

PLOT DATE December 22, 2010 F:\10000 Projects\2517 Husky S1340 G5516LE Ariel RG357M\Drawing\PMID\2517-111-A6 BUILT.dwg

PROJECT DESCRIPTION

ONE (1) AIR COMPRESSOR PACKAGE
FOR: HUSKY OIL OPERATIONS LTD.
LOCATION NAME: MCMULLEN THERMAL CONDUCTION
PILOT (TCP) PROJECT LSD: 03-35-078-25 W4

FABRICATED BY:

ENERFLEX LTD
CALGARY, ALBERTA, CANADA

TANK CAPACITIES

GLYCOL (EJW) SURGE TANK: 103L
GLYCOL (AJW) SURGE TANK: 103L
WASTE OIL STORAGE TANK: 1281L
COMP/ENGINE OIL DAYTANK: 2 X 480L
WASTE GLYCOL STORAGE TANK: 1281L

EQUIPMENT LIST

TAG NO.	DESCRIPTION
FR-0100A/B	INLET VACUUM FILTERS
V-0100	OIL SEPARATOR
E-0100	COOLER SECTION
CE-0100	ENGINE
K-0100	SCREW COMPRESSOR FRAME
CP-0100	CONTROL PANEL
E-0100	AIR/AC/EJW/AJW COOLER
E-0101	COMP. OIL COOLER
FR-0101A/B	COMP. LUBE OIL FILTERS
P-0101	ENGINE PRE-LUBE OIL PUMP
T-0100	WASTE OIL TANK
T-0101	ENGINE OIL DAYTANK
T-0102	COMP OR ENGINE OIL DAYTANK
V-0101	FUEL GAS SCRUBBER
T-0103	WASTE GLYCOL TANK
T-0104	GLYCOL (EJW) SURGE TANK
T-0105	GLYCOL (AJW) SURGE TANK
E-0100	EJW COOLER
E-0100	AJW COOLER

POWER REQUIREMENTS

ENGINE IGNITION SYSTEM: VOL: 24 VDC
CONTROL PANEL: VOL: 24 VDC
LEL & FIRE DETECTION: VOL: 24 VDC
LIGHTS: VOL: 120 VAC
BUILDING FANS: VOL: 120 VAC
KIM HOT START: VOL: 480 VAC
BUILDING HEATERS: VOL: 120 VAC
IMMERSION HEATER: VOL: 480 VAC

SYSTEM CONSUMABLES

COMPRESSOR LUBE OIL: S9-68, 776 L
ENGINE LUBE OIL: SAE 40, LOW ASH, 810 L
GLYCOL: 50% ETHYLENE INHIBITED GLYCOL/WATER SOLUTION
IN ENGINE & AUXILIARY JACKED WATER SYSTEMS
AJW & EJW CAPACITY: 2755 L

DESIGN CRITERIA & APPLICABLE CODES

SITE ELEVATION:	575 M ABOVE MEAN SEA LEVEL
BAROMETRIC PRESSURE:	94.53 KPAA
AMBIENT TEMPERATURE:	40°C
	-45°C
PROCESS INLET:	DESIGN
PROCESS FINAL DISCHARGE:	DESIGN
INSTRUMENT AIR:	MINIMUM PRESSURE
	MAXIMUM PRESSURE
	QUALITY
APPLICABLE CODE:	CODE PIPING
	NON-CODE PIPING
	VESSEL
	EXCHANGER
	STRUCTURAL
	ELECTRICAL
REGISTRATION:	VESEL
MISCELLANEOUS:	GASKETS
	PROCESS PIPE
	UTILITY PIPE
	FLANGES
	THREAD SEALANT
	MTR's REQUIRED
TUBING & FITTINGS:	TUBING - 316(SS) SMLS / 3/8" MIN. DIA.
(SPE-010-TUB)	FITTINGS - 316(SS)
	FERRULES - 316(SS) BACK / 316(SS) FRONT
	TUBING - 304(SS)/ 3/8" MIN. DIA.
	FITTINGS - ZINC PLATED CS
	FERRULES - 316(SS) BACK / CS FRONT
	RIGID ALUMINUM CONDUIT
	CLASS 1, ZONE 2, GROUP D
ELECTRICAL:	
SUITABLE FOR USE IN:	
	UTILITY

DESIGN SPECIFICATION:

ENERFLEX LTD. SCOPE OF SUPPLY ON THIS PROJECT CONSISTS OF ONE
SKIDDED AIR COMPRESSOR PACKAGE.

PACKAGE CONSISTS OF ONE (1) CATERPILLAR G3516LE-AFRC ENGINE DRIVING
AN ARIEL RG357M, AIR COMPRESSOR.

PRIMER: -TPS-SP-001, FIN-1, RED OXIDE
PAINT: -TPS-SP-001, FIN-1, WARM GRAY
PROCESS PIPING: -10% RADIOGRAPHIC TESTING
-10% MT ON FILLET WELDS
-1.6MM CORROSION ALLOWANCE
-NO PWHT
-SSPC-SP3
-NO PICKLING
-NDE TO CGSB
-MTR's REQUIRED
VESSELS: -10% RADIOGRAPHIC TESTING
-10% MT ON FILLET WELDS
-NO PWHT
-SSPC-SP3
-NO PICKLING
-1.6MM CORROSION ALLOWANCE
-NDE TO CGSB
-MTR's REQUIRED

										PERMIT TO PRACTISE		APEGGA PERMIT: No. P8651					
4	AS BUILT		12/22/10	JH	KG	DATE 12/09/09		SCALE NTS		FOR HUSKY OIL OPERATIONS		ENERFLEX 10121 - BARLOW TRAIL N.E. CALGARY ALBERTA CANADA	TITLE P & I DIAGRAM PROJECT DESCRIPTION AND OVERVIEW				
3	ISSUED FOR CONSTRUCTION TO THE SHOP		07/15/10	KW	AR	DRAWN BY X. WALTON	CHECKED BY A. BOSS	APPROVED BY A. BOSS	CATERPILLAR G3516LE-AFRC								
2	GENERAL REVISIONS		06/30/10	KW	AR	CUST PO N/A		ARIEL RG357M									
1	ISSUED FOR FABRICATION		06/25/10	KW	AR												
A	ISSUED FOR APPROVAL		06/04/10	KW	AR	STEP CODE N/A				DWG NO 12517-099		SHT 1	REV 4				
REV		DESCRIPTION		DATE		BY		APR									

PERMIT TO PRACTISE APEGGA PERMIT: No. P8651

ENG. STAMP

CERTIFIED AS BUILT

NAME X. W. L. J. O. N. I. DATE 12/22/10

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PLOT DATE December 22, 2010 F:\10000 Projects\2517 Husky S1340 G3516LE Ariel RG357M\Drawing\PAID\12517-111-AS BUILT.dwg

K-0100
SCREW GAS COMPRESSOR FRAME

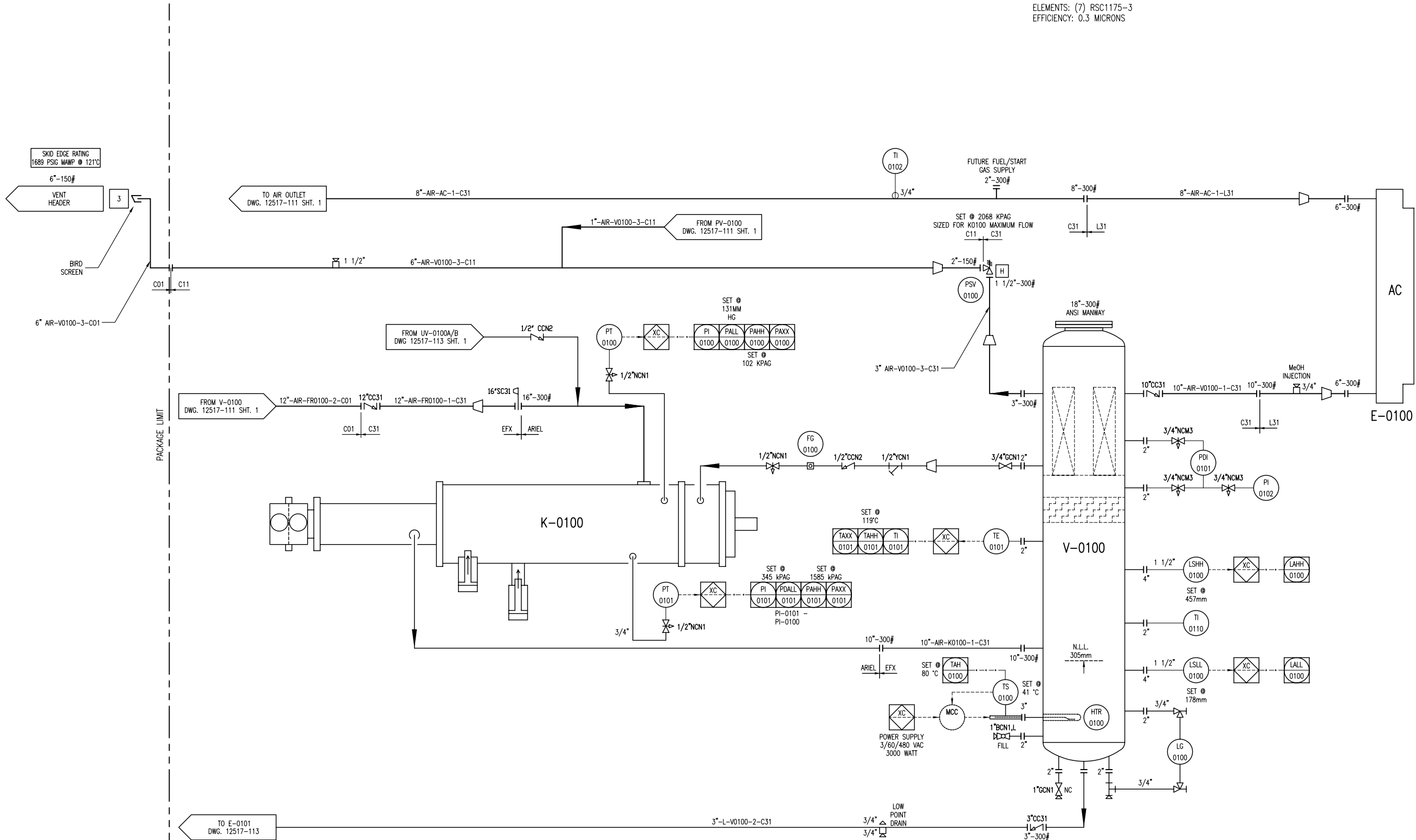
MFG: ARIEL
MODEL: RG357M
OPERATING: 2489 RPM

V-0100
OIL SEPARATOR

MFG: TESI
SIZE: 1219mm x 2591mm S/S
MAWP: 2413 kPAG @ 121°C
MDMT: -29°C @ 2413 kPAG
CA: 1.6mm
MAT'L: SA-516-70
ELEMENTS: (7) RSC1175-3
EFFICIENCY: 0.3 MICRONS

AC (E-0100)
COOLER SECTION

MFG: AIR-X-CHANGERS
MODEL: 156EH-122-24
MAWP: 2413 kPAG @ 149°C
MDMT: -45°C @ 2413 kPAG



**MTR's REQUIRED
ON ALL
PRESSURE RETAINING
PIPE & FITTINGS**

DESTROY PREVIOUS COPIES

NO SWAK ALLOWED

7	AS BUILT	12/22/10	JH	KG
6	FOR REGISTRATION	NOV 23/10	JH	AR
5	TAG REMOVED	SEP 17/10	KW	AR
4	AIR COOLER REVISED	07/21/10	KW	AR
3	ISSUED FOR CONSTRUCTION TO THE SHOP	07/15/10	KW	AR
2	GENERAL REVISIONS	06/30/10	KW	AR
1	ISSUED FOR FABRICATION	06/25/10	KW	AR
A	ISSUED FOR APPROVAL	06/04/10	KW	AR
REV	DESCRIPTION	DATE	BY	APR

PERMIT TO
PRACTISE APEGGA PERMIT: No. P8651

FOR
HUSKY OIL OPERATIONS
CATERPILLAR G3516LE-AFRC
ARIEL RG357M

ENERFLEX
10121 - BARLOW TRAIL N.E.
CALGARY ALBERTA CANADA

TITLE
P & I DIAGRAM
PROCESS GAS

**CERTIFIED
AS BUILT**

NAME *K. WALTON* DATE 12/22/10

DWG
NO 12517-111

SHT
2

REV
7

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K-0100
SCREW GAS
COMPRESSOR FRAME
MFG: ARIEL
MODEL: RG357M
OPERATING SPEED: 2489 RPM
OIL TEMPERATURE: 77°C

CE-0100
COMPRESSOR ENGINE
MFG: CATERPILLAR
MODEL: G3516LE-AFRC
BORE: 6.7 INCHES
STROKE: 7.5 INCHES
DISPLACEMENT: 4210 IN
COMP RATIO: 8:1
POWER: 1340 BHP @ 1400 RPM

CP-0100
CONTROL PANEL
MFG: TES
POWER: 15A @ 24 VDC
MAKE: ALLEN BRADLEY
PROCESSOR: COMPACT LOGIX

KBU-0100/0101/0102
EXHAUST FANS
16" VENTURI XP FAN
115/230V, 1HP, 60HZ, 1/4AP
CLASS 1, DIV.1, GROUP C & D

E-0100
PACKAGE GAS COOLER FRAME
MFG: AIR-X-CHANGERS
MODEL: 156EH-122-24
TYPE: FORCED DRAFT
AIR FLOW: 239,534 SCFM
FAN TYPE: 1 MOORE 156 DIA x 10 BLADE
FAN POWER: 62.9 BHP @ 240 RPM
AMBIENT AIR: 40°C
EXIT AIR: 58°C

2101
BUILDING

TDI STARTER TAG
TDI STARTER DECAL
COUPLING DECAL

BELT SIZE DECAL
LUBRICATION DECAL
BUILDING DECAL

UNIT DECALS

JBA-0100
24VDC
ANALOG
JB

JBC-0100
24VDC
DISCRETE
JB

JBP-0100
24VDC
POWER
JB

FROM 120VDC JB
2106 2107
120VAC 150W
HPS LIGHTS
EXTERIOR

FROM 120VDC JB
2108 2109
2110 2111
120VAC 150W
HPS LIGHTS
INTERIOR

TO JBA 0100
AE 0100
LEL DETECTION

TO JBA 0100
AE 0101
LEL DETECTION

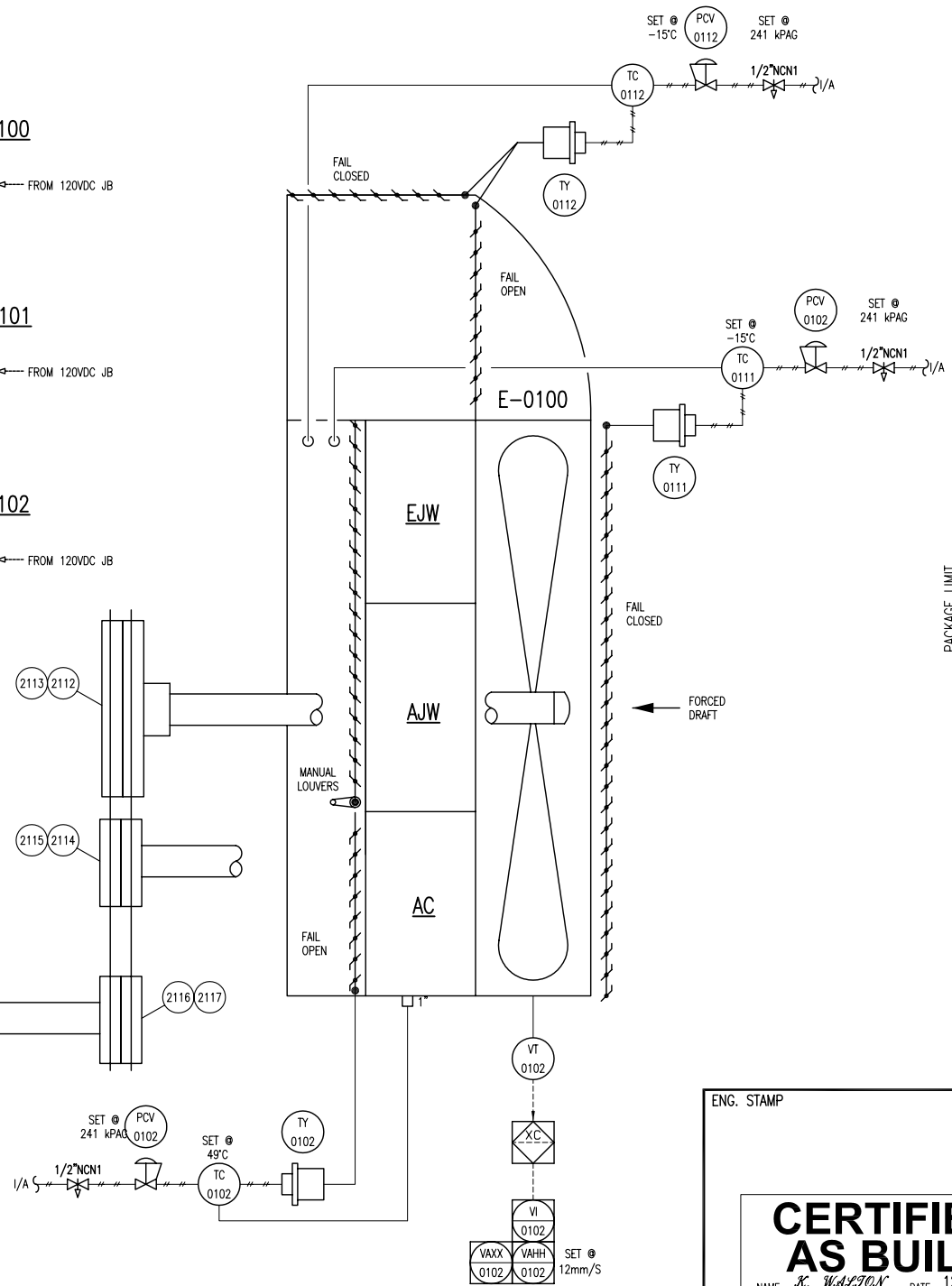
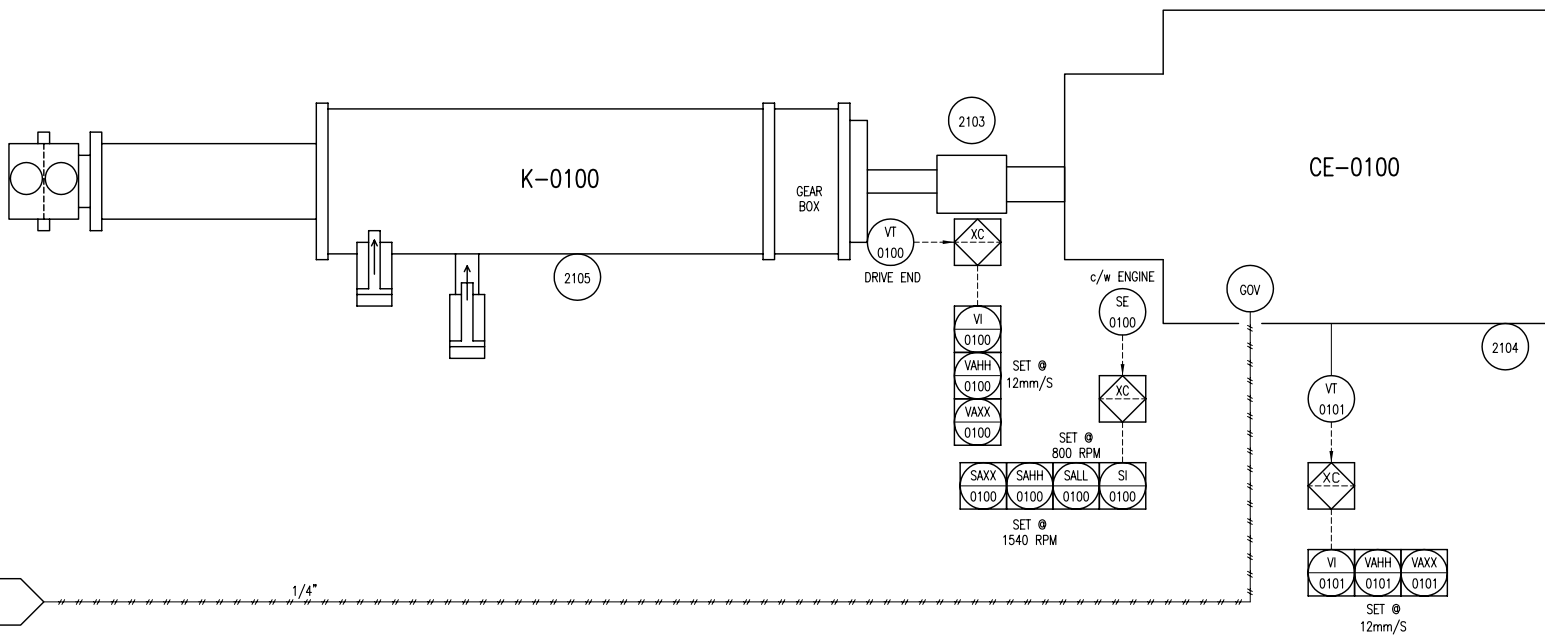
TO JBA 0100
AE 0102
FIRE DETECTION

KBU-0100
120 VAC
BUILDING EXHAUST FAN
HOA FROM 120VDC JB

KBU-0101
120 VAC
BUILDING EXHAUST FAN
HOA FROM 120VDC JB

KBU-0102
120 VAC
BUILDING EXHAUST FAN
HOA FROM 120VDC JB

WIRED FROM 24VDC JB
CP-0100
ETHERNET
XY 0101 STATUS
XY 0102 REMOTE & ESD
MCC



ENG. STAMP
CERTIFIED AS BUILT
NAME *K. WALTON* DATE 12/22/10

DESTROY PREVIOUS COPIES
NO SWAK ALLOWED

MTR's REQUIRED ON ALL PRESSURE RETAINING PIPE & FITTINGS

6	AS BUILT	12/22/10	JH	KG
5	GENERAL REVISIONS	SEP 17/10	KW	AR
4	AIR COOLER REVISED	07/21/10	KW	AR
3	ISSUED FOR CONSTRUCTION TO THE SHOP	07/15/10	KW	AR
2	GENERAL REVISIONS	06/30/10	KW	AR
1	ISSUED FOR FABRICATION	06/25/10	KW	AR
A	ISSUED FOR APPROVAL	06/04/10	KW	AR
REV	DESCRIPTION	DATE	BY	APR

DATE	12/09/09	SCALE	NTS
DRAWN BY	X. WALTON	CHECKED BY	A. WALTON
CUST PO	N/A	APPROVED BY	A. WALTON
STEP CODE	111 112 113 142 531 711		

PERMIT TO PRACTISE	APEGGA PERMIT: No. P8651
FOR	HUSKY OIL OPERATIONS CATERPILLAR G3516LE-AFRC ARIEL RG357M
DWG NO	12517-112

ENERFLEX
10121 - BARLOW TRAIL N.E.
CALGARY ALBERTA CANADA

TITLE
P & I DIAGRAM
DRIVE TRAIN /
CONTROL PANEL

SHT 1 REV 6

P-0100
COMPRESSOR LUBE OIL PUMP

MFG: ARIEL (INTEGRAL)
MODEL: P755x3.00
FLOW RATE: 88.4 GPM

FR-0100B
COMPRESSOR BEARING OIL FILTER

MFG: ARIEL
PARTICLE RATING: 6 MICRON

FR-0100A
COMPRESSOR ROTOR OIL FILTER

MFG: ARIEL
PARTICLE RATING: 16 MICRON

FR-0100C
COMPRESSOR PRELUBE OIL FILTER

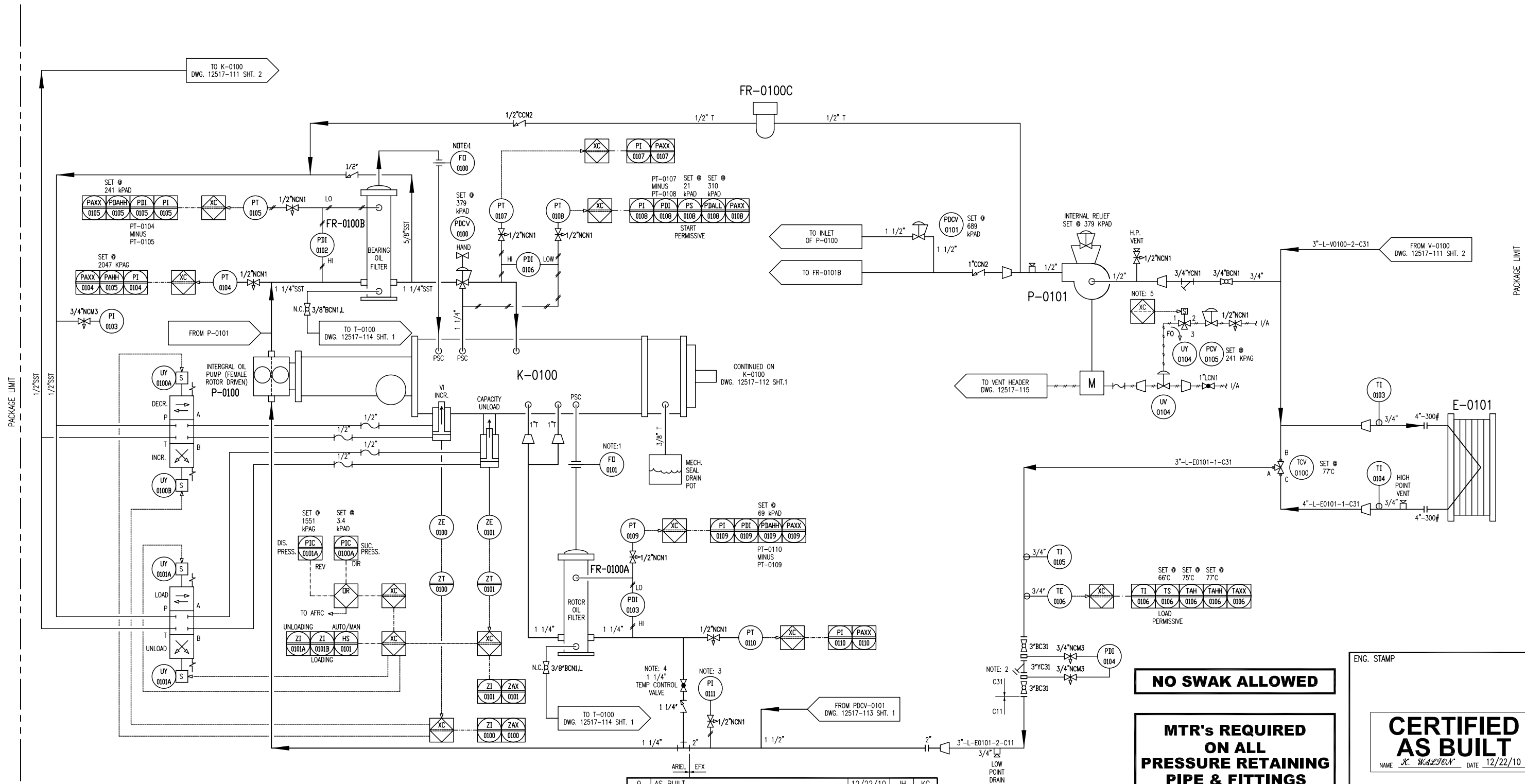
MFG: PARKER
PARTICLE RATING: 5-7 MICRON

P-0101
COMPRESSOR OIL COOLER PUMP

MFG: TUTHILL
MODEL: 4105V-L-7
MAWP: 1724 KPAG
FLOW: 18 LPM
DRIVER: AIR MOTOR

E-0101
COMPRESSOR OIL COOLER

MFG: GEA
MODEL: FPA10X20-360M
CHANNELS: 90
MAWP - OIL SIDE: 2413 KPAG @ 177°C
MAWP - GLYCOL SIDE: 2413 KPAG @ 177°C



- NOTES:
- ORIFICE SUPPLIED WITH COMPRESSOR.
 - 40 MESH MINIMUM.
 - MOUNT PI-0111 REMOTELY.
 - VALVE IS NORMALLY OPEN; THROTTLE TO ADJUST ROTOR OIL TEMP
 - PRE-LUBE ONLY REQUIRED ON FIRST START ATTEMPT

DESTROY PREVIOUS COPIES

9	AS BUILT	12/22/10	JH	KG
8	VALVE ADDED	SEP 17/10	KW	AR
7	PSV-0101 CHANGED TO PDCV-0101	SEP 13/10	KW	AR
6	PUMP VENT DESCRIPTIONS REVISED	SEP 10/10	KW	AR
5	PUMP VENT DESCRIPTIONS REVISED	SEP 02/10	KW	AR
4	GENERAL REVISIONS	AUG 26/10	KW	AR
3	ISSUED FOR CONSTRUCTION TO THE SHOP	07/15/10	KW	AR
2	GENERAL REVISIONS	06/30/10	KW	AR
1	ISSUED FOR FABRICATION	06/25/10	KW	AR
A	ISSUED FOR APPROVAL	06/04/10	KW	AR
REV	DESCRIPTION	DATE	BY	APR

DATE	12/09/09	SCALE	NTS
DRAWN BY	X. WALTON	CHECKED BY	A. BOGGS
CUST PO	N/A	APPROVED BY	A. BOGGS
STEP CODE	113	550	

NO SWAK ALLOWED

MTR's REQUIRED ON ALL PRESSURE RETAINING PIPE & FITTINGS

PERMIT TO PRACTISE APEGGA PERMIT: No. P8651

FOR HUSKY OIL OPERATIONS
CATERPILLAR G3516LE-AFRC
ARIEL RC357M

ENERFLEX
10121 - BARLOW TRAIL N.E.
CALGARY ALBERTA CANADA

ENG. STAMP

CERTIFIED AS BUILT

NAME X. WALTON DATE 12/22/10

TITLE P & I DIAGRAM
COMPRESSOR LUBE OIL / UTILITIES

DWG NO 12517-113 SHT 1 REV 9

PLOT DATE December 22, 2010 F:\10000 Projects\12517 Husky S1340 G3516LE Ariel RC357M\Drawing\PAID\12517-111-AS BUILT.dwg

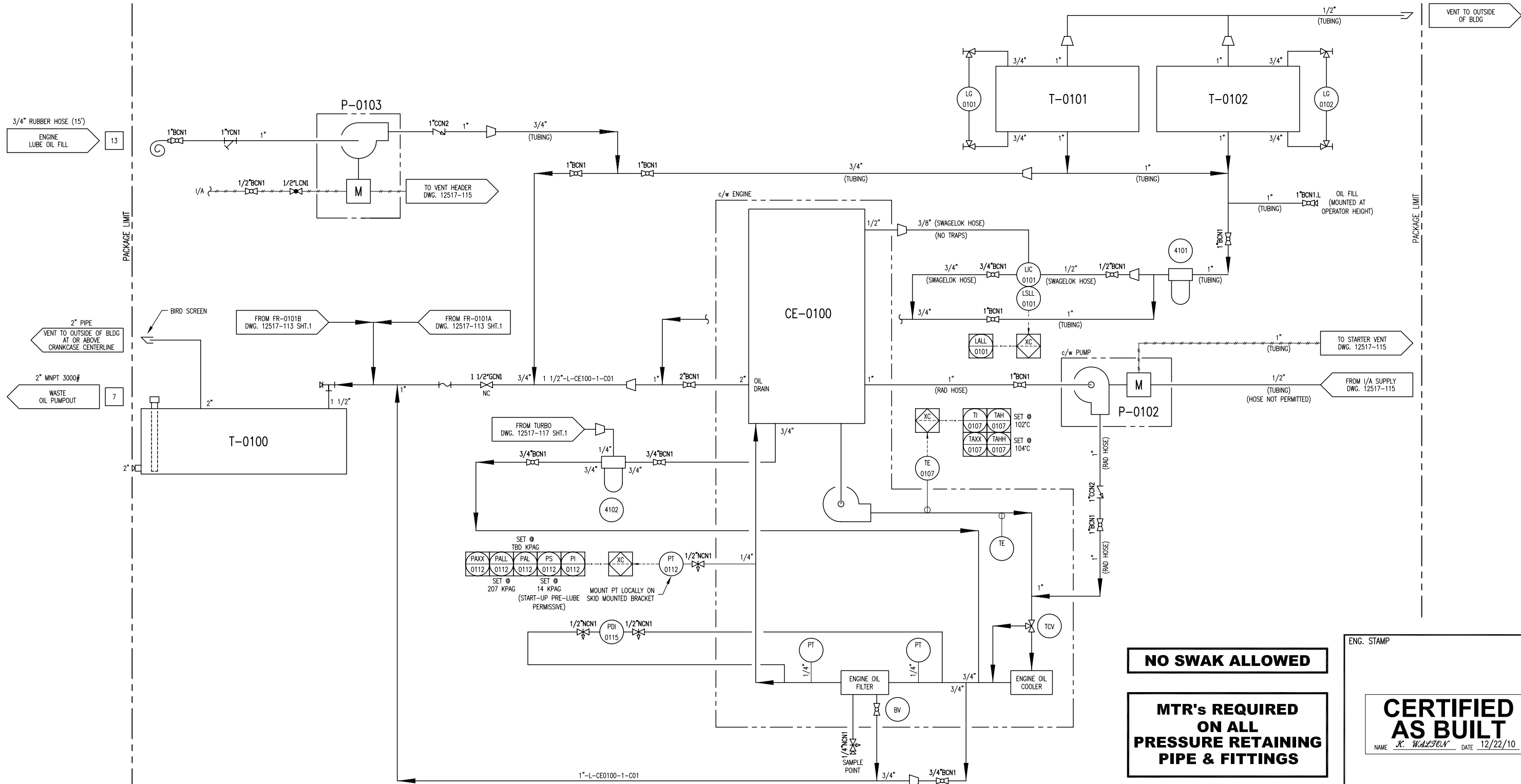
T-0100
WASTE OIL TANK
MFG: EFX
CAPACITY: 1281L
SIZE: 24"x8"x480", 3/8" THK
MAT'L: G40.21350W

P-0102
ENGINE PRE-LUBE
OIL PUMP
MFG: WARREN RUPP
MODEL: G1FB1ABTXNSX00
INLET GAS PRESSURE: 689 KPAG
FLOW: 95 LPM @ 138 KPAG

P-0103
ENGINE OIL
TRANSFER PUMP
MFG: YAMADA
MODEL: NDP-25BAN
INLET GAS PRESSURE: 138-689 KPAG
FLOW: 100 LPM @ 276 KPAG

T-0101
COMPRESSOR/ENGINE
OIL DAYTANK
MFG: EFX
CAPACITY: 480L
SIZE: 12"x8"x340", 1/4" THK
MATERIAL: G40.21350W

T-0102
COMPRESSOR/ENGINE
OIL DAYTANK
MFG: EFX
CAPACITY: 480L
SIZE: 12"x8"x340", 1/4" THK



DESTROY PREVIOUS COPIES

6	AS BUILT	12/22/10	JH	KG
5	TAG ADDED	SEP 17/10	KW	AR
4	PUMP VENT DESCRIPTIONS REVISED/TAG REVISED	SEP 02/10	KW	AR
3	ISSUED FOR CONSTRUCTION TO THE SHOP	07/15/10	KW	AR
2	GENERAL REVISIONS	06/30/10	KW	AR
1	ISSUED FOR FABRICATION	06/25/10	KW	AR
A	ISSUED FOR APPROVAL	06/04/10	KW	AR
REV	DESCRIPTION	DATE	BY	APR

DATE	12/09/09	SCALE	NTS
DRAWN BY	X. W. ALLEN	CHECKED BY	A. ROSS
CUST PO	N/A	APPROVED BY	A. ROSS
STEP CODE	112 540		

PERMIT TO PRACTISE	APEGGA PERMIT: No. P8651
FOR	HUSKY OIL OPERATIONS CATERPILLAR G3516LE-AFRC ARIEL RC357M

ENERFLEX
10121 - BARLOW TRAIL N.E.
CALGARY ALBERTA CANADA

DWG NO 12517-114

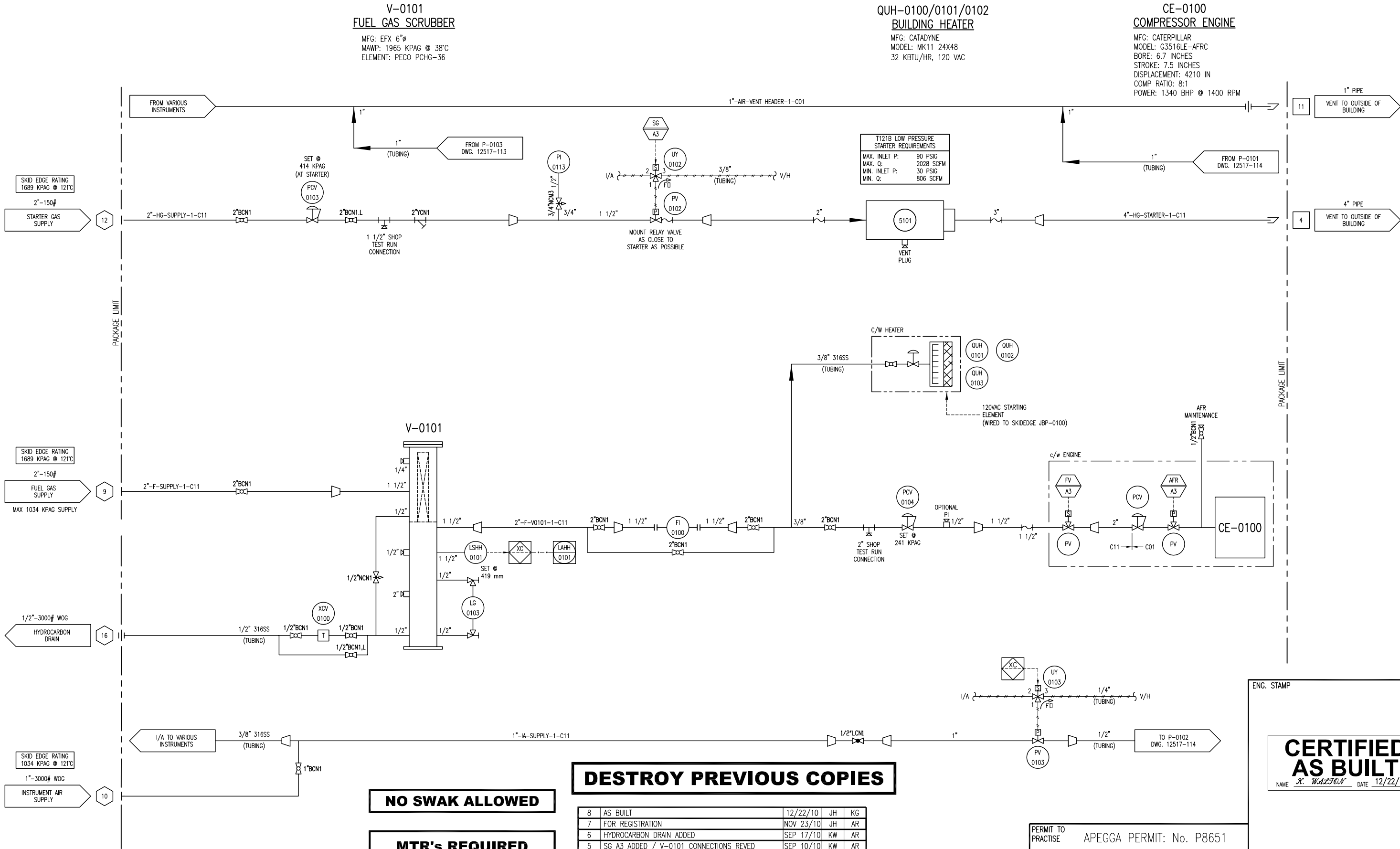
ENG. STAMP
CERTIFIED AS BUILT
NAME X. W. ALLEN DATE 12/22/10

TITLE P & I DIAGRAM
ENGINE LUBE OIL

SHT 1 REV 6

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MTR's REQUIRED
ON ALL
PRESSURE RETAINING
PIPE & FITTINGS

8	AS BUILT	12/22/10	JH	KG
7	FOR REGISTRATION	NOV 23/10	JH	AR
6	HYDROCARBON DRAIN ADDED	SEP 17/10	KW	AR
5	SG A3 ADDED / V-0101 CONNECTIONS REVED	SEP 10/10	KW	AR
4	PUMP VENT DESCRIPTIONS REVISED/TAG REVISED	SEP 02/10	KW	AR
3	ISSUED FOR CONSTRUCTION TO THE SHOP	07/15/10	KW	AR
2	GENERAL REVISIONS	06/30/10	KW	AR
-	-	-	-	-
A	ISSUED FOR APPROVAL	06/04/10	KW	AR
REV	DESCRIPTION	DATE	BY	APR

DATE	12/09/09	SCALE	NTS
DRAWN BY	J. W. L. J. O. N. I.	CHECKED BY	A. R. O. S. S. J.
CUST PO	N/A	APPROVED BY	A. R. O. S. S. J.
STEP CODE	112 240 244 510	PERMIT TO PRACTISE	APEGGA PERMIT: No. P8651
FOR	HUSKY OIL OPERATIONS CATERPILLAR G3516LE-AFRC ARIEL RC357M	ENERFLEX	10121 - BARLOW TRAIL N.E. CALGARY ALBERTA CANADA
DWG NO	12517-115	SHT	1
REV	8		

ENG. STAMP

CERTIFIED AS BUILT

NAME J. W. L. J. O. N. I. DATE 12/22/10

TITLE P & I DIAGRAM
START / FUEL SUPPLY

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T-0103
WASTE GLYCOL TANK

MFG: EFX
CAPACITY: 1281L
SIZE: 24" X 8" X 480", 3/8" THK.
MAT'L: G40.21350W

ECE-0100
GLYCOL HEATER

MFG: KIM HOT START
MODEL: CLER31804
POWER: 480V/3Ph/60Hz
FLOW RATE: 40 GPM

P-0104
GLYCOL TRANSFER PUMP

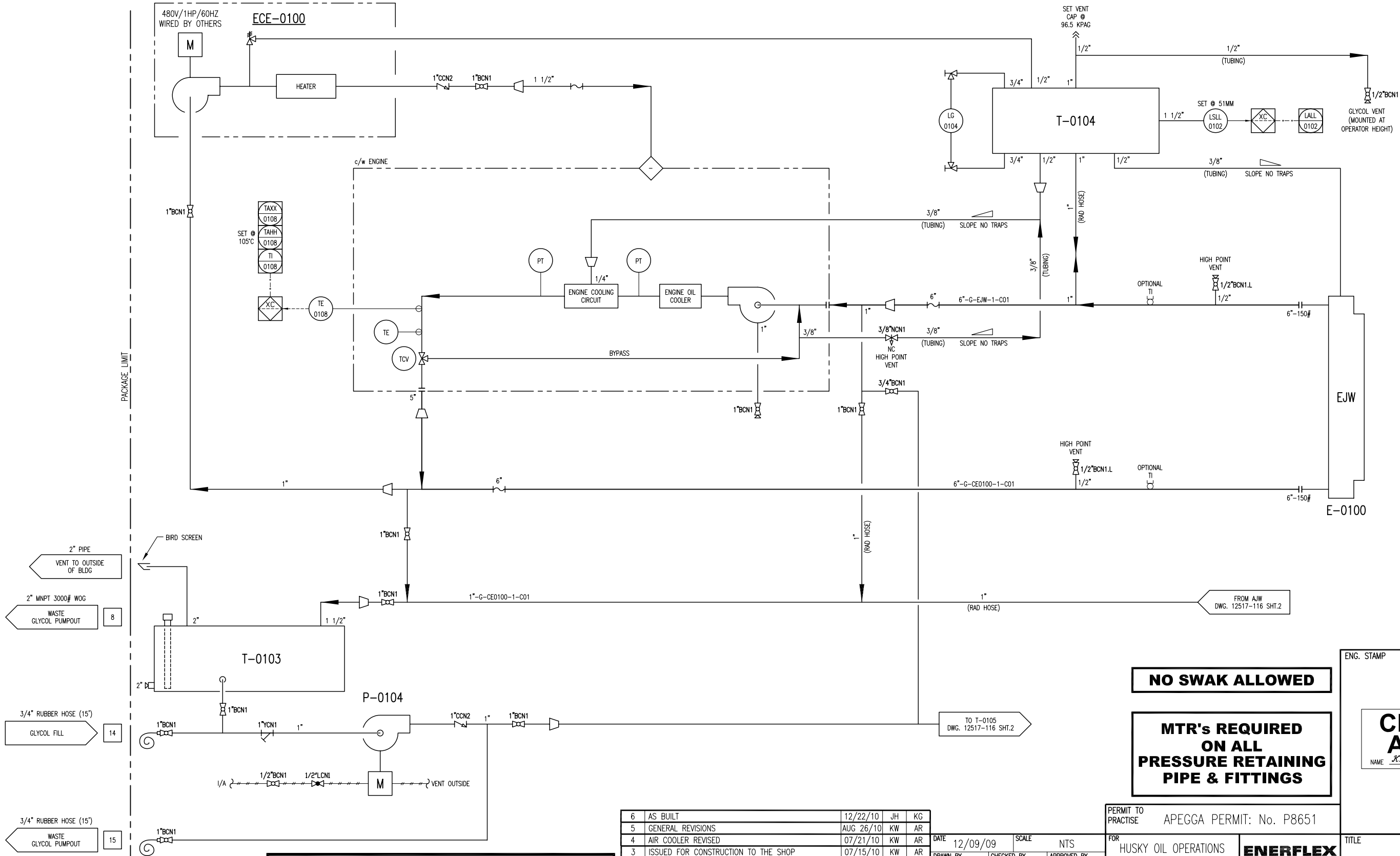
MFG: YAMADA
MODEL: NDP-25BAN
INLET GAS PRESSURE: 138-689 KPAG
FLOW: 100 LPM @ 276 KPGA

T-0104
GLYCOL (EJW) SURGE TANK

MFG: EFX
CAPACITY: 103L
SIZE: 12" X 12" X 48", 1/4" THK
MAT'L: G40.21350W

EJW (E-0100)
ENGINE JACKET WATER
COOLER SECTION

MAWP: 97 KPAG @ 149°C
MDMT: -29°C @ 97 KPAG



DESTROY PREVIOUS COPIES

6	AS BUILT	12/22/10	JH	KG
5	GENERAL REVISIONS	AUG 26/10	KW	AR
4	AIR COOLER REVISED	07/21/10	KW	AR
3	ISSUED FOR CONSTRUCTION TO THE SHOP	07/15/10	KW	AR
2	GENERAL REVISIONS	06/30/10	KW	AR
1	ISSUED FOR FABRICATION	06/25/10	KW	AR
A	ISSUED FOR APPROVAL	06/04/10	KW	AR
REV	DESCRIPTION	DATE	BY	APR

DATE	12/09/09	SCALE	NTS
DRAWN BY	J. W. L. J. O. N. I.	CHECKED BY	A. B. O. B. S. S.
CUST PO	N/A	APPROVED BY	A. B. O. B. S. S.
STEP CODE	112 412 521		

PERMIT TO PRACTISE	APEGGA PERMIT: No. P8651
FOR	HUSKY OIL OPERATIONS CATERPILLAR G3516LE-AFRC ARIEL RC357M
ENERFLEX	10121 - BARLOW TRAIL N.E. CALGARY ALBERTA CANADA
DWG NO	12517-116

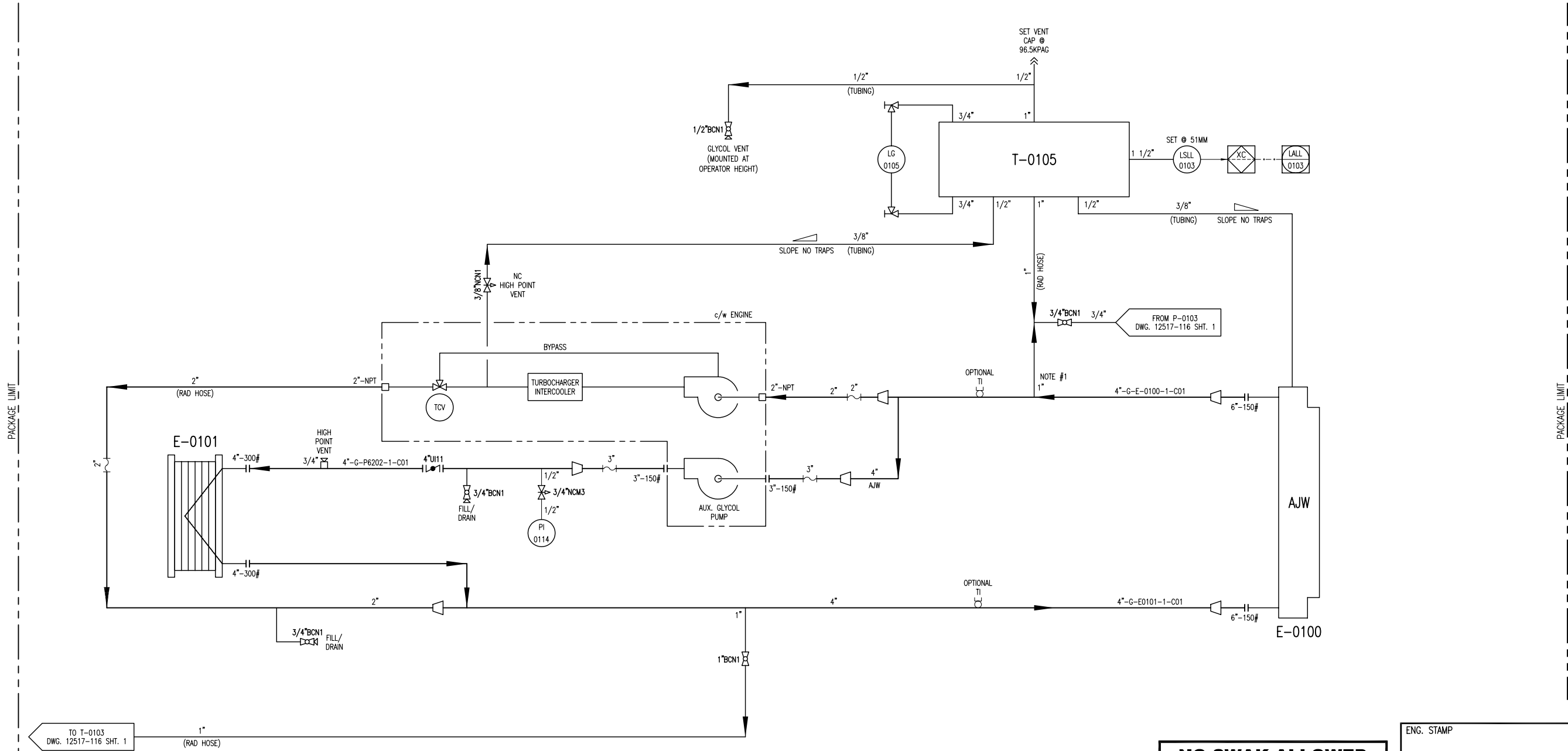
ENG. STAMP	
CERTIFIED AS BUILT	NAME <i>J. W. L. J. O. N. I.</i> DATE 12/22/10
TITLE	P & I DIAGRAM COOLING SYSTEM ENGINE JACKET WATER
SHT	1
REV	6

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E-0101
COMPRESSOR OIL COOLER
SEE DWG. #12517-113

T-0105
GLYCOL (AJW) SURGE TANK
MFG: EFX
CAPACITY: 103L
SIZE: 12" X 12" X 48", 1/4" THK
MAT'L: G40.21350W

AJW (E-0100)
AUXILIARY JACKET WATER
COOLER SECTION
MAWP: 97 KPAG @ 149°C
MDMT: -29°C @ 97 KPAG



NOTES:
1. LOCATE STATIC HEAD CONNECTION CLOSE TO PUMP INLET.

5	AS BUILT	12/22/10	JH	KG
4	AIR COOLER REVISED	07/21/10	KW	AR
3	ISSUED FOR CONSTRUCTION TO THE SHOP	07/15/10	KW	AR
2	GENERAL REVISIONS	06/30/10	KW	AR
1	ISSUED FOR FABRICATION	06/25/10	KW	AR
A	ISSUED FOR APPROVAL	06/04/10	KW	AR
REV	DESCRIPTION	DATE	BY	APR

DATE	12/09/09	SCALE	NTS
DRAWN BY	X. WALTON	CHECKED BY	A. BOBBS
CUST PO	N/A	APPROVED BY	A. BOBBS
STEP CODE	412 521		

NO SWAK ALLOWED

**MTR's REQUIRED
ON ALL
PRESSURE RETAINING
PIPE & FITTINGS**

PERMIT TO
PRACTISE APEGGA PERMIT: No. P8651

FOR
HUSKY OIL OPERATIONS
CATERPILLAR G3516LE-AFRC
ARIEL RC357M

ENERFLEX

10121 - BARLOW TRAIL N.E.
CALGARY ALBERTA CANADA

DWG
NO 12517-116

SHT 2

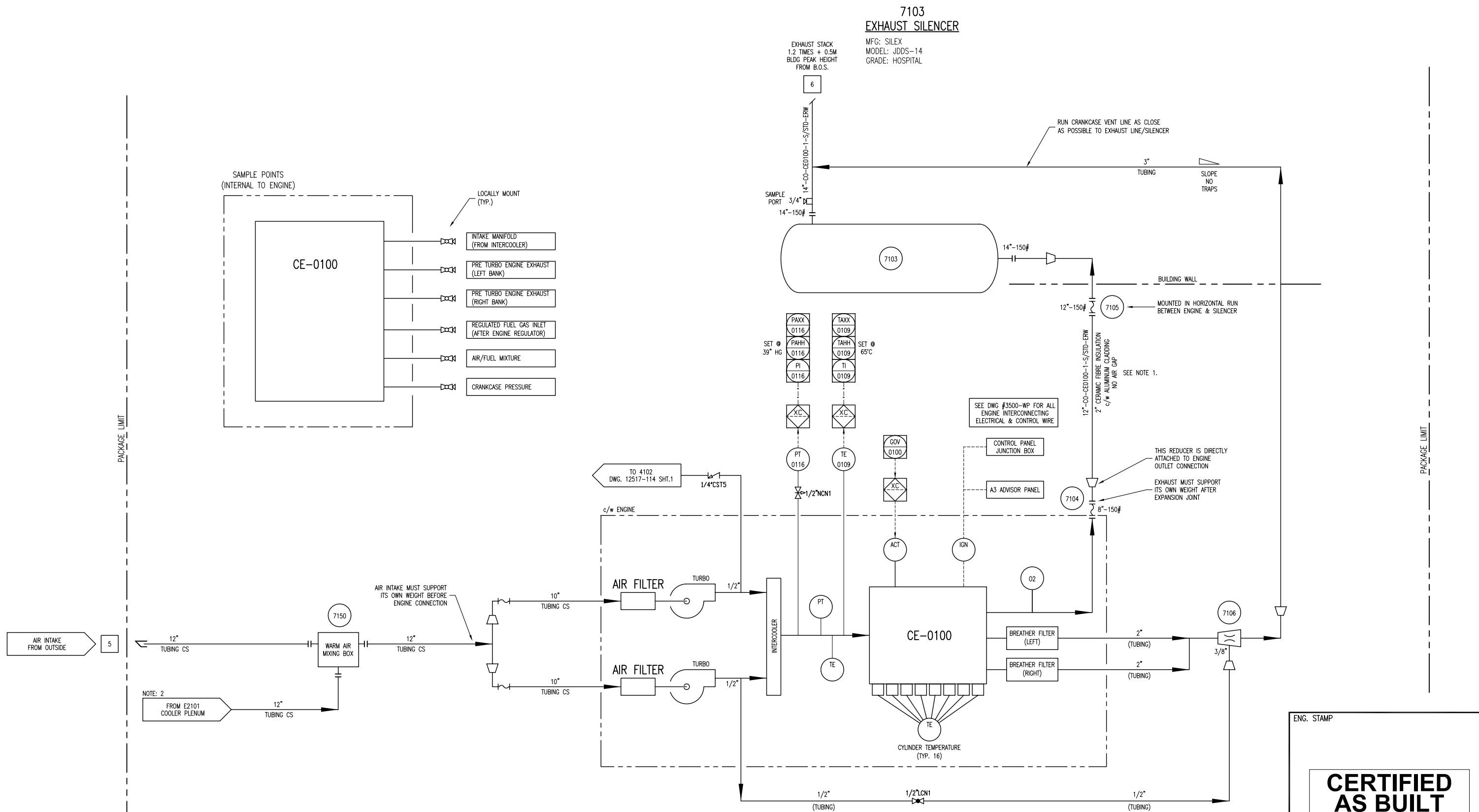
REV 5

ENG. STAMP

**CERTIFIED
AS BUILT**

NAME X. WALTON DATE 12/22/10

TITLE
P & I DIAGRAM
COOLING SYSTEM
AUXILIARY JACKET WATER



NO SWAK ALLOWED

MTR's REQUIRED
ON ALL
PRESSURE RETAINING
PIPE & FITTINGS

- NOTES:
1. INSULATION FROM ENGINE EXHAUST TO BUILDING WALL.
2. TAKE WARM AIR FROM BOTTOM OF COOLER PLENUM.

DESTROY PREVIOUS COPIES

5	AS BUILT	12/22/10	JH	KG				
4	GENERAL REVISIONS	AUG 26/10	KW	AR	DATE	12/09/09	SCALE NTS	
3	ISSUED FOR CONSTRUCTION TO THE SHOP	07/15/10	KW	AR	DRAWN BY	X. WALTON	CHECKED BY	A. BOBBS
2	GENERAL REVISIONS	06/30/10	KW	AR	APPROVED BY	A. BOBBS		
1	ISSUED FOR FABRICATION	06/25/10	KW	AR	CUST PO	N/A		
A	ISSUED FOR APPROVAL	06/04/10	KW	AR				
REV	DESCRIPTION	DATE	BY	APR	STEP CODE	112	531	

PERMIT TO PRACTISE	APEGGA PERMIT: No. P8651
FOR	HUSKY OIL OPERATIONS CATERPILLAR G3516LE-AFRC ARIEL RG357M
10121 - BARLOW TRAIL N.E. CALGARY ALBERTA CANADA	
DWG NO	12517-117

ENG. STAMP			
<div>CERTIFIED AS BUILT</div> <div>NAME <u>X. WALTON</u> DATE <u>12/22/10</u></div>			
TITLE P & I DIAGRAM AIR INTAKE & EXHAUST			
-117		SHT 1	REV 5

P:\0000 Projects\12517 Husky S1340 G3516LE Ariel RG357M\Drafting\2517-111-AS BUILT.dwg
PLOT DATE December 22, 2010

LINE IDENTIFICATION

A-B-CD-E-FGHI-J,J,J

A: NOMINAL LINE SIZE IN INCHES

B: FLUID

A AMMONIA L LUBE OIL
C CARBON DIOXIDE N NATURAL GAS
CO CARBON MONOXIDE O OXYGEN
F FUEL GAS P PROPANE
G GLYCOL PG PURGE GAS
HG HYDROCARBON GAS S STEAM
HL HYDROCARBON LIQUID SG SYNGAS
IA INSTR. AIR SUPPLY V WASTE PROCESS WATER
IG INSTR. GAS SUPPLY W WATER

C: EQUIPMENT TYPE

AC AFTER COOLER IC INTERSTAGE COOLER
B BLOWER/FAN M MOTOR
C COMPRESSOR P PUMP
E EXCHANGER S OIL SKIMMER
F FILTER T TANK
H HEATER V PRESSURE VESSEL

D: EQUIPMENT NUMBER 1 TO 9 SEQUENTIAL NUMBERS

E: LINE NUMBER 1 TO 9 SEQUENTIAL NUMBERS FROM EQUIPMENT

FGHI: PIPING SPECIFICATION

F: MATERIAL GROUP

C CARBON STEEL
L LOW TEMPERATURE CARBON STEEL
S STAINLESS STEEL

G: FLANGE CLASS (ANSI 16.5)

1 150# 9 900#
3 300# 15 1500#
6 600# 25 2500#

H: LINE MATERIAL SPECIFICATION REFERENCE

1 TO 9 SEQUENTIAL NUMBERS

I: SPECIFICATION REFERENCE

R RECIPROCATING SPECIFICATION
BLANK SCREW SPECIFICATION

JJJ: MODIFIER / GENERAL

H HOT INSULATION THICKNESS IN INCHES
C COLD INSULATION THICKNESS IN INCHES
PP PERSONAL PROTECTION THICKNESS IN INCHES
HT HEAT TRACING
ST STEAM TRACING
GT GLYCOL TRACING
ET ELECTRICAL TRACING

EXAMPLE: 3"-A-V401-2-C11R-ET,1"

3" LINE-SIZE
A AMMONIA
V401 OIL SEPARATOR
2 SECOND LINE FROM VESSEL
C11R C CARBON STEEL LINE
1 150# ANSI FLANGE RATING
1 LINE MATERIAL SPECIFICATION REFERENCE
R RECIPROCATING SPECIFICATION REFERENCE
ET,1" ELECTRICAL TRACING, 1" THICK INSULATION

VALVE IDENTIFICATION

A"BCDE.F

A: NOMINAL VALVE SIZE IN INCHES

B: TYPE

A ANGLE GLOBE M MANIFOLD
B BALL N NEEDLE
C CHECK P PLUG
G GATE S STRAINER
L GLOBE U BUTTERFLY

C: BODY MATERIAL

B BRONZE L LOW TEMP. CARBON STEEL
C CARBON STEEL S STAINLESS STEEL
I CAST IRON

D: END CONNECTIONS

1 FLANGED 150# C SW BY NPT
3 FLANGED 300# F NPT BY FLANGE MANIFOLD)
6 FLANGED 600# N NPT (SCREWED)
9 FLANGED 900# M NPT MALE BY NPT FEMALE
15 FLANGED1500# S SW (SOCKETWELD)
25 FLANGED 2500# T TUBE (SWAGELOCK)

E: IDENTIFIER - NUMBER USED TO SPECIFY VALVE
REFER TO VALVE DATA SHEETS

F: MODIFIER

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

EXAMPLE: 6"GC11.C
6" VALVE SIZE C CARBON STEEL 1 API-600
G GATE 1 FLANGED 150# C CHAIN OPERATOR

LINE CODE

MAIN PROCESS LINE
SECONDARY PROCESS LINE
AUXILIARY LINE
INSTRUMENT LINE
ELECTRIC LINE
FILLED CAPILLARY TUBE
PNEUMATIC LINE
MECHANICAL LINK
INSTRUMENT DATA LINK
INTERCONNECTING PIPING
SKID LIMIT
FUTURE

VALVES

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

CONTROL VALVES

POSITIONER
DIAPHRAGM CONTROL VALVE
TWO-WAY SOLENOID VALVE
THREE-WAY
SOLENOID VALVE
MOTOR ACTUATOR
HAND CONTROL VALVE
PRESSURE SAFETY /
RELIEF VALVE
DESIGNATES ORIFICE
LETTER (SIZE)
OUTLET PRESSURE REGULATOR
SELF-CONTAINED
INLET PRESSURE REGULATOR
SELF-CONTAINED
PRESSURE DIFFERENTIAL
CONTROL VALVE
SELF-CONTAINED
DIAPHRAGM CONTROL VALVE
HYDRAULIC / PNEUMATIC
PISTON OPERATED

MISCELLANEOUS

CUSTOMER
SKID TIE-POINTS
SKID EDGE
NOT REQ'D
CUSTOMER TIE-IN
CONTINUOUS LIQUID DRAINER
OR STEAM TRAP
FLEXIBLE/ EXPANSION
CONNECTION
SPECTACLE BLIND
(LINE OPEN)
SPECTACLE BLIND
(LINE CLOSED)
BALL CHECK VALVE
THROTTLE BLOCK
ORIFICE
CONE STRAINER
BASKET STRAINER
Y-PATTERN STRAINER
TEE STRAINER
OPEN DRAIN
SPACER / FUTURE
ORIFICE
UNION
SIGHT GLASS
LINE SIZE CHANGE
SPECIALTY ITEM
THICKNESS
INSULATION - (C) COLD
(H) HOT
(HT) HEAT TRACING
(PP) PERSONNEL PROTECTION
ELECTRIC HEAT TRACE
STEAM OR GLYCOL
HEAT TRACE

VORTEX BREAKER
DIAPHRAGM SEAL
RUPTURE DISC FOR
PRESSURE RELIEF
RUPTURE DISC FOR
VACUUM RELIEF
VENTURI

(MODIFIER)

FIRST LETTER	SUCCEEDING LETTERS	PRIMARY ELEMENT	INDICATOR	RECORDER	CONTROLLER				TRANS-MITTER	CONTROL		CONTROL VALVE OR REGULATOR	SELF-ACTUATED VALVE	RELAY OR CONVERTER
					BLIND	INDICATING	RECORDING			SWITCH	ALARM			
A	ANALYSIS	ALARM	AE	AI	AR	AC	AIC	ARC	AT	AS()	AA()	AV		AY
B	BURNER FLAME	USER'S CHOICE	BE	BI	BR	BC			BT	BS()	BA()	BV		BY
C	CONDUCTIVITY	CONTROL (CLOSE)	CE	CI	CR	CC	CIC	CRC	CT	CS()	CA()	CV		CY
D	DENSITY OR MASS (DIFFERENTIAL)		DE	DI	DR	DC	DIC	DRC	DT	DS()	DA()	DV		DY
E	VOLTAGE	PRIMARY ELEMENT	EE	EI	ER	EC	EIC	ERC	ET	ES()	EA()	EV		EY
F	FLOW (RATIO OR FRACTION)	SHUTDOWN FIRST OUT	FE	FI	FR	FC	FIC	FRC	FT	FS()	FA()	FV	FCV	FY
G	GAUGING	GLASS	GE	GI	GR	GC	GIC	GRC	GT	GS()	GA()	GV		
H	HAND	(HIGH)				HC	HIC		HT	HS()		HV	HCV	HY
I	CURRENT	INDICATE	IE	II	IR	IC	IIC	IRC	IT	IS()	IA()			IY
J	POWER (SCAN)		JE	JI	JR	JC	JIC	JRC	JT	JS()	JA()			JY
K	TIME	CONTROL STATION		KI	KR	KC	KIC	KRC	KT	KS()	KA()			KY
L	LEVEL	LIGHT (LOW)	LE	LI	LR	LC	LIC	LRC	LT	LS()	LA()	LV	LCV	LY
M	MOISTURE, HUMIDITY	(MIDDLE OR INTERMEDIATE)	ME	MI	MR	MC	MIC	MRC	MT	MS()	MA()	MV		MY
N	USER'S CHOICE													
O	POINT	ORIFICE (OPEN)												
P	PRESSURE OR VACUUM	POINT	PE	PI	PR	PC	PIC	PRC	PT	PS()	PA()	PV	PCV	PY
Q	QUANTITY OR EVENT (INTEGRATE/TOTALIZE)			OI	OR	OC	OIC	ORC	OT	OS()	OA()	QV		QY
R	RADIOACTIVITY	RECORD OR PRINT	RE	RI	RR	RC	RIC	RRC	RT	RS()	RA()			RY
S	SPEED OR FREQUENCY	SWITCH		SI	SR	SC	SIC	SRC	ST	SS()	SA()			SY
T	TEMPERATURE	TRANSMIT	TE	TI	TR	TC	TIC	TRC	TT	TS()	TA()	TV	TCV	TY
U	MULTI-VARIABLE	MULTI-FUNCTION		UI	UR	UC	UIC	URC				UV		
V	VISCOSITY OR VIBRATION	VALVE OR DAMPER	VE	VI	VR	VC	VIC	VRC	VT	VS()	AA()	WV		VY
W	WEIGHT OR FORCE	WELL	WE	WI	WR	WC	WIC	WRC	WT	WS()	AA()	WV		WY
X	UNCLASSIFIED	UNCLASSIFIED (DIAGNOSTIC)	XE	XI	XR	XC	XIC	XRC	XT	XS()	SA()	XV		XY
Y	USER'S CHOICE	RELAY OR COMPUTE												YY
Z	POSITION	DRIVE OR ACTUATE	ZE	ZI	ZR	ZC	ZIC	ZRC	ZT	ZS()	ZA()			ZY

VALVE CONNECTIONS

SCREWED (NPT) FLANGED
SOCKET WELDED (SW) NPT BY SW
BUTT WELDED (BW)

INSTRUMENTS

LOCAL MOUNTED
LOCAL PANEL MOUNTED
MOUNTED BEHIND OR
IN LOCAL PANEL
MAIN PANEL MOUNTED
MOUNTED BEHIND OR
IN MAIN PANEL
BY OTHERS
HUMAN MACHINE INTERFACE(HMI)
ACCESSIBLE TO OPERATOR
HUMAN MACHINE INTERFACE(HMI)
ACCESSIBLE TO OPERATOR
THROUGH LOCAL PLC
BY OTHERS
CAT ADEM III
INTERNAL SIGNAL
PROGRAMMABLE LOGIC CONTROLLER (PLC)
XC REPRESENTS GENERAL LOGIC
PILOT LIGHT * COLOR-(A) AMBER
(G) GREEN
(R) RED
(B) BLUE
(O) ORANGE
(W) WHITE
INTERLOCK
ELECTRICAL (HARD WIRE) INTERLOCK
THERMOWELL (FLANGED)
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

BW BUTT WELD
CA CORROSION ALLOWANCE
CS CARBON STEEL
C/W COMPLETE WITH
CSC CAR SEALED CLOSED
CSO CAR SEALED OPEN
CUST CUSTOMER
DB DEAD BAND
DIR DELTA (DIFFERENTIAL)
DIR DIRECT ACTING
ESD EMERGENCY SHUTDOWN
FC FAIL CLOSED
FF FLAT FACED
FO FAIL OPEN
FLP FAIL LAST POSITION
FX FROST EXTENSION
FOT FLAT ON TOP
HI HIGH
HLL HIGH LIQUID LEVEL
HS HAND SWITCH
I/A INSTRUMENT AIR
I/G INSTRUMENT GAS
I/P CURRENT TO PRESSURE
I/O INPUT / OUTPUT
LLL LOW LIQUID LEVEL
LPD LOW POINT DRAIN
MAX MAXIMUM
MAWP MAXIMUM ALLOWABLE WORKING PRESSURE
MDMT MAXIMUM DESIGN METAL TEMPERATURE
MCC MOTOR CONTROL CENTER
MIN MINIMUM
NLL NORMAL LIQUID LEVEL
NC NORMALLY CLOSED
NO NORMALLY OPEN
NPT NATIONAL PIPE THREAD (SCREWED)
PB PUSH BUTTON
PL PILOT LIGHT
PLC PROGRAMMABLE LOGIC CONTROLLER
REV REVERSE ACTING
RF RAISED FACE
RTD RESISTANCE TEMPERATURE DEVICE
RTJ RING TYPE JOINT
S/F SEAM TO FACE OF FLANGE
SS STAINLESS STEEL
S/S SEAM TO SEAM
SO SLIP-ON
SW SOCKET WELD
SVU SUCTION VALVE UNLOADER
T TUBING
TESI TOROMONT ENERGY SYSTEMS INC.
V/H VENT HEADER
VTA VENT TO ATMOSPHERE
WCP VARIABLE VOLUME CONTROL POCKET
FVCP FIXED VOLUME CONTROL POCKET
W/ WITH
W/O WITHOUT

ENG. STAMP

CERTIFIED
AS BUILT

NAME X. W. L. JON DATE 12/22/10

PERMIT TO
PRACTISE APEGGA PERMIT: No. P8651

FOR
HUSKY OIL OPERATIONS
CATERPILLAR G3516LE-AFRC
ARIEL RG357M

ENERFLEX

10121 - BARLOW TRAIL N.E.
CALGARY ALBERTA CANADA

DWG
NO 12517-199

TITLE LEGEND

SHT

1

REV 4

4	AS BUILT	12/22/10	JH	KG	DATE	12/09/09	SCALE	NTS
3	ISSUED FOR CONSTRUCTION TO THE SHOP	07/15/10	KW	AR	DRAWN BY	X. W. L. JON	CHECKED BY	A. ROSS
2	GENERAL REVISIONS	06/30/10	KW	AR	CUST PO	N/A	APPROVED BY	A. ROSS
1	ISSUED FOR FABRICATION	06/25/10	KW	AR				
A	ISSUED FOR APPROVAL	06/04/10	KW	AR				
REV	DESCRIPTION	DATE	BY	APR	STEP CODE	112 531		

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