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PROJECT DESCRIPTION

New Construction of a
12 to 15 MMSCFD
Gas Plant
LSD: 07-33-90-12 W6M

GENERAL NOTES:

SITE ELEVATION: XXX M
BAROMETRIC PRESSURE: 101.325 KPAA
OUTDOOR TEMPERATURE: -5 DEGREE C (LOWEST)
+40 DEGREE C (HIGHEST)
ELECTRICAL WIRING CLASS: CLASS I, DIV II GROUP D
ELECTRICAL VOLTAGES: 3 / 60 / 460 VAC
1 / 60 / 115 / 230 VAC
24 VDC

INSTRUMENT AIR: AVAILABLE PRESSURE 552 TO 690 KPAG
DEWPOINT LOWER THAN -50 DEG.C

SYSTEM CHARGES, CONSUMABLES, ETC.

FLUID CHARGES

R-290 PROPANE REFRIGERANT: XX
GLYCOL: XX

OIL CHARGES (TOTAL)

REFRIGERANT COMPRESSOR: XX LITRES OF XXXX
ALL FLUIDS SUPPLIED BY OTHERS

CONSUMABLES NOTE: BASED ON DESIGN PRODUCTION

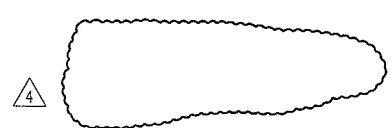
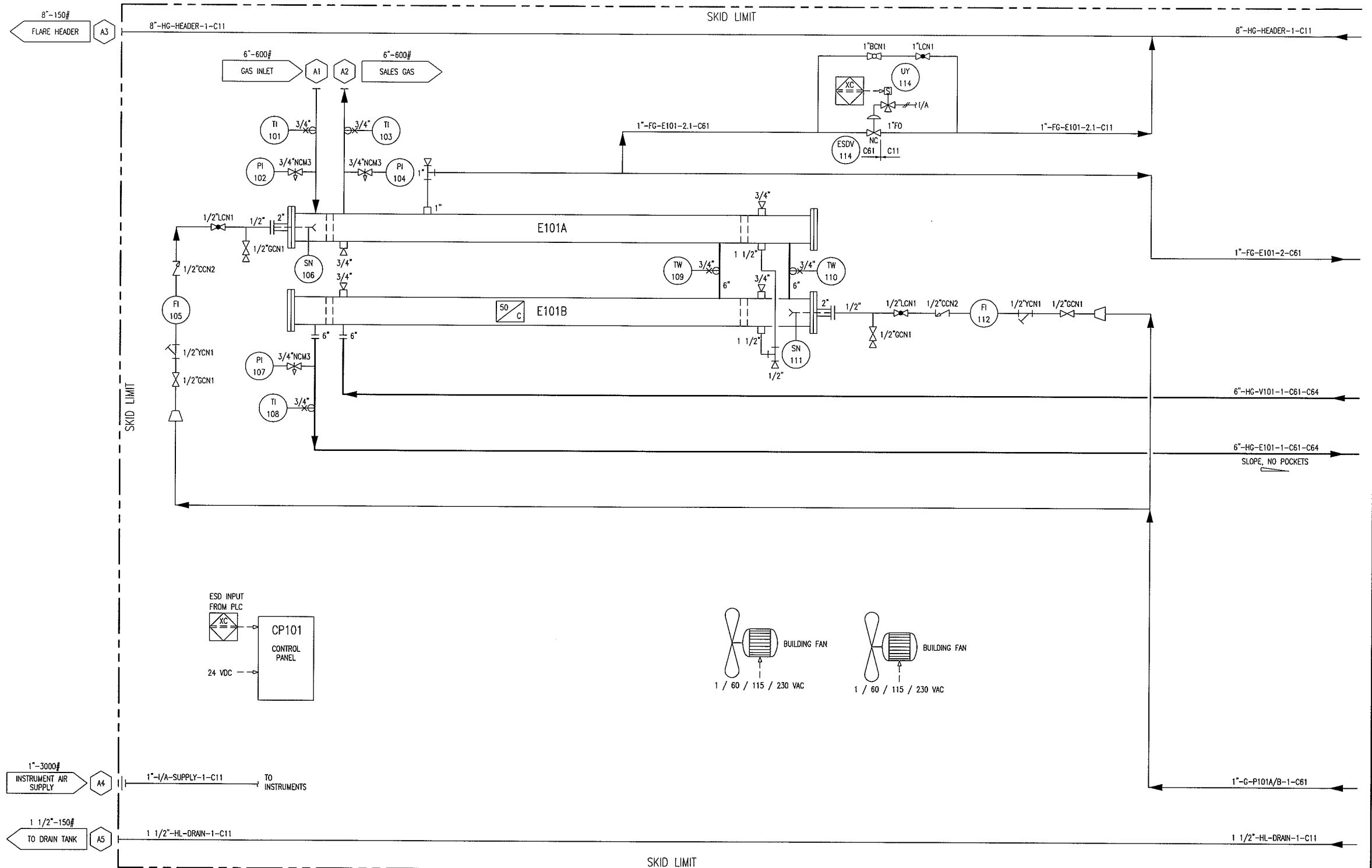
INSTRUMENT AIR CONSUMPTION: 5.3 NM3/HR
POWER CONSUMPTION: (ESTIMATED AVERAGE) (NO MOTOR EFFICIENCIES) XXX KWH/MMSCFD

ELECTRICAL POWER REQUIREMENTS

CD101	COMPRESSOR MOTOR	3 / 60 / 460 VAC	112 KW
PD101A	GLYCOL INJECTION PUMP MOTOR	3 / 50 / 220 VAC	2.2 KW
PD101B	GLYCOL INJECTION PUMP MOTOR	3 / 50 / 220 VAC	2.2 KW
PD102	GLYCOL PUMP MOTOR	3 / 50 / 380 VAC	0.37 KW
ED105	FAN MOTOR	3 / 50 / 460 VAC	14.9 KW
	BUILDING FAN	1 / 60 / 115 / 230 VAC	- KW
	BUILDING FAN	1 / 60 / 115 / 230 VAC	- KW
	BUILDING HEATER	1 / 60 / 120 VAC	- KW
	BUILDING HEATER	1 / 60 / 120 VAC	- KW
	BUILDING HEATER	1 / 60 / 120 VAC	- KW
	COMPRESSOR EMERSION HEATER	1 / 60 / 120 VAC	3 KW

CP101
CONTROL PANEL
MAKE: ALTRONIC
MODEL: DE-1500
POWER: 24 VDC (BY OTHERS)
CSA APPROVED, CLASS 1, ZONE 2
GROUP IIA
TEMP CODE T3

E101A/B
GAS/GAS EXCHANGER
SIZE: 324 MM O.D. X 9144 MM T/L
(2) UNITS IN SERIES
TEMA TYPE: NEN CLASS 'C'
MAWP SHELLSIDE: 9756 KPAG @ 66 DEG.C
MDMT SHELLSIDE: -29 DEG.C @ 9756 KPAG
MAWP TUBESIDE: 9756 KPAG @ 66 DEG.C
MDMT TUBESIDE: -29 DEG.C @ 9756 KPAG
DESIGN DUTY: 553 KW PER UNIT
SURFACE AREA: 289 M2 PER UNIT
WEIGHT: 2804 KGS. PER UNIT



REV.	DESCRIPTION	DATE	BY	APPR.
4	GENERAL REVISIONS	NOV 16/05	TM	
3	GENERAL REVISIONS	OCT 25/05	TM	BM
2	GENERAL REVISIONS	OCT 12/05	AF	BM
1	ISSUED FOR CONSTRUCTION	SEP 12/05	GS	BM
A	ISSUED FOR APPROVAL	AUG 26/05	TM	BM

PERMIT TO PRACTICE STAMP		ENGINEER STAMP	

DRAWN BY: THOMAS MAH		DATE: AUG. 26, 2005	
CHKD. BY: B. MILLARD		SCALE: N/A	
APPR. BY: B. MILLARD		W.O. No.: 11957101	
CUST. PO No:		DWG. No.: 11957-101	

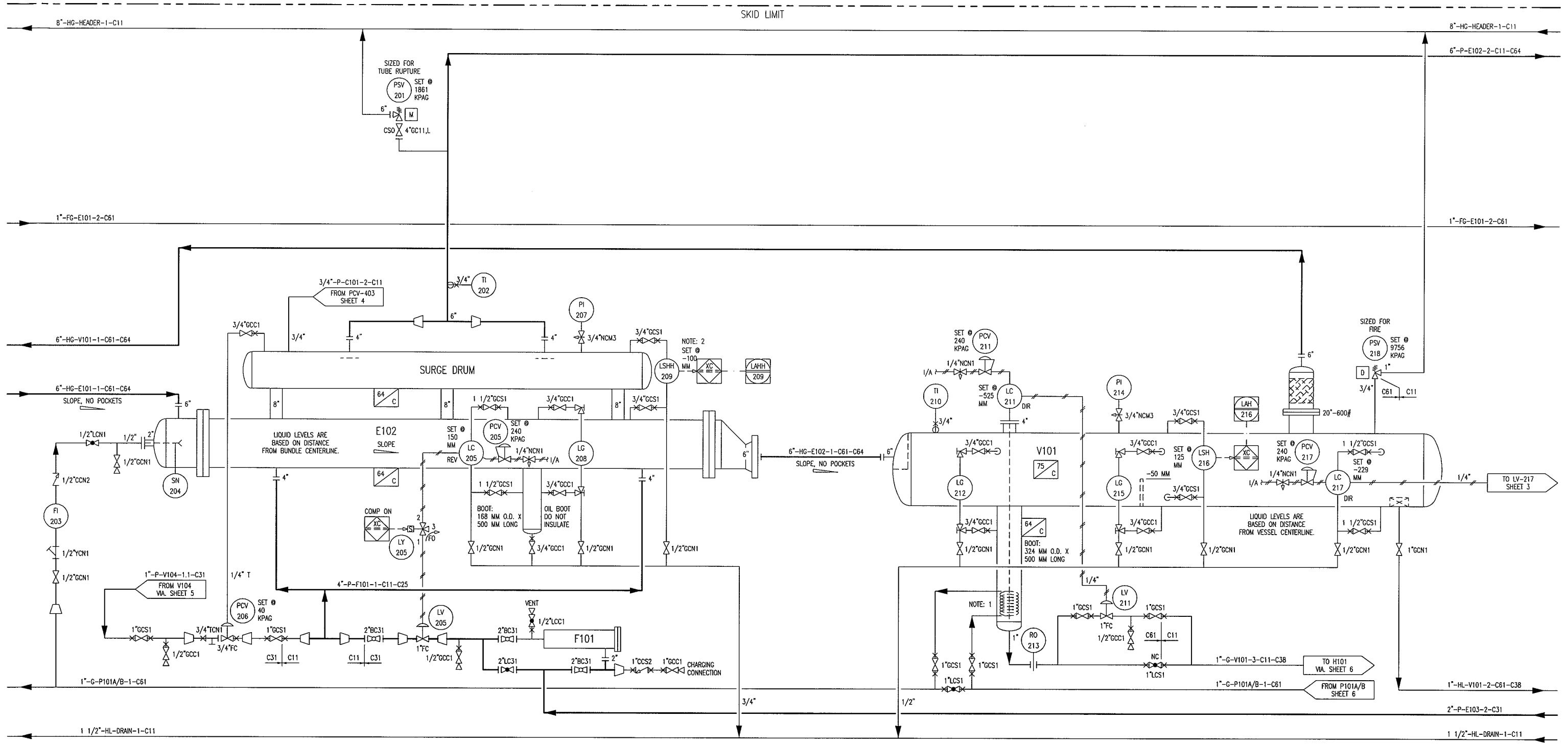
TITLE: P & I FLOW DIAGRAM	
FOR: ALTAGAS LIMITED PARTNERSHIP 12 TO 15 MMSCFD ALTAGAS CLEAR PRAIRIE GAS PLANT LSD: 07-33-90-12 W6M	
SHEET No: 1	REV: 4

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E102
GAS CHILLER
 SIZE: 356 MM O.D. X 6096 MM T/L
 SURGE DRUM: 406 MM O.D. X 4877 MM OAL
 TEMA TYPE: BEM CLASS 'C'
 MAWP SHELLSIDE: 1861 KPAG @ 66 DEG.C
 MDMT SHELLSIDE: -29 DEG.C @ 1861 KPAG
 MAWP TUBESIDE: 9756 KPAG @ 66 DEG.C
 MDMT TUBESIDE: -29 DEG.C @ 9756 KPAG
 DESIGN DUTY: 278 KW
 SURFACE AREA: 52.3 M2
 WEIGHT: 1892 KGS.

F101
REFRIGERANT FILTER/DRIER
 MAKE: SPORLAN
 MODEL: C40016-P
 MAWP: 3448 KPAG
 ELEMENTS: (4) RC-1009B

V101
LOW TEMPERATURE SEPARATOR
 SIZE: 1067 MM I.D. X 3048 MM S/S
 MAWP: 9756 KPAG @ 66 DEG.C
 MDMT: -29 DEG.C @ 9756 KPAG
 C.A.: 1.6 MM
 SHELL MATERIAL: SA-516-70N
 HEAD MATERIAL: SA-516-70N
 WEIGHT: 4600 KGS.



NOTE: 1
 COIL TO BE 3/4" DIA TUBING WRAPPED 6 TIMES.
 NOTE: 2
 LIQUID LEVEL FROM CENTER OF SURGE DRUM.

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A	ISSUED FOR APPROVAL	AUG 26/05	TM	BM

NEXT AVAILABLE TAG NUMBER: 219

TOROMONT		TOROMONT PROCESS SYSTEMS	
DRAWN BY: THOMAS MAH	DATE: AUG. 26, 2005	TITLE: P & I FLOW DIAGRAM	
CHKD. BY: B. MILLARD	SCALE: N/A	FOR: ALTAS LIMITED PARTNERSHIP 12 TO 15 MMSCFD ALTAS CLEAR PRAIRIE GAS PLANT LSD: 07-33-90-12 WGM	
APPR. BY: B. MILLARD	W.O. No: 11957101	DWC. No: 11957-101	
CUST. PO No:		SHEET No: 2	REV: 4

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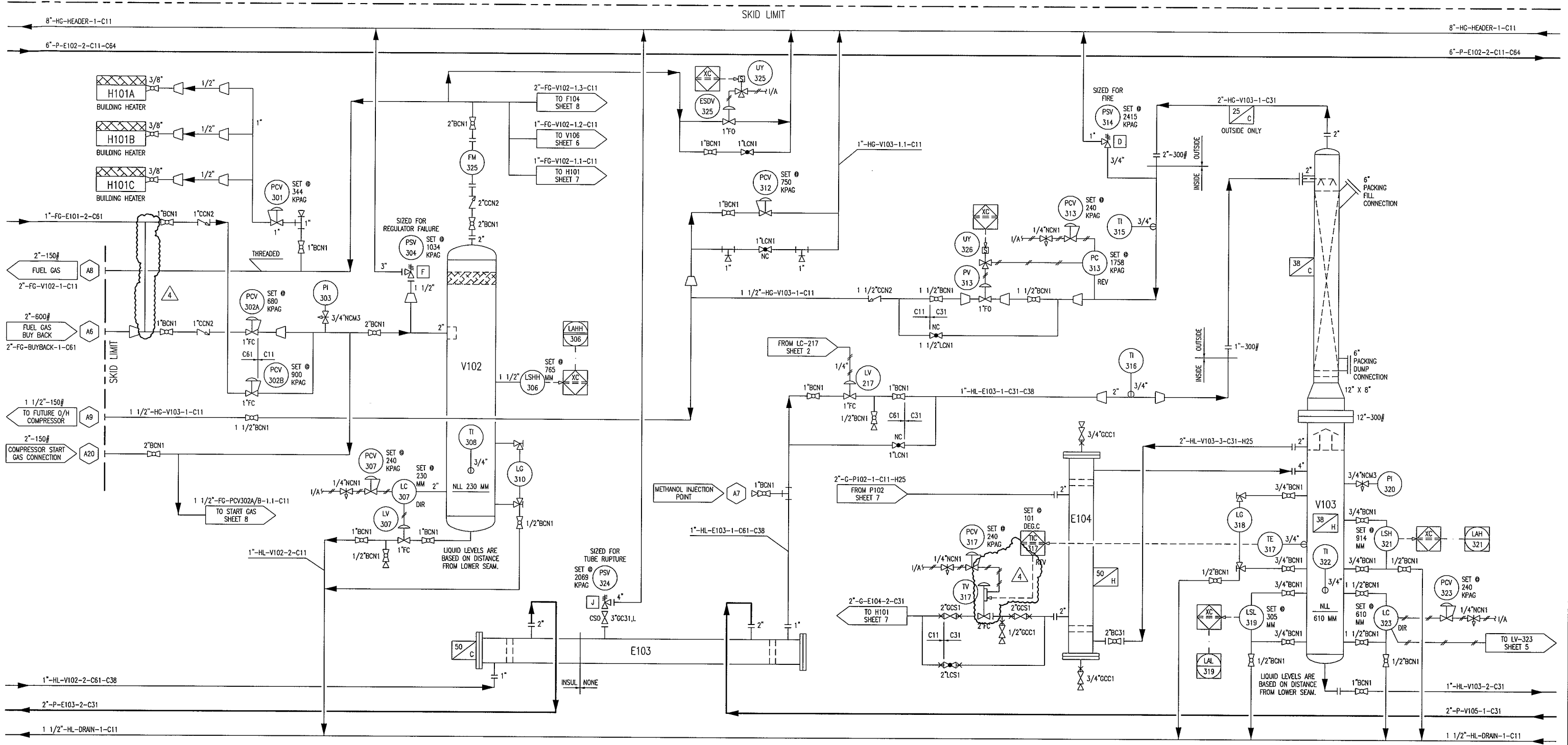
BUILDING HEATERS (3)
 MAKE: CATADYNE
 MODEL: W X 24 X 48
 DUTY: 32000 BTU/H
 120 VAC STARTERS

V102 FUEL GAS SCRUBBER
 SIZE: 324 MM O.D. X 1524 MM S/S
 MAWP: 1034 KPAG @ 66 DEG.C
 MDMT: -29 DEG.C @ 1034 KPAG
 C.A.: 1.6 MM
 SHELL MATERIAL: SA-106B
 HEAD MATERIAL: SA-516-70
 WEIGHT: 156 KGS.

E103 PROPANE SUBCOOLER
 SIZE: 168 MM O.D. X 4267 MM T/L
 TEMA TYPE: NEN CLASS 'C'
 MAWP SHELLSIDE: 2069 KPAG @ 121 DEG.C
 MDMT SHELLSIDE: -29 DEG.C @ 2069 KPAG
 MAWP TUBESIDE: 9756 KPAG @ 66 DEG.C
 MDMT TUBESIDE: -29 DEG.C @ 9756 KPAG
 DESIGN DUTY: 15.6 KW
 SURFACE AREA: 6.4 M2
 WEIGHT: 530 KGS.

E104 STABILIZER REBOILER
 SIZE: 219 MM O.D. X 1524 MM T/L
 TEMA TYPE: NEN CLASS 'C'
 MAWP SHELLSIDE: 1862 KPAG @ 148 DEG.C
 MDMT SHELLSIDE: -29 DEG.C @ 1862 KPAG
 MAWP TUBESIDE: 2415 KPAG @ 250 DEG.C
 MDMT TUBESIDE: -29 DEG.C @ 2415 KPAG
 DESIGN DUTY: 21.44 KW
 SURFACE AREA: 3.78 M2
 WEIGHT: 355 KGS.

V103 DE-ETHANIZER COLUMN
 SIZE: 219 / 324 MM O.D. X 10973 MM S/S
 MAWP: 2415 KPAG @ 204 DEG.C
 MDMT: -29 DEG.C @ 2415 KPAG
 C.A.: 1.6 MM
 SHELL MATERIAL: SA-106B
 HEAD MATERIAL: SA-234-WPB
 PACKING TYPE: X
 PACKING VOLUME: X
 WEIGHT: XXX KGS.



NEXT AVAILABLE TAG NUMBER: 325

REV.	DESCRIPTION	DATE	BY	APPR.
4	GENERAL REVISIONS	NOV 16/05	TM	
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A	ISSUED FOR APPROVAL	AUG 26/05	TM	BM

PERMIT TO PRACTICE STAMP

ENGINEER STAMP

TOROMONT PROCESS SYSTEMS

DRAWN BY: THOMAS MAH
 CHKD. BY: B. MILLARD
 APPR. BY: B. MILLARD
 CUST. PO No:

DATE: AUG. 26, 2005
 SCALE: N/A
 W.O. No: 11957101

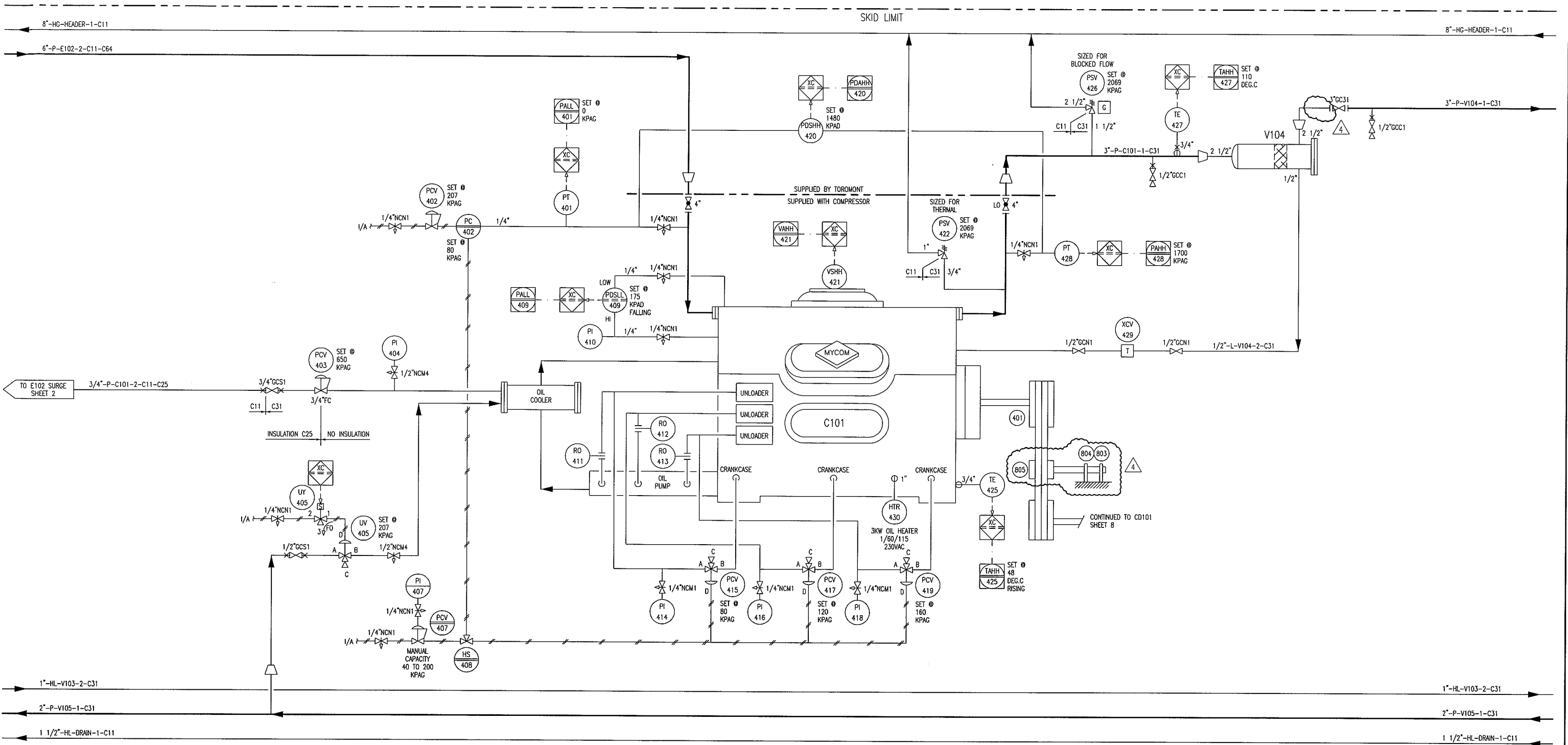
TITLE: P & I FLOW DIAGRAM
 FOR: ALTAGAS LIMITED PARTNERSHIP
 12 TO 15 MMSCFD
 ALTAGAS CLEAR PRAIRIE GAS PLANT
 LSD: 07-33-90-12 W6M

DWG. No: 11957-101
 SHEET No: 3
 REV: 4

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C101
REFRIGERANT COMPRESSOR
 MAKE: MYCOM PBWB
 OPERATING SPEED: 1185 RPM
 SUCTION PRESSURE: 80 TO 225 KPAG
 SUCTION TEMPERATURE: -21 TO -18.5 DEG.C
 DISCHARGE PRESSURE: 1457 KPAG
 DISCHARGE TEMPERATURE: 72 DEG.C
 MAX. FLOW RATE: 2611 KGS/HR
 MAX. POWER DRAW: 108 KW
 WEIGHT: 1550 KGS.

V104
SECONDARY OIL SEPARATOR
 MODEL: CHILCON COSM-0700
 SIZE: 324 MM O.D. X 1092 MM OAL
 MAWP: 2758 KPAG @ 121 DEG.C
 MDMT: -29 DEG.C @ 2758 KPAG
 SHELL MATERIAL: SA-538
 HEAD MATERIAL: SA-516-70
 WEIGHT: 111 KGS.



NOTE: 1
 PSV SUPPLIED WITH COMPRESSOR.

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		TITLE: P & I FLOW DIAGRAM FOR: ALTAGAS LIMITED PARTNERSHIP 12 TO 15 MMSCFD ALTAGAS CLEAR PRAIRIE GAS PLANT LSD: 07-33-90-12 W6M
DRAWN BY: THOMAS MAH CHKD. BY: B. MILLARD APPR. BY: B. MILLARD	DATE: AUG. 26, 2005 SCALE: N/A W.D. No: 11957101	DWG. No: 11957-101 SHEET No: 4 REV: 4

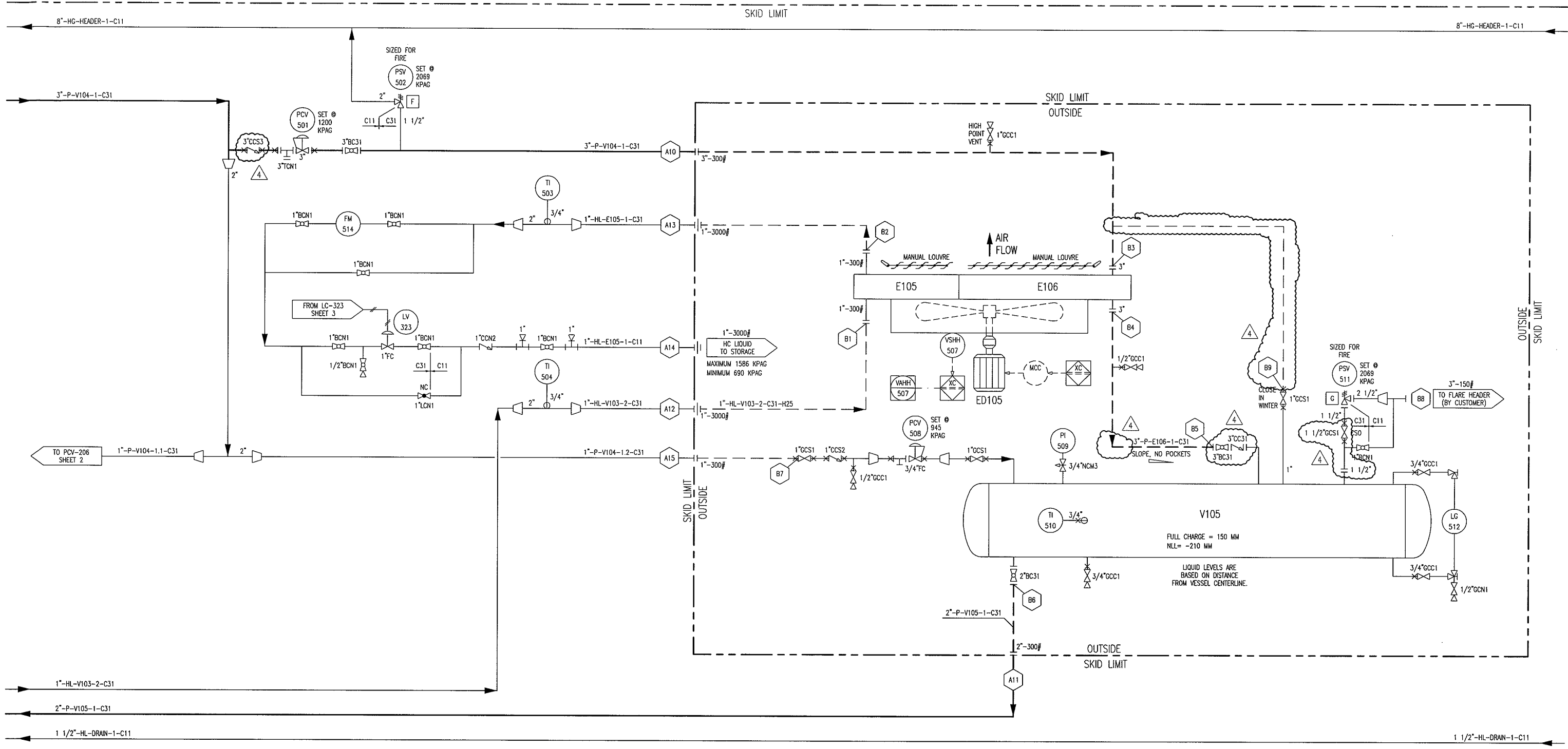
NEXT AVAILABLE TAG NUMBER: 431

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E105/E106
PRODUCT COOLER/REFRIGERANT CONDENSER
 TYPE: ACE
 MODEL: E-108-115-15
 E105
 H.C. LIQUID PRODUCT COIL
 TYPE: HIGH PERFORMANCE MARINE
 MAWP: 2415 KPAG @ 204 DEG.C
 MDMT: -29 DEG.C @ 2415 KPAG
 DUTY: 15 KW
 E106
 PROPANE CONDENSER COIL
 TYPE: HIGH PERFORMANCE MARINE
 MAWP: 2069 KPAG @ 149 DEG.C
 MDMT: -29 DEG.C @ 2069 KPAG
 DUTY: 216 KW

ED105
FAN MOTOR
 ELECTRIC MOTOR
 MAKE: TBD
 MODEL: 160L
 14.9 KW @ 1800 RPM
 3 / 60 / 460 VAC
 SERVICE FACTOR: 1.0
 ENCLOSURE: TEFC
 FRAME: TBD
 WEIGHT: XX KGS.
 FAN: (1) MOORE SERIES 30
 2743 MM DIA.
 (6) BLADES
 FAN SPEED: 389 RPM
 AIR FLOW: 147311 MM3/HR
 WEIGHT: 4728 KGS.

V105
REFRIGERANT RECEIVER
 SIZE: 610 MM O.D. X 3658 MM S/S
 MAWP: 2069 KPAG @ 148 DEG.C
 MDMT: -29 DEG.C @ 2069 KPAG
 C.A.: 1.6 MM
 SHELL MATERIAL: SA-106B
 HEAD MATERIAL: SA-516-70
 WEIGHT: XXX KGS.



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NEXT AVAILABLE TAG NUMBER: 514

		TITLE: P & I FLOW DIAGRAM FOR: ALTAGAS LIMITED PARTNERSHIP 12 TO 15 MMSCFD ALTAGAS CLEAR PRAIRIE GAS PLANT LSD: 07-33-90-12 W6M
DRAWN BY: THOMAS MAH CHKD. BY: B. MILLARD APPR. BY: B. MILLARD CUST. PO No:	DATE: AUG. 26, 2005 SCALE: N/A W.O. No: 11957101	PERMIT TO PRACTICE STAMP ENGINEER STAMP
DWG. No: 11957-101		SHEET No: 5 REV: 4

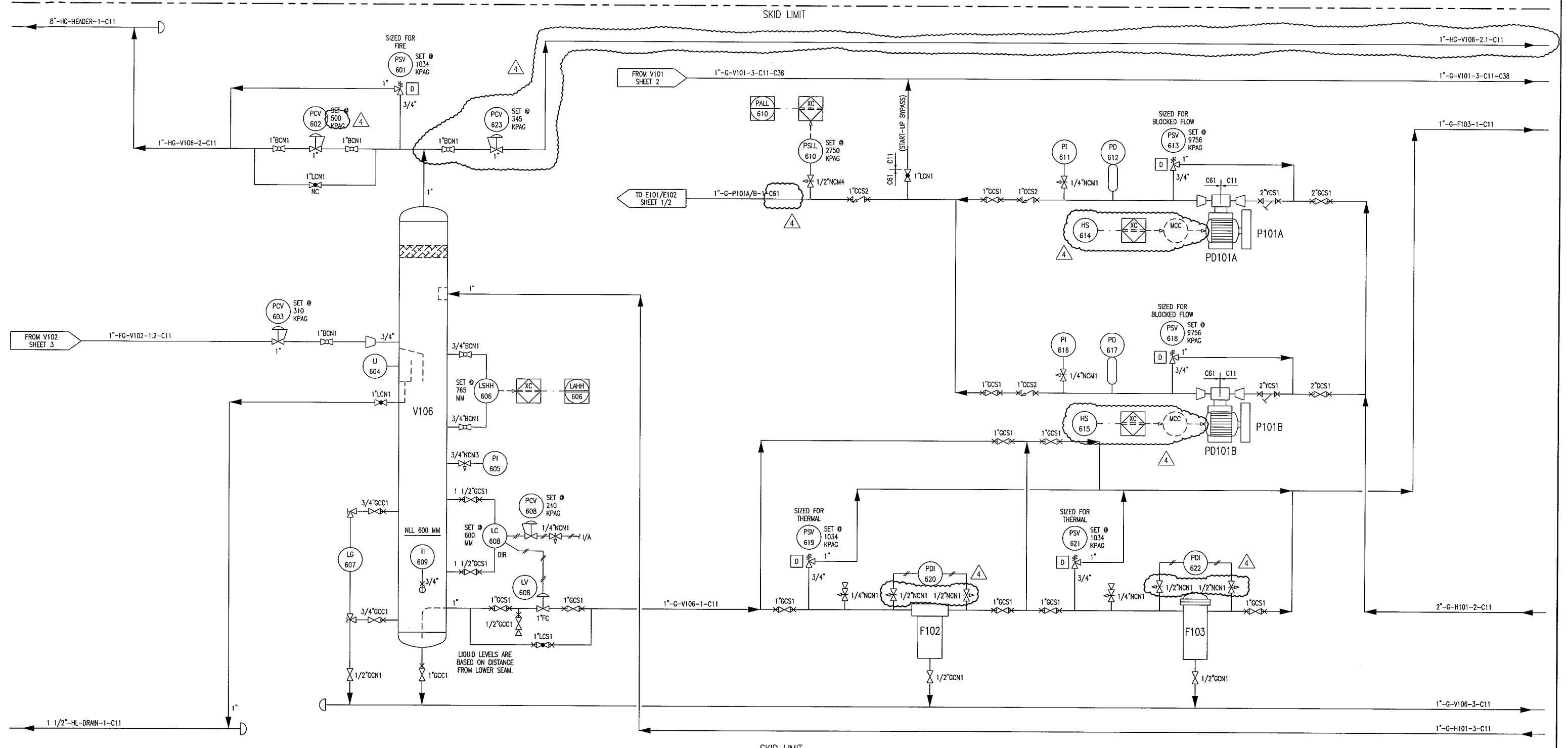
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V106
GLYCOL FLASH TANK
 SIZE: 324 MM O.D. X 1524 MM S/S
 MAWP: 1034 KPAG @ 77 DEG.C
 MDMT: -29 DEG.C @ 1034 KPAG
 C.A.: 1.6 MM
 SHELL MATERIAL: SA-106B
 HEAD MATERIAL: SA-516-70
 WEIGHT: 290 KGS.

F102
GLYCOL FILTER
 MAKE: WEIR
 MODEL: 1B1-G78CBIN
 MAWP: 1207 KPAG @ 121 DEG.C
 SHELL MATERIAL: 304SS
 HEAD MATERIAL: 304SS
 WEIGHT: 5 KGS.

F103
CARBON FILTER
 MAKE: WEIR
 MODEL: 1B2-JUCACS19.5FS
 MAWP: 1207 KPAG @ 121 DEG.C
 SHELL MATERIAL: 304SS
 HEAD MATERIAL: 304SS
 WEIGHT: 6 KGS.

P101A/B & PD101A/B
GLYCOL INJECTION PUMPS & MOTORS
 MAKE: DAVID BROWN UNION
 MODEL: SX3
 MAX FLOW RATE: 7.9 LPM @ 7585 KPAG
 FLUID: GLYCOL
 POWER DRAW: 1.88
 MOTOR: 2.2 KW
 3 / 60 / 460/230 V
 ENCLOSURE: XP
 WEIGHT: 275 KGS. (EACH)



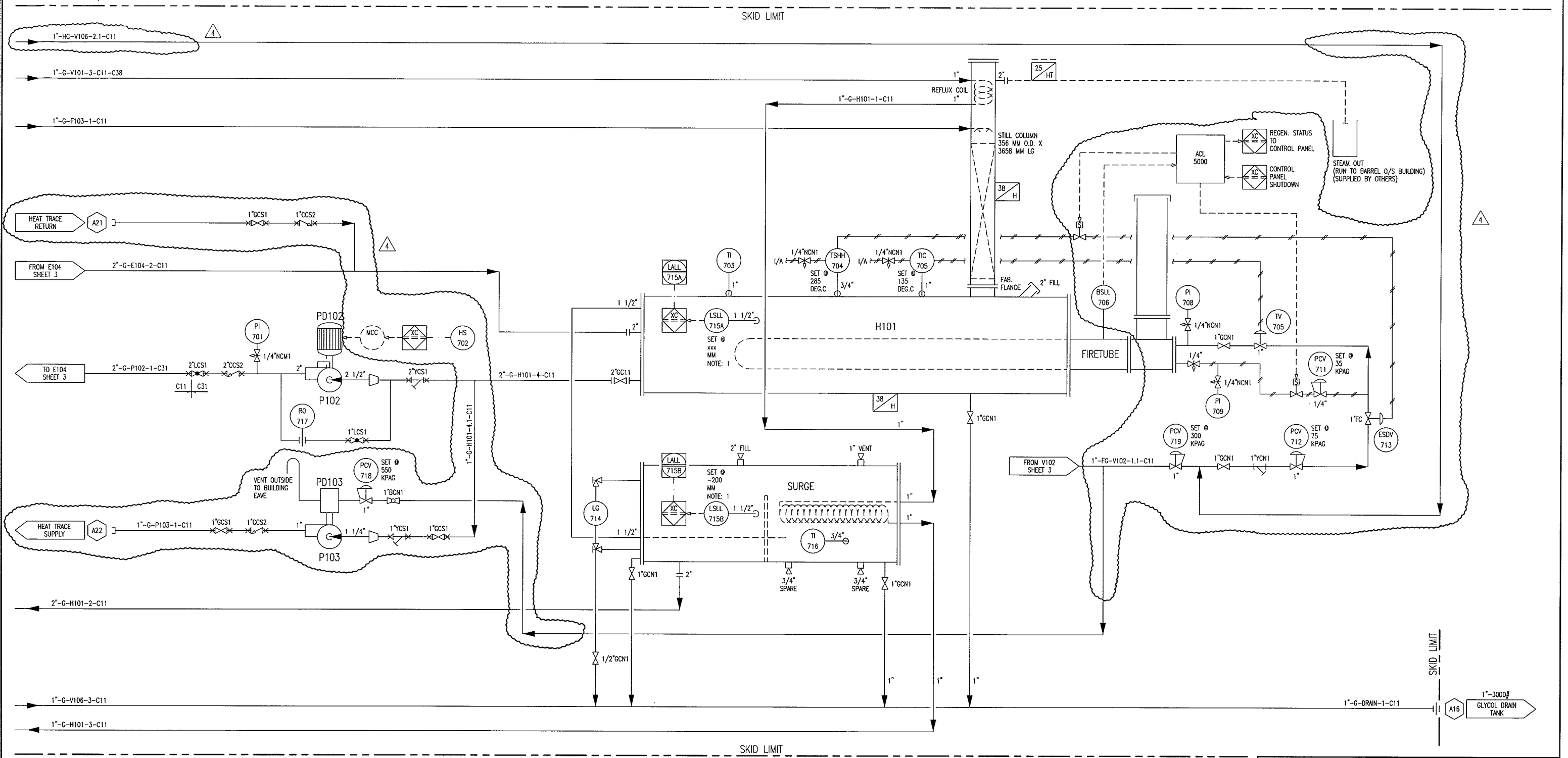
				NEXT AVAILABLE TAG NUMBER: 624				TITLE: P & I FLOW DIAGRAM		
				PERMIT TO PRACTICE STAMP 		ENGINEER STAMP 		FOR: ALTAGAS LIMITED PARTNERSHIP 12 TO 15 MMSCFD ALTAGAS CLEAR PRAIRIE GAS PLANT LSD: 07-33-90-12 W6M		
4	GENERAL REVISIONS	NOV 16/05	TM			DRAWN BY: THOMAS MAH		DATE: AUG. 26, 2005		
3	GENERAL REVISIONS	OCT 25/05	TM	BM			CHKD. BY: B. MILLARD		SCALE: N/A	
2	GENERAL REVISIONS	OCT 12/05	AF	BM			APPR. BY: B. MILLARD		W.O. No: 11957101	
1	ISSUED FOR CONSTRUCTION	SEP 12/05	GS	BM			CUST. PO No:		DWG. No: 11957-101	
A	ISSUED FOR APPROVAL	AUG 26/05	TM	BM			SHEET No: 6		REV: 4	
REV.	DESCRIPTION	DATE	BY	APPR.						

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P102 & PD102
GLYCOL PUMP & MOTOR
 MAKE: CARVER
 MODEL: BC-2 1/2" X 2" X 7
 DESIGN FLOW RATE: 283 LPM @ 10.6 M HEAD
 FLUID: GLYCOL
 POWER DRAW: 0.55 KW
 MOTOR: 1.11 KW
 3 / 60 / 460 VAC EXPLOSION PROOF
 WEIGHT: XX KGS.

P103 & PD103
GLYCOL PUMP & GAS MOTOR
 MAKE: PRICE
 MODEL: CD100-AI-425-P
 SIZE: 1" X 1 1/4" X 5"
 GAST GAS MODEL: 4AM-FRV-13C
 MOTOR: 0.89 KW
 WEIGHT: XX KGS.

H101
GLYCOL REGENERATOR
 MAKE: PETRO-TECH
 REGEN SHELL: 762 MM OD X 3657 MM LG
 SURGE SHELL: 609 MM OD X 3048 MM LG
 SHELL MATERIAL: SA-53B
 HEAD MATERIAL: SA-36
 DUTY: 146 KW
 WEIGHT: 3025 KGS.



NOTE: 1
 LIQUID LEVEL FROM CENTER OF SURGE.

NEXT AVAILABLE TAG NUMBER: 720

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4	GENERAL REVISIONS	NOV 16/05	TM	
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PERMIT TO PRACTICE STAMP
 ENGINEER STAMP

TOROMONT
 TOROMONT PROCESS SYSTEMS
 DRAWN BY: THOMAS MAH
 DATE: AUG. 26, 2005
 CHKD. BY: B. MILLARD
 SCALE: N/A
 APPR. BY: B. MILLARD
 W.O. No.: 11957101
 CUST. PO No.:

TITLE: P & I FLOW DIAGRAM
 FOR: ALTAGAS LIMITED PARTNERSHIP
 12 TO 15 MMSCFD
 ALTAGAS CLEAR PRAIRIE GAS PLANT
 LSD: 07-33-90-12 W6M
 DWG. No.: 11957-101
 SHEET No.: 7
 REV: 4

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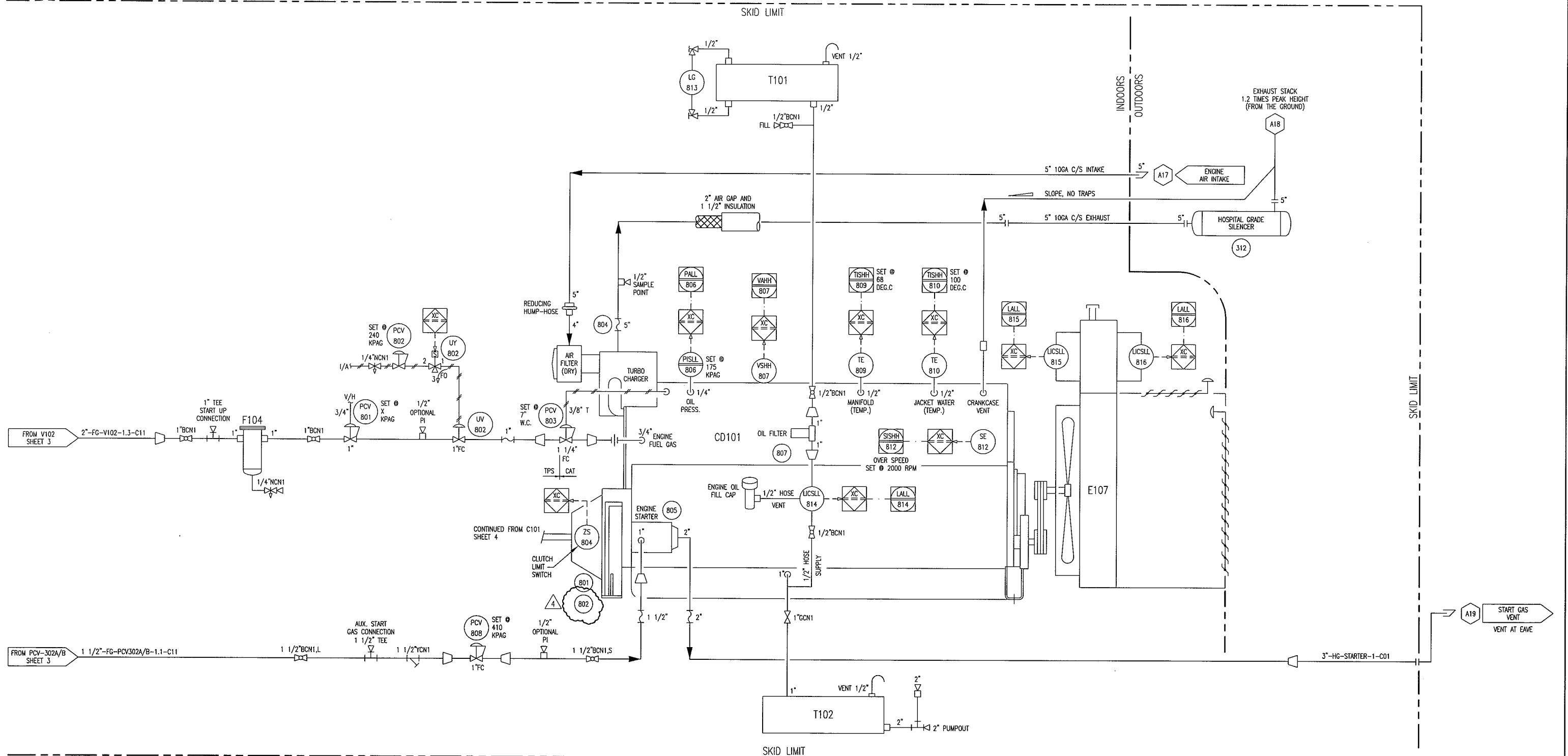
F104
FUEL GAS FILTER
 TYPE: HEADLINE
 MODEL: AA5.3.152.N.1-70C
 SIZE: 4" O.D. X 305 MM S/F
 MAWP: 3448 KPAC @ 93 DEG.C
 ELEMENT: 38-152-70C
 WEIGHT: 5 KGS.

T101
OIL DAY TANK
 SIZE: HSS 1/4" THK 12" X 8" X 3750 MM LG
 VOLUME: 208 LITERS

CD101
NATURAL GAS ENGINE
 TYPE: CATERPILLAR 3306TA
 BORE: 4.75"
 STROKE: 6"
 DISPLACEMENT: 638 CU. IN.
 COMPRESSION RATIO: 8.0: 1
 SPEED RANGE: 1200-1800 RPM
 BHP (RATED): 203 HP @ 1800 RPM
 WEIGHT: 2090 LBS.

E107
RADIATOR COOLER
 GLOBAL HEAT TRANSFER
 COMBINED EJW/AJW
 EJW SECTION FLOW: 189 L/MIN
 EJW SECTION DUTY: 175 KW
 AJW SECTION FLOW: 132 L/MIN
 AJW SECTION DUTY: 13 L/MIN

T102
OIL DRAIN TANK
 SIZE: TBD
 VOLUME: XXX LITERS



NEXT AVAILABLE TAG NUMBER: 817

REV.	DESCRIPTION	DATE	BY	APPR.
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PERMIT TO PRACTICE STAMP	ENGINEER STAMP
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		TITLE: P & I FLOW DIAGRAM	
DRAWN BY: THOMAS MAH	DATE: AUG. 26, 2005	FOR: ALTAGAS LIMITED PARTNERSHIP 12 TO 15 MMSCFD ALTAGAS CLEAR PRAIRIE GAS PLANT LSD: 07-33-90-12 W6M	
CHKD. BY: B. MILLARD	SCALE: N/A	W.O. No.: 11957101	
APPR. BY: B. MILLARD	W.O. No.: 11957101	DWG. No.: 11957-101	SHEET No.: 8
CUST. PO No.:	REV.: 4		

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LINE IDENTIFICATION

A-B-CCDDD-E-FGH-I,J,K

A : NOMINAL LINE SIZE IN INCHES

B : FLUID

- C CARBON DIOXIDE
CW COOLING WATER
FG FUEL GAS
G GLYCOL
HG HYDROCARBON GAS
HL HYDROCARBON LIQUID
I/A INSTRUMENT AIR
I/G INSTRUMENT GAS
L LUBE OIL (COMPRESSOR)
NG NATURAL GAS
P PROPANE
PG PURGE GAS
V PRODUCED WATER

C : EQUIPMENT TYPE / MODIFIER (IF REQUIRED)

- B BLOWER
C COMPRESSOR
D DRIVER (MOTOR/ENGINE)
E EXCHANGER
F FILTER
H HEATER
P PUMP
T TANK
V PRESSURE VESSEL

D : EQUIPMENT NUMBER: 101 TO 999 SEQUENTIAL NUMBERS

E : LINE NUMBER: 1 TO 9 SEQUENTIAL NUMBERS FROM EQUIPMENT

FGH : PIPING SPECIFICATION

- F : MATERIAL GROUP
C CARBON STEEL
L LOW TEMPERATURE CARBON STEEL
S STAINLESS STEEL

G : ANSI 16.5 FLANGE CLASS

- 0 NON CODE
1 150#
3 300#
6 600#
9 900#
15 1500#
25 2500#

H : LINE MATERIAL SPECIFICATION REFERENCE: 1 TO 9 SEQUENTIAL NUMBERS

I : INSULATION TYPE (IF REQUIRED)

- C COLD
H HOT
HC HOT/COLD
HT HEAT TRACING
PP PERSONAL PROTECTION

J : INSULATION THICKNESS (IF REQUIRED) THICKNESS IN MILLIMETERS OR INCHES

K : TRACING (IF REQUIRED)

- ET ELECTRICAL TRACING
GT GLYCOL TRACING
ST STEAM TRACING

EXAMPLE: 3"-HG-V101-1-C61-HTXX,ET

- 3" - LINE SIZE
HG - HYDROCARBON GAS
V101 - PRESSURE VESSEL TAG NUMBER
1 - FIRST LINE FROM VESSEL
C61 - C CARBON STEEL LINE
6 600# ANSI FLANGE RATING
1 LINE MATERIAL SPECIFICATION REFERENCE
HT - HEAT TRACING INSULATION
XX - THICKNESS IN MILLIMETERS OR INCHES (")
ET - ELECTRICAL TRACING

VALVE IDENTIFICATION

A"BCDE,F

A : NOMINAL VALVE SIZE IN INCHES

B : TYPE

- A ANGLE GLOBE
B BALL
C CHECK
G GATE
L GLOBE
M MANIFOLD
N NEEDLE
P PLUG
S START-UP STRAINER
T TEE STRAINER
U BUTTERFLY
Y Y PATTERN STRAINER

C : BODY MATERIAL

- B BRONZE
C CARBON STEEL
L LOW TEMP. CARBON STEEL
S STAINLESS STEEL

D : END CONNECTIONS

- 1 FLANGED 150#
3 FLANGED 300#
6 FLANGED 600#
9 FLANGED 900#
15 FLANGED 1500#
25 FLANGED 2500#
B BUTT WELD
C SW BY NPT
F NPT BY FLANGE (MANIFOLD)
M NPT MALE BY NPT FEMALE
N NPT (THREADED)
S SW (SOCKETWELD)
T TUBE (SWAGELock)

E : UNIQUE DESCRIPTION REFER TO VALVE DATA SHEETS

F : MODIFIER

- C CHAIN OPERATOR
E EXTENDED BONNET
G GEAR OPERATOR
L LOCKING DEVICE
N NACE TRIM
O OXYGEN SERVICE/CLEANING
P FULL PORT DESIGN
R RTJ FLANGED
S SPRING HANDLE (CLOSE)
X SPECIAL SPECIFICATIONS

EXAMPLE: 6"GC11,C
6" VALVE SIZE
G GATE
C CARBON STEEL

VALVE TYPES

- ANGLE GLOBE VALVE
BALL VALVE
BUTTERFLY VALVE
CHECK VALVE
GATE VALVE
GLOBE VALVE
NEEDLE VALVE
PLUG VALVE
3-WAY VALVE
4-WAY VALVE
VALVE W/BLEED
VALVE W/PLUG

VALVE CONNECTIONS

- THREADED
WELDED (BUTT OR SOCKET)
THREADED BY WELDED
FLANGED

LINE CODE

- PRIMARY PROCESS LINE
SECONDARY PROCESS LINE
INSTRUMENT PROCESS LINE (TUBING)
BY OTHERS
SKID LIMIT
PNEUMATIC SIGNAL
ELECTRIC SIGNAL
CAPILLARY TUBING
INSTRUMENT SYSTEM LINK (ELECTRONIC MEMORY SHARING)

CONTROL VALVES

- POSITIONER DIAPHRAGM CONTROL VALVE
OUTLET PRESSURE REGULATOR (SELF-CONTAINED)
INLET PRESSURE REGULATOR (SELF-CONTAINED)
PRESSURE DIFFERENTIAL CONTROL VALVE (SELF-CONTAINED)
TWO-WAY SOLENOID VALVE
THREE-WAY SOLENOID VALVE
MOTOR ACTUATOR
HYDRAULIC/PNEUMATIC PISTON OPERATED

MISCELLANEOUS

- PRESSURE SAFETY/RELIEF VALVE
DESIGNATES API ORIFICE SIZE
RUPTURE DISC FOR PRESSURE RELIEF
RUPTURE DISC FOR VACUUM RELIEF
SPECTACLE BLIND (LINE OPEN)
SPECTACLE BLIND (LINE CLOSED)
CONE START-UP STRAINER
BASKET START-UP STRAINER
Y-PATTERN STRAINER
TEE STRAINER
FLEXIBLE CONNECTION
CONTINUOUS LIQUID DRAINER OR STEAM TRAP
VORTEX BREAKER
DIAPHRAM SEAL
SKID TIE-POINTS
OPEN DRAIN
INSULATION TYPE
ELECTRIC HEAT TRACE
GLYCOL OR STEAM HEAT TRACE

(MODIFIER)

INSTRUMENT IDENTIFICATION GENERAL REFERENCE (ISA - S5.1)

Table with columns: FIRST LETTER, SUCCEEDING LETTERS, PRIMARY ELEMENT, INDICATOR, RECORDER, CONTROLLER (BLIND, INDICATING, RECORDING), TRANS-MITTER, CONTROL (SWITCH, ALARM), CONTROL VALVE OR REGULATOR, SELF-ACTIVATED VALVE, RELAY OR CONVERTOR. Rows include ANALYSIS, USER'S CHOICE, CONDUCTIVITY, DENSITY OR MASS (DIFFERENTIAL), VOLTAGE, FLOW (RATIO OR FRACTION), GAUGING, HAND, CURRENT, POWER (SCAN), TIME, LEVEL, MOISTURE, HUMIDITY, USER'S CHOICE, ORIFICE OR OPEN, PRESSURE OR VACUUM, QUANTITY OR EVENT (INTEGRATE/TOTALIZE), RELIEF OR RESTRICTION, SPEED OR FREQUENCY, TEMPERATURE, MULTI-VARIABLE, VIBRATION, WEIGHT OR FORCE, LIGHT, USER'S CHOICE, POSITION.

INSTRUMENTS

- LOCAL MOUNTED
LOCAL PANEL MOUNTED
MOUNTED BEHIND OR IN LOCAL PANEL
MAIN PANEL MOUNTED
MOUNTED BEHIND OR IN MAIN PANEL
MAN MACHINE INTERFACE IN MAIN PANEL
BY OTHERS
PILOT LIGHT * COLOUR (A) AMBER (B) BLUE (C) GREEN (O) ORANGE (R) RED (W) WHITE
RELAY OR CONVERTER * FOR INPUT/OUTPUT SEQUENCES
DESIGNATION: SIGNAL: I CURRENT (ELECTRICAL) P PNEUMATIC
PROGRAMMABLE LOGIC CONTROLLER (PLC) XC REPRESENTS GENERAL LOGIC
INTERLOCK
ELECTRICAL (HARD WIRE) INTERLOCK
THERMOWELL (THREADED)
THERMOWELL (WELDED)

- (C) -CLOSE (O) -OPEN
(H) -HIGH ALARM (L) -LOW ALARM
(HH) -HIGH SHUTDOWN (LL) -LOW SHUTDOWN
(xx) -DIAGNOSTIC SHUTDOWN (USED TO INDICATE THE DIAGNOSTIC CHECK REQ'D ON THE ANALOG INPUT)

ABBREVIATIONS

- AOUT AUTOMATIC OUTPUT
CA CORROSION ALLOWANCE
CSO CAR SEAL OPEN
CUST CUSTOMER
DEG.C DEGREES CELSIUS
DEG.F DEGREES FARENHEIT
DIR DIRECT ACTING
DB DEADBAND
DELTA (DIFFERENTIAL)
ESD EMERGENCY SHUTDOWN
FC FAIL CLOSED
FO FAIL OPEN
FOT FLAT ON TOP
FLP FAIL LAST POSITION
FT2 SQUARE FEET
FT3 CUBIC FEET
HI HIGH
HLL HIGH LIQUID LEVEL
HR HOUR
HTR HEATER
I/A INSTRUMENT AIR
I/G INSTRUMENT GAS
I/O INPUT / OUPUT
I.D. INSIDE DIAMETER
KGS KILOGRAMS
KPAA KILOPASCAL ABSOLUTE
KPAD KILOPASCAL DIFFERENTIAL
KPAG KILOPASCAL GAUGE
KW KILOWATTS
LBS POUNDS
LC LOCKED CLOSED
LO LOCKED OPEN
LP LOCKED IN POSITION
M2 SQUARE METERS
M3 CUBIC METERS
MAX MAXIMUM
MAWP MAXIMUM ALLOWABLE WORKING PRESSURE
MCC MOTOR CONTROL CENTER
MDMT MINIMUM DESIGN METAL TEMPERATURE
MIN MINIMUM
MM MILLIMETER
MOUT MANUAL OUTPUT
MS MOTOR STARTER
NC NORMALLY CLOSED
NLL NORMAL LIQUID LEVEL
NO NORMALLY OPEN
NPT NATIONAL PIPE THREAD
OIC OPERATOR INTERFACE COMPUTER
O.D. OUTSIDE DIAMETER
PB PUSH BUTTON
PSIA POUNDS / SQUARE INCH ABSOLUTE
PSID POUNDS / SQUARE INCH DIFFERENTIAL
PSIG POUNDS / SQUARE INCH GAUGE
PLC PROGRAMMABLE LOGIC CONTROLLER
REV REVERSE ACTING
RST RESET (INTEGRAL)
SCR SILICON CONTROLLED RECTIFIER
S/F SEAM TO FACE OF FLANGE
SP SETPOINT
SPC CALCULATED SETPOINT
SS SELECTOR SWITCH
S/S SEAM TO SEAM
T/T TANGENT TO TANGENT
TS/TS TUBESHEET TO TUBESHEET
T/L TUBE LENGTH
V/H VENT HEADER

Table with columns: REV., DESCRIPTION, DATE, BY, APPR. Rows include GENERAL REVISIONS and ISSUED FOR CONSTRUCTION/ISSUED FOR APPROVAL.

PERMIT TO PRACTICE STAMP and ENGINEER STAMP fields.

TOROMONT PROCESS SYSTEMS logo, TITLE: P & I FLOW DIAGRAM, DRAWN BY: THOMAS MAH, DATE: AUG. 26, 2005, FOR: ALTAGAS LIMITED PARTNERSHIP 12 TO 15 MMSCFD ALTAGAS CLEAR PRAIRIE GAS PLANT LSD: 07-33-90-12 W6M, SHEET No: 9, REV: 4