

BOP Configuration and Performance Information

General Summary:

The GSF Development Driller 1 has a Hydril BOP and Hydril BOP Control System with one complete BOP stack and Lower Marine Riser Package as per API Spec 6A & 16D.

BOP:

1 x Hydril 18 ¾ , 15K single ram (LPR)

1 x Hydril 18 ¾ , 15K double ram (MPR & UPR)

1 x Cameron UII 18 ¾ single (super shear ram)

1 x Hydril 18 ¾ , 15K extended double ram (Lower and Upper BSR's)

1 x Hydril GX 18 ¾ 10K annular preventer

LMRP:

1 x Hydril GX 18 ¾ 10K annular preventer

Control System:

Hydril Multiplex Control System

Riser Details:

100 x Kaverner 21" OD clip riser with 1 x 6" ID dual density line (boost), 2 x 4" ID choke and kill line, and 2 x 1.875" ID hydraulic lines, 75ft joints with Class G

Choke and Kill:

4" ID x 15K C&K Manifold H2S Service

Diverter:

Vetgo Gray CSO 20" ID, 500psi WP with 1 x Jurong Shipyard Unlimited 48" OP Mud Gas Separator, 250psi WP with 12" vent line

OPERATOR: BHPB

DATE: August 3th, 2011

RKB-WHD: 6,243ft

WELL: AT617 SA01ST01

FROM RKB TO--
FEET

FROM WHD TO--
Inch FEET

6,188.35

655.83 54.65

Riser Adapter

6,199.41



523.11 43.59

Subsea Flex Joint
(Center of Rotation)

6,201.92



493.00

41.08

Hydril GX 10k Upper Annular



6,209.15



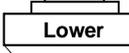
406.20 33.85

Vetco E x F HAR

LMRP DATUM



6,213.42



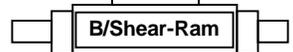
355.00

29.58

Hydril GX 10k Lower Annular



6,220.38

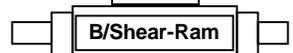


271.47

22.62

Hydril 15k Blind Shear Rams

6,222.72



243.37

20.28

Hydril 15k Blind Shear Rams

6,226.71



195.45

16.29

Cameron Super Shear

6,230.73



147.27

12.27

Hydril 15k 4-1/2" x 7" VBR's

6,233.07



119.17

9.93

Hydril 15k 4-1/2" x 7" VBR's

6,236.98



72.24

6.02

Hydril 15k 5-1/2" x 7*5/8" VBR's

6,243.00



WHD DATUM

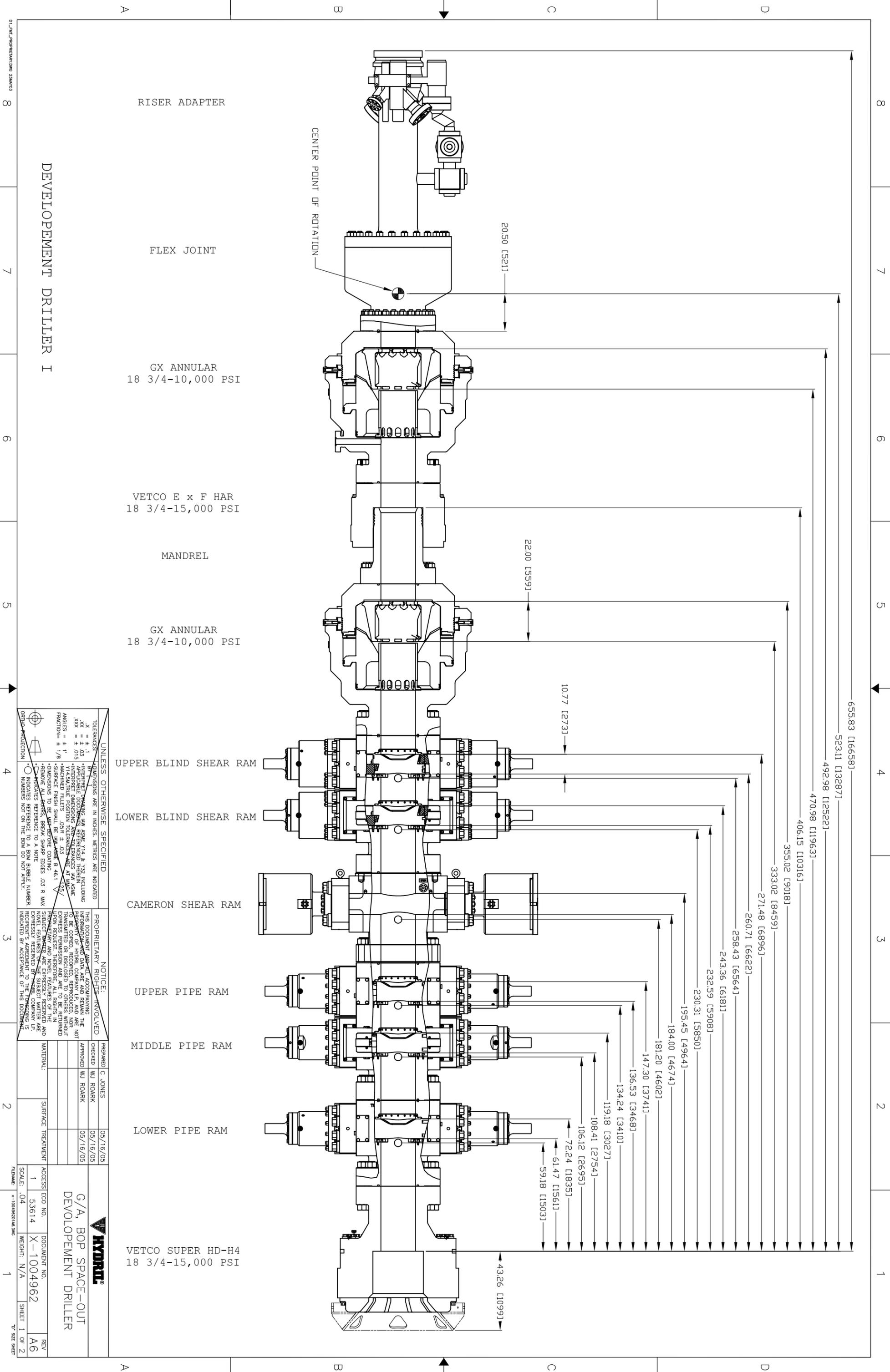


Vetco HDH4 Connector
15,000 psi



All dimensions are to top of element
Super Shear Ram height 11.45"
Hydril Annular element height = 22"
HDH4 Swallow is 43.26"
Variable Ram height 10.77"

Component ID's
BOP stack ID: 18.75in
Riser: 19.25in
Choke / Kill: 4in
Boost: 6in



01_LW1-PROPRIETARY.DWG 23AW03 8 7 6 5 4 3 2 1

FILENAME: X-1004962.DWG

SCALE: .04

WEIGHT: N/A

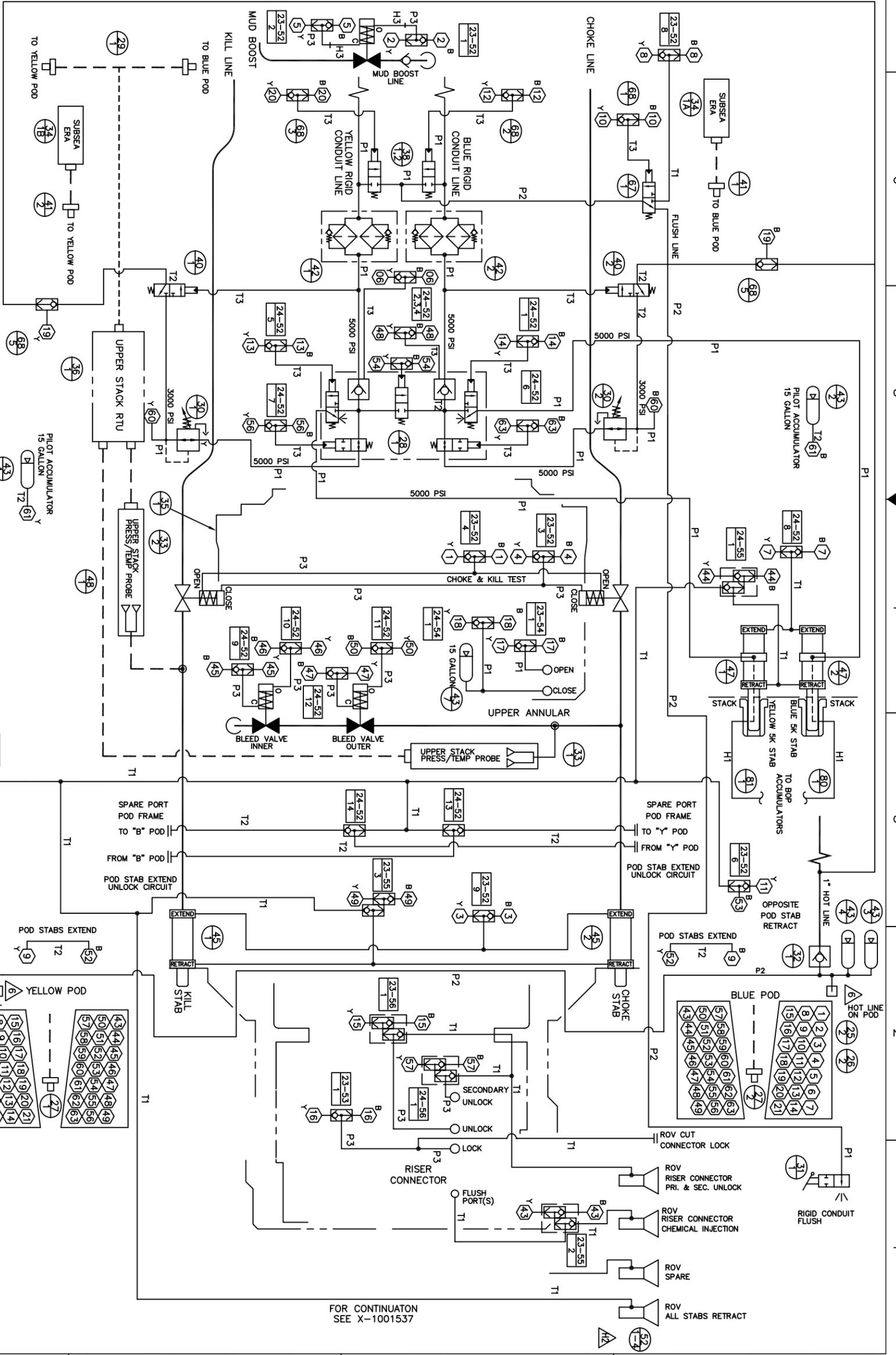
SHEET 1 OF 2

TV SIZE SHEET

<p>UNLESS OTHERWISE SPECIFIED</p> <p>TOLERANCES:</p> <p>X = ± .03</p> <p>XX = ± .015</p> <p>XXX = ± .01</p> <p>ANGLES = ± 1°</p> <p>FRACTION = 1/8</p> <p>SURFACE FINISH SHALL BE AS SHOWN B 48.1</p> <p>DIMENSIONS TO BE MET BEFORE COATING</p> <p>REMOVE ALL BARRIERS, BREAK SHARP EDGES .03 R MAX</p> <p>INDICATES REFERENCE TO A BOW BUBBLE NUMBER</p> <p>INDICATES REFERENCE TO A BOW BUBBLE NUMBER</p> <p>INDICATES REFERENCE TO A BOW BUBBLE NUMBER</p>		<p>NOTICE: INVOLVED</p> <p>THIS DOCUMENT IS THE PROPERTY OF HYDRIL COMPANY LP AND IS NOT TO BE COPIED, REPRODUCED, REPRODUCED, NOR TRANSMITTED IN ANY FORM OR BY ANY MEANS WITHOUT THE WRITTEN PERMISSION OF HYDRIL COMPANY LP. ALL RIGHTS IN THIS DOCUMENT ARE RESERVED BY HYDRIL COMPANY LP. PROPRIETARY AND NOVEL FEATURES OF THE SUBJECT MATTER ARE EXPRESSLY RESERVED AND NO EXPRESS OR IMPLIED LICENSE OR OTHER RIGHTS ARE GRANTED BY THIS DOCUMENT.</p>	
<p>PREPARED: C. JONES</p> <p>CHECKED: WJ ROARK</p> <p>APPROVED: WJ ROARK</p>	<p>05/16/05</p> <p>05/16/05</p> <p>05/16/05</p>	<p>ACCESS ECG NO.</p> <p>53614</p>	<p>DOCUMENT NO.</p> <p>X-1004962</p>
<p>HYDRIL</p>		<p>G/A, BOP SPACE-OUT DEVELOPMENT DRILLER</p>	
<p>REVISIONS:</p>		<p>REV</p> <p>A6</p>	<p>REV</p> <p>A6</p>

A B C D

POD PORT SIZE	PRESSURE SUPPLY	FUNCTION
1 0.5" MN	CHOKE & KILL TEST VALVES OPEN	
2 0.5" MN	MUD BOOST VALVE OPEN	
3 0.5" MN	CHOKE AND KILL STABS EXTEND	
4 0.5" MN	CHOKE & KILL TEST VALVES CLOSE	
5 0.5" MN	MUD BOOST VALVE CLOSE	
6 ST PL	YELLOW RIGID CONDUIT CHECK VALVE VENT	
7 0.5" MN	HOT STAB EXTEND	
8 0.5" MN	RIGID CONDUIT FILL - SUPPLY	
9 0.5" PS	TO OPPOSITE POD STAB EXTEND	
10 ST PL	RIGID CONDUIT FILL - PILOT	
11 0.5" PS	TO OPPOSITE POD STAB RETRACT	
12 ST PL	BLUE RIGID CONDUIT FLUSH VALVE OPEN	
13 ST PL	BOP ACCUM CHARGE/DUMP VALVE - (YELLOW)	
14 ST PL	BOP ACCUM CHARGE/DUMP VALVE - (BLUE)	
15 1.0" MN	RISER CONNECTOR PRIMARY UNLOCK	
16 1.5" MN	RISER CONNECTOR LOCK	
17 1.5" UA	UPPER ANNULAR OPEN	
18 1.5" UA	UPPER ANNULAR CLOSE	
19 0.5" RC	HYD. SUPPLY TO AUTOSHEAR VALVE	
20 ST PL	YELLOW RIGID CONDUIT FLUSH VALVE OPEN	
21 ST --	BLANK	
23 0.5" PS	RISER CONNECTOR FLUSH	
43 0.5" PS	HOT STAB RETRACT	
44 0.5" MN	INNER BLEED VALVE CLOSE	
45 0.5" MN	INNER BLEED VALVE OPEN	
46 0.5" MN	INNER BLEED VALVE OPEN	
47 0.5" MN	OUTER BLEED VALVE CLOSE	
48 ST PL	BLUE RIGID CONDUIT CHECK VALVE VENT	
49 0.5" MN	CHOKE AND KILL STABS RETRACT	
50 0.5" MN	OUTER BLEED VALVE OPEN	
51 0.5" --	BLANK PORT (VALVE #51 USED INTERNALLY)	
52 0.5" PS	FROM OPPOSITE POD STAB EXTEND	
53 0.5" PS	FROM OPPOSITE POD STAB RETRACT	
54 ST PL	RIGID CONDUIT CROSSOVER VALVE OPEN	
55 ST MN	SPARE	
56 ST PL	LOWER YELLOW CONDUIT ISOLATOR VALVE CLOSE	
57 1.0" PS	RISER CONNECTOR SECONDARY UNLOCK	
58 1.5" MN	BLANK	
59 1.5" MN	BLANK	
60 1.5" PS	3000 PSI POD SUPPLY	
61 ST PL	PILOT ACCUMULATOR	
62 ST MN	SPARE	
63 ST PL	LOWER BLUE CONDUIT ISOLATOR VALVE CLOSE	



- THE POD PORT NUMBER AND THE LOWER VALVE UNIT VALVE NUMBER ARE THE SAME (E.G. VALVE 27 FUNCTIONS THROUGH PORT 27).
- NOMINAL POD PORT SIZE:
ST = STRAIGHT THROUGH FUNCTION, 1/2" PORT SIZE.
- HYDRAULIC PRESSURE SOURCE FOR THE FUNCTION:
MN = MAINFOLD REGULATOR
UA = UPPER ANNULAR REGULATOR
PL = PILOT SUPPLY (3,000 PSI)
PS = POD SUPPLY (3,000 PSI)
RC = RIGID CONDUIT REGULATOR (3,000 PSI)
-- = NO CONNECTION TO PRESSURE SUPPLY
- ITEM CALLOUTS REFER TO PARTS LIST

- CONTINUED ON DRAWING X-1001538 AT 1-B-8
- SHUTTLE VALVE CALLOUTS REFER TO PARTS LIST
- PANEL NUMBER ON PARTS LIST
- VALVE NUMBER ON PARTS LIST
- BUBBLE NUMBER ON PARTS LIST
- OCCURRENCE

P1	PIPE, 1-1/2" XXS, 316L SST (5000 PSI WP)
P2	PIPE, 1" SCH 160, 316L SST (5000 PSI WP)
P3	PIPE, 1/2" SCH 160, 316L SST (5000 PSI WP)
T1	TUBE, 1/2" O.D. x .065" WALL, 316 SST
T2	TUBE, 3/8" O.D. x .065" WALL, 316 SST
T3	TUBE, 1/4" O.D. x .049 WALL, 316 SST
H1	HOSE, 1" COLLAPSE RESISTANT (5000 PSI MIN. WP)
H2	HOSE, 1" (3000 PSI MIN. WP)
H3	HOSE, 1/2" (3000 PSI MIN. WP)
H4	HOSE, 1" (5000 PSI MIN. WP)

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
 INCHES: ± 0.015
 DECIMALS: ± 0.005
 ANGLES: ± 1°
 SURFACE FINISH SHALL BE 125 μ IN.
 DIMENSIONS TO BE MET BEFORE COATING.
 REMOVE ALL BARRIERS, BREAK SHARP EDGES .03 IN MAX.
 INDICATES REFERENCE TO A NEW BUBBLE NUMBER.
 INDICATES LOCATION OF CURRENT REVISION CHANGE.

NOTICE: PROPRIETARY RIGHTS INVOLVED

THIS DOCUMENT AND ALL ACCOMPANYING INFORMATION AND DATA ARE THE PROPERTY OF HONOLULU DISTRIBUTION LLC, AND NOT TO BE REPRODUCED, COPIED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, WITHOUT EXPRESS PERMISSION AND ARE TO BE RETURNED TO HONOLULU DISTRIBUTION LLC UPON REQUEST. HONOLULU DISTRIBUTION LLC RESERVES ALL RIGHTS AND NOVEL FEATURES OF THE SUBJECT MATTER ARE RESERVED TO HONOLULU DISTRIBUTION LLC. RECIPIENT'S AGREEMENT TO THE FOREGOING IS INDICATED BY ACCEPTANCE OF THIS DOCUMENT.

PREPARED BY	C. NGUYEN	28OCT10
CHECKED BY	R. GUSTAFSON	28OCT10
APPROVED BY	R. GUSTAFSON	28OCT10

S/D, HYDRAULIC LMRP DEVELOPMENT DRILLER I (AKA CSF 184)

ACCESS EGO NO. 94930

DOCUMENT NO. X-1001536

SCALE: N/A

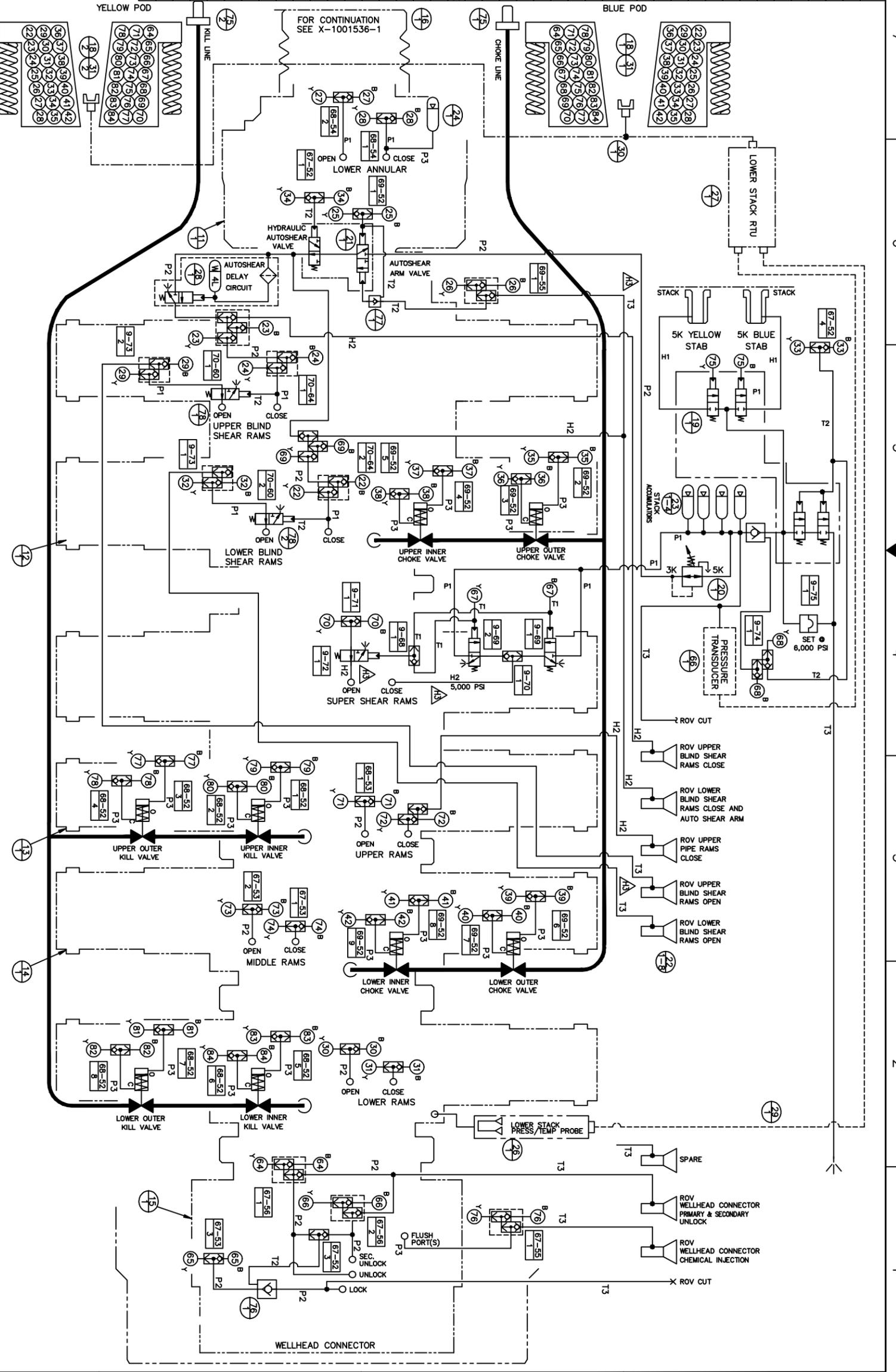
WEIGHT: N/A

REV H2

DATE: 1-10-13

SHEET 1 OF 1

PORT SIZE	FUNCTION
22 1.0" PS	LOWER BLD SHEAR RAMS HI PRESS CLOSE
23 1.0" MN	UPPER BLIND SHEAR RAMS CLOSE
24 1.0" PS	UPPER BLD SHEAR RAMS HI PRESS CLOSE
25 ST	PL AUTO SHEAR DISARM
26 ST	PL AUTO SHEAR ARM
27 1.5" LA	LOWER ANNULAR OPEN
28 1.5" LA	LOWER ANNULAR CLOSE
29 1.0" MN	UPPER BLIND SHEAR RAMS OPEN
30 1.0" MN	LOWER RAMS OPEN
31 1.0" MN	LOWER RAMS CLOSE
32 1.0" MN	LOWER BLIND SHEAR RAMS OPEN
33 ST	PL BOP ACCUMULATOR DUMP VALVE OPEN
34 0.5" PS	HYDRAULIC AUTOSHEAR VALVE CLOSE
35 0.5" MN	UPPER OUTER CHOKE OPEN
36 0.5" MN	UPPER OUTER CHOKE CLOSE
37 0.5" MN	UPPER INNER CHOKE OPEN
38 0.5" MN	UPPER INNER CHOKE CLOSE
39 0.5" MN	LOWER OUTER CHOKE OPEN
40 0.5" MN	LOWER OUTER CHOKE CLOSE
41 0.5" MN	LOWER INNER CHOKE OPEN
42 0.5" MN	LOWER INNER CHOKE CLOSE
64 1.0" WC	WELLHEAD CONNECTOR PRIMARY UNLOCK
65 1.0" WC	WELLHEAD CONNECTOR PRIMARY LOCK
66 1.0" WC	WELLHEAD CONNECTOR SECONDARY UNLOCK
67 ST	PL SUPER SHEAR RAMS CLOSE (SKSI VALVE)
68 ST	PL STACK ACCUMULATORS CHECK VALVE VENT
69 1.5" MN	LOWER BLIND SHEAR RAMS CLOSE
70 1.5" MN	UPPER SHEAR RAMS OPEN
71 1.0" MN	UPPER RAMS OPEN
72 1.0" MN	UPPER RAMS CLOSE
73 1.0" MN	MIDDLE RAMS OPEN
74 1.0" MN	MIDDLE RAMS CLOSE
75 ST	PL BOP ACCUMULATOR VALVE OPEN
76 0.5" PS	WELLHEAD CONNECTOR FLUSH
77 0.5" MN	UPPER OUTER KILL OPEN
78 0.5" MN	UPPER OUTER KILL CLOSE
79 0.5" MN	UPPER INNER KILL OPEN
80 0.5" MN	UPPER INNER KILL CLOSE
81 0.5" MN	LOWER OUTER KILL OPEN
82 0.5" MN	LOWER OUTER KILL CLOSE
83 0.5" MN	LOWER INNER KILL OPEN
84 0.5" MN	LOWER INNER KILL CLOSE



1. THE POD PORT NUMBER AND THE LOWER VALVE UNIT VALVE NUMBER ARE THE SAME (E.G. VALVE 27 FUNCTIONS THROUGH PORT 27).
2. NOMINAL POD PORT SIZE.
3. ST = STRAIGHT THROUGH FUNCTION, 1/2" PORT SIZE.
4. ITEM CALLOUTS REFER TO PARTS LIST
5. SHUTTLE VALVE CALLOUTS REFER TO PARTS LIST

PLUMBING SCHEDULE

P1	PIPE, 1-1/2" XXS, 316L SST (5000 PSI WP)
P2	PIPE, 1" SCH 160, 316L SST (5000 PSI WP)
P3	PIPE, 1/2" SCH 160, 316L SST (5000 PSI WP)
T1	TUBE, 3/8" O.D. x .049" WALL, 316 SST
T2	TUBE, 1/4" O.D. x .035 WALL, 316 SST
T3	TUBE, 1/2" O.D. x .065 WALL, 316 SST
H1	HOSE, 1" COLLAPSE RESISTANT (5000 PSI MIN. WP)
H2	HOSE, 1" (5000 PSI MIN. WP)

UNLESS OTHERWISE SPECIFIED

TOLERANCES: DIMENSIONS ARE IN INCHES. DECIMALS ARE INDICATED BY ".". FRACTIONS ARE INDICATED BY "/".

ANGLES: ± .015

FRACTIONS: ± 1/8

THIRD ANGLE PROJECTION

NOTICE: PROPRIETARY RIGHTS INVOLVED

THIS DOCUMENT AND ALL ACCOMPANYING INFORMATION ARE THE PROPERTY OF HYPONIC DISTRIBUTION LLC AND ARE NOT TO BE REPRODUCED, COPIED, TRANSMITTED, OR DISCLOSED TO OTHERS WITHOUT EXPRESS PERMISSION AND ARE TO BE RETURNED TO HYPONIC DISTRIBUTION LLC UPON REQUEST. HYPONIC DISTRIBUTION LLC RECEIVES NO LIABILITY FOR THE FOREGOING IS INCURRED BY ACCEPTANCE OF THIS DOCUMENT.

PREPARED	C. NGUYEN	02/MAR/11
CHECKED	R. GUSTAFSON	02/MAR/11
APPROVED	R. GUSTAFSON	02/MAR/11

S/D, HYDRAULIC STACK, DEVELOPMENT DRILLER I (AKA CSF 184)

ACCESS: EDO NO. 97422

SCALE: N/A

WEIGHT: N/A

DOCUMENT NO. X-1001537

REVISION: H3

SHEET 1 OF 1

2.0 Overview

2.1 General

This section provides summary descriptions of the Hydril MUX BOP Control System and the equipment in its major subsystems.

2.2 System Design

Figure 2-1 diagrams the basic control system design. The system operates BOP components installed on the stack and on the lower marine riser package (LMRP) attached to the stack. These components are operated with hydraulic pressures applied and removed in response to electronic commands from system work stations at the surface.

As shown, the system work stations comprise three surface consoles - Driller's Panel (DP), Central Control Unit (CCU), and Remote Control Panel (RCP). Each console utilizes video display screens generated from computers that are linked to each other and to the subsea control pods via two redundant communication networks. System operators manipulate the video displays to issue electronic commands for BOP control and to view the system responses and status.

All communication between the surface panels and system equipment, including the subsea control pods, passes through the central control unit (CCU). At the surface, network communication occurs in ethernet, and work stations and equipment are linked via fiber optic cables. Communication between the CCU and subsea control pods occurs in RS485 via umbilical cables unspooled from Hydril cable reels on the drilling rig.

The typical control pod comprises an electro/hydraulic (E/H) section and a lower hydraulic valve control (LHVC) section. Electrical power and electronic communication are con-

veyed by an umbilical cable to the E/H section.

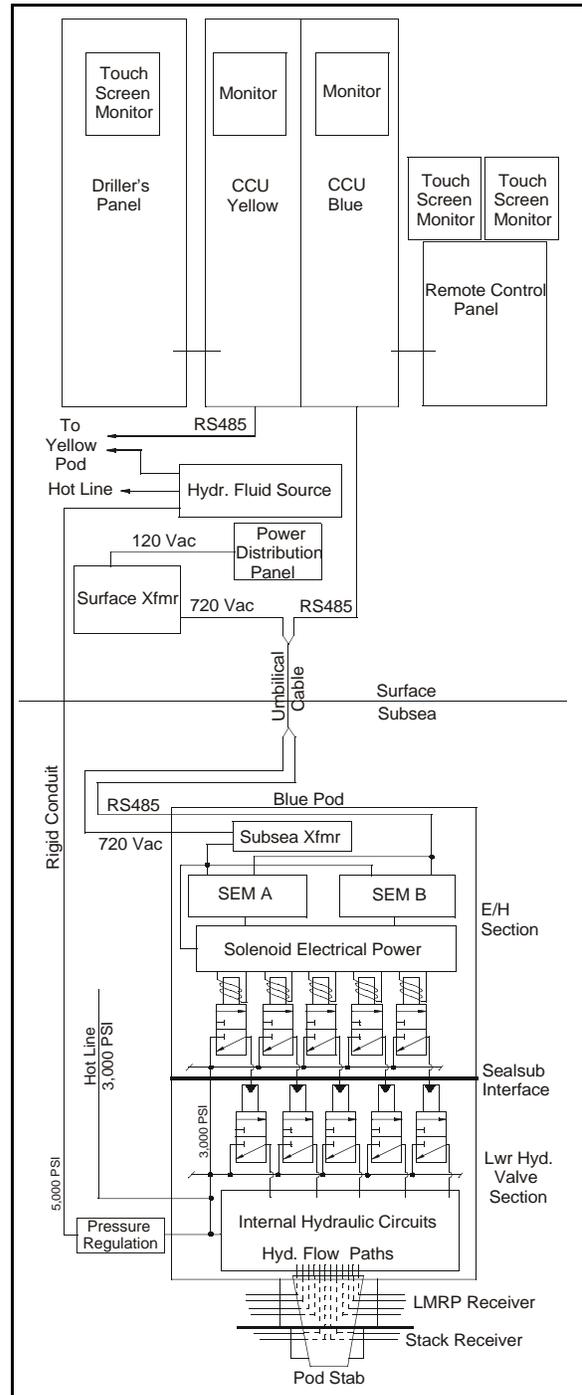
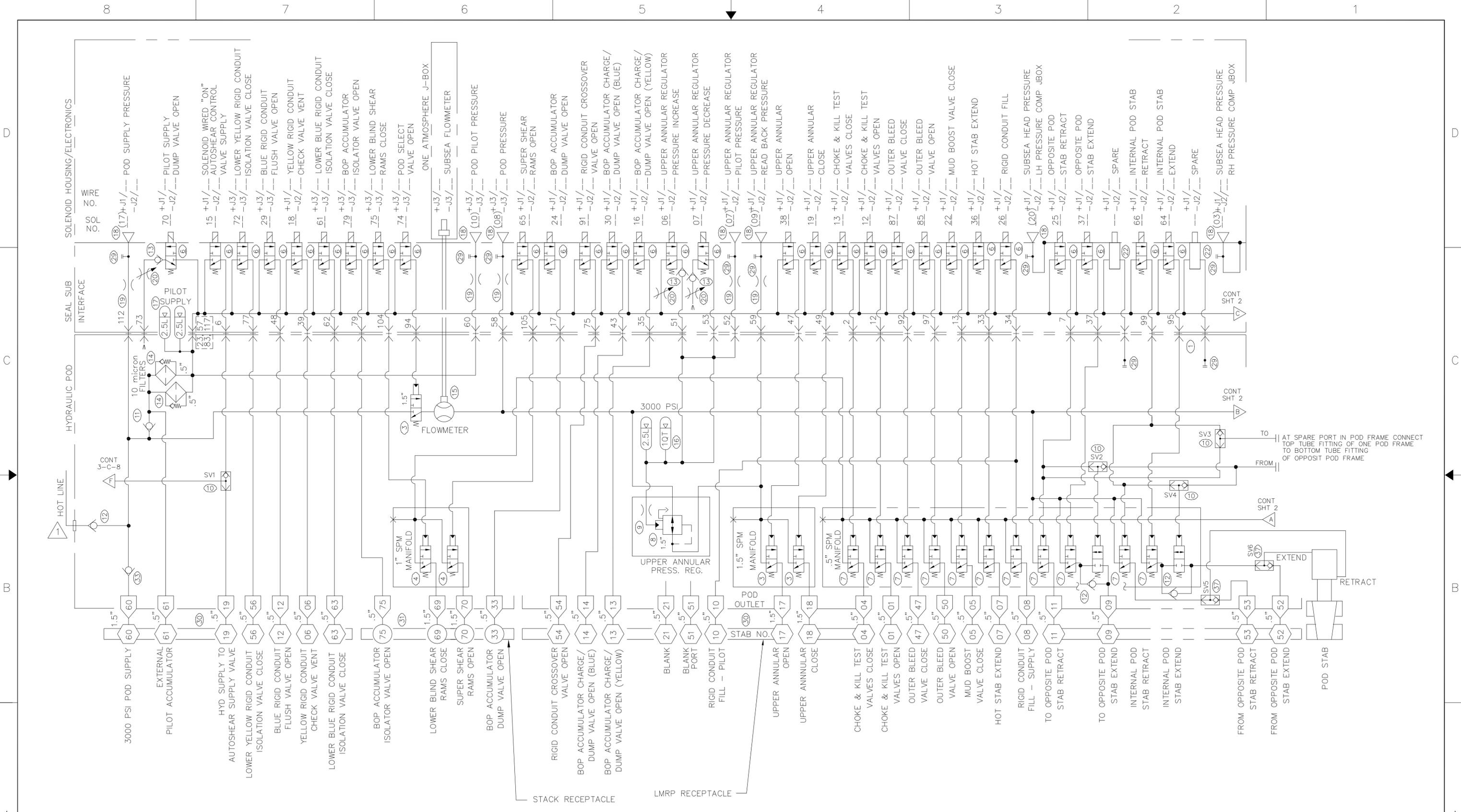


Figure 2-1. Idealized Control System Design



PLUMBING SCHEDULE (NORMAL 3000 PSI WP)	
P1	PIPE, 1-1/2" SCH 160, 316L SST (TYP. FOR 1.5" MANIF. JUMPER LINES)
P2	PIPE, 1" SCH 160, 316L SST (TYP. FOR 1" MANIF. JUMPER LINES)
P3	PIPE, 1/2" SCH 160, 316L SST (TYP. FOR 1/2" MANIF. JUMPER LINES)
T1	TUBE, 1/2" O.D. x .049" WALL, 316 SST (TYP. FOR HOTLINE SUPPLY)
T2	TUBE, 3/8" O.D. x .049 WALL, 316 SST (TYP. FOR PILOT SUPPLY)
T3	TUBE, 1/4" O.D. x .049 WALL, 316 SST (TYP. FOR ACCUM. PRE-CHARGE)
T4	TUBE, 1/4" O.D. x .035 WALL, 316 SST (TYP. FOR PILOT LINES)

CONTINUED ON DRAWING X-1001536 AT 1-A-2 AND 1-D-2.

UNLESS OTHERWISE SPECIFIED

TOLERANCES:
 .X = ± .1
 .XX = ± .03
 .XXX = ± .015

ANGLES = ± 1°
 FRACTION = ± 1/8

ORTHOGONAL PROJECTION

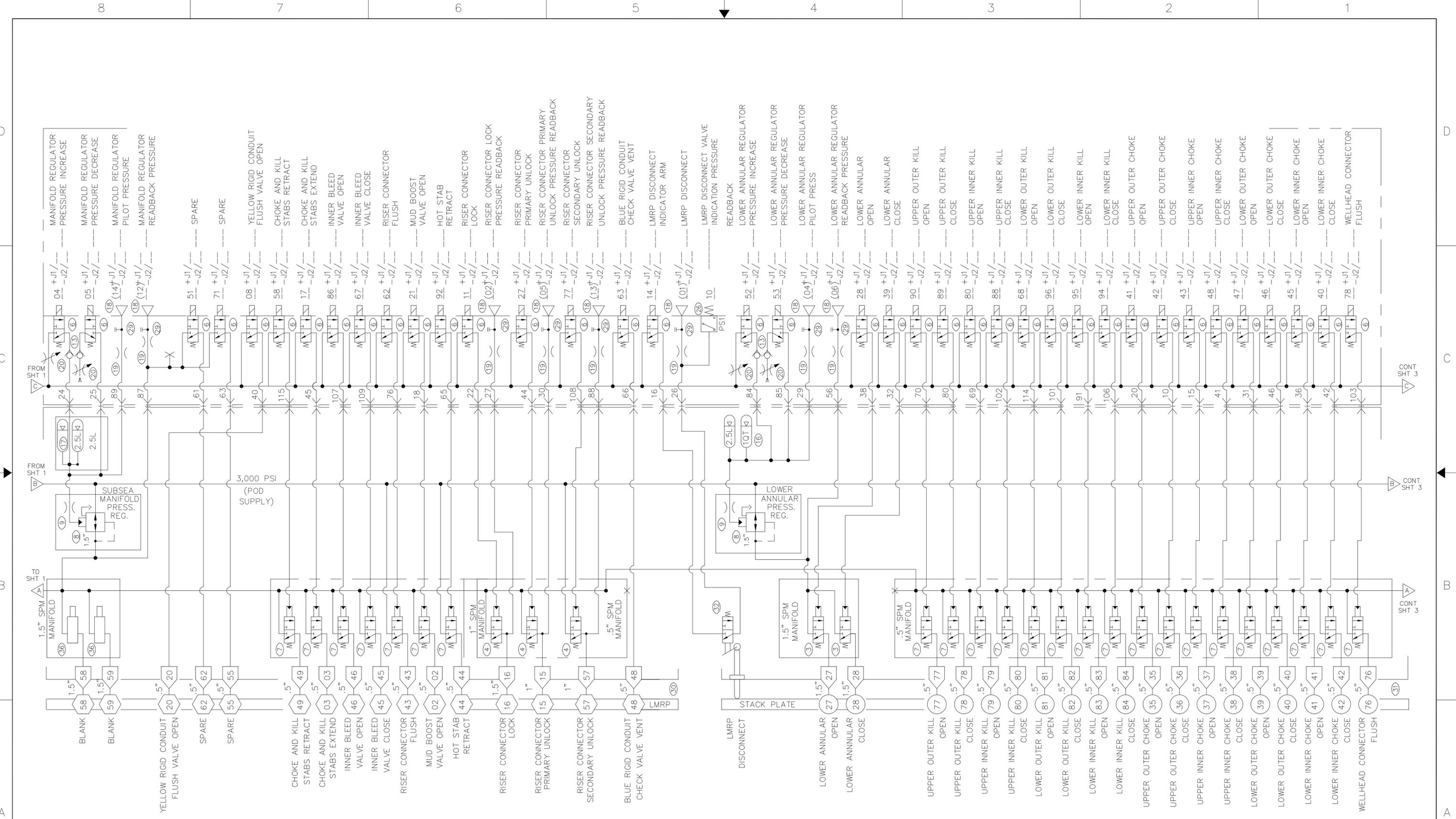
- DIMENSIONS ARE IN INCHES. METRICS ARE INDICATED BY []
- INTERPRET DRAWING IAW ASME Y14 & Y32 INCLUDING APPLICABLE DOCUMENTS REFERENCED THEREIN
- INTERPRET DIMENSIONS AND TOLERANCES IAW ASME Y14.5M, TRUE POSITION TOLERANCES ARE AT MMC
- MACHINED FILLETS .05R ± .03
- SURFACE FINISH SHALL BE IAW ASME B 46.1
- DIMENSIONS TO BE MET BEFORE COATING
- REMOVE ALL BURRS, BREAK SHARP EDGES .03 R MAX
- V INDICATES REFERENCE TO A NOTE
- O INDICATES REFERENCE TO A BOM BUBBLE NUMBER, NUMBERS NOT ON THE BOM DO NOT APPLY.

NOTICE: PROPRIETARY RIGHTS INVOLVED

THIS DOCUMENT AND ALL ACCOMPANYING INFORMATION AND DATA ARE AND REMAIN THE PROPERTY OF HYDRIL COMPANY LP, AND ARE NOT TO BE COPIED, REPRODUCED, REPRODUCED, NOR TRANSMITTED OR DISCLOSED TO OTHERS WITHOUT EXPRESS PERMISSION AND ARE TO BE RETURNED UPON REQUEST. THEREFORE, ALL RIGHTS IN PROPRIETARY AND NOVEL FEATURES OF THE SUBJECT MATTER ARE EXPRESSLY RESERVED AND NOVEL FEATURES OF THE SUBJECT MATTER ARE EXPRESSLY RESERVED BY HYDRIL COMPANY LP. RECIPIENT'S AGREEMENT TO THE FOREGOING IS INDICATED BY ACCEPTANCE OF THIS DOCUMENT.

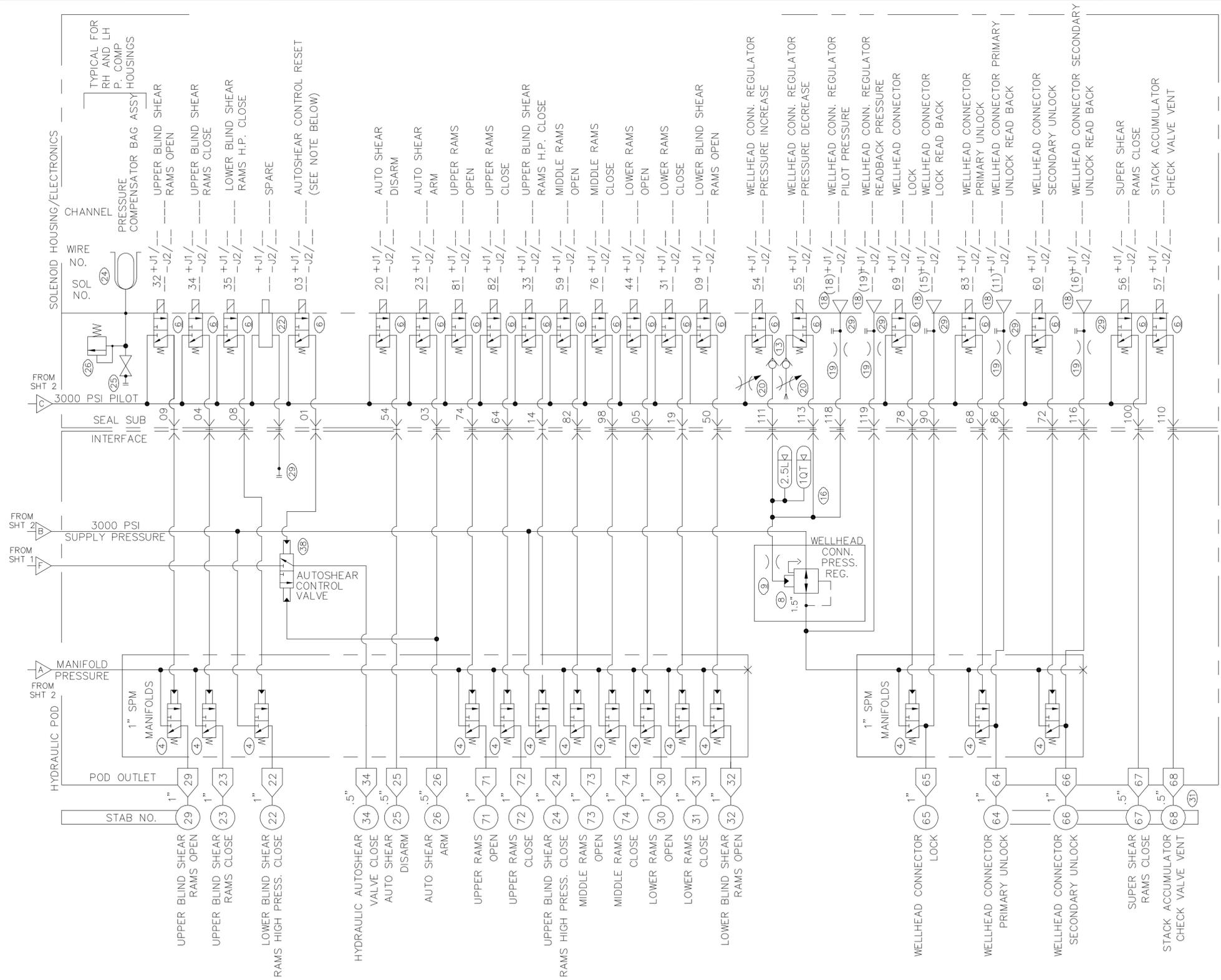
PREPARED	D. HANKS	29 JUN 06
CHECKED	M. CHANCE	29 JUN 06
APPROVED	M. CHANCE	29 JUN 06
MATERIAL:		
SURFACE TREATMENT		

ACCESS		ECO NO.	DOCUMENT NO.	REV
1	62264		X-1001538	M 1
SCALE: NTS		WEIGHT: ---	SHEET 1 OF 3	
FILENAME: x-1001538.dwg		TYP SIZE SHEET		



S/D, HYDRAULIC
MUX POD, DDI
(AKA GSF 184)

DOCUMENT NO. X-1001538	REV M1
SCALE: NTS	WEIGHT: ---
SHEET 2 OF 3	



NOTE:
 AUTOSHEAR CONTROL RESET SOLENOID IS ENERGIZED VIA SOFTWARE WHEN ANY ONE OF THE FOLLOWING SOLENOIDS IS ENERGIZED

- 1) INTERNAL POD STAB RETRACT
- 2) RISER CONNECTOR PRIMARY UNLOCK
- 3) RISER CONNECTOR SECONDARY UNLOCK
- 4) AUTOSHEAR DISARM

---LEGEND OF SYMBOLS---

SYMBOL	ITEM	DESCRIPTION
	1	SEAL SUB INTERFACE, 1/4"
	2	VALVE,3NO--SHEAR SEAL PILOT VALVE 1/4"
	3	VALVE,3NC,SSUB X SSUB, 1.5"SPM
	4	VALVE,3NC,SSUB X SSUB, 1"SPM
	7	VALVE,3NC,SSUB X SSUB, .5"SPM
	5	VALVE,2NO MOD,SSUB X SSUB, .5" SPM *
	6	SHEAR SEAL VALVE, SOLENOID
	38	VALVE, 3W DOUBLE PILOT
	8	REGULATOR,1.5",3K,HARD TRIM
	9	ORIFICE FITTING
	10	VALVE, SHUTTLE 1/4" SAE PORTS, INTERFLOW TYPE
	37	VALVE, SHUTTLE 3/8" CARTRIDGE TYPE
	11	VALVE, CHECK, 3/8" T, 6000 PSI
	12	CHECK VALVE, CARTRIDGE, .5", 3K
	13	CHECK VALVE,1/4" TUBE,SS,1 PSI
	28	CHECK VALVE,1.5" EXHAUST TYPE
	33	CHECK VALVE,1.5" CARTRIDGE TYPE
	14	ELEMENT, FILTER 10 micron WITH BY PASS
	15	ASSM, FLOWMETER, 1.5", 5KSI
	16	ASSY,ACCUMULATOR, SINGLE 2.5 LITER & 1 QUART 7.5 KSI (SURFACE SET)
	17	ASSY,ACCUMULATOR, DUAL 2.5 LITER, 7.5 KSI
	18	TRANSDUCER, PRESSURE
	19	SNUBBER, 1/4 MXF, 5KSI, SS
	20	VALVE, METERING, 1/4T,SS
	21	VALVE, NEEDLE, 3/8T, 5KSI
	25	VALVE, 2W BALL, 1/2" TUBE, SS
	22	DUMMY SOLENOID, SS
	35	BLANK PLATE, .5"SPM, SEAL SUB
	23	BLANK PLATE, 1"SPM, SEAL SUB
	36	BLANK PLATE, 1.5"SPM, SEAL SUB
	24	PRESSURE COMPENSATOR BAG ASSY.
	26	VALVE, RELIEF, 3/4" MNPT, 10 PSI
	29	PLUG, PURGE
	30	STAB, LMRP TYPE
	31	STAB, STACK TYPE
	32	TRIP VALVE, 1/4", LMRP DISCONNECT

*VALVE WILL USE A STANDARD 3WNC SPM CARTRIDGE ASSEMBLY EXCEPT TOP SEAT END OF SPOOL IS MODIFIED. BODY IS PORTED TO FUNCTION AS 2WNO VALVE.

HYDRIL

S/D, HYDRAULIC
MUX POD, DDI
(AKA GSF 184)

DOCUMENT NO. X-1001538	REV M1
SCALE: NTS	WEIGHT: ---
SHEET 3 OF 3	

70" SIZE SHEET

	STARTING AIR RECEIVER	EMERGENCY AIR RECEIVER	SERVICE AIR RECEIVER	BULK AIR RECEIVER	DRILL FLOOR AIR RECEIVER	INSTRUMENT AIR RECEIVER
CAPACITY	AIR-ARCV-003/008/009/010	AIR-ARCV-004	AIR-ARCV-005/007	AIR-ARCV-002	AIR-ARCV-006	AIR-ARCV-001
OPERATING PRESSURE	9 kgf/cm ²	9 kgf/cm ²	9 kgf/cm ²	4 kgf/cm ²	9 kgf/cm ²	9 kgf/cm ²
DESIGN PRESSURE	10 kgf/cm ²	10 kgf/cm ²	10 kgf/cm ²	5 kgf/cm ²	10 kgf/cm ²	10 kgf/cm ²

LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	GATE VALVE		FLEXIBLE HOSE
	BALL VALVE		CAP
	RELIEF VALVE		COMPLEX STRAINER
	DEPRESSURIZATION VALVE		FILTER
	TANK TOP		BALL VALVE WITH S.S. MISMATCH FITTING
	3-WAY SOLENOID		INTERMEDIATE DECK
	SERVICE OUTLET		PRESSURE SWITCH
	VALVE TAG NUMBER		MAN DECK
	GLOBE VALVE		CONC. REDUCER
	PRESSURE REDUCING VALVE		BLIND FLANGE
	SCREW DOWN NON-RETURN VALVE		BALL VALVE WITH S.S. MISMATCH FITTING
	FILTER REGULATOR		SOLENOID VALVE
	INSTRUMENTATION AIR PIPE		COMPRESSED AIR PIPE
	PRESSURE TRANSMITTER LOCAL		PRESSURE TRANSMITTER DISPLAY WMS FUNCTION IN CONTROL ROOM
	PRESSURE SWITCH		PRESSURE INDICATOR
	AUTOMATIC DRAIN		FILTER
	VMS VESSEL MANAGEMENT SYSTEM - KONGSBERG SImRAD		EXPANSION BELLOW
	Y-STRAINER		
	LUBRICATOR		

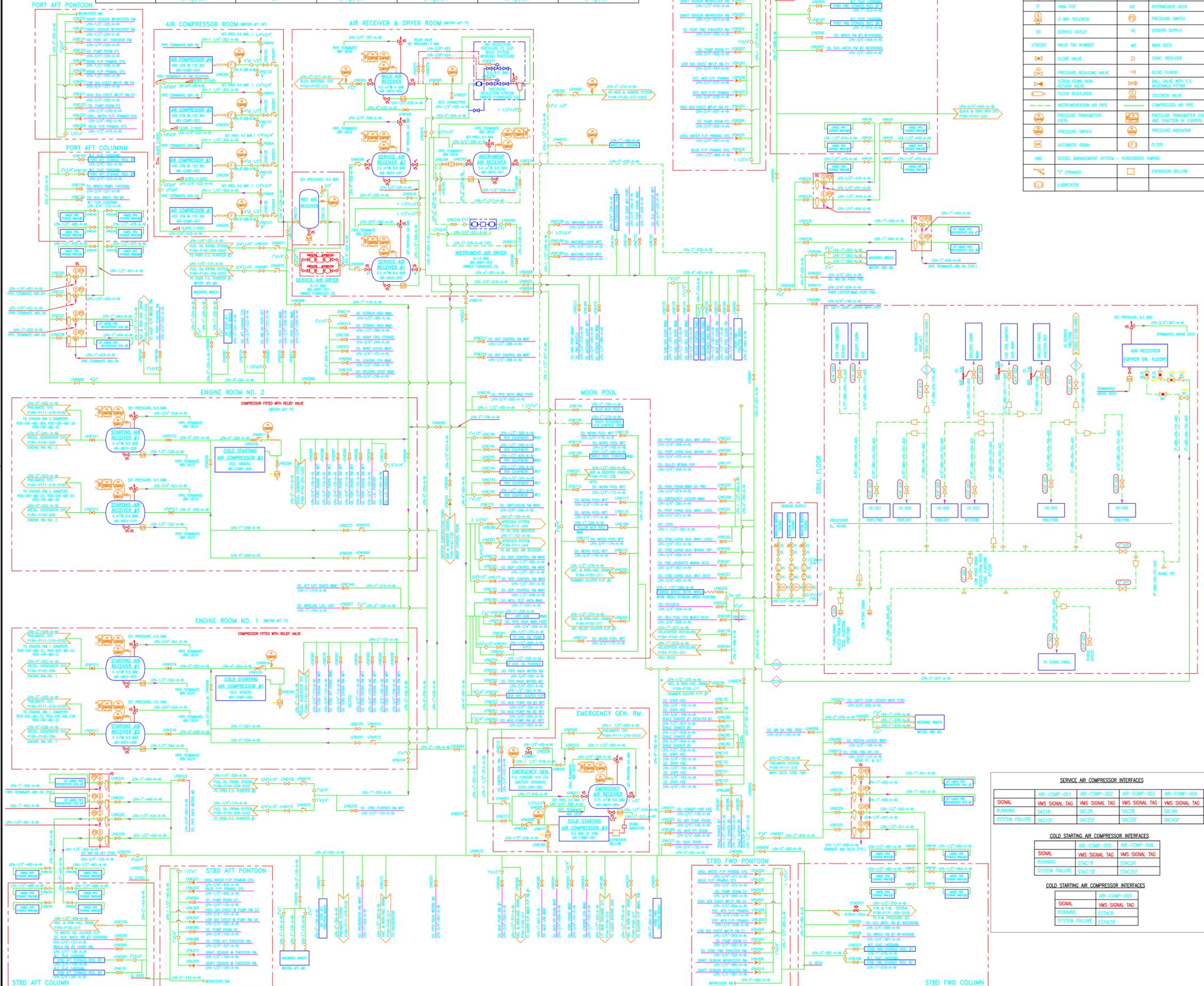
MATERIAL DESCRIPTION LIST				
COMPONENT	SIZE	COMPONENT DESCRIPTION	ASTM MAT'L	ANSI STD
PIPE	ALL	CARBON STEEL, SMLS, SCH XS BLK.	A106/GR. B	B.36.10
FITTING	1/2"-2"	3000# S.E./S.W.		
	2 1/2"-4"	CARBON STEEL, SMLS, SCH XS B.W.E.	A234 GR.WPB	B.16.5
VALVE	1/2"-2"	STOP CHECK / GATE, S.E. 150# BRZ. UR.	B.61	B.120.1
	1/2"-2"	BALL, 150# SE BRZ.	B.62	B.120.1
	2 1/2"-4"	STOP CHECK / GLOBE / GATE, F.E. 150# R.F. DI. RS.	A395	B.16.10
	3/4"	SCREW DOWN NON-RETURN, 150# F.E. BRZ.		
CONNECTION	1/2"-2"	FULL COUPLING, S.E. 3000# F.S. BLK.	A105	B.16.11
	2 1/2"-4"	FLG., 150#, SO. RF/FF FORGED STEEL	A105	B.16.5
	1/2"-2"	UNION, 3000# S.E. FORGED STEEL BLK. (L.P. AIR)	A105	B.16.11
BOLTING	ALL	ALLOY STEEL (STUD BOLTS)	A193/B7	B.18.2.1
	ALL	ALLOY STEEL (NUTS)	A194/2H	B.18.2.2
GASKET	ALL	NON-ASBESTOS 1/8" THK FR/FF		B.16.21

GENERAL NOTES

1. PIPING SYSTEMS SHALL BE DESIGNED, INSTALLED AND TESTED IN ACCORDANCE WITH ABS RULES, THE REQUIREMENTS OF API CODES, AND SPECIFICATIONS.
2. ALL WELDING TO BE IN ACCORDANCE WITH ABS RULES AND BY A.M.S. D1.1.
3. ALL PIPING TO BE PROPERLY SUPPORTED TO ALLOW EXPANSION AND TO MINIMIZE VIBRATION.
4. IDENTIFICATION/COLOR CODING METHODS SHALL COMPLY WITH SFC SPECIFICATION.
5. PIPING IS TO BE ROUTED SUCH THAT NO LINES ARE CLOSER THAN 5'-0" TO THE SIDE SHELL.
6. ALL PIPING PRIOR TO DRYER IS TO BE PRE FABRICATED, AND HOT DIP GALVANIZED WITH NO WELD DAMAGE TO GALVANIZING.
7. FOR PNEUMATIC VALVE CONTROL SEE SEPARATE DRAWING.
8. STARTING AIR WORKING PRESSURE TO BE SUIT ENGINE VENDOR REQUIREMENTS.

REASON FOR REV.3

1. REVISED BRANCH-OUT CONNECTION OF WINDOW WIPER AS PER ARRGT.
2. REVISED AS PER COR 721



ITEM	COMP. NAME	DRAWING OR DOCUMENTS No./TITLE	REV.
7	P184-P156-228	SCHEMATIC POTABLE COLD / HOT WATER SUPPLY PIPING (QUARTERS)	
6	P184-P111-219	SCHEMATIC PNEUMATIC SYSTEM	
5	P184-P111-217	SCHEMATIC HAZARDOUS & NON HAZARDOUS DRAIN SYSTEM	
4	P184-P111-206	SCHEMATIC DRILL WATER SYSTEM	
3	P184-P140-204	SCHEMATIC DIESEL GENERATOR SYSTEM	
2	P184-P111-203	SCHEMATIC SALT WATER SERVICE & SALT WATER / FRESH WATER COOLING SYSTEM	
1	P184-P130-212	SCHEMATIC BULK MATERIAL SYSTEM	

LIST OF REFERENCED DRAWINGS AND DOCUMENTS USED FOR DRAWINGS					
REV	DATE	ALTERATIONS	MOD'D	CHK'D	APPR'D
X5	30.03.05	AS BUILT-GSF		ZH	STEVE
X4	15.10.04	DELETE AIR TO WINDOW WIPER		HISHAM	
X3	07.10.04	REVISED AS SHOWN		HISHAM	BANU OMAR
X2	12.08.04	REVISED AS SHOWN		HISHAM	BANU OMAR
X1	14.07.04	AS-BUILT		LZ	BANU OMAR
X0	28.05.04	AS-BUILT		HISHAM	BANU OMAR
12	05.03.04	REVISED AS SHOWN AND IFC.		LZ	BANU OMAR

DISTRIBUTION LIST									
REVISION	DATE	10F3	10F4	11	12	X0	X1	X2	X3
OWNER		5	5	5	5	4	4	4	4
CLASSIFICATION SOCIETY		-	-	8	-	2	2	2	2
ENGINEERING DEPT.		1	1	1	1	-	-	-	-
PROJECT DEPT.		12	12	12	12	1	1	1	1
PRODUCTION DEPT.		-	-	-	-	1	1	1	1
PURCHASING DEPT.		-	-	-	-	-	-	-	-
CENTRAL FILES		1	1	1	1	2	2	2	2
Q.C. / M. PLANNER		-	-	-	-	-	-	-	-
COMMISSIONING		1	1	1	1	1	1	1	1
TOTAL		20	20	28	20	11	11	11	11

APPROVALS

APPROVALS	APPROVED BY.	DATE / REV. NO.
CLASSIFICATION SOCIETY		
OWNER		
OTHERS		

THIS DOCUMENT AND THE INFORMATION CONTAINED WITHIN COMPRISE PROPRIETARY INFORMATION OWNED SOLELY BY PPL SHIPYARD PTE LTD. THIS DOCUMENT IS PROVIDED SUBJECT TO THE PROVISION THAT THE INFORMATION HEREIN WILL NOT BE DISCLOSED OR REPRODUCED UNLESS SPECIFICALLY AUTHORIZED IN WRITING BY PPL SHIPYARD PTE LTD NOR WILL BE USED IN ANY WAY DETRIMENTAL TO OR IN COMPETITION WITH INTEREST OF PPL SHIPYARD PTE LTD. THIS DOCUMENT, REPRODUCTIONS PREVIOUSLY AUTHORIZED IN WRITING AND ASSOCIATED INFORMATION SHALL BE RETURNED WHEN THEY HAVE SERVED THEIR INTENDED PURPOSES, OR ON DEMAND.

IMO 8765503 / ABS 04112715 HULL NO: P2003 FORMAT=A1

OWNER :

PPL SHIPYARD PTE LTD
21, Pandan Road, SINGAPORE 609273
Tel: 6265 0477, Fax: 6265 7904

GLOBALSAFE
GlobalSantaFe Corporation
Memorial Office
15375 Memorial Drive
Houston, Texas 77079, USA
Phone : 281 925 6000

DEVELOPMENT DRILLER I

TITLE : SCHEMATIC COMPRESSED AIR SYSTEM

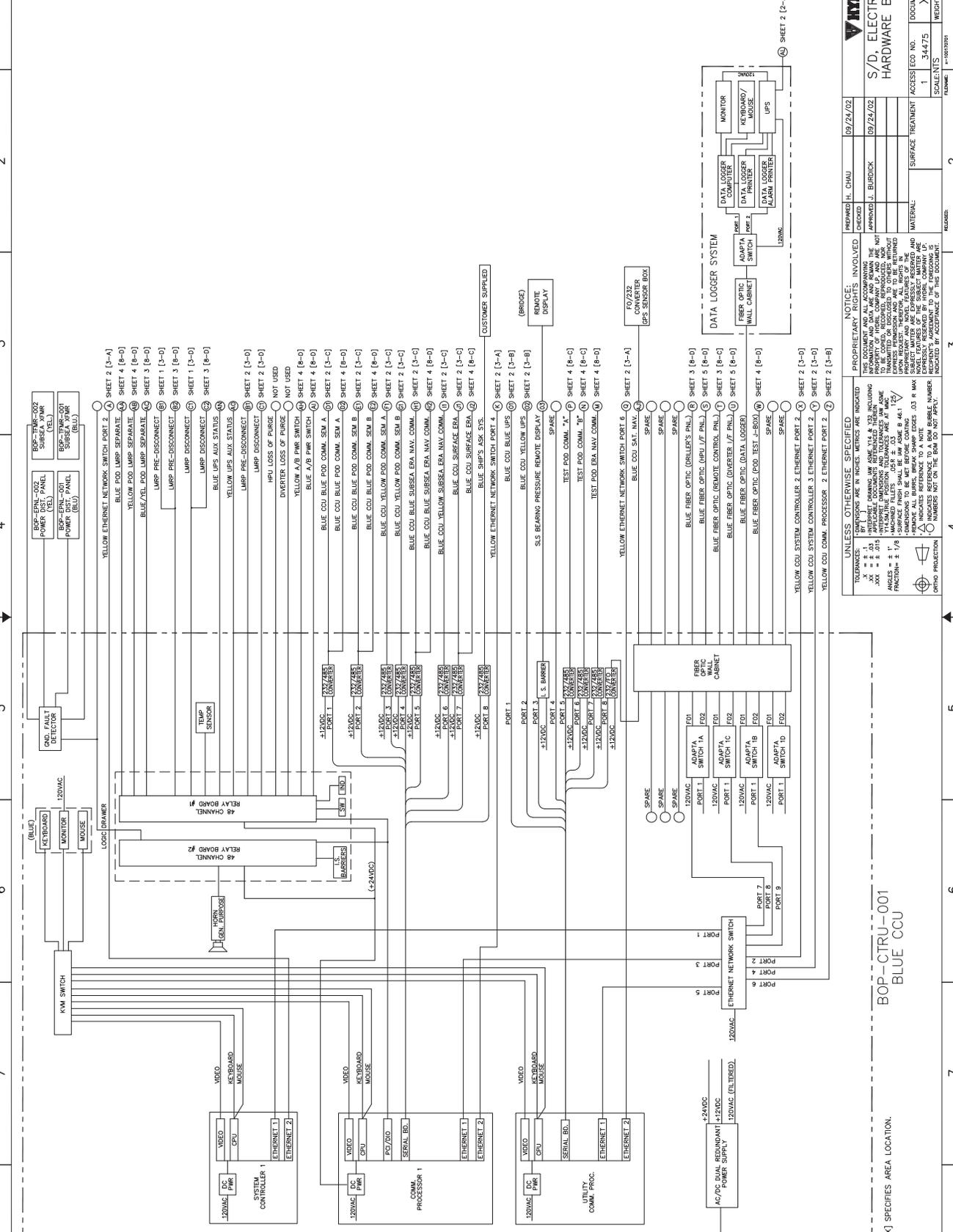
AS BUILT

CHK: HISHAM DATE: 26.04.04
CHK BY: BANU DATE: 26.04.04
APP BY: OMAR DATE: 26.04.04
SCALE: NTS

DWG. NO: P184-P111-211 SHT 0101 REV X5

SERVICE AIR COMPRESSOR INTERFACES				
SIGNAL	AIR-COMP-001	AIR-COMP-002	AIR-COMP-003	AIR-COMP-004
RUNNING	WMS SIGNAL TAG	WMS SIGNAL TAG	WMS SIGNAL TAG	WMS SIGNAL TAG
SYSTEM FAILURE	SAC1SF	SAC2SF	SAC3SF	SAC4SF

COLD STARTING AIR COMPRESSOR INTERFACES				
SIGNAL	AIR-COMP-005	AIR-COMP-006	AIR-COMP-007	AIR-COMP-008
RUNNING	ESTACR	ESTACR	ESTACR	ESTACR
SYSTEM FAILURE	ESTACSF	ESTACSF	ESTACSF	ESTACSF



NO.	DESCRIPTION	DATE	BY	CHKD.	REV.
1	ISSUED FOR CONSTRUCTION	09/24/02	H. CHAU		1
2	REVISION				2
3	REVISION				3
4	REVISION				4
5	REVISION				5
6	REVISION				6
7	REVISION				7
8	REVISION				8

APPROVED BY:	APPROVED BY:	DATE:
H. CHAU	J. BURDICK	09/24/02

PROJECT NO.:	DOCUMENT NO.:	REV.:
1001701	X-1001707	C1

SCALE:	WEIGHT:
NATS	34475

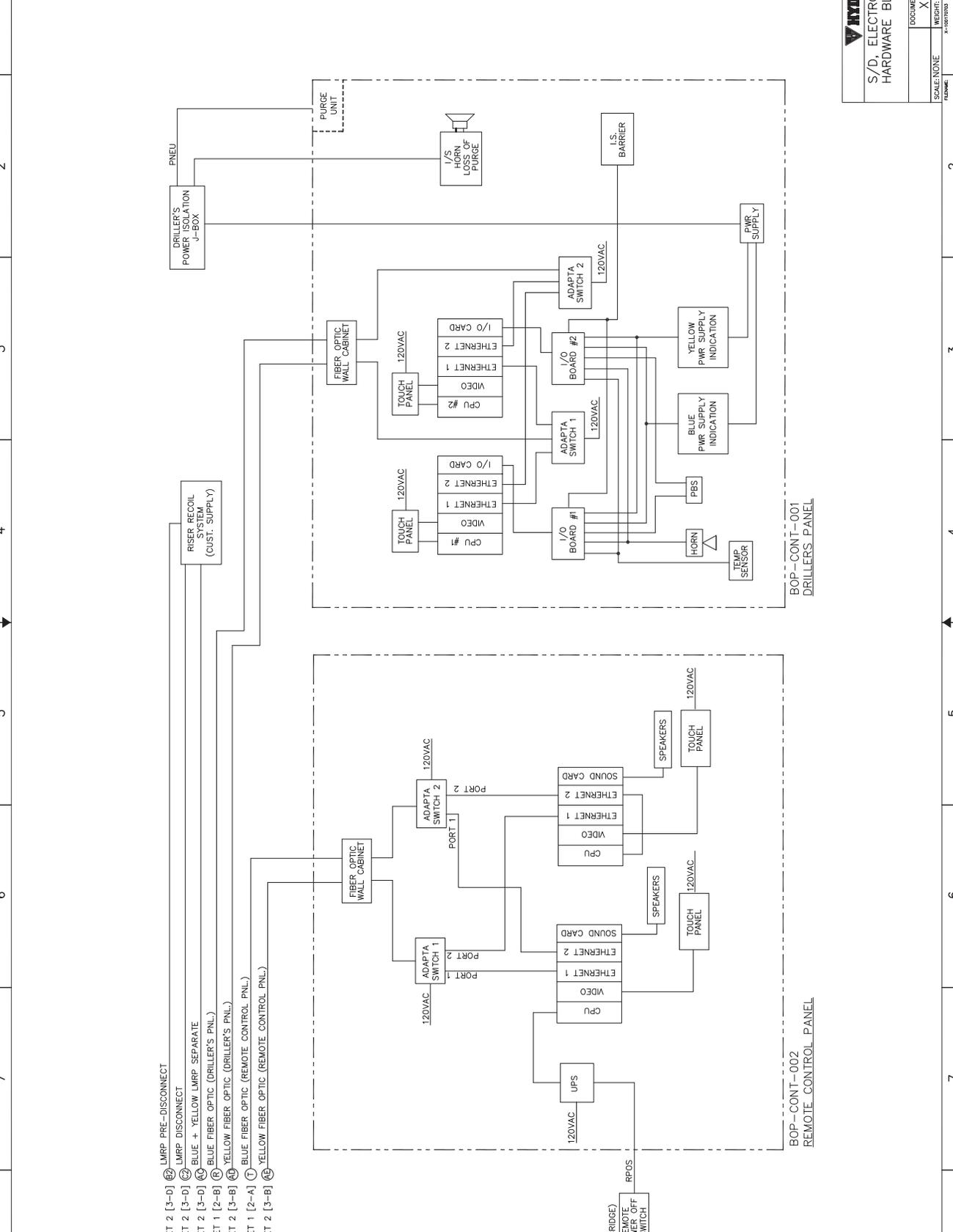
DATE: 09/24/02
 DRAWN BY: H. CHAU
 CHECKED BY: J. BURDICK
 APPROVED BY: J. BURDICK

[X-X] SPECIFIES AREA LOCATION.

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE IN INCHES. METRICS ARE INDICATED IN PARENTHESES.

PROPRIETARY RIGHTS NOTICE: THIS DOCUMENT IS THE PROPERTY OF HYDRONIC SYSTEMS, INC. AND IS NOT TO BE REPRODUCED, COPIED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF HYDRONIC SYSTEMS, INC.

HYDRONIC SYSTEMS, INC. 1001701

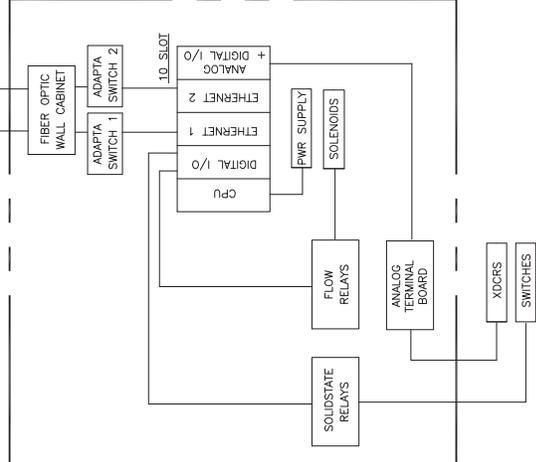


- SHEET 2 [3-D] (2) LMRP PRE-DISCONNECT
- SHEET 2 [3-D] (3) LMRP DISCONNECT
- SHEET 2 [3-D] (4) BLUE + YELLOW LMRP SEPARATE
- SHEET 1 [2-B] (5) BLUE FIBER OPTIC (DRILLER'S PNL.)
- SHEET 1 [2-B] (6) YELLOW FIBER OPTIC (DRILLER'S PNL.)
- SHEET 1 [2-A] (7) BLUE FIBER OPTIC (REMOTE CONTROL PNL.)
- SHEET 2 [3-B] (8) YELLOW FIBER OPTIC (REMOTE CONTROL PNL.)

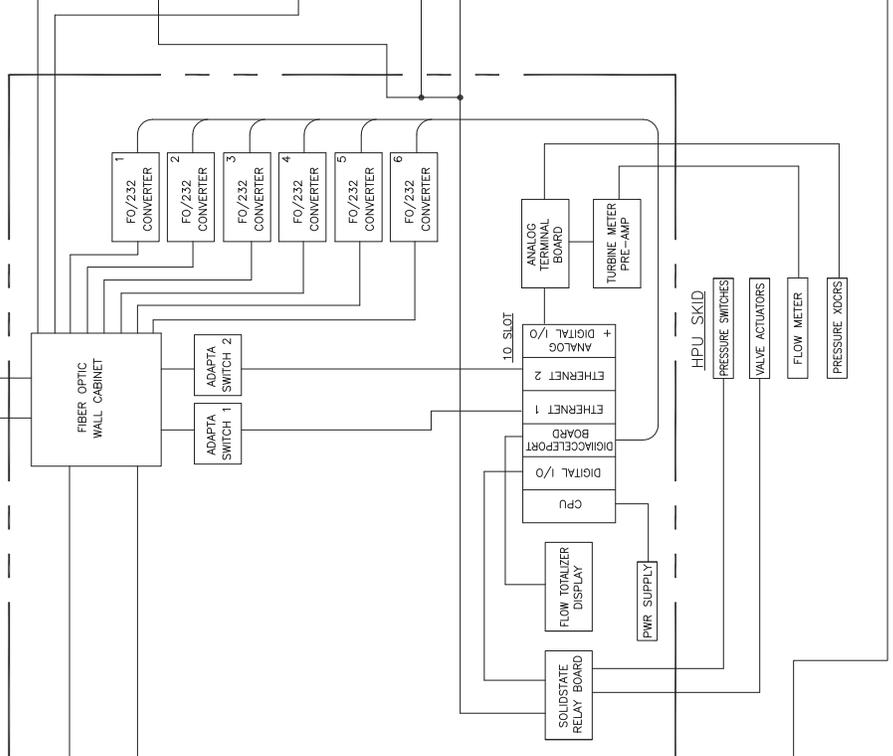
HYDRO®	
S/D. ELECTRONIC SYSTEMS HARDWARE BLOCK DIAGRAM	
DOCUMENT NO.	REV
X-1001707	C1
WEIGHT: N/A	SHEET 3 OF 5
SCALE: NONE	DATE: 10/03/03
NAME:	BY: SEE SHEET

- SHEET 1 [2-B] (S) BLUE CCU FIBER OPTIC (HPU I/F PNL)
- SHEET 1 [2-A] (U) BLUE CCU FIBER OPTIC (CONVERTER I/F PNL)
- SHEET 2 [3-B] (AG) YELLOW CCU FIBER OPTIC (HPU I/F PNL)
- SHEET 2 [3-B] (AF) YELLOW CCU FIBER OPTIC (CONVERTER I/F PNL)

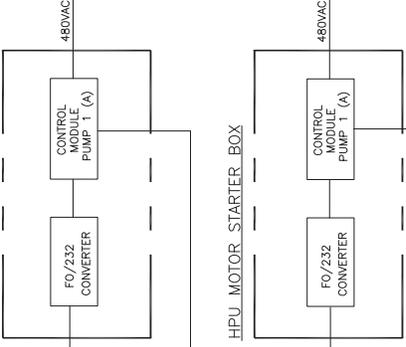
DVT-CONT-001
DIVERITER INTERFACE PANEL



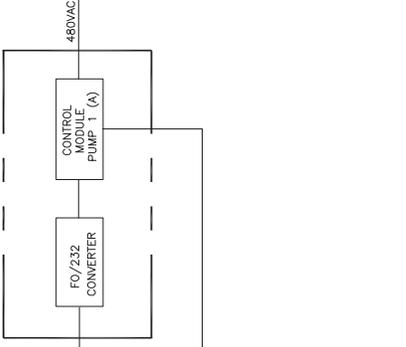
BOP-CONT-004
HPU INTERFACE PANEL



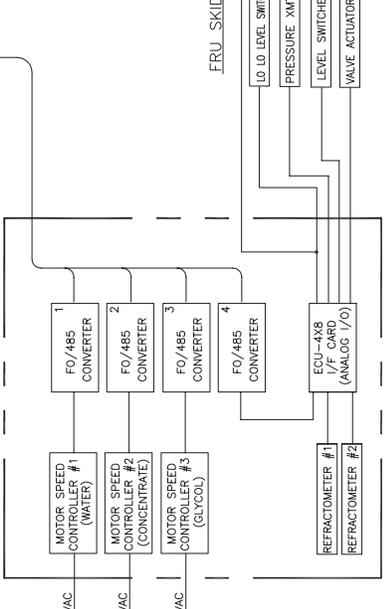
HPU MOTOR STARTER_BOX



HPU MOTOR STARTER_BOX

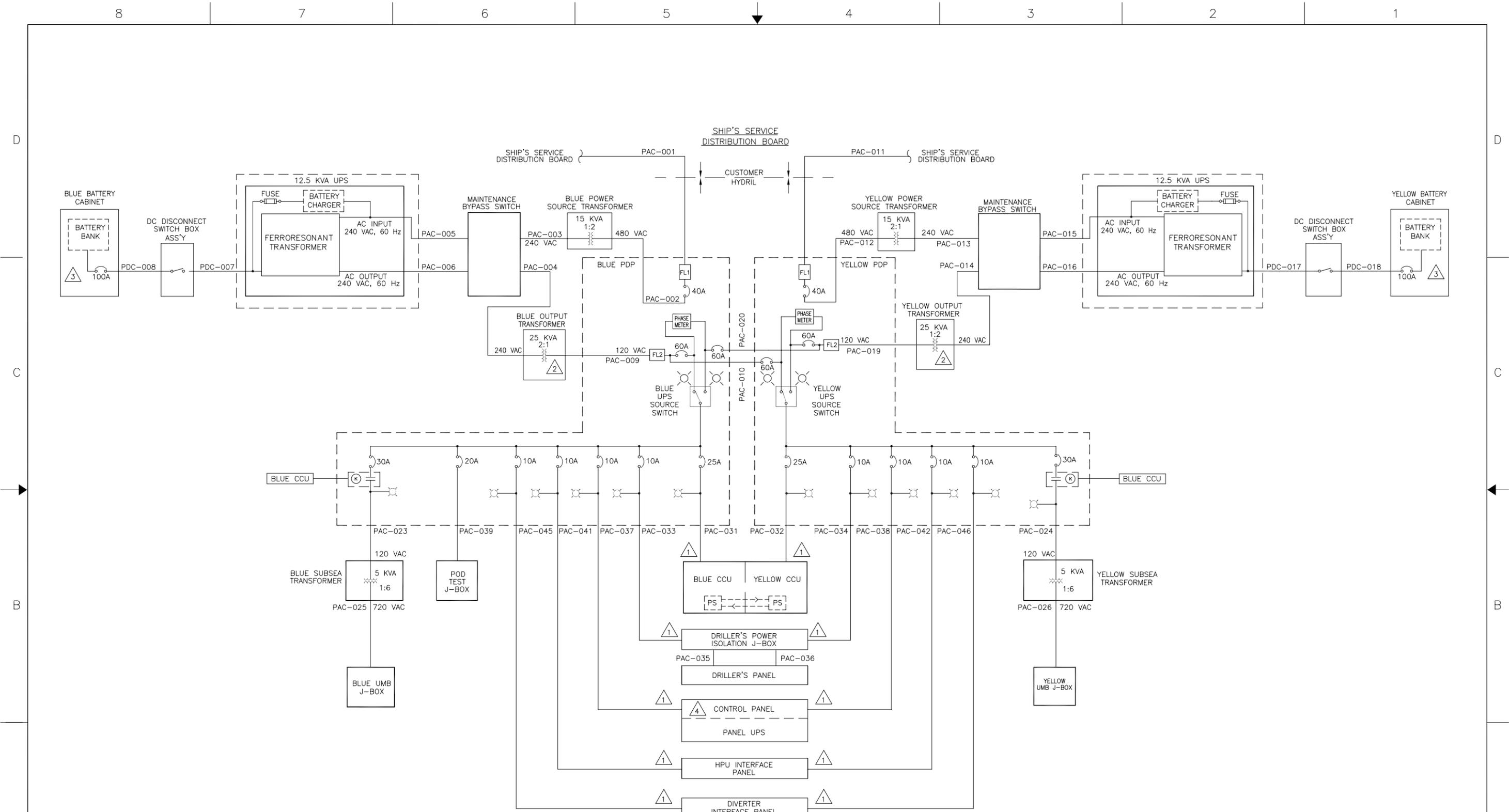


BOP-MXS-001
FRU MOTOR CONTROL PANEL



HYDROLIC
S/D ELECTRONIC SYSTEMS
HARDWARE BLOCK DIAGRAM

DOCUMENT NO.	REV
X-1001707	C1
WEIGHT: N/A	SHEET 5 OF 5
NAME:	DATE: 10/20/08



NOTES:

- ① 120:120 POWER ISOLATION TRANSFORMERS WITH FUSING AND FILTERS ARE INSTALLED IN EACH PANEL; TRANSFORMER SECONDARY IS REFERENCED/TIED TO LOCAL SHIP'S PE GROUND.
- ② THE UPS OUTPUT TRANSFORMER 240:120 IS SUPPLIED BY VENDOR AND INSTALLED BY HYDRIL IN PDP.
- ③ TWO (2) STRINGS OF TEN (10) BATTERIES (CONNECTED IN PARRALLEL), 120 VDC NOMINAL.
- △ THIS PANEL CAN BE REFERRED TO AS THE REMOTE CONTROL PANEL OR AS THE TOOLPUSHER'S PANEL.

UNLESS OTHERWISE SPECIFIED

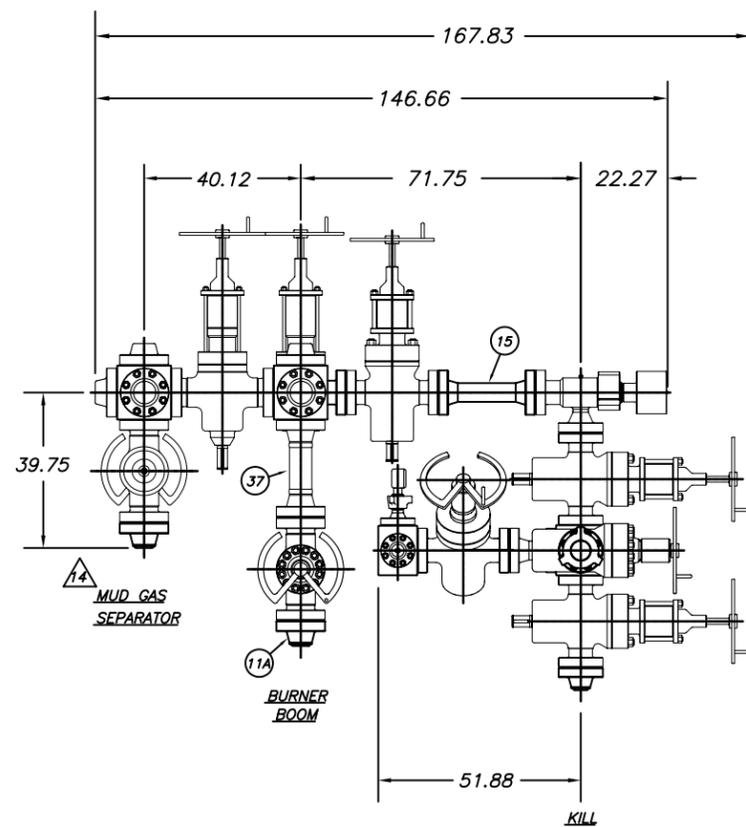
TOLERANCES: X = ± .1 .XX = ± .03 .XXX = ± .015	• DIMENSIONS ARE IN INCHES. METRICS ARE INDICATED BY [] • INTERPRET DRAWING IN ACCORDANCE WITH ASME Y14 & Y32 INCLUDING APPLICABLE DOCUMENTS REFERENCED THEREIN • INTERPRET DIMENSIONS AND TOLERANCES IN ACCORDANCE WITH ASME Y14.5M, TRUE POSITION TOLERANCES ARE AT MMC • MACHINED FILLETS .05R ± .03 125° • SURFACE FINISH SHALL BE IN ACCORDANCE WITH ASME B 46.1 • DIMENSIONS TO BE MET BEFORE COATING • REMOVE ALL BURRS, BREAK SHARP EDGES .03 R MAX
ANGLES = ± 1' FRACTION = ± 1/8	• INDICATES REFERENCE TO A NOTE • ○ INDICATES REFERENCE TO A BOM BUBBLE NUMBER. NUMBERS NOT ON THE BOM DO NOT APPLY.

NOTICE: PROPRIETARY RIGHTS INVOLVED
THIS DOCUMENT AND ALL ACCOMPANYING INFORMATION AND DATA ARE AND REMAIN THE PROPERTY OF HYDRIL COMPANY LP, AND ARE NOT TO BE COPIED, REPRODUCED, REPRODUCED, NOR TRANSMITTED OR DISCLOSED TO OTHERS WITHOUT EXPRESS PERMISSION AND ARE TO BE RETURNED UPON REQUEST. THEREFOR, ALL RIGHTS IN PROPRIETARY AND NOVEL FEATURES OF THE SUBJECT MATTER ARE EXPRESSLY RESERVED AND NOVEL FEATURES OF THE SUBJECT MATTER ARE EXPRESSLY RESERVED BY HYDRIL COMPANY LP. RECIPIENT'S AGREEMENT TO THE FOREGOING IS INDICATED BY ACCEPTANCE OF THIS DOCUMENT.

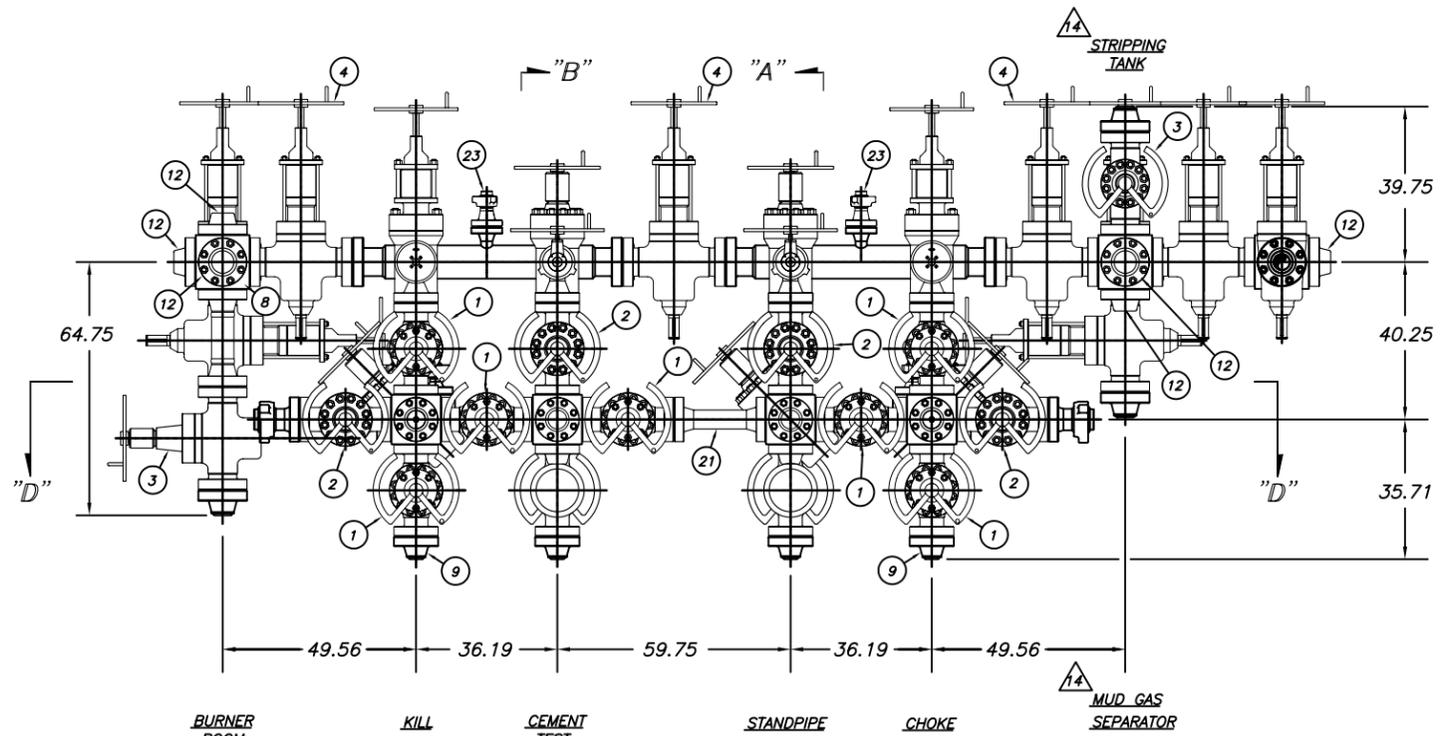
PREPARED	L. JACKSON	03/13/03
CHECKED	S. RONAN	03/13/03
APPROVED	S. RONAN	03/13/03
MATERIAL:	SURFACE TREATMENT	

HYDRIL		
S/D, BLOCK DIAGRAM, POWER DISTRIBUTION SYSTEM		
ACCESS/ECO NO.	DOCUMENT NO.	REV
38527	X-1002807	A5
SCALE: NTS	WEIGHT:	SHEET 1 OF 1

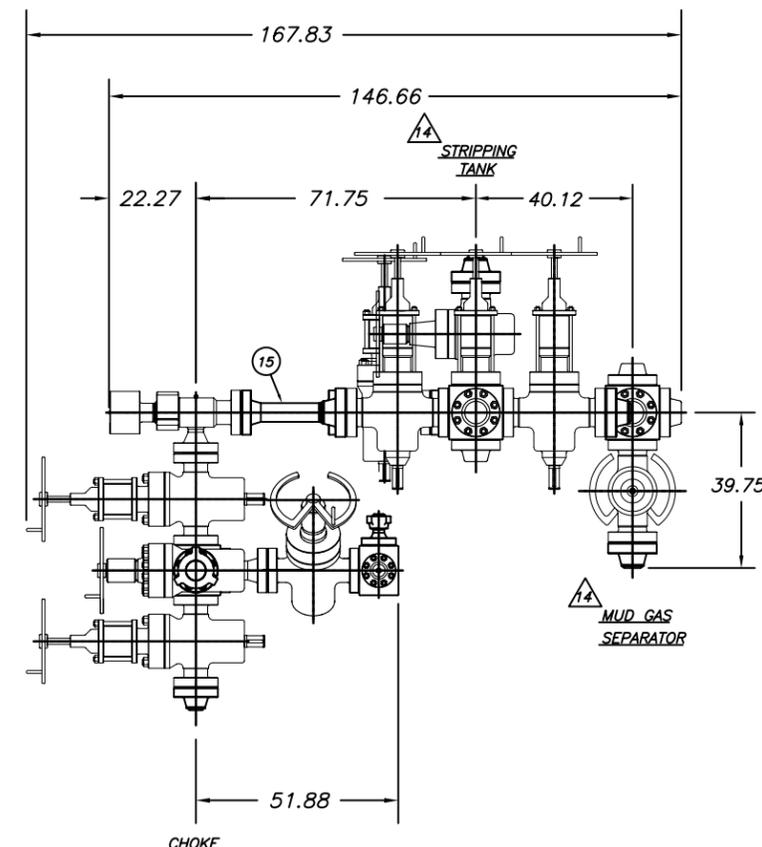
REVISIONS		
NO	DATE	BY
0	12/19/00	GS
1	12/14/01	GS
2	01/10/02	GS
3	02/07/02	GS
4	02/11/02	GS
5	02/15/02	GS
6	02/28/02	GS
7	03/06/02	GS
8	03/07/02	GS
9	04/08/02	GS
10	05/08/02	GS
11	06/12/02	GS
12	01/15/03	GS
13	02/10/03	GS
14	02/18/03	GS



LT. SIDE VIEW



ELEVATION



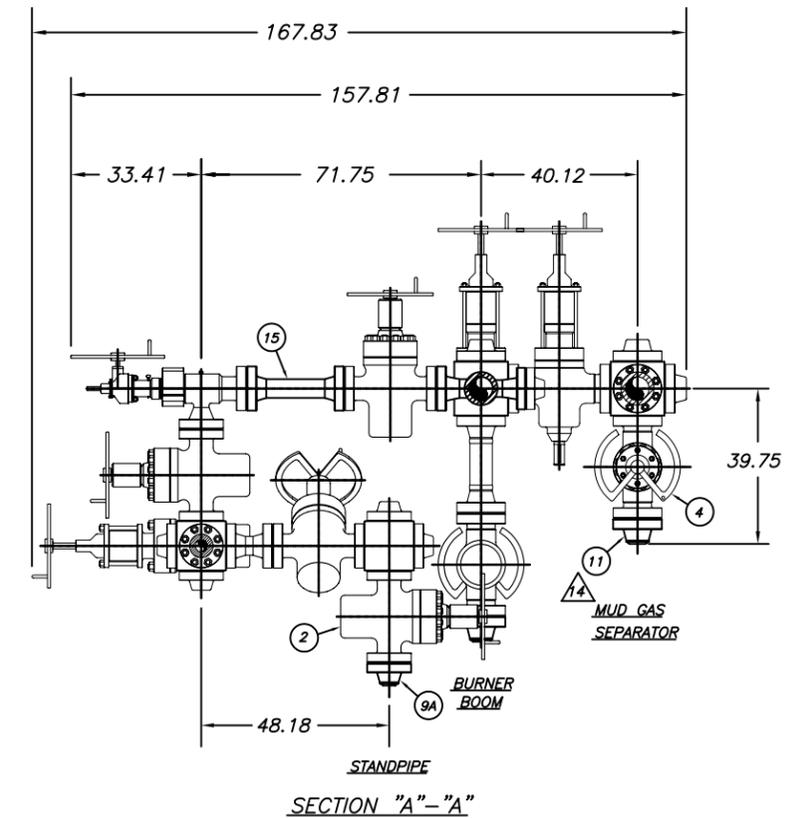
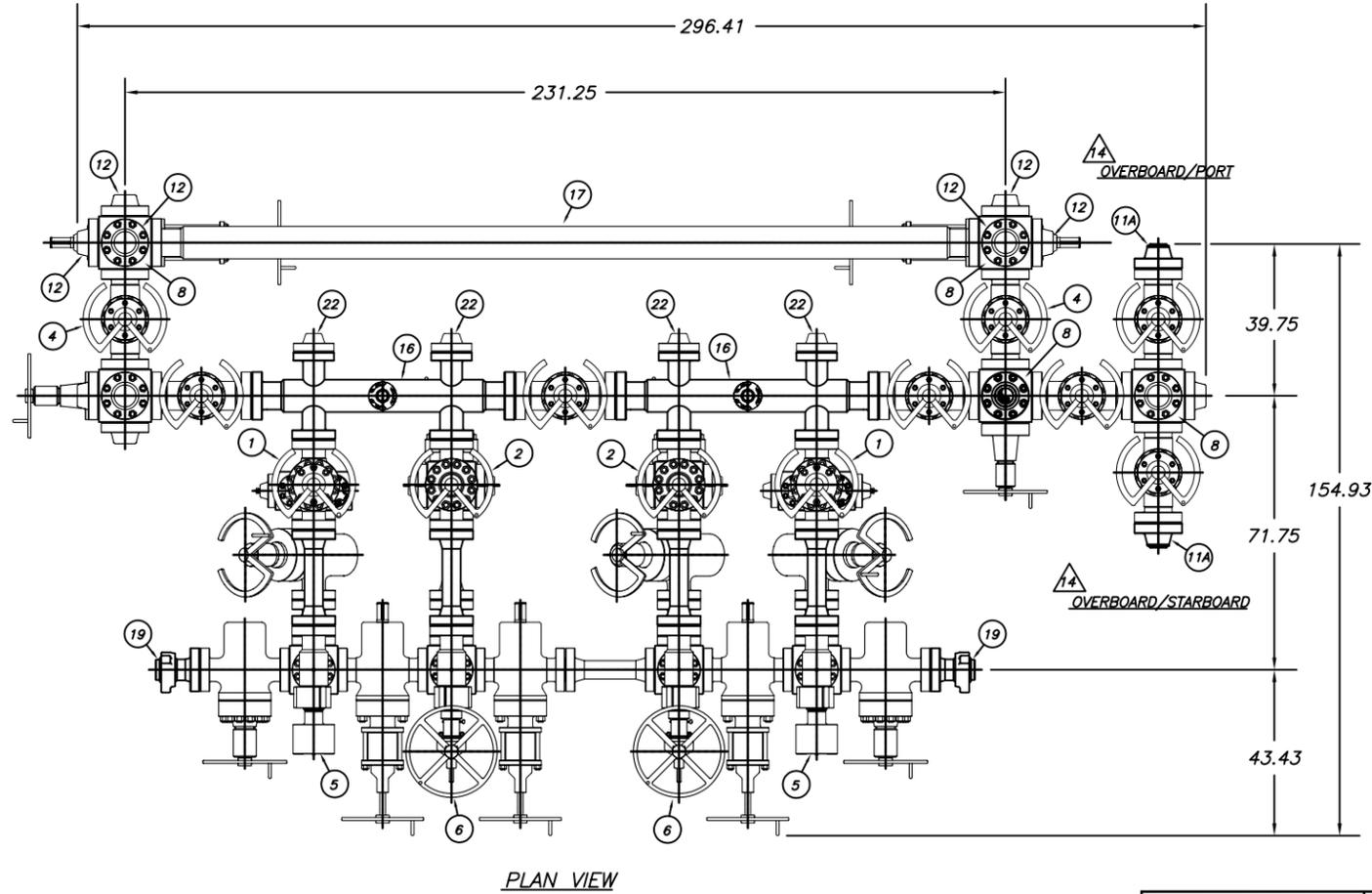
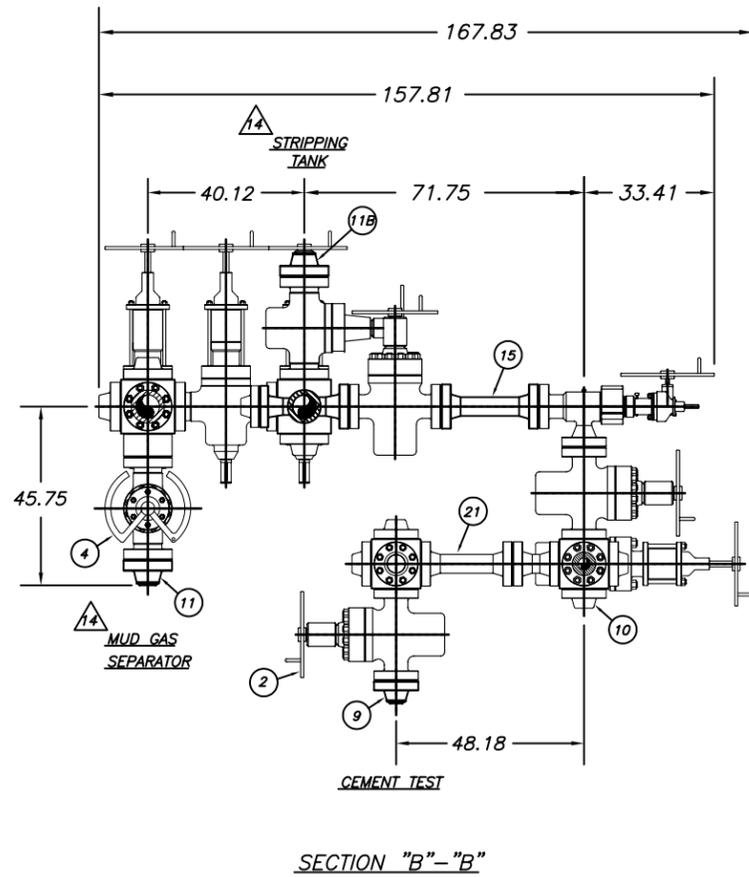
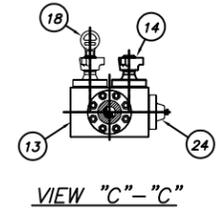
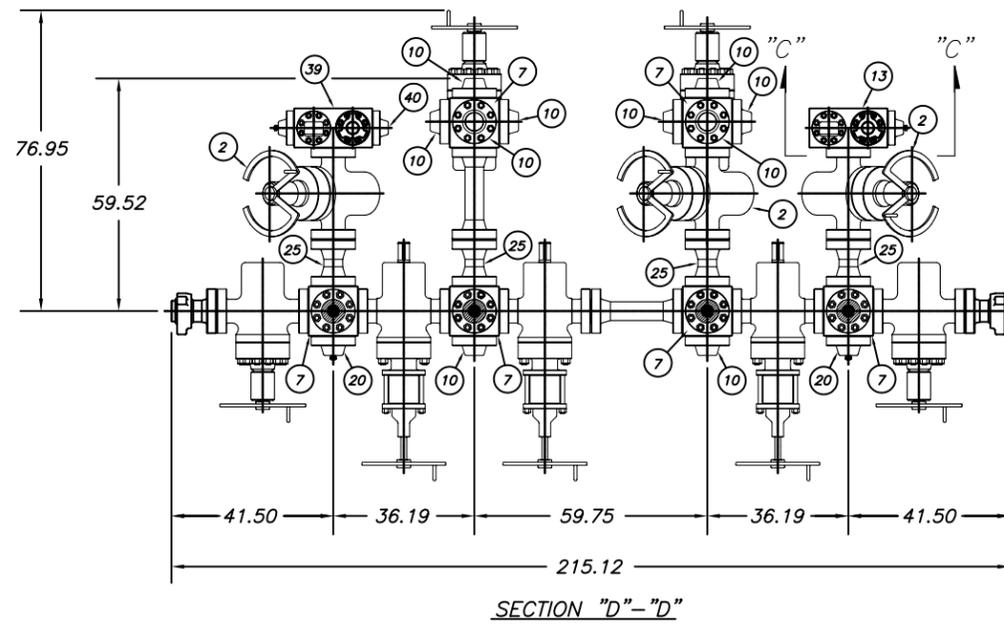
RT. SIDE VIEW

NOTES

1. MDT=-20 DEG. C
2. MEETS NACE MR-01-75
3. MEETS REQUIREMENTS OF P.O. S-603-027
4. REF. B.O.M. (SHT. 3 OF 3)

FINAL AS BUILD

TOLERANCES (EXCEPT WHERE NOTED)		 WORLDWIDE OILFIELD MACHINE INC. 11809 CANEMONT, HOUSTON, TX 77035.	
FRACTION	± 1/64	SCALE: NONE	APPROVED BY
DECIMAL O.X	± .030	DATE: 12/19/00	RAJAN 18FEB03
O.XX	± .015	CHOKE MANIFOLD, 15,000 PSI W.P. H ₂ S	
O.XXX	± .005		
ANGULAR	± 1/2	DRAWN BY: GS	
M/C FINISH	125	CHK. BY: GF	
BREAK ALL SHARP CORNERS		GSF RIG 185, P.O. #S-603-027 WOM S.O. #24693	
		SHT. 1 OF 3 DRAWING NUMBER M1442R185 14	



NOTES

1. MDT=-20 DEG. C
2. MEETS NACE MR-01-75
3. MEETS REQUIREMENTS OF P.O. S-603-027
4. REF. B.O.M. (SHT. 3 OF 3)

FINAL AS BUILD

TOLERANCES (EXCEPT WHERE NOTED)	
FRACTION	± 1/64
DECIMAL 0.X	± .030
0.XX	± .015
0.XXX	± .005
ANGULAR	± 1/2
M/C FINISH	125
BREAK ALL SHARP CORNERS	



WORLDWIDE OILFIELD MACHINE INC.
11809 CANEMONT, HOUSTON, TX 77035.

SCALE: NONE
DATE: 12/19/00

APPROVED BY
RAJAN 18FEB03

DRAWN BY: GS
CHK. BY: GF

CHOKE MANIFOLD, 15,000 PSI W.P. H₂S

GSF RIG 185, P.O. #S-603-027
WOM S.O. #24693

SHT. 2 OF 3

DRAWING NUMBER
M1442R185 14

ASSY. PART NO. M1442

APPROX. WT. = 38,047 LBS.

ITEM	PART NO.	QTY.	DESCRIPTION
1	M1744	9	VALVE, HYDRAULIC GATE 3 1/16"-15M F.E.
2	M1732	11	VALVE, MANUAL GATE 3 1/16"-15M F.E.
3	M1745	2	VALVE, MANUAL GATE 4 1/16"-10M F.E.
4	M1746	10	VALVE, HYDRAULIC GATE 4 1/16"-10M F.E.
5	WCR-501(PH)	2	CHOKE, HYDRAULIC DRILLING 3 1/16"-15M F.E.
6	WA19002N(PH)	2	CHOKE, ADJUSTABLE 3 1/16"-15M F.E.
7	WS-404-1	6	CROSS, STUD'D. 6-WAY 3 1/16"-15M
8	WS-603A	5	CROSS, STUD'D. 6-WAY 4 1/16"-10M
9	WFN-302-2	3	FLANGE, WELDNECK 3 1/16"-15M (5.50 O.D. X 3.00 BORE)
9A	M1442-9C	1	FLANGE, WELDNECK 3 1/16"-15M (4.50 O.D. X 3.06 BORE)
10	M0545-27	11	FLANGE, FLUID CUSHION 3 1/16"-15M
11	SW4649A	2	FLANGE, WELDNECK 4 1/16"-10M (5"-SCH. XXH BORE)
11A	M1442-11B	3	FLANGE, WELDNECK 4 1/16"-10M (4"-SCH. XXH BORE)
11B	M1442-11-2	1	FLANGE, WELDNECK 4 1/16"-10M (4"-SCH. 80 BORE)
12	WFC-410-1	14	FLANGE, FLUID CUSHION 4 1/16"-10M
13	M1442-13	1	BLOCK, STUD'D. INSTRUMENT 4-WAY (1) 3 1/16" X (3) 2 1/16"-15M
14	M1442-14C	2	FLANGE, CROSSOVER 2 1/16"-15M FLG'D. X 2"-FIG.2202 UNION FEMALE SUB C/W BLIND MALE SUB, WING NUT
15	M1442-15	4	SPOOL, SPACER 3 1/16"-15M FLG'D. X 25.06 O.A.L.
16	M1442-16	2	CHAMBER, BUFFER 10,000 PSI W.P. 8.50 O.D. X 6.00 I.D. X 69.18 O.A.L.
17	M1442-17	1	CHAMBER, LOOP PSI W.P. 8.50 O.D. X 6.00 I.D. X 217.50 O.A.L.
18	M1442-18	2	GAUGE, PRESS. 0-20,000 PSI W.P. C/W 2 1/16"-15M FLG. CONN. (LARGE FACE)
19	M1442-19C	2	FLANGE, CROSSOVER 3 1/16"-15M FLG'D. X 3"-FIG.2202 UNION FEMALE SUB C/W BLIND MALE SUB, WING NUT AND 9/16" AUTOCLAVE PLUG
20	SW-4722	2	FLANGE, GLYCOL INJECTION 3 1/16"-15M C/W 9/16" AUTOCLAVE PLUG
21	M1442-21	1	SPOOL, SPACER 3 1/16"-15M FLG'D. X 23.56 O.A.L.
22	M1132-40B	4	FLANGE, FLUID CUSHION 3 1/16"-10M
23	M1442-23	2	FLANGE, CROSSOVER 2 1/16"-10M FLG'D. X 2"-FIG.2202 UNION FEMALE SUB C/W BLIND MALE SUB, WING NUT
24	SW-4723	2	FLANGE, TEST 2 1/16"-15M C/W 9/16" AUTOCLAVE PLUG
25	M1421-32B	4	SPOOL, SPACER 3 1/16"-10M FLG'D. X 12.00 O.A.L.
26	BX-152-04	9	GASKET, RING BX-152
27	BX-154-04	69	GASKET, RING BX-154
28	BX-155-04	39	GASKET, RING BX-155

NOTES

1. MDT=-20 DEG. C
2. MEETS NACE MR-01-75
3. MEETS REQUIREMENTS OF P.O. S-603-027

ITEM	PART NO.	QTY.	DESCRIPTION
29	AB-0654Z	16	STUD, 3/4"-10UNC X 5 3/4" O.A.L. (ZYLAN COATED) 2 1/16"-10M
30	B-06Z	32	NUT, HEX 3/4"-10UNC (ZYLAN COATED) 2 1/16"-10M
31	AB-1072Z	32	STUD, 1"-8UN X 7 1/4" O.A.L. (ZYLAN COATED) 3 1/16"-10M
32	B-10Z	64	NUT, HEX 1"-8UN (ZYLAN COATED) 3 1/16"-10M
33	AB-1180Z	176	STUD, 1 1/8"-8UN X 8" O.A.L. (ZYLAN COATED) 3 1/16"-15M
34	B-11Z	352	NUT, HEX 1 1/8"-8UN (ZYLAN COATED) 3 1/16"-15M
35	AB-1184Z	80	STUD, 1 1/8"-8UN X 8 1/2" O.A.L. (ZYLAN COATED) 4 1/16"-10M
36	B-11Z	160	NUT, HEX 1 1/8"-8UN (ZYLAN COATED) 4 1/16"-10M
37	M1442-37B	1	SPOOL, SPACER 4 1/16"-10M FLG'D. X 25.00 O.A.L.
38	DELETED		DSA, 4 1/16"-10M X 6" O.A.L. (THRU HOLES)
39	M1442-39	1	BLOCK, STUD'D. INSTRUMENT 5-WAY (1) 3 1/16" X (4) 2 1/16"-15M
40	M0545-28	1	FLANGE, FLUID CUSHION 2 1/16"-15M

LOOSE FLANGES

9	WFN-302-2	3	FLANGE, WELDNECK 3 1/16"-15M (5.50 O.D. X 3.00 BORE) 15,000 PSI MAX. W.P., 350° F (CHOKE, KILL & CEMENT TEST LINES)
9A	M1442-9C	1	FLANGE, WELDNECK 3 1/16"-15M (4.50 O.D. X 3.06 BORE) 10,000 PSI MAX. W.P., 350° F (STANDPIPE TO CHOKE/KILL MANIFOLD)
11	SW-4649A	2	FLANGE, WELDNECK 4 1/16"-10M (5"-SCH. XXH BORE) (TO MUD GAS SEPARATOR)
11A	M1442-11B	3	FLANGE, WELDNECK 4 1/16"-10M (4"-SCH. XXH BORE) 250 PSI MAX. W.P., 375 PSI MAX. TEST PRESS.), 350° F (TO BURNER BOOM/OVERBOARD LINES TO ATMOSPHERE) NON-CONTAINMENT
11B	M1442-11-2	1	FLANGE, WELDNECK 4 1/16"-10M (4"-SCH. 80 BORE) (TO STRIPPING TANK)

FINAL AS BUILD

TOLERANCES (EXCEPT WHERE NOTED)		 WORLDWIDE OILFIELD MACHINE INC. 11809 CANEMONT, HOUSTON, TX 77035.	
FRACTION	± 1/64	SCALE: NONE	APPROVED BY
DECIMAL 0.X	± .030	DATE: 12/19/00	RAJAN 18FEB03
0.XX	± .015	CHOKE MANIFOLD, 15,000 PSI W.P. H ₂ S GSF RIG 185, P.O. #S-603-027 WOM S.O. #24693	
0.XXX	± .005		
ANGULAR	± 1/2		
M/C FINISH	125	DRAWING NUMBER	
BREAK ALL SHARP CORNERS		M1442R185 	

SHT. 3 OF 3

Transocean Development Driller I

ABB Vetco Gray KFDS – CSO Diverter System

General Information:

The Development Driller I uses a GE Vetco Gray Diverter System, CSO 1000, SN H121245, 1000psi working pressure, 60.5" OD, 20.0" ID, 1500 psi hydraulic working pressure, 500 kips hang off capacity.

Diverter piping elevation drawing, piping has no bends/curves. Valves are Piper Valve Systems, 13.56" ID, 1448 psi working pressure, and Body: A350-LF2.

The ABB Vetco Gray KFDS - CSO (Complete Shutoff) Diverter is specifically designed for floating drilling vessels. It provides fast, open hole closure from 21-1/4" (540 mm) diameter. It is installed and seals off in a special Support Housing below the rotary table and is secured to the Crossover Assembly on top of the Telescopic Joint Inner Barrel.

The KFDS-CSO diverter includes the following major components:

- **Diverter Spool:** The main component of the complete diverter assembly. This unit lands in the support housing and directs the flow of wellbore fluid to the appropriate processing device. During emergencies, the diverter can close off around drillpipe, casing or open hole and contain surges in pressure up to the rated working pressure of the system.
- **Diverter CSO Packer:** Rubber bag element that closes on drillpipe, casing, or on open hole. It is energized with hydraulic pressure to the diverter from the diverter control system.
- **Flowline Seals:** Elastomer seals used to provide a seal between the Diverter and the Support Housing. They are energized with hydraulic pressure from the diverter control system.
- **Flex Joint:** The Flex Joint is secured to the bottom of the Diverter. It has a crossover connector (looking down) to attach to the Crossover Assembly on the Inner Barrel of the Telescopic Joint. The Flex Joint allows a deviation of up to 15° from vertical in any direction.

Specifications:

- Pressure Rating: Up to the pressure rating of the diverter support housing but not to exceed:
 - 1,000 psi (69 bar) closed on 5" (127 mm) pipe
 - 500 psi (35 bar) closed on open hole
- Diverter Operating Pressure: 1,500 psi (103 bar)
- Tensile Rating: Up to 2.5 million lbs

- Diverter Operating Pressure on Casing:

CASING SIZE (inches)	CLOSING PRESSURE	
	(psi)	(bar)
7	1200	83
7-5/8	1100	76
8-5/8	1000	69
9-5/8	900	62
10-3/4	800	55
11-3/4	650	45
13-3/8	500	35

- Hydraulic Connections
 - Open/Close Line:
 - 1-1/2" (38 mm) ID
 - 3,000 psi (207 bar) rated
 - Open/Close Connections: 1-1/2" NPT
- Volume to open: 15 gallons (57 liters) maximum
- Volume to close: 31 gallons (117 liters) maximum
- Closure Range: 21-1/4" (540 mm) Diameter to open hole
- Operating Fluid: Houghto Safe 273 or equivalent

Diverter Operating Procedures & Control Sequences For Development Driller I

1) Diverter Packer Closure with flow diverted overboard

Verify Hydril Diverter Panel set to Normal Diverting
 Depress and hold down push & hold to operate button
 Select diverter packer close

Functions that open:

Port Overboard Valve
 Starboard Overboard Valve

Functions that close:

Trip tank Valve
 Flowline Valve
 Test line Valve
 Fill up line Valve
 Water injection Valve
 Mud Gas Separator Valve

Functions that energize or pressurize

Flowline Seals
 Lower Solid Packer
 Diverter Lock Down Dogs

The last item that closes is the "Diverter Packer" only after all of the above functions are complete

Note: There is no specific order to the functions

listed above, but all must take place before the diverter packer will close.

2) Diverter Packer Closure with flow diverted to MGS

Verify Hydriil Diverter Panel set to Mud Gas Separator Mode

Depress and hold down push & hold to operate button

Select diverter packer close

Functions that open:

Mud Gas Separator Valve

Functions that close:

Port Overboard Valve

Starboard Overboard Valve

Trip tank Valve

Flowline Valve

Test line Valve

Fill up line Valve

Water injection Valve

Functions that energize or pressurize

Flowline Seals

Lower Solid Packer

Diverter Lock Down Dogs

The last item that closes is the "Diverter Packer" only after all of the above functions are complete

Note: There is no specific order to the functions listed above, but all must take place before the diverter packer will close.

3) MGS Pressure Pre-Set Limit Exceeded

Sensor on MGS will send a signal to control system activating alarm in driller control screen.

Changing mode from "Mud Gas Separator Mode" to Normal Diverting Mode

Select normal Normal Diverting Mode

Functions that open:

Overboard Valves Port & Starboard Open Automatically

Mud Gas Separator Valve will have to be functioned closed on panel after overboards are open

Note function state of "Diverter Packer" will not change from Close

Changing mode from "Normal Diverting" to Mud Gas Separator Mode

Select Mud Gas Separator Mode on panel

Note: There are no automated sequences in this application

Open Mud Gas Separator Valve

Close Starboard Overboard Valve

Close Port Overboard Valve

Note function state of "Diverter Packer" will not change from Close

System Test Mode

This mode is only for testing the Diverter and or it's componets

This mode inhibits all interlocks

This mode should never be used in a well control situation

"Operation while in this mode could cause damage to the riser and or diverter componets"

Valve Override Mode

Disarm is the normal state of operation of the panel

Arm gives you the ability or over ride the interlocks for the valves on the Diverter housing

"This is not a mode to be used in normal operation this is only to be used in an emergency"

Diverter Control System Notes:

Once an auto sequence is initiated all interlocks listed must be met or diverter packer will not close

When Mud Gas Separator Mode is initiated if Mud Gas Valve does not open the system will default to Normal diverting Mode

At no time while in Normal Diverteing Mode or Mud Gas Separator Mode are you allowed thru interlocks to close all valves on the diverter housing at one time.

All regulators and supplies represented on the Diverter control screen must have the correct values to properly activate the pressure switches and allow the control system to operate. Reference chart below.

Pressure ranges expected on panel gauges (Depends on size of pipe):

Upper Split Packer Air Pressure: 50-250psi

Diverter Manifold Regulator: 1,500psi

System Regulated Supply Pressure: 3,000psi

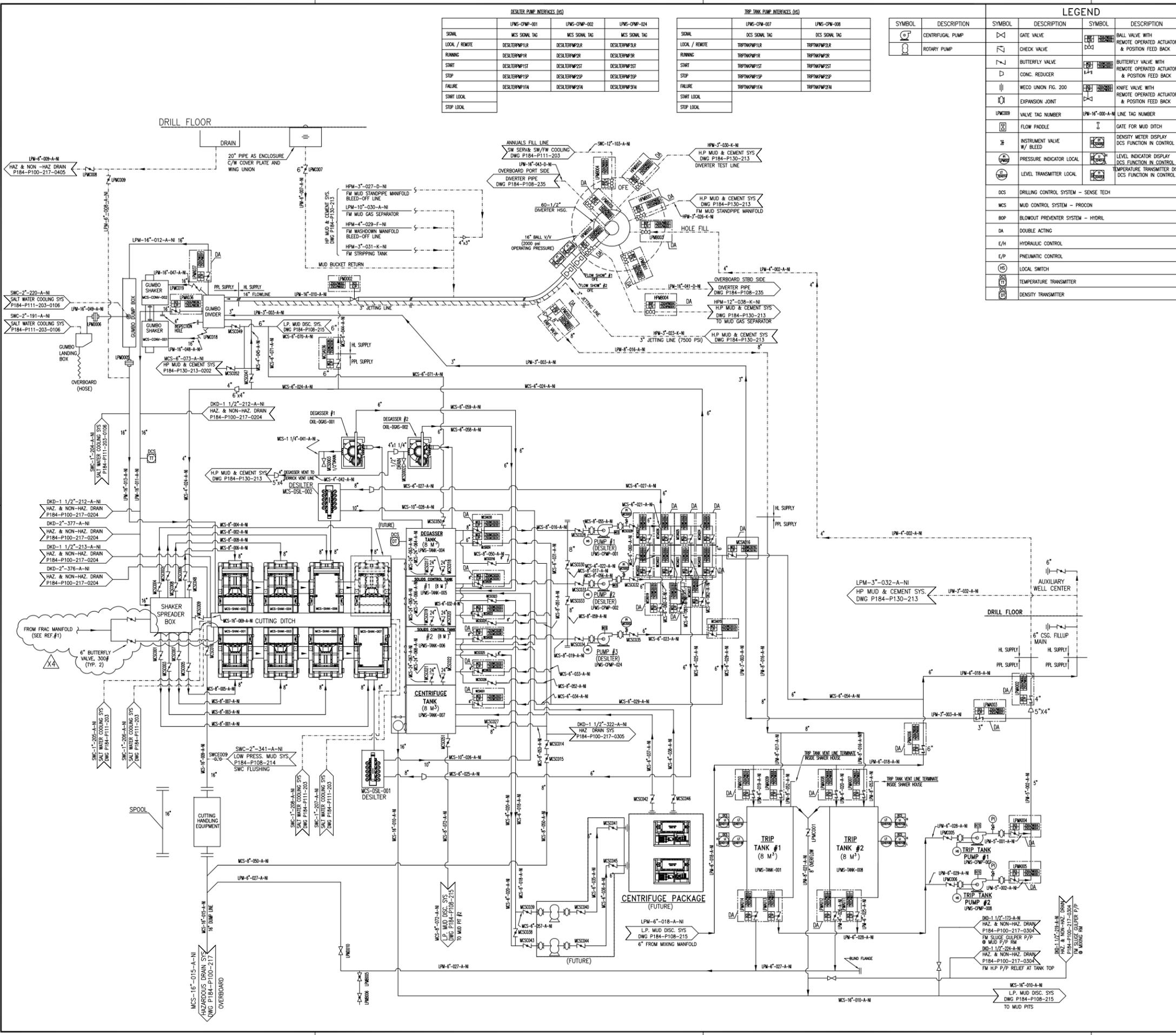
Flowline Seals Regulator: 500-750psi

Lower Solid Packer Regulator: 250-500psi

Rig Air Supply Pressure: 100-125psi

Diverter Accumulator Supply Pressure: 4,500-5,000psi

Diverter Packer Regulator: 500-1,500psi



DESILTER PUMP INTERFACES (HS)				TRIP TANK PUMP INTERFACES (HS)	
SYMBOL	LPM-001-001	LPM-001-002	LPM-001-004	SYMBOL	LPM-007-001
LOCAL / REMOTE	DESILTERP001R	DESILTERP002R	DESILTERP004R	LOCAL / REMOTE	TRIP007R
RUNNING	DESILTERP001S	DESILTERP002S	DESILTERP004S	RUNNING	TRIP007R
START	DESILTERP001ST	DESILTERP002ST	DESILTERP004ST	START	TRIP007R
STOP	DESILTERP001SP	DESILTERP002SP	DESILTERP004SP	STOP	TRIP007R
FAILURE	DESILTERP001FA	DESILTERP002FA	DESILTERP004FA	FAILURE	TRIP007R
START LOCAL	DESILTERP001SL	DESILTERP002SL	DESILTERP004SL	START LOCAL	TRIP007R
STOP LOCAL	DESILTERP001SL	DESILTERP002SL	DESILTERP004SL	STOP LOCAL	TRIP007R

LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	CENTRIFUGAL PUMP		GATE VALVE
	ROTARY PUMP		CHECK VALVE
	BUTTERFLY VALVE		BALL VALVE WITH REMOTE OPERATED ACTUATOR & POSITION FEED BACK
	CONC. REDUCER		BUTTERFLY VALVE WITH REMOTE OPERATED ACTUATOR & POSITION FEED BACK
	WEED UNION FIG. 200		KNIFE VALVE WITH REMOTE OPERATED ACTUATOR & POSITION FEED BACK
	EXPANSION JOINT		LINE TAG NUMBER
	VALVE TAG NUMBER		GATE FOR MUD DITCH
	FLOW PADDLE		DENSITY METER DISPLAY DCS FUNCTION IN CONTROL ROOM
	INSTRUMENT VALVE W/ BLEED		LEVEL INDICATOR DISPLAY DCS FUNCTION IN CONTROL ROOM
	PRESSURE INDICATOR LOCAL		TEMPERATURE TRANSMITTER DISPLAY DCS FUNCTION IN CONTROL ROOM
	LEVEL TRANSMITTER LOCAL		DRILLING CONTROL SYSTEM - SENSE TECH
	DCS		MUD CONTROL SYSTEM - PROCON
	DOUBLE ACTING		BLOWOUT PREVENTER SYSTEM - HYDRIL
	E/H		LOCAL SWITCH
	E/P		TEMPERATURE TRANSMITTER
	DENSITY TRANSMITTER		

MATERIAL DESCRIPTION LIST			
COMPONENT	SIZE	COMPONENT DESCRIPTION	ASTM MAT'L ANSI STD
PIPE	2"-24"	CARBON STEEL, SMLS. BLK, SCH 40	A106/GR. B B.36.10
FITTING	2"-24"	SCH.40, SMLS, B.W.E., BLK., CARBON STEEL	A234/GR.WPB B.16.9
VALVE	1 1/2"	CHECK. SWING, 150#, S.E. BRZ.	B62 B.16.3
	3"-24"	BUTTERFLY, 150#, LUG TYPE, DUCTILE IRON, AL. BRZ. DISC, BUNA-N SEAT, STAINLESS STEEL STEM	A395
	1/2"	GATE, 150#, BRZ. SCRD. RS	B62 B.16.3
	16"	GATE KNIFE, 150#, LUG OR WAFER TYPE	A395
CONNECTION	2"-24"	FLG., 150#, SO. FF/RF, FORGED STEEL	A105 B.16.5
	1/2"-2"	3000# S.W.E./S.E. FORGED STEEL	A105 B.16.5
BOLTING	ALL	BOLTS - ALLOY STEEL	A193/B7 B.18.2.1
	ALL	NUTS - ALLOY STEEL	A194/2H B.18.2.2
GASKET	ALL	NON-ASBESTOS. RF, 1/16" THK, 150#, HEAT & OIL RESISTANCE	B.16.21

- GENERAL NOTES**
- FOR GENERAL REQUIREMENTS OF THE SYSTEM & MATERIAL SCHEDULE, SEE SECTION 13 OF THE SPECIFICATIONS.
 - FOR A DESCRIPTION OF THE SYSTEM, SEE SECTION 14 OF THE SPECIFICATIONS.
 - ALL SYSTEMS SHALL BE BUILT ACCORDING TO THE RULES OF THE REGULATORY BODIES AS CALLED OUT IN THE SPECIFICATIONS.
 - VACUUM PIPING INTERFACES TO BE HARD PIPED ACCORDING TO VACUUM TYPE CUTTINGS DISPOSAL EQUIPMENT REQUIREMENTS
 - ALL E/P VALVES TO BE DOUBLE ACTING - FAIL STAY

ITEM	COMP. NAME	DRAWING OR DOCUMENTS No./TITLE	REV.
6	P184-P100-217	SCHEMATIC HAZARDOUS & NON-HAZARDOUS DRAIN SYSTEM	
5	P184-P111-203	SCHEMATIC SALT WATER SERVICE & SALT WATER/FRESH WATER COOLING SYSTEM	
4	P184-P108-235	SCHEMATIC DIVERTER PIPES	
3	P184-P108-216	SCHEMATIC LOW PRESSURE MUD SUCTION SYSTEM	
2	P184-P108-215	SCHEMATIC LOW PRESSURE MUD DISCHARGE SYSTEM	
1	P184-P130-213	SCHEMATIC HIGH PRESSURE MUD & CEMENT SYSTEM	

REV	DATE	ALTERATIONS	MOD'D	CHK'D	APPR'D
X4	12/11/07	REVISED TO SHOW LINE FROM FRAC MANIFOLD	JIG	CB	RH
X3	29.03.05	AS BUILT-GSP	ZZ	STEVE	
X2	15.09.04	REVISED AS PER CAR 870	HSHAM		
X1	20.08.04	REVISED AS SHOWN	HSHAM	BANU	OMAR
X0	20.08.04	AS BUILT	HSHAM	BANU	OMAR
10	28.10.03	SCHEMATIC REVISED TO UPDATE INSTRUMENTATION	SSR	BANU	OMAR
9F2	26.06.03	ISSUED FOR CONSTRUCTION	LZ	BANU	OMAR
9F1	12.06.03	REVISED AS ARRANGEMENT, IFC.	LZ	BANU	OMAR

DISTRIBUTION LIST											
REVISION	RF3	9	9F1	9F2	10	X0	X1	X2			
DATE	29/03/03	06/06/03	12/06/03	26/06/03	28/10/03	28/04/04	20/08/04	15/09/04			
OWNER	5	5	5	5	5	4	4	4			
CLASSIFICATION SOCIETY	-	7	-	-	8	2	2	2			
ENGINEERING DEPT.	1	1	1	1	1	-	-	-			
PROJECT DEPT.	12	12	-	-	-	1	1	1			
PRODUCTION DEPT.	-	-	-	-	-	1	1	1			
PURCHASING DEPT.	-	-	-	-	-	-	-	-			
CENTRAL FILES	1	1	1	1	1	2	2	2			
Q.C. / M. PLANNER	-	-	-	-	-	-	-	-			
COMMISSIONING	1	1	1	1	1	1	1	1			
TOTAL	20	27	20	20	28	11	11	11			

APPROVALS		
APPROVALS	APPROVED BY:	DATE / REV. NO.
CLASSIFICATION SOCIETY		
OWNER		
OTHERS		

THIS DOCUMENT AND THE INFORMATION CONTAINED WITHIN COMPRISE PROPRIETARY INFORMATION OWNED SOLELY BY PPL SHIPYARD PTE LTD. THIS DOCUMENT IS PROVIDED SUBJECT TO THE PROVISION THAT THE INFORMATION HEREIN WILL NOT BE DISCLOSED OR REPRODUCED UNLESS SPECIFICALLY AUTHORIZED IN WRITING BY PPL SHIPYARD PTE LTD. NOW WILL BE USED IN ANY MANNER INTENTIONAL TO OR IN COMPETITION WITH INTEREST OF PPL SHIPYARD PTE LTD. THIS DOCUMENT, REPRODUCTIONS PREVIOUSLY AUTHORIZED IN WRITING AND ASSOCIATED INFORMATION SHALL BE RETURNED WHEN THEY HAVE SERVED THEIR INTENDED PURPOSES, OR ON DEMAND.

IMO 8765503 / ABS 04112715 HULL NO: P2003 FORMAT=A1

OWNER :

GLOBAL SANTAFE
GlobalSantafe Corporation
Memorial Office
15378 Memorial Drive
Houston, Texas 77079, USA
Phone : 281 925 6000

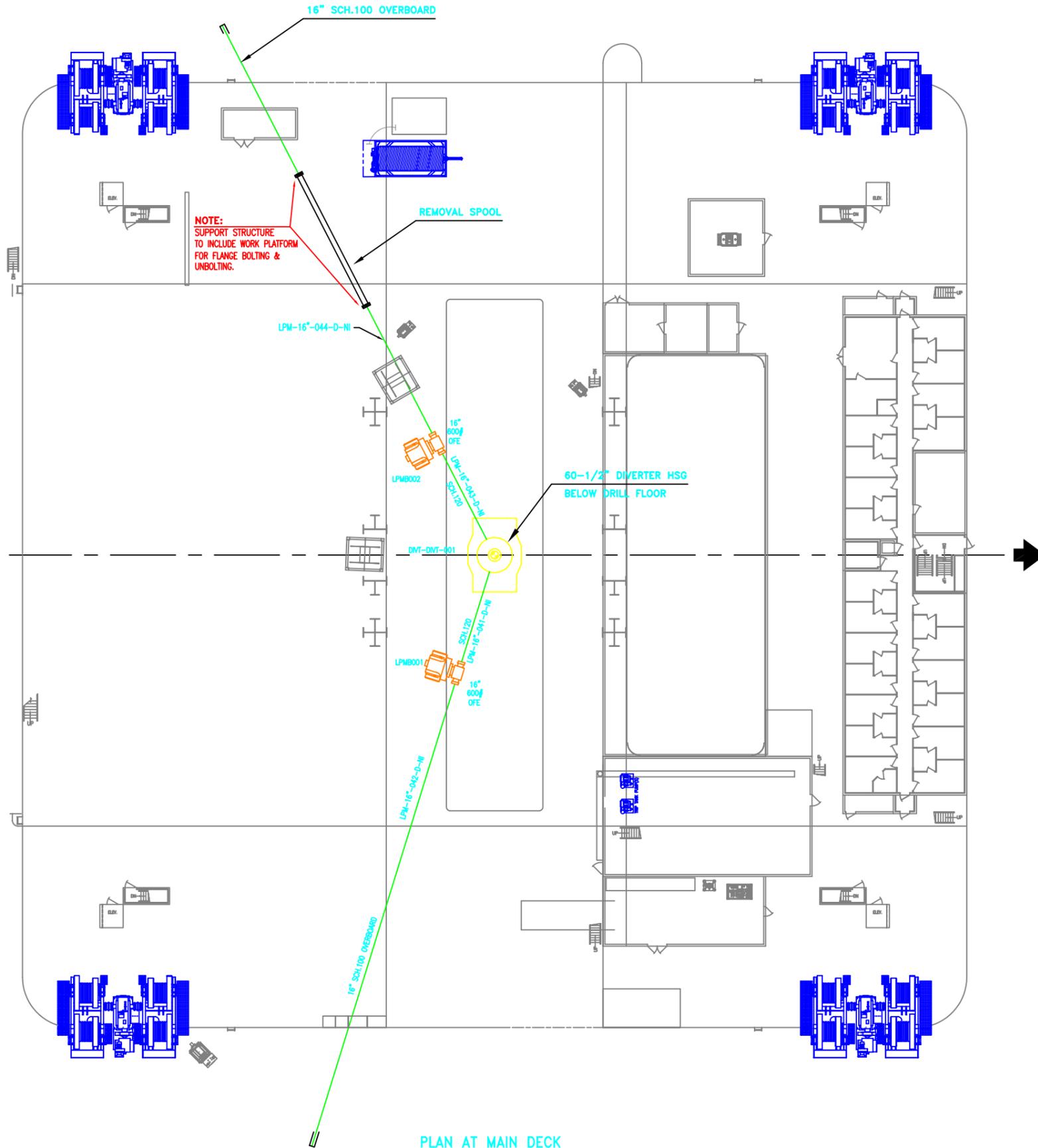
PPL SHIPYARD PTE LTD
21, Pandan Road, SINGAPORE 609273
Tel: 6265 0477, Fax: 6265 7904

DEVELOPMENT DRILLER I

TITLE :
SCHEMATIC
LOW PRESSURE MUD SYSTEM

OWN: Z Z DATE: 29/03/05
CHK.BY: STEVE DATE: 29/03/05
APP.BY: DATE:
SCALE: NTS

DWG. NO: P184-P108-214 SHT 0101 REV X4



PLAN AT MAIN DECK
36000 ABOVE

LEGEND		SYMBOL		DESCRIPTION	
LPM001	VALVE TAG NUMBER	LPM-16-041-D-NI	LINE TAG NUMBER		

SYSTEM WORKING PRESSURE: 35 BAR | HYDROSTATIC TEST PRESSURE: 52 BAR | MIN DESIGN TEMPERATURE: -10°C

MATERIAL DESCRIPTION LIST					
COMPONENT	SIZE	COMPONENT DESCRIPTION		ASTM MAT'L	ANSI STD
PIPE	16"	CARBON STEEL, SMLS, SCH 100/120		A106 GR. B	B.36.1
FITTINGS	16"	SCH.100/120 CARBON STEEL, SMLS, B.W.E., BLK.		A234/GR.WPB	B.16.9
CONNECTION	ALL	FLG., 300#, WN. RF, FORGED STEEL		A105	B.16.5
BOLTING	ALL	ALLOY STEEL (STUDBOLTS)		A193/B7	B.18.2.1
	ALL	ALLOY STEEL NUTS		A194/2H	B.18.2.2
GASKET	ALL	NON- ASBESTOS 1/16" THK RF			B.16.21

GENERAL NOTES

1. PIPING SYSTEMS SHALL BE DESIGNED, INSTALLED AND TESTED IN ACCORDANCE WITH ABS RULES THE REQUIREMENTS OF API CODES, AND SFIC SPECIFICATION.
2. ALL WELDING TO BE IN ACCORDANCE WITH ABS RULES AND BY A.W.S. D1.1.
3. ALL PIPING TO BE PROPERLY SUPPORTED TO ALLOW EXPANSION AND TO MINIMIZE VIBRATION.
4. IDENTIFICATION/COLOR CODING METHODS SHALL COMPLY WITH SFIC SPECIFICATION.
5. PIPES AND FITTING TO BE SUITABLE FOR H2S SERVICE.

2	P184-P111-203	SCHEMATIC SALT WATER SERVICE & SALT WATER/ FRESH WATER COOLING SYSTEM	
1	P184-P108-216	SCHEMATIC LOW PRESSURE MUD SUCTION SYSTEM	

ITEM	COMP. NAME	DRAWING OR DOCUMENTS No./TITLE	REV.
------	------------	--------------------------------	------

LIST OF REFERENCED DRAWINGS AND DOCUMENTS USED FOR DRAWINGS

X0	28.04.04	AS BUILT	ZJS	BANU	OMAR
5	28.10.03	ISSUED FOR ABS APPROVAL	SSR	BANU	OMAR
4	15.08.02	REVISED AS PER OWNER'S COMMENTS & IFC.	DNG	ZGQ/SUN	OMAR
3	21.06.02	MODIFIED LINE TAG NUMBERS AND IFC.	DNG	ZGQ/SUN	OMAR
2	05.06.02	ISSUED FOR CONSTRUCTION.	YL	ZGQ/SUN	OMAR
1	06.05.02	REVISED AS PER OWNER'S COMMENTS & IFA.	JESSICA	ZGQ/SUN	OMAR
0	19.10.01	REVISED AS PER OWNER'S COMMENTS, ADDED TAGGING FOR VALVES & LINES AND ISSUED FOR CONSTRUCTION.	ZJS	ZGQ/SUN	OMAR
A	07.09.01	ISSUED FOR APPROVAL.	KCP	ZGQ/SUN	OMAR

REV	DATE	ALTERATIONS	MOD'D	CHK'D	APPR'D
-----	------	-------------	-------	-------	--------

DISTRIBUTION LIST

REVISION	A	0	1	2	3	4	5	X0
DATE	07.09.01	19.10.01	06.05.02	05.06.02	21.06.02	15.08.02	28.10.03	28.04.04
OWNER	4	4	4	5	5	5	5	4
CLASSIFICATION SOCIETY	7	7	-	2	2	-	8	2
ENGINEERING DEPT.	1	1	1	1	1	1	1	-
PROJECT DEPT.	8	12	-	12	12	12	12	1
PRODUCTION DEPT.	-	-	-	-	-	-	-	1
PURCHASING DEPT.	-	-	-	-	-	-	-	-
CENTRAL FILES	1	1	1	1	1	1	1	2
Q.C. / M. PLANNER	-	-	-	-	-	-	-	-
COMMISSIONING	-	-	-	-	-	-	1	1
TOTAL	21	25	6	21	21	20	28	11

APPROVALS

APPROVALS	APPROVED BY.	DATE / REV. NO.
CLASSIFICATION SOCIETY		
OWNER		
OTHERS		

THIS DOCUMENT AND THE INFORMATION CONTAINED WITHIN COMPRISE PROPRIETARY INFORMATION OWNED SOLELY BY PPL SHIPYARD PTE LTD. THIS DOCUMENT IS PROVIDED SUBJECT TO THE PROVISION THAT THE INFORMATION HEREIN WILL NOT BE DISCLOSED OR REPRODUCED UNLESS SPECIFICALLY AUTHORIZED IN WRITING BY PPL SHIPYARD PTE LTD NOR WILL BE USED IN ANY WAY DETRIMENTAL TO OR IN COMPETITION WITH INTEREST OF PPL SHIPYARD PTE LTD. THIS DOCUMENT, REPRODUCTIONS PREVIOUSLY AUTHORIZED IN WRITING AND ASSOCIATED INFORMATION SHALL BE RETURNED WHEN THEY HAVE SERVED THEIR INTENDED PURPOSES, OR ON DEMAND.

IMO 8765503 / ABS 04112715 | HULL NO: P2003 | FORMAT=A1

OWNER :

PPL SHIPYARD PTE LTD
21, Pandan Road, SINGAPORE 609273
Tel: 6265 0477, Fax: 6265 7904

DEVELOPMENT DRILLER I

TITLE :

DWN: ZJS	DATE: 28.04.04	DWG. NO:	SHT	REV
CHK.BY: BANU	DATE: 28.04.04	P184-P108-235	0101	X0
APP.BY: OMAR	DATE: 28.04.04			
SCALE: NTS				