BT	GW	GTM	JS	ISSUED FOR CONSTRUCTION
B	18-10-24	BT	GW	GTM	JS	ISSUED FOR HAZOP
A	18-09-25	BT	GW	GTM	JS	ISSUED FOR APPROVAL

MAIN SHOP / OFFICE 6900 - 112th AVENUE S.E. CALGARY, AB T2C 4Z1 PHONE: (403) 235-5877 FAX: (403) 272-7749		BIDELL TM GAS COMPRESSION		APEGA PERMIT NUMBER P08318	
HEATER, ELECTRICAL & BUILDING DETAILS WAUKESHA H24GSI / ARIEL JGJ 4 / AIR-X-LIMITED 108EF-102-11 CUSTOMER: CNRL C/O BLUESTAR ENGINEERING LTD. LOCATION: HP RE-INJECTION COMPRESSOR (K-101) LSD: TBD					
PAPER SIZE 11"x17"		SCALE NTS		DWG# 18-1157-770	
SHEET#: JOB#:				1 OF 1 18-1157	
REV 2					