

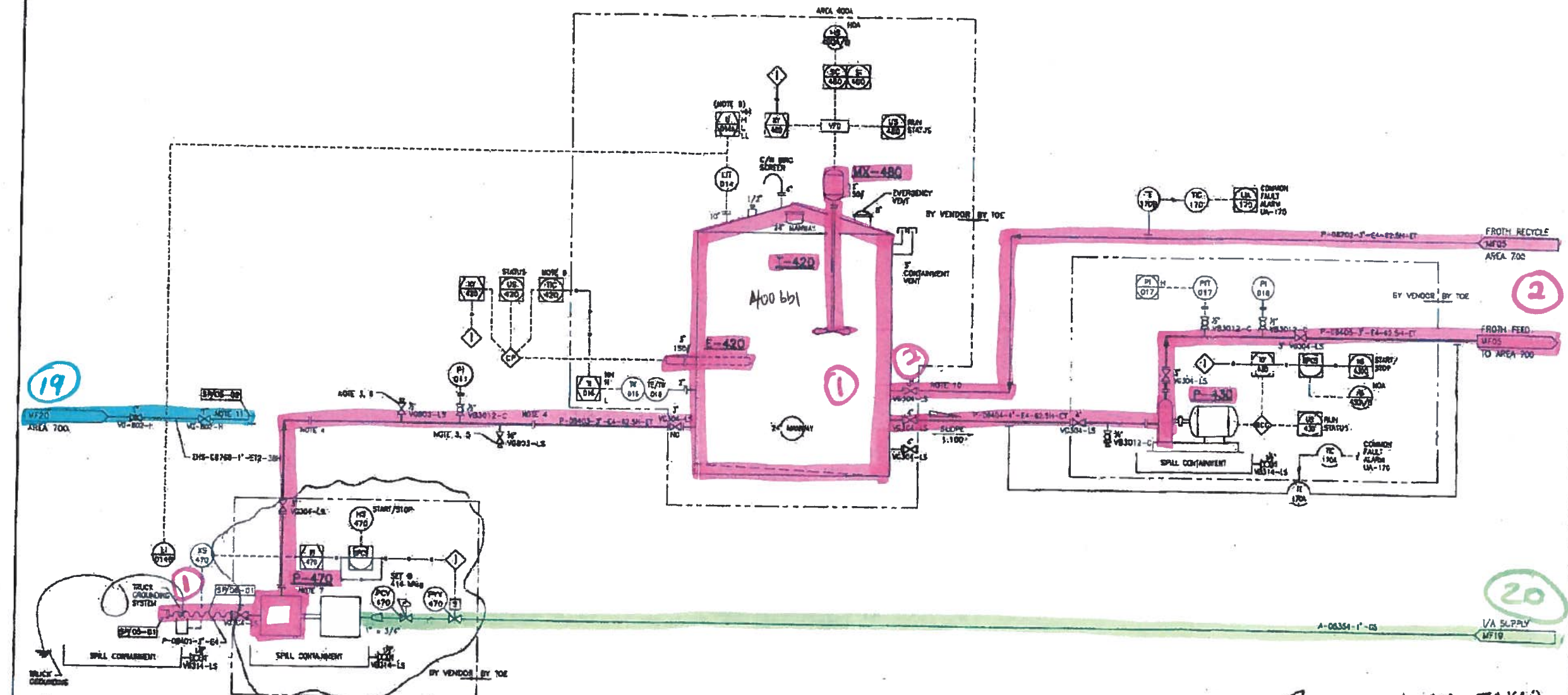
P-470
FROTH TRUCK
UNLOADING PUMP
 CAPACITY: 800 L/min
 DIFF. PRESS: 150 kPa
 POWER: BY AIR

E-420
TK-420 HEATER
 ELECTRICAL HEATER: 11 kW

T-420
FROTH STORAGE TANK
 SIZE: 3759mm OD x 5639mm H (60m³) - 400 bbl
 DESIGN: 0.7m
 INSULATION: 87.5H
 CONSTRUCTION: DOUBLE WALL STEEL

MX-480
 DUTY: 15 HP
 45 RPM

P-430
FROTH RECIRCULATION PUMP
 CAPACITY: 480 L/min
 HEAD: 35.2m (520.871)
 POWER: 10 HP / 1200 RPM, RELIANCE



- NOTES:**
1. DELIVERED
 2. ALL INSTRUMENTATION WILL BE PROVIDED BY *400*
 3. STAIN-LESS CONNECTIONS
 4. SECTION PIPING TO T-420 TO CONTAIN BREAK FLANGES TO ALLOW EASY REPAIR.
 5. AS CLOSE TO TANK AS POSSIBLE
 6. AS CLOSE TO TRUCK CONNECTION AS POSSIBLE
 7. P-470 WILL BE COUPLED WITH CLACK CONNECT FITTINGS.
 8. LAL-014 TO SHUT DOWN P-470. LAL-014 TO SHUT DOWN P-470. REFER TO 3D KEY.
 9. CHARGE SOURCE FROM T-420 (CONCRETE OUTPUT).
 10. DRAW AND ASSEMBLE LIST ON OPPOSITE SIDE OF THE TANK T-420.
 11. AVAILABLE STRAIN FOR CLEANING OF FROTH FEED LINES.

ACTION TAKEN AFTER HAZOP

NO.	DATE	BY	DESCRIPTION	NO.	DATE	BY	DESCRIPTION
00	20 FEB 04	JJP	ISSUED FOR DESIGN	01	20 FEB 04	JJP	ISSUED FOR DESIGN
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FROTH TREATMENT TEST FACILITY
AREA 400 FROTH TANK AREA
PIPING & INSTRUMENTATION DIAGRAM (P&ID)

REV BY: FCS DATE: 2008 MAR 26
 DATE FILED: 00301-058C
 PROJECT NO: 08207-0-DG-BC-00003.01
 SHEET NO: XX-XX-MF03

ASRC ENERGY SERVICES
 TRI OCEAN ENGINEERING LTD.
 APEUCA PERMIT 28034

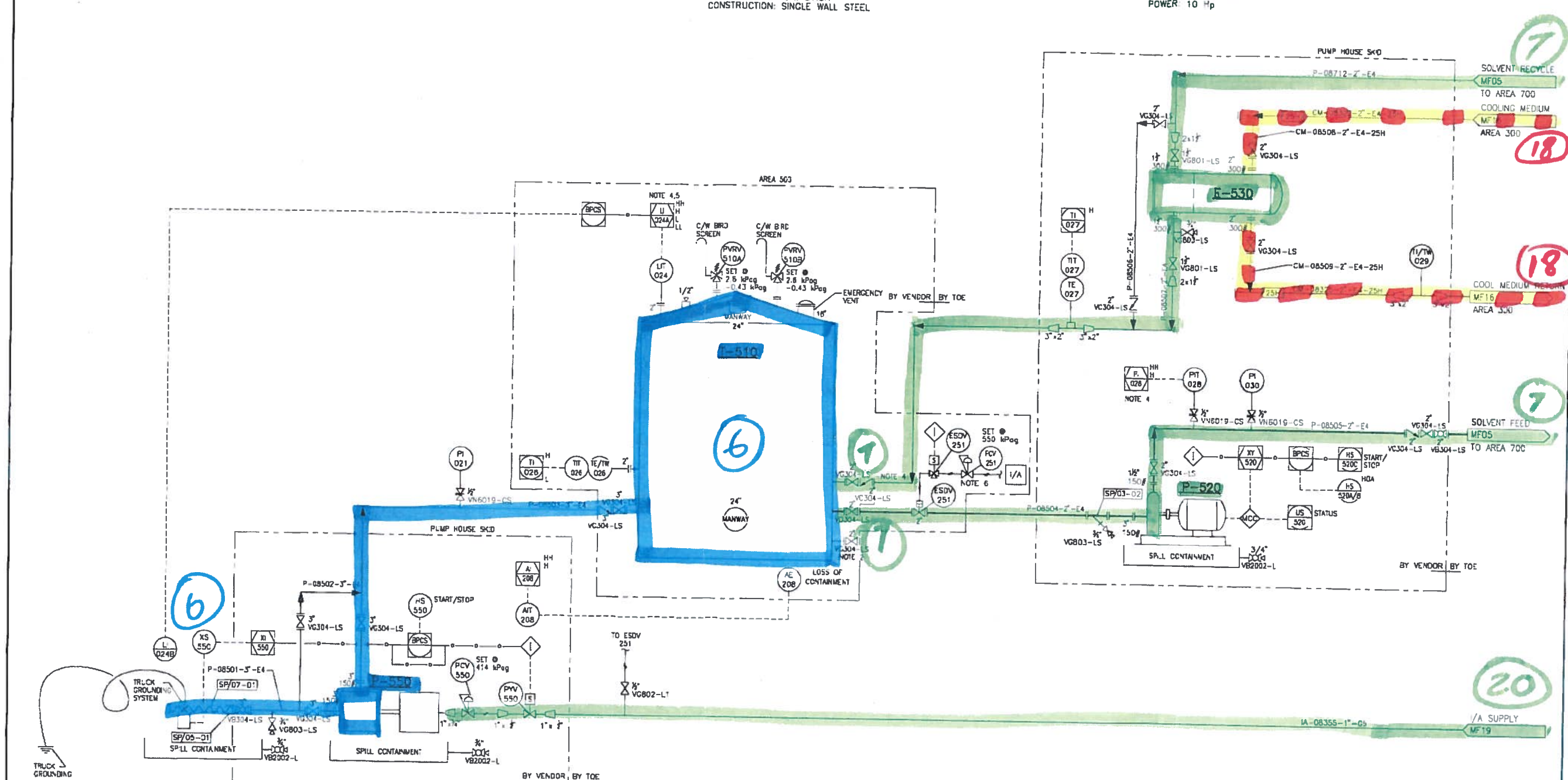
PROFESSIONAL SEAL

P-550
SOLVENT TRUCK UNLOADING PUMP
 CAPACITY: 600L/min
 DIFFERENTIAL PRESSURE: 200 kPa(g)
 POWER: BY AIR

T-510
SOLVENT STORAGE TANK
 SIZE: 4724mm OD x 4877mm H (79.4m³) (500b1)
 DESIGN: ATM
 INSULATION: 37.5H
 CONSTRUCTION: SINGLE WALL STEEL

P-520
SOLVENT RECIRCULATION PUMP
 CAPACITY: 200L/min
 DIFFERENTIAL PRESSURE: 590 kPa
 POWER: 10 Hp

E-530
SOLVENT COOLER
 REQUIRED DUTY: 71kW



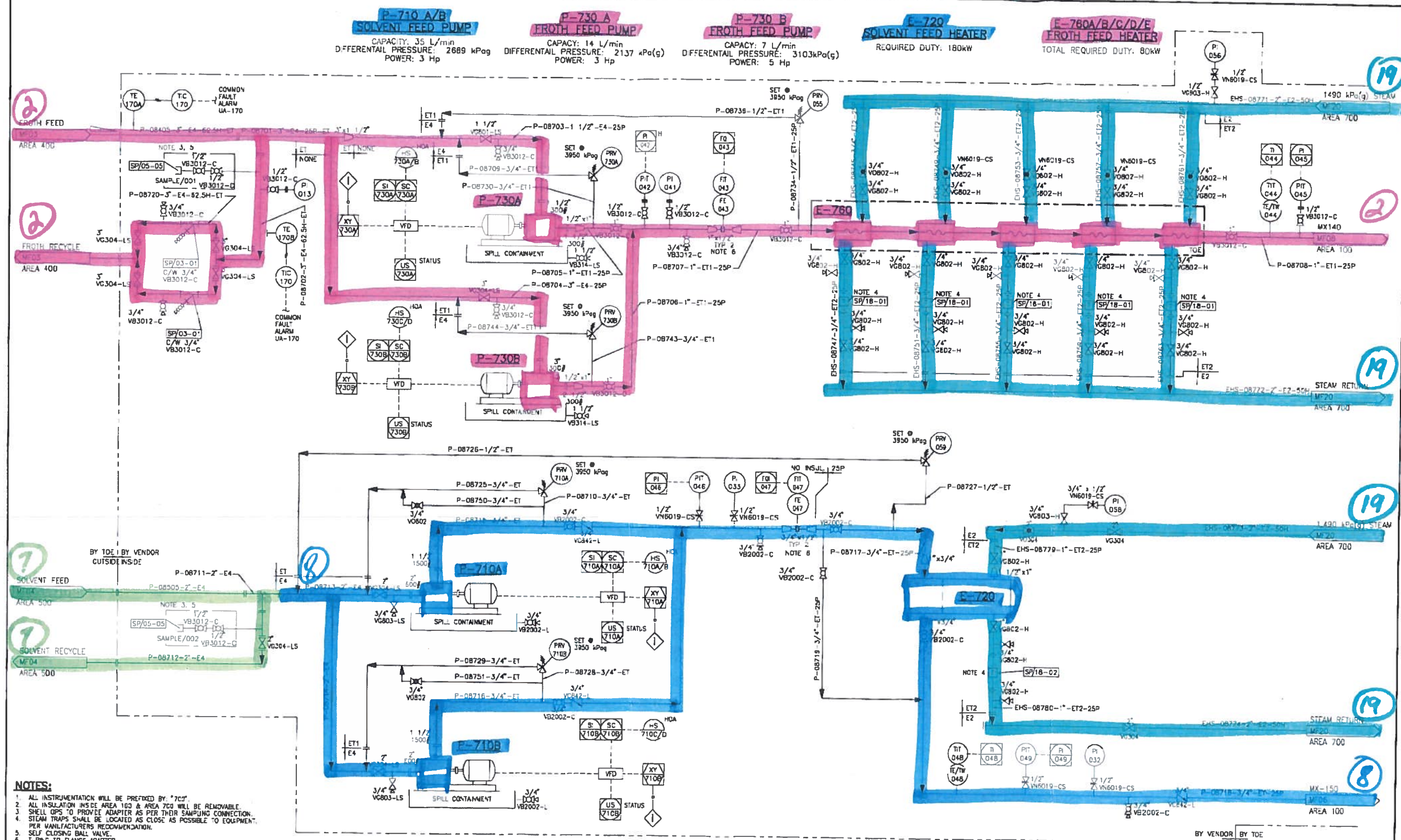
- NOTES:**
1. ALL INSTRUMENTATION WILL BE PREFIXED BY: "500"
 2. CLEAN-OUT.
 3. REFER TO P&ID XX-XX-MF18 AND S/D KEY FOR H.H. SHUT DOWN.
 4. SOLVENT RECYCLE INLET CLOSE TO TANK BOTTOM.
 5. LAH-024 TO SHUT DOWN P-520 LAH-024 TO SHUT DOWN P-550 REFER TO SD KEY.
 6. PVC 251 TO BE SHIPPED LOOSE.

NO.	DATE	BY	CHKD	DESCRIPTION	ISSUES / REVISIONS
D4	08 APR 07	JRP	ONK	ISSUED FOR DESIGN	
D3	08 FEB 04	GR	EG	ISSUED FOR DESIGN	
D2	08 OCT 24	ROM	JRP	ISSUED FOR DESIGN	
D1	08 MAY 30	FOS	JRP	ISSUED FOR DESIGN	
C1	08 APR 30	FOS	JRP	ISSUED FOR HAZOP	
B1	08 APR 15	FOS	JRP	ISSUED FOR CLIENT REVIEW	
A1	08 APR 10	FOS	JRP	ISSUED FOR INTERNAL REVIEW	

DESIGN/DRFT	LEAD DISCIPLINE	PROJECT LEAD	PROJECT MANAGER
JRP	JMS	NU	KYN
JRP	JMS	NU	KYN
JRP	DJA	RCU	KYN
JRP	DJA	RCU	KYN
JRP	DJA	RCU	TAM
JRP	DJA	RCU	JTD
JRP	DJA		

PROFESSIONAL STAMP
ASRC ENERGY SERVICES TRI OCEAN ENGINEERING LTD. APEGGA PERMIT P2034

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SHELL CANADA LIMITED COMPLEX ALBERTA	
TITLE FROTH TREATMENT TEST FACILITY AREA 500 SOLVENT TANK AREA PIPING & INSTRUMENTATION DIAGRAM (P&ID)	
OWN BY FGS	DATE 2008 MAR 29
SCALE NTS	CODE FILE 00401-0SA0
TCE DRG No. 08207-0-DG-BC-00004.01	
REV. D4	
XX-XX-MF04	



NO.	DATE	ORIG.	CHK'D	DESCRIPTION
04	09 APR 07	JRP	CMK	ISSUED FOR DESIGN
03	09 FEB 04	JRP	EC	ISSUED FOR DESIGN
02	08 OCT 24	ROM	JRP	ISSUED FOR DESIGN
01	08 MAY 30	FOS	JRP	ISSUED FOR DESIGN
C1	08 APR 30	FOS	JRP	ISSUED FOR HAZOP
B1	08 APR 15	FOS	JRP	ISSUED FOR CLIENT REVIEW
A1	08 APR 10	FOS	JRP	ISSUED FOR INTERNAL REVIEW

DESIGN/PROJECT CO-ORDINATOR	LEAD DISCIPLINE	PROJECT LEAD	PROJECT MANAGER
JRP	JRS	MJ	KYN
JRP	JWS	MJ	KYN
JRP	DJA	RCU	KYN
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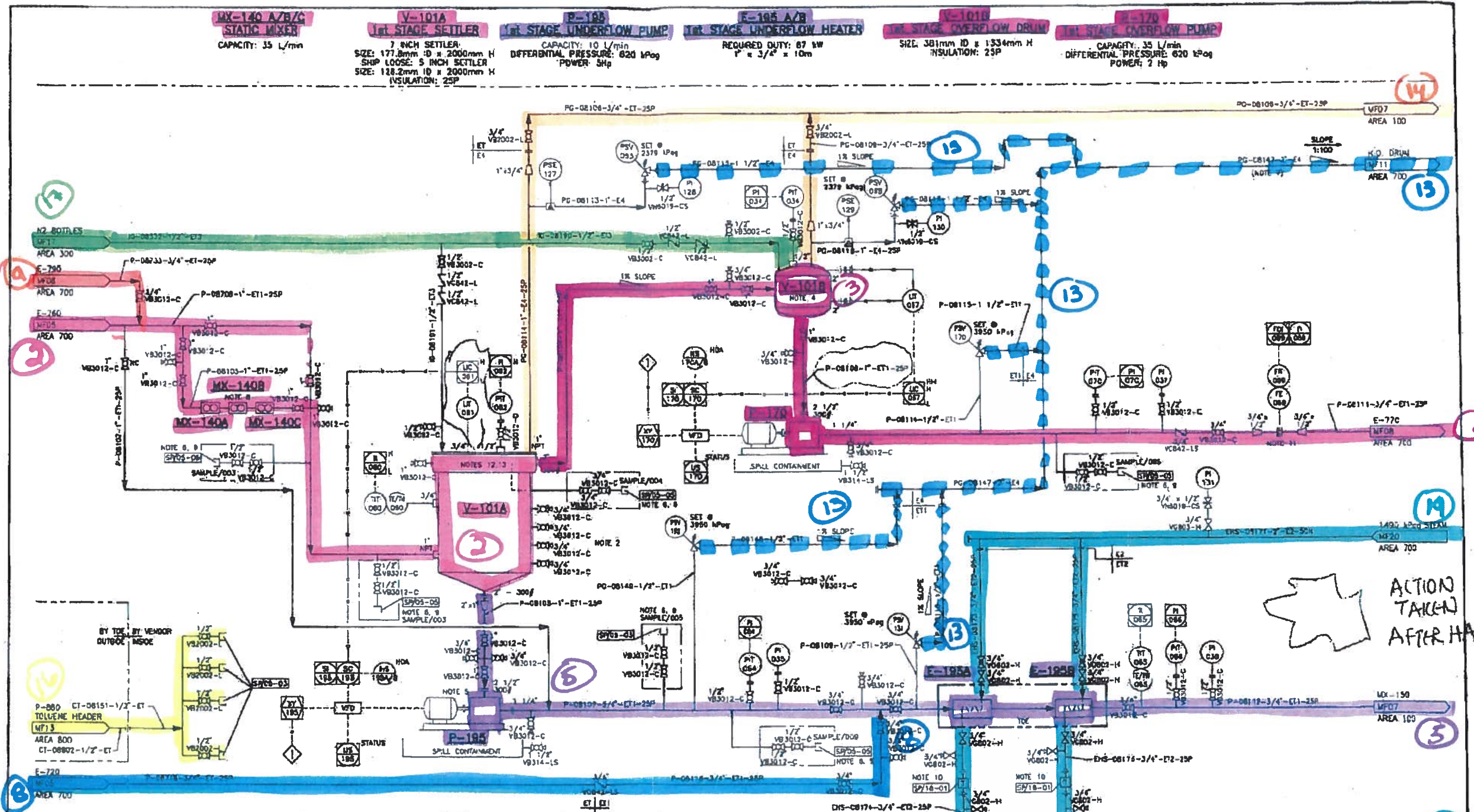
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TITLE: **FROTH TREATMENT TEST FACILITY
AREA 700 FROTH / SOLVENT PUMP AREA
PIPING & INSTRUMENTATION DIAGRAM (P&ID)**

DRW. BY	DATE	TOC DWG. NO.	REV.
FGS	2008 MAR 28	08207-0-DG-BC-00005.01	
SCALE	DWG. FILE	SHELL DWG. NO.	
NTS	00501-OSBY	XX-XX-MF05	D4



- NOTES**
1. ALL INSTRUMENTATION WILL BE PREFIXED BY "100".
 2. SAMPLE POINTS EVERY 18 INCH.
 3. ALL INSTRUMENTATION INSIDE AREA 100 & AREA 700 WILL BE REMOVABLE.
 4. BASED ON ELEVATION SHOWN TO BRAG.
 5. LOCATE P-185 AS CLOSE TO V-101A AS POSSIBLE.
 6. SHIELD OPS TO PROVIDE ADAPTER AS PER THEIR SAMPLING BOTTLE CONNECTION.
 7. DO NOT POCKET.
 8. MX-140A/B/C ARE VERTICALLY ORIENTED.
 9. SELF CLOSING BALL VALVES.

10. STEAM TRIPS SHOULD BE LOCATED AS CLOSE AS POSSIBLE TO EQUIPMENT. PER MANUFACTURERS RECOMMENDATION.
11. TUBING TO FLANGE ADAPTER.
12. LOCATE V-101A AT EDGE OF BUILDING FOOT.
13. ACCESS AROUND VESSEL NEEDS TO BE CONSIDERED FOR REMOVAL / INSTALLATION / MAINTENANCE.

DATE	BY	DESCRIPTION
02 FEB 04	OP	REQUIRED FOR DESIGN
02 OCT 04	ROM	REQUIRED FOR DESIGN
01 MAR 06	JLS	ISSUED FOR DESIGN
01 APR 06	FDS	ISSUED FOR HAZOP
01 APR 06	FDS	ISSUED FOR CLIENT REVIEW
01 APR 10	FDS	ISSUED FOR INTERNAL REVIEW

NO.	DATE	BY	DESCRIPTION
1	02 FEB 04	OP	REQUIRED FOR DESIGN
2	02 OCT 04	ROM	REQUIRED FOR DESIGN
3	01 MAR 06	JLS	ISSUED FOR DESIGN
4	01 APR 06	FDS	ISSUED FOR HAZOP
5	01 APR 06	FDS	ISSUED FOR CLIENT REVIEW
6	01 APR 10	FDS	ISSUED FOR INTERNAL REVIEW

DESIGNER	LEAD ENGINEER	PROJECT LEAD	PROJECT MANAGER
JJP	JUN	ML	RYN
JJP	BAH	REJ	RYN
JJP	BAH	REJ	RYN
JJP	BAH	REJ	RYN
JJP	BAH	REJ	RYN
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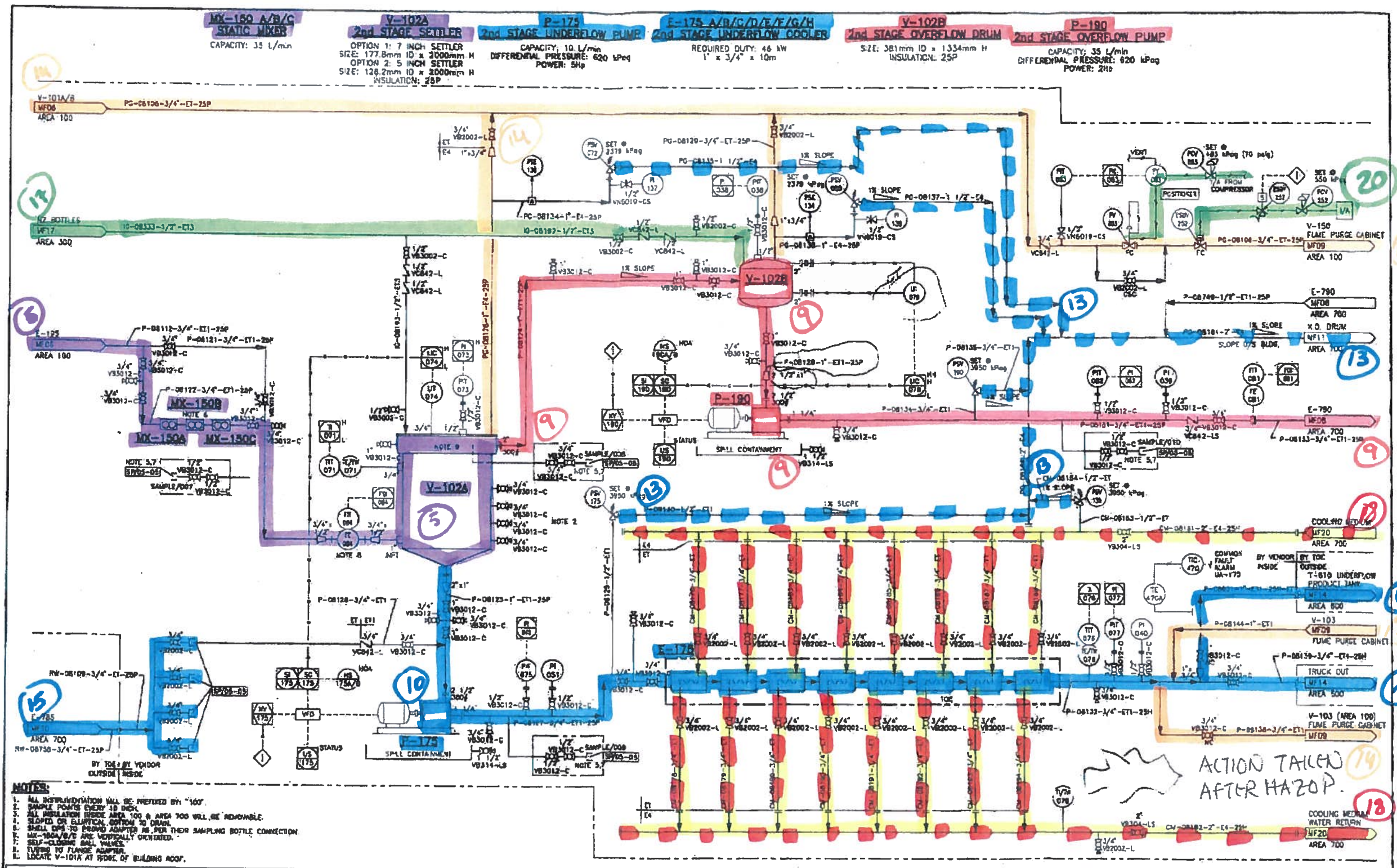
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ASRC ENERGY SERVICES TRI OCEAN ENGINEERING LTD APEGA PERMIT P2034

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FROTH TREATMENT TEST FACILITY
AREA 100 FROTH TREATMENT PROCESS PILOT PLANT
PIPING & INSTRUMENTATION DIAGRAM (P&ID)

PROJECT: FDS DATE: 2008 MAR 31
SCALE: MTS DATE FILE: 0801-DEA7
PROJECT NO: 08207-0-DG-BC-00008.01
SHEET NO: XX-XX-MF08

REV: 03



- NOTES:**
1. ALL INSTRUMENTATION WILL BE PROVIDED BY "100".
 2. SAMPLE POINTS EVERY 10 INCH.
 3. ALL INSULATION INSIDE AREA 100 & AREA 700 WILL BE REMOVABLE.
 4. SLOPED OR ELIPTICAL BOTTOM TO DRAIN.
 5. SHALL USE 70 POUND ADAPTER FOR THEIR SAMPLING BOTTLE CONNECTION.
 6. MX-150A/B/C ARE VERTICALLY ORIENTED.
 7. SELF-CLOSING BALL VALVES.
 8. TURN TO FLANGE ADAPTER.
 9. LOCATE V-101A AT ROOF OF BUILDING ROOF.

NO.	DATE	BY	CHKD	DESCRIPTION
06	08 FEB 04	GR	GR	REVISED FOR DESIGN
02	08 OCT 04	GR	GR	REVISED FOR DESIGN
01	08 MAY 04	TRG	JPP	ISSUED FOR DESIGN
01	08 APR 04	TRG	JPP	ISSUED FOR DESIGN
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A1	08 APR 10	TRG	JPP	REVISED FOR INTERNAL REVIEW

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02	08 OCT 04	GR	GR	REVISED FOR DESIGN
01	08 MAY 04	TRG	JPP	ISSUED FOR DESIGN
01	08 APR 04	TRG	JPP	ISSUED FOR DESIGN
01	08 APR 04	TRG	JPP	ISSUED FOR CLIENT REVIEW
A1	08 APR 10	TRG	JPP	REVISED FOR INTERNAL REVIEW

NO.	DATE	BY	CHKD	DESCRIPTION
06	08 FEB 04	GR	GR	REVISED FOR DESIGN
02	08 OCT 04	GR	GR	REVISED FOR DESIGN
01	08 MAY 04	TRG	JPP	ISSUED FOR DESIGN
01	08 APR 04	TRG	JPP	ISSUED FOR DESIGN
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NO.	DATE	BY	CHKD	DESCRIPTION
06	08 FEB 04	GR	GR	REVISED FOR DESIGN
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01	08 MAY 04	TRG	JPP	ISSUED FOR DESIGN
01	08 APR 04	TRG	JPP	ISSUED FOR DESIGN
01	08 APR 04	TRG	JPP	ISSUED FOR CLIENT REVIEW
A1	08 APR 10	TRG	JPP	REVISED FOR INTERNAL REVIEW

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COMPLEX ALBERTA

FROTH TREATMENT TEST FACILITY
AREA 100 FROTH TREATMENT PROCESS PILOT PLANT
PIPING & INSTRUMENTATION DIAGRAM (P&ID)

NO.:	DATE:	REV. NO.:
001	3008 MAR 31	001
SCALE:	DATE:	SCALE:
1/8" = 1'-0"	00201-00AF	XX-XX-MF07

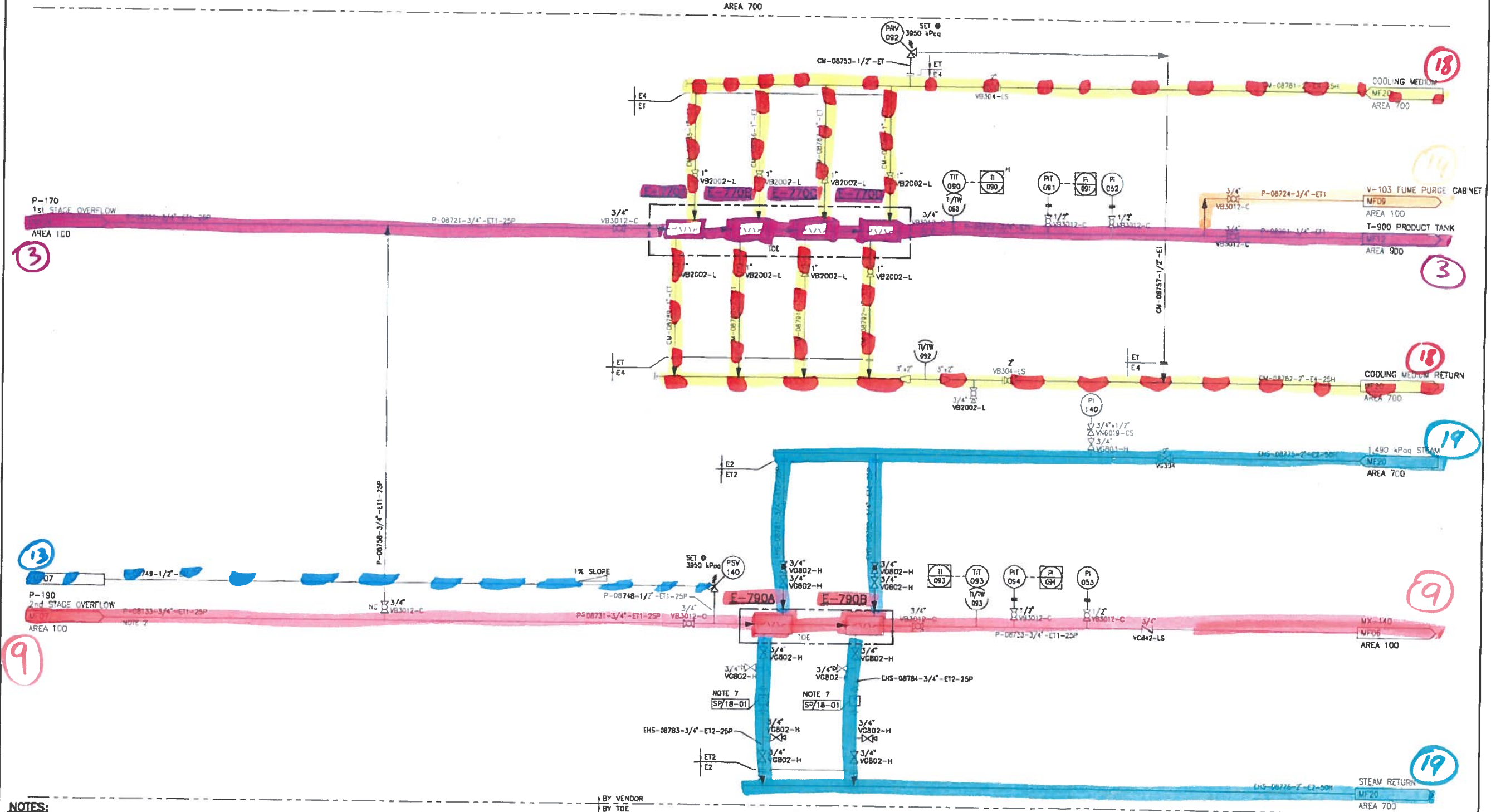
D3

E-790A/B
2nd STAGE OVERFLOW HEATER

REQUIRED DUTY: 135 kW
1" x 3/4" COILS x 10m

E-790A/B/C/D
1st STAGE OVERFLOW COOLER

REQUIRED DUTY: 100 kW
1 1/2" x 1" COILS x 10m



- NOTES:**
1. ALL INSTRUMENTATION WILL BE PREFIXED BY "703".
 2. ALL INSULATION INSIDE AREA 100 & AREA 700 WILL BE REMOVABLE.
 3. STEAM TRAP TO BE LOCATED AS CLOSE AS POSSIBLE TO EQUIPMENT.

NO.	DATE	BY	CHKD	DESCRIPTION
D4	09 APR 07	DMK	JRP	ISSUED FOR DESIGN
D3	09 FEB 04	GR	EG	ISSUED FOR DESIGN
D2	08 OCT 24	ROM	JRP	ISSUED FOR DESIGN
D1	08 MAY 30	TJC	JRP	ISSUED FOR DESIGN
C1	08 APR 30	FGS	JRP	ISSUED FOR HAZOP
B1	08 APR 15	FGS	JRP	ISSUED FOR CLIENT REVIEW
A1	08 APR 10	FGS	JRP	ISSUED FOR INTERNAL REVIEW

ISSUES / REVISIONS	DESCRIPTION

DESIGN/DRAFT	CO-ORDINATOR	LEAD DISCIPLINE	PROJECT LEAD	PROJECT MANAGER
JRP	DJA	RCU	KYN	
JRP	DJA	RCU	KYN	
JRP	DJA	RCU	KYN	
JRP	DJA	RCU	TAM	
JRP	DJA	RCU	JTD	
JRP	DJA			

PROFESSIONAL STAMP

ASRC ENERGY SERVICES
TRI OCEAN ENGINEERING LTD.
APEGA PERMIT P2034

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TRI ALLIANCE

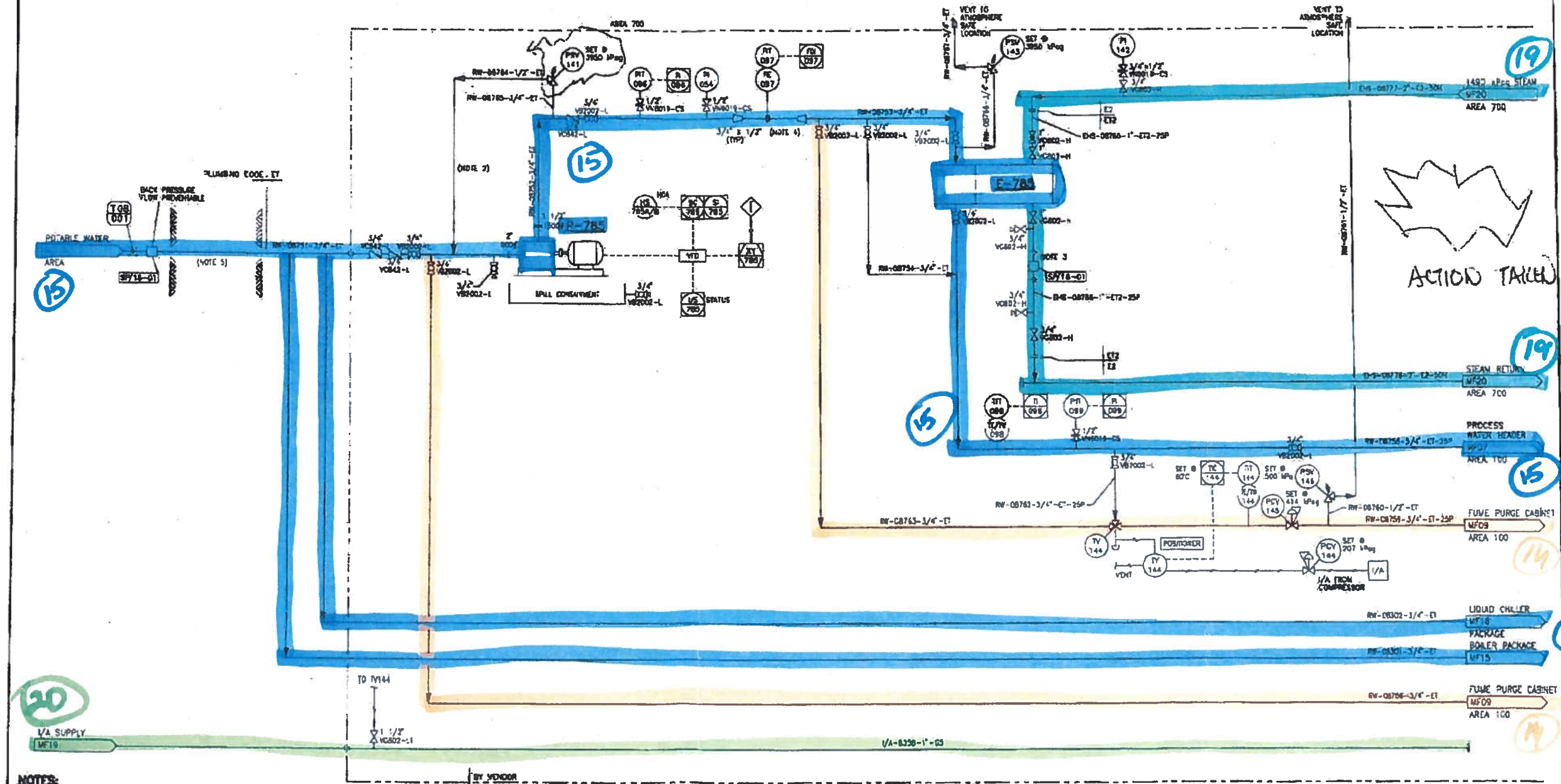
SHELL CANADA LIMITED
COMPLEX
ALBERTA

TITLE
**FROTH TREATMENT TEST FACILITY
AREA 700 FROTH / SOLVENT PUMP AREA
PIPING & INSTRUMENTATION DIAGRAM (P&ID)**

DESIGNED BY	DATE	SCALE	REV.
FGS	2008 MAR 29	NTS	D4
CADD FILE	00801-05A6	SHELL DWG. NO.	08207-0-DG-BC-00008.01
SCALE	NTS	SHELL DWG. NO.	XX-XX-MF08

**P-785
PROCESS WATER PUMP**
CAPACITY: 10 L/min
OFF. PRESS: 2688 kPa
POWER: 2 Hp

**E-785
PROCESS WATER HEATER**
REQUIRED DUTY: 44kW

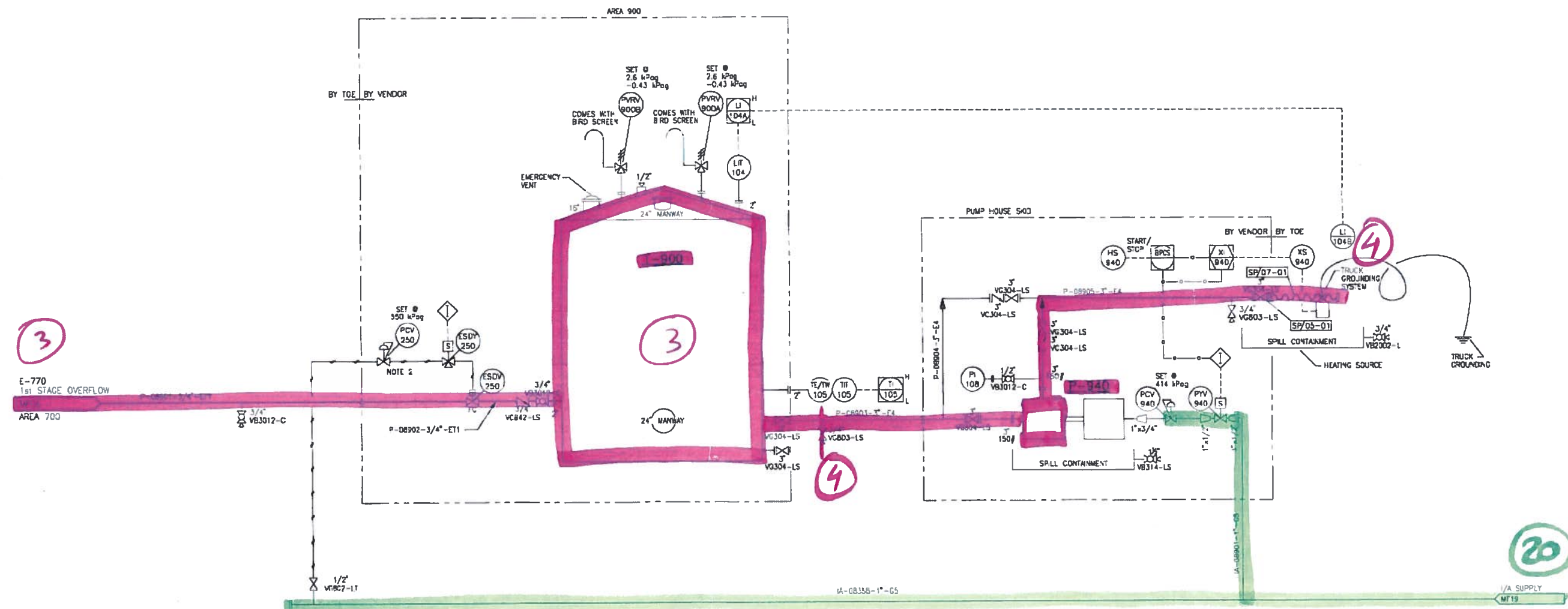


- NOTES:**
1. ALL INSTRUMENTATION WILL BE PROVIDED "FOU".
 2. ALL INSULATION INSIDE AREA 100 & AREA 700 SHALL BE REMOVABLE.
 3. STEAM TRAYS TO BE COVERED AS CLOSE AS POSSIBLE TO EQUIPMENT.
 4. 10 PIPE DIAMETERS UPSTREAM & PIPE DIAMETERS DOWNSTREAM.
 5. LINE TO BE BUILT UNDER EXISTING PAVING COOLS.

REVISIONS		DESCRIPTION		PROPOSED STAMP			
NO.	DATE	BY	CHKD.	NO.	DATE	BY	CHKD.
03	20 FEB 04	GR	GR	ISSUED FOR DESIGN	JIP	JUB	HJ
02	20 OCT 04	GRM	JIP	ISSUED FOR DESIGN	JIP	BAH	REU
01	20 MAY 04	FEB	JIP	ISSUED FOR DESIGN	JIP	BAH	REU
01	20 APR 04	TAB	JIP	ISSUED FOR DESIGN	JIP	BAH	REU
01	20 APR 04	FEB	JIP	ISSUED FOR CLIENT REVIEW	JIP	BAH	REU
01	20 APR 04	FEB	JIP	ISSUED FOR INTERNAL REVIEW	JIP	BAH	REU
DESIGNER		CHECKER		PROJECT MGR		ASRC ENERGY SERVICES TRIOCEAN ENGINEERING LTD. APEACA PERMIT P2034	
DRAWN		REVISED		PROJECT MGR		SHELL FROTH TREATMENT TEST FACILITY AREA 700 FROTH / SOLVENT PUMP AREA PIPING & INSTRUMENTATION DIAGRAM (P&ID)	
DATE		BY		DATE		SHEET NO: 01001-02A2 PROJECT NO: 06207-0-00-BC-00010.01 DRAWING NO: XX-XX-MF10	

P-800
PRODUCT TANK
 SIZE: 4724mm ODx4877mm H -500361
 DESIGN: ATM
 INSULATION: 37.5mm
 CONSTRUCTION: SINGLE WALL STEEL

P-940
PRODUCT TANK TRUCK
LOADING PUMP
 CAPACITY: 600 L/min
 DIFF. PRESS: 150kPa
 POWER: BY AIR



- NOTES:**
1. ALL INSTRUMENTATION WILL BE PREFIXED BY: "800".
 2. PCV-250 TUBE SHIPPED LOOSE.

NO.	DATE	DRW.	CHK'D	DESCRIPTION	DESIGN/CHART CO-ORDINATOR	LEAD COORDINATOR	PROJECT LEAD	PROJECT MANAGER
D4	08 APR 07	OMK	JRP	RE-ISSUED FOR DESIGN	JRP	JNS	NU	KYN
D3	08 FEB 04	GR	EG	REISSUED FOR DESIGN	JRP	JNS	NU	KYN
D2	08 OCT 24	ROM	JRP	REISSUED FOR DESIGN	JRP	DJA	RCU	KYN
D1	08 MAY 30	FGS	JRP	ISSUED FOR DESIGN	JRP	DJA	RCU	KYN
C1	08 APR 30	TJG	JRP	ISSUED FOR HAZOP	JRP	DJA	RCU	TAM
B1	08 APR 15	FGS	JRP	ISSUED FOR CLIENT REVIEW	JRP	DJA	RCU	JTD
A1	08 APR 10	FGS	JRP	ISSUED FOR INTERNAL REVIEW	JRP	DJA		

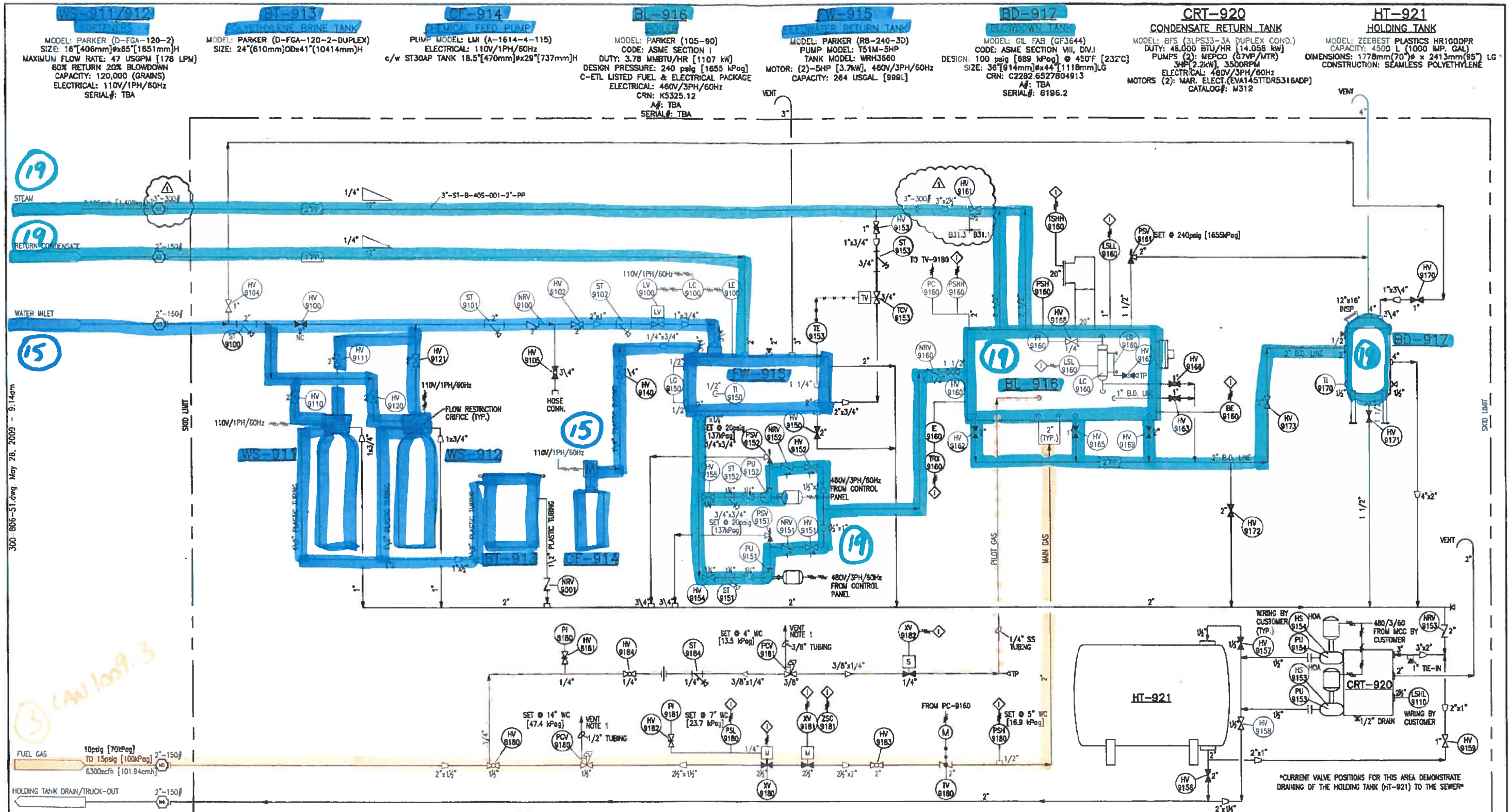
PROFESSIONAL STAMP	DATE	SCALE	FILE	TOE DWG. NO.	REV.
ASRC ENERGY SERVICES TRI OCEAN ENGINEERING LTD APEGGA PERMIT P2034	2008 MAR 29	NTS	01201-05A3	08207-0-DG-BC-00012.01	D4

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 ALBERTA

FILE
FROTH TREATMENT TEST FACILITY
AREA 900 PRODUCT TANK AREA
PIPING & INSTRUMENTATION DIAGRAM (P&ID)

DWG. NO. FGS
 DATE 2008 MAR 29
 SCALE NTS
 FILE 01201-05A3
 SHELL DWG. NO. 08207-0-DG-BC-00012.01
 XX-XX-MF12



300-806-51.dwg, May 28, 2009 - 9:14am

3) CAW 1009.3

CURRENT VALVE POSITIONS FOR THIS AREA DEMONSTRATE DRAINING OF THE HOLDING TANK (HT-921) TO THE SEWER

REFERENCE DRAWINGS
100-806-51 GENERAL ARRANGEMENT DRAWINGS
BILL OF MATERIALS

GENERAL NOTES
1. FUEL GAS VENT VALVES, PRESSURE REGULATOR VENTS, AND RELIEF VALVE VENTS TO BE PIPED TO SAFE AREA.
<ul style="list-style-type: none"> ○ LOCAL MOUNTED ◇ FLAME SAFEGUARD INTERLOCK — ELECTRICAL WIRING —*— CAPILLARY
THIS DOCUMENT CONTAINS MATERIAL AND/OR INFORMATION WHICH IS PROPERTY OF HTH HEATECH INC. AND SUPPLIED ONLY ON A CONFIDENTIAL BASIS. NO TRANSMITTAL OR DISCLOSURE SHALL BE MADE TO ANY PERSON, FIRM OR CORP. WITHOUT THE PRIOR WRITTEN APPROVAL OF HTH HEATECH INC.

REVISIONS			
ISSUED FOR CONSTRUCTION			
HTH: BY <i>[Signature]</i> DATE MAY 28 2009			
NO.	BY	CHK'D	DESCRIPTION
1	FO	SM	REVISED PER MARK-UPS OF 09-05-07, ISSUED FOR CONSTRUCTION
0	FO	JM	REVISED PER MARK-UPS OF 09-04-24, ISSUED FOR CONSTRUCTION
B	FO	JM	ISSUED FOR APPROVAL / REVIEW PER MARK-UPS OF 03-03-05
A	FO	JM	ISSUED FOR APPROVAL / REVIEW
NO.	BY	CHK'D	DESCRIPTION

CUSTOMER TAG NO.	TBA
CUSTOMER PROJECT NO.	TBA
CUSTOMER PO NO.	082020059
DRAWN BY	FO
DATE	09-02-17
APPROVED BY	JM
DATE	09-02-17
PROJECT CO.	HC
HTH TAG NO.	
HTH JOB NO.	HTH-806-51 [393]

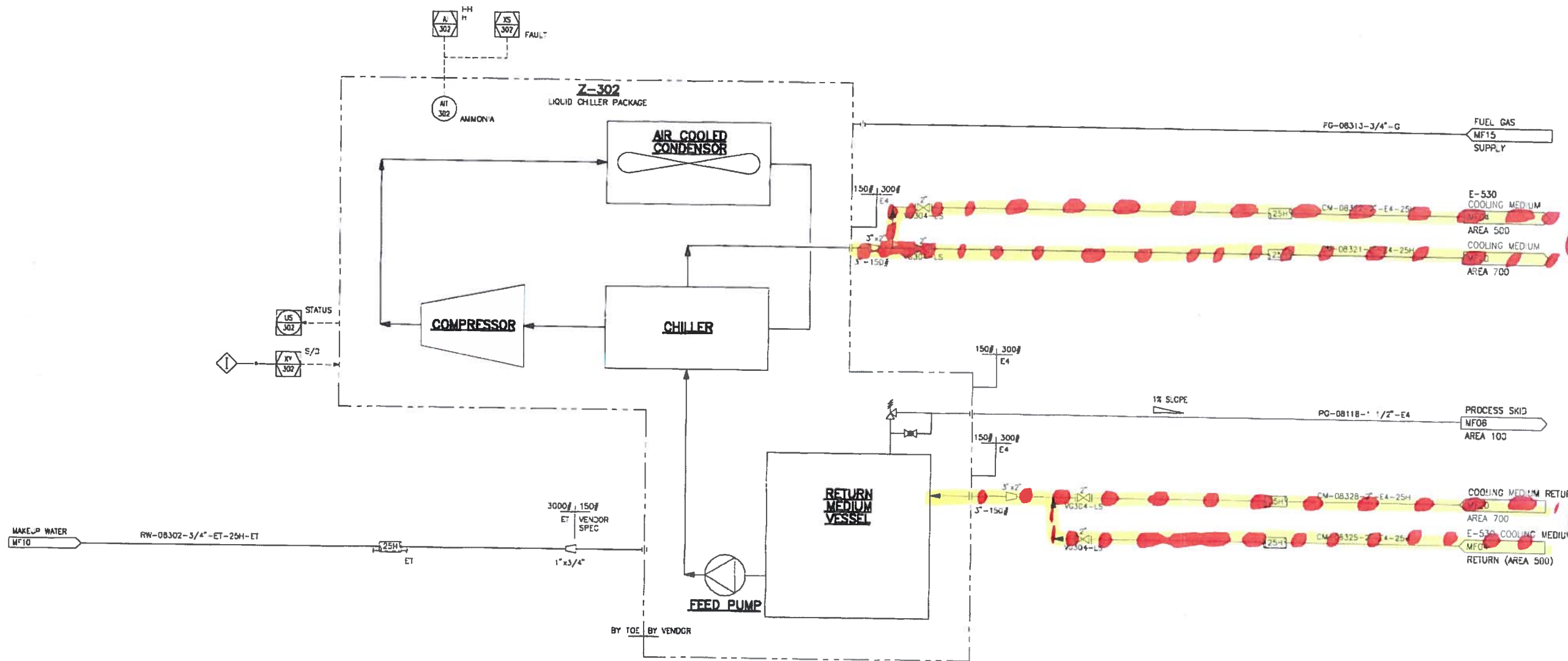
HEATECH

HTH HEATECH INC.
CALGARY, ALBERTA, CANADA

TITLE	
PROCESS AND INSTRUMENTATION DIAGRAM	
END USER/CUSTOMER	SHELL CANADA c/o TARPON ENERGY SERVICES LTD.
PROJECT/LOCATION	SHELL CANADA FROTH TREATMENT TESTING FACILITY ALBERTA
SCALE	N.T.S.
DRAWING NO.	300-806-51
REV	1

**Z-302
LIQUID CHILLER PACKAGE**

DUTY: 294 kw/h
CAPACITY: 13,000 kg/h



NO.	DATE	BY	CHKD	DESCRIPTION
D4	08 APR 07	JRP	ONK	REISSUED FOR DESIGN
D3	08 FEB 04	JRP	EG	REISSUED FOR DESIGN
D2	08 OCT 24	ROM	JRP	REISSUED FOR DESIGN
D1	08 MAY 30	FGS	JRP	ISSUED FOR DESIGN
C1	08 APR 30	TJO	JRP	ISSUED FOR HAZOP
B1	08 APR 15	FOS	JRP	ISSUED FOR CLIENT REVIEW
A1	08 APR 10	FGS	JRP	ISSUED FOR INTERNAL REVIEW

DESIGN/DRAWN/CD/OPERATOR	LEAD DISCIPLINE	PROJECT LEAD	PROJECT MANAGER
JRP	JWS	NU	KYN
JRP	JWS	NU	KYN
JRP	DJA	RCU	KYN
JRP	DJA	RCU	KYN
JRP	DJA	RCU	TAM
JRP	DJA	RCU	JTD
JRP	DJA	RCU	-

DATE	BY	FOR	SCALE
2008 APR 09	FGS	DATE	NTS

PROJECT NO.	SCALE	DATE	BY
08207-0-DG-BC-00016.01	NTS	2008 APR 09	FGS

NO.	DATE	BY	CHKD	DESCRIPTION
1				ISSUES / REVISIONS

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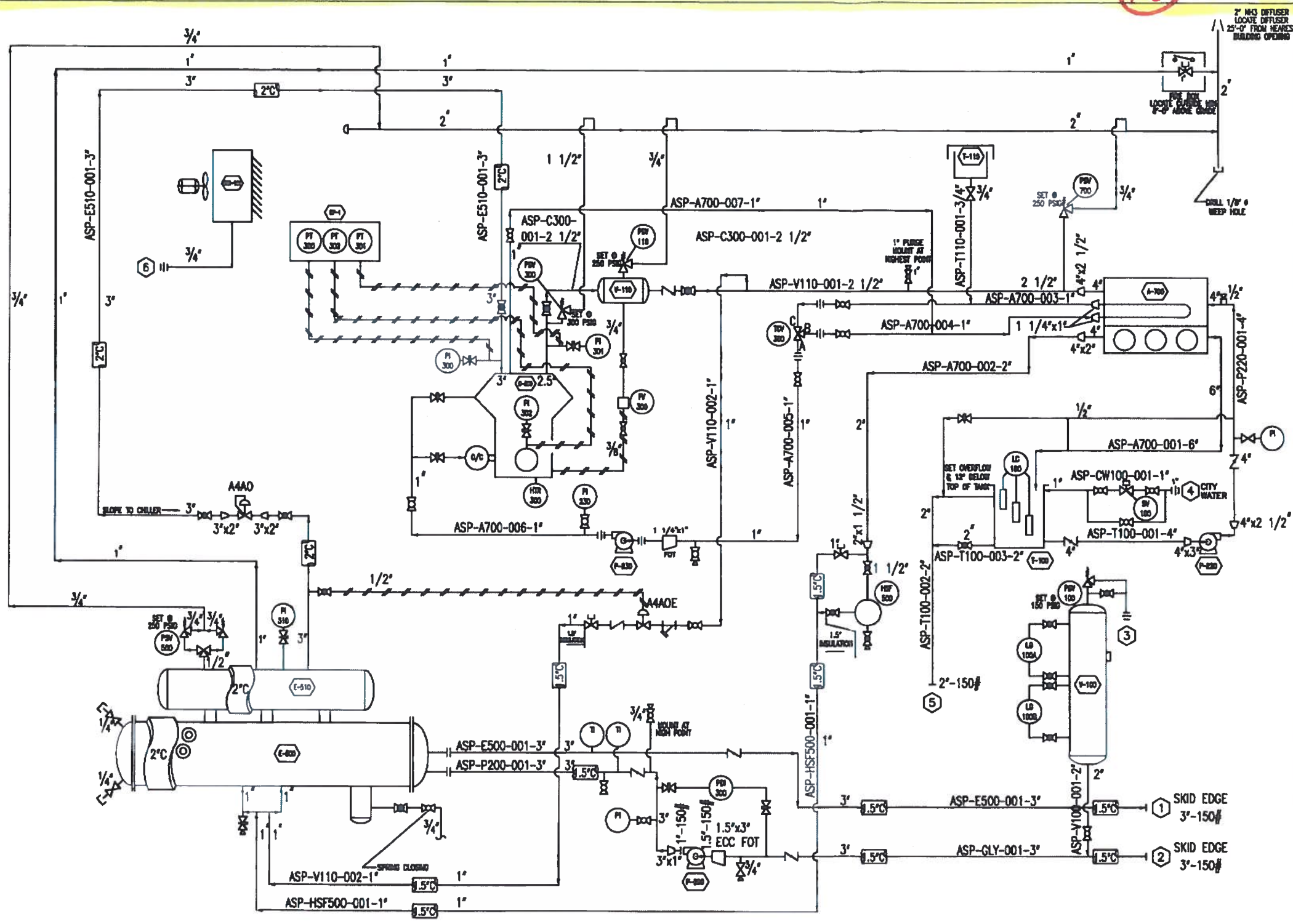
SHELL CANADA LIMITED
COMPLEX
ALBERTA

TITLE: FROTH TREATMENT TEST FACILITY
AREA 300 - CHILLER
PIPING & INSTRUMENTATION DIAGRAM (P&ID)

ASRC ENERGY SERVICES
TRI OCEAN ENGINEERING LTD
APEGGA PERMIT P2034


PROJECT NO.: 08207-0-DG-BC-00016.01
SCALE: NTS
DATE: 2008 APR 09
BY: FGS

REV: D4



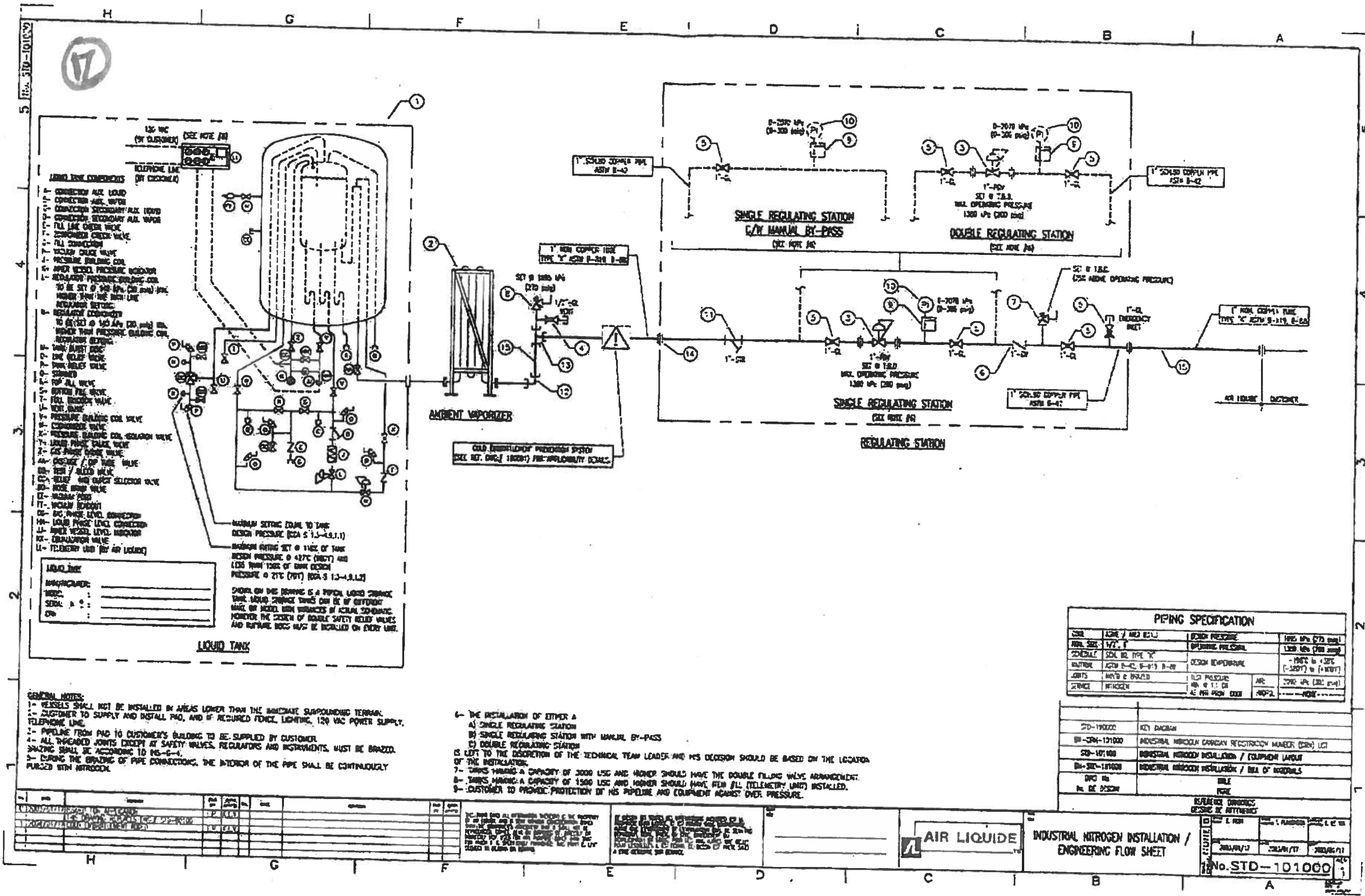
- UNIT EQUIPMENT**
- C-300 COMPRESSOR; MYCOM MODEL M94
 - A-700 CONDENSER; BALTIMORE AROCLOR EVAPORATIVE CONDENSER MODEL CHAMBER CIRCUIT A 1200 MMH @ 85°F SAT, 85°F WB. CIRCUIT B 10 USGPM FROM 85°F TO 85°F @ 85°F WB.
 - F-200 CHILLER GLYCOL PUMP; SUMMIT AMS CENTRIFUGAL PUMP MODEL 2186ST0 1 1/2 1.5-8 c/w 15 HP TOSHIBA TEFC 3800 RPM ELECTRIC MOTOR.
 - F-220 CONDENSER WATER PUMP; ARMSTRONG MODEL 4030 3x2.5x8 180 USGPM @ 25 FEET TDH c/w 2 HP TOSHIBA TEFC 1800 RPM ELECTRIC MOTOR.
 - F-230 COMPRESSOR GLYCOL COOLING PUMP; OULOU MODEL MPE 18T
 - E-800/510 GLYCOL CHILLER; DOCAL MODEL DL80M-17-132-8
 - T-100 CONDENSER WATER TANK; ZEEBEST MODEL LTB30 LOAF TANK.
 - T-110 COMPRESSOR GLYCOL COOLING EXPANSION TANK.
 - V-100 GLYCOL EXPANSION TANK 24" OD x 88", 150 PSIG DWP.
 - V-110 CHILSON MODEL C06 140 COALESCING OIL SEPARATOR.
 - CP-1 MYCOM MYPRO MICROPROCESSOR
 - HTR-100 RAZOR MODEL UDAS SIZE 45 SEPARATED COMBUSTION UNIT HEATER.
- NOTES**
1. REFRIGERATION PIPING CONSTRUCTION: ALL PIPE SA-338 AND SA-1088 SEAMLESS
 2. NH3 STOP VALVE - WELD IN LINE GLOBE VALVES
 3. NH3 PIPE - 2 1/2" & LARGER AS38 ERW SCH 40
- 3" & LARGER SEAMLESS SCH. 40
- SMALLER THAN 3" A1088 SEAMLESS SCH. 80
 4. NH3 FITS - 2" & LARGER SCH 40 A234WP BUTTWELD
- 1 1/2" & SMALLER 2000# SA105 S.W.
 5. ALL ELECTRICAL ENCLOSURES TO BE CORN WEATHER TIGHT
 6. DRP PIPING SYSTEMS 250 PSIG LOW SIDE / 250 PSIG HIGH SIDE
DWP PIPING SYSTEMS LOW SIDE -20 / 220°F
HIGH SIDE -20 / 220°F
 7. OPERATING CHARGE: NH3 (SYSTEM) 500 LBS
 8. TEST PRESSURE: (PUMP ONLY) 275 PSI HIGH SIDE, PER SERVICE
 9. VENTILATION REQUIREMENTS: - 300 CFM CONTINUOUS
- 2250 CFM EMERGENCY.
- LEGEND**
- | | |
|--|---------------------------|
| AS AIR SUPPLY | TCV THERMAL CONTROL VALVE |
| C COMPRESSOR | TI TEMPERATURE INDICATOR |
| CCO COMPRESSOR DIFFERENTIAL OIL CUTOFF | VS VIBRATION SWITCH |
| DCO HIGH DISCHARGE TEMPERATURE CUTOFF | |
| F FILTER | |
| FDEL FILTER DIFFERENTIAL PRESSURE CUTOFF | |
| HTR HEATER | |
| HPCO HIGH DISCHARGE PRESSURE CUTOFF | |
| HTCO HIGH OIL TEMPERATURE CUTOFF | |
| LLCO LOW OIL SEPARATOR LEVEL CUTOFF | |
| LPCC LOW SUCTION PRESSURE CUTOFF | |
| LTCO LOW OIL TEMPERATURE CUTOFF | |
| M MOTOR | |
| OPS LOW OIL PRESSURE CUTOFF | |
| P PUMP | |
| PCV PRESSURE CONTROL VALVE | |
| PI PRESSURE INDICATOR | |
| PM PUMP MOTOR | |
| PSV HIGH PRESSURE SAFETY VALVE | |
| SO SIGHT GLASS | |
| SV SOLENOID VALVE C/W PILOT LIGHT | |

REFERENCE DRAWINGS				REVISIONS											
DWG. NO	DESCRIPTION	DWG. NO.	DESCRIPTION	NO.	DATE	BY	AP'D.	DESCRIPTION	ISSUE	NO.	DATE	BY	AP'D.	DESCRIPTION	ISSUE
SRC0802-02	LAYOUT			A	09/01/30	DB	LB	PRELIMINARY							
				0	09/02/12	DB		ISSUED FOR CONSTRUCTION							



STARTEC
REFRIGERATION • COMPRESSION
• PROCESS SOLUTIONS

DATE 08/01/30	DATE 08/01/30	OUTDOOR/PROJECT/LOCATION SHELL CANADA LTD. CALGARY, ALBERTA
DATE 08/01/30	DATE 08/01/30	TITLE AMMONIA REFRIGERATION SYSTEM P. & I.D.
SCALE NTS	ISSUE NO. SRC0802-01	REV. 0



- LEAD THE COMPONENTS**
- 1- CONNECTION AND LEAD CONNECTION AND LEAD CONNECTION SECONDARY AND LEAD TIA LINE CHECK VALVE
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 - 95- CONNECTION SECONDARY AND LEAD CONNECTION SECONDARY AND LEAD TIA LINE CHECK VALVE
 - 96- CONNECTION SECONDARY AND LEAD CONNECTION SECONDARY AND LEAD TIA LINE CHECK VALVE
 - 97- CONNECTION SECONDARY AND LEAD CONNECTION SECONDARY AND LEAD TIA LINE CHECK VALVE
 - 98- CONNECTION SECONDARY AND LEAD CONNECTION SECONDARY AND LEAD TIA LINE CHECK VALVE
 - 99- CONNECTION SECONDARY AND LEAD CONNECTION SECONDARY AND LEAD TIA LINE CHECK VALVE
 - 100- CONNECTION SECONDARY AND LEAD CONNECTION SECONDARY AND LEAD TIA LINE CHECK VALVE

LIQUID LINE

INSTRUMENT	_____
WIRE	_____
SOLE	_____
OR	_____

DESIGN SETTING EQUAL TO TANK DESIGN PRESSURE (SEE S 1.3-4.1.1)

DESIGN SETTING SET @ 1/2 OF TANK DESIGN PRESSURE @ 427°C (800°F) AND LESS THAN 1/2 OF TANK DESIGN PRESSURE @ 21°C (70°F) (SEE S 1.3-4.1.1.2)

SHOULD ON THIS DRAWING IS A PIPING LEAD TO CHECK TANK LEAD CHECK VALVE CAN BE OF DIFFERENT MAKE OR MODEL WITH VARIANCES IN ACTUAL CONNECTIONS. HOWEVER THE DESIGN OF DOUBLE SAFETY RELIEF VALVES AND RETURN BOSS MUST BE INSTALLED ON EVERY LINE.

- GENERAL NOTES:**
- 1- VESSELS SHALL NOT BE INSTALLED IN AREAS LOWER THAN THE IMMEDIATE SURROUNDING TERRAIN.
 - 2- CUSTOMER TO SUPPLY AND INSTALL PAD, AND IF REQUIRED FENCE, LIGHTING, 120 VAC POWER SUPPLY, TELEPHONE LINE.
 - 3- PIPELINE FROM PAD TO CUSTOMER'S BUILDING TO BE SUPPLIED BY CUSTOMER.
 - 4- ALL TRAPPED JOINTS EXCEPT AT SAFETY VALVES, REGULATORS AND INSTRUMENTS, MUST BE BRAZED.
 - 5- BRAZING SHALL BE ACCORDING TO BS-6-4.
 - 6- DURING THE BRAZING OF PIPE CONNECTIONS, THE INTERIOR OF THE PIPE SHALL BE CONTINUOUSLY PURGED WITH NITROGEN.

- 6- THE INSTALLATION OF EITHER A
 - A) SINGLE REGULATING STATION
 - B) SINGLE REGULATING STATION WITH MANUAL BY-PASS
 - C) DOUBLE REGULATING STATION
 IS LEFT TO THE DISCRETION OF THE TECHNICAL TEAM LEADER AND HIS DECISION SHOULD BE BASED ON THE LOCATION OF THE INSTALLATION.
- 7- TANKS HAVING A CAPACITY OF 3000 USG AND HIGHER SHOULD HAVE THE DOUBLE FILLING VALVE ARRANGEMENT.
- 8- TANKS HAVING A CAPACITY OF 1500 USG AND HIGHER SHOULD HAVE FEM (FL TELEMETRY UNIT) INSTALLED.
- 9- CUSTOMER TO PROVIDE PROTECTION OF HIS PIPELINE AND EQUIPMENT AGAINST OVER PRESSURE.

PIPING SPECIFICATION

SIZE	LINE / AND IS/LJ	DESIGN PRESSURE	TEST PRESSURE (SEE S 1.3-4.1.1)
MIN. SIZE	1/2" I	OPERATING PRESSURE	1500 PSIG (100 barg)
GENERAL	SOIL RES. TYPE 'X'	DESIGN TEMPERATURE	-100°F to 130°F (-200°F to 100°F)
MATERIAL	ASTM B-36, B-31.1, B-31.3, B-31.4		
JOINTS	WELD & BRAZED	TEST PRESSURE	1500 PSIG (100 barg)
SERVICE	NITROGEN	MAX. @ 1.5 (SEE S 1.3-4.1.1)	

20-10000	KEY DIAGRAM
20-10100	INDUSTRIAL NITROGEN CAPACITY RESTRICTION MAJOR (MIN) LIT
20-10200	INDUSTRIAL NITROGEN INSTALLATION / EQUIPMENT LAYOUT
20-10300	INDUSTRIAL NITROGEN INSTALLATION / BULK OF MATERIALS
20-10400	FILE
20-10500	FILE

AIR LIQUIDE

INDUSTRIAL NITROGEN INSTALLATION / ENGINEERING FLOW SHEET

No. STD-101000

AIR COMPRESSOR
 QUINCY MODEL QGD-30 SCREW COMPRESSOR
 RATED: 134.9 ACFM @ 125 PSIG
 DRIVER: 30 HP/480V/3/60/TEFC

WET AIR RECEIVER
 VERTICAL TYPE
 CAPACITY: 180 GALLON, 24" X 67" OAL
 200 PSIG MWP

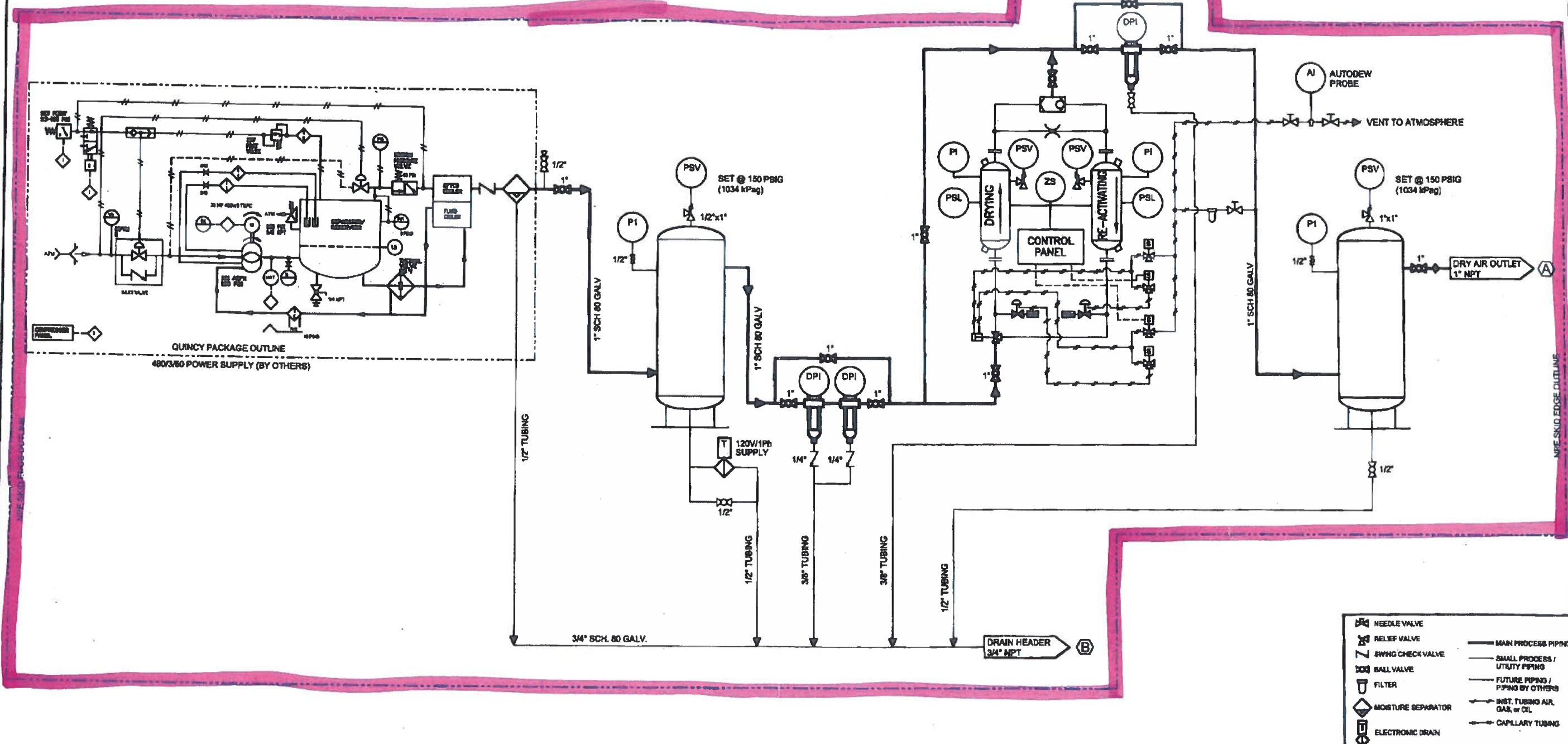
AIR DRYER
 XEBEC MODEL 22HDX10 AUTO DEW
 RATED: 172 SCFM @ 100 PSIG, -60 DEG. F. DEWPOINT
 C/W PREFILTERS WITH AUTODRAIN AND AFTERFILTER
 115V/1/60Hz POWER

DRY AIR RECEIVER
 VERTICAL TYPE
 CAPACITY: 680 GALLON, 42" X 120" OAL
 150 PSIG MWP

SCHEDULE OF OPENINGS

CONN	SIZE/RATING	SERVICE/DESCRIPTION
A	1" - 3000B NPT	AIR OUTLET
B	3/4" - 3000B NPT	DRAIN HEADER

20



NOTES:

1. COMPRESSOR CONTROL PIPING: AS PER QUINCY STANDARDS.
 COMPRESSOR TUBING: PARKER SS FITTINGS WITH 304SS TUBING.
2. DRYER PIPING: THREADED 3000 A105 F.S. FITTINGS WITH A106B PIPE.
3. DRYER CONTROL TUBING: SWAGelok SS FITTINGS WITH 304SS TUBING.
4. NPE INTERCONNECTING PIPING & TUBING:
 - 3000 F.S. A105 THREADED GALVANIZED FITTINGS WITH SCH. 80 A106B SEAMLESS PIPE.
 - SWAGelok SS FITTINGS WITH 316SS TUBING.

	NEEDLE VALVE		MAIN PROCESS PIPING
	RELIEF VALVE		SMALL PROCESS / UTILITY PIPING
	SWING CHECK VALVE		FUTURE PIPING / PIPING BY OTHERS
	BALL VALVE		INST. TUBING AIR, GAS, or OIL
	FILTER		CAPILLARY TUBING
	MOISTURE SEPARATOR		
	ELECTRONIC DRAIN		

National
 Process Equipment
 PUMPS & COMPRESSORS

Receiver - Calgary - Edmonton - Saskatoon - Winnipeg - Toronto - Montreal - Halifax

PROJECT: INSTRUMENT AIR COMPRESSOR PACKAGE
 QUINCY QGD-30 / XEBEC 22HDX10 AutoDEW
 PIPING & INSTRUMENTATION DIAGRAM

CUSTOMER / PROJECT: SHELL - TRI OCEAN - FLINT

LOCATION: FROTH TREATMENT TEST FACILITY AREA 300

JOB: SLS 711216	TRG: 2304	OUT: TAR-15-F-009
DRN: DA	DATE: FEB 28/09	SCALE: EDM 2008 710
CHK: DH	DATE: FEB 27/09	SCALE: NTS
APP: AS	DATE: FEB 22/09	SCALE: 711216-001A