



DDS Drill String Dynamics
DGR Dual Gamma Ray

Country : Australia			
Field : Casino			
Location : Lat: 38° 47' 13.03" South Long: 142° 41' 54.49" East			
Well : Casino-4DW2			
Company : Santos Ltd			
Rig : Ocean Patriot			
LOCATION	Company	: Santos Ltd	
	Rig	: Ocean Patriot	
	Well	: Casino-4DW2	
	Field	: Casino	
	Country	: Australia	
	DOE Number	:	
Latitude : 38° 47' 13.03" South Longitude : 142° 41' 54.49" East UTM Easting = 647,518.19 m UTM Northing = 5,705,495.28 m		Other Services Directional Drilling	
Permanent Datum : LAT		Elev. : 0.00 m	
Log Measured From : Drill Floor		22.00 m Above Permanent Datum	
Drilling Measured From : Drill Floor		MD LOG	
Depth Logged : 1,146.00 m To 2,404.00 m		Unit No. : 197 Job No. : AU-FE-0003735541	
Date Logged : 27-May-05 To 04-Jun-05		Plot Type : Final	
Total Depth MD : 2,404.00 m TVD: 1,786.70 m		Plot Date : 29-Jun-05	
Spud Date : 27-May-05			
Run No.	Borehole Record (MD)		Run No.
	Size	To	
800	311.000 mm	1,146.00 m	1,157.00 m
900	311.000 mm	1,157.00 m	1,274.00 m
1000	311.000 mm	1,274.00 m	1,998.00 m
1100	216.000 mm	1,998.00 m	2,404.00 m
		Casing Record (MD)	
		Size	Weight
		762.000 mm	573.00 kgpm
		340.000 mm	107.00 kgpm
		244.000 mm	70.00 kgpm
		From To	
		92.80 m 137.40 m	
		92.80 m 727.87 m	
		92.80 m 1,989.85 m	

WELL INFORMATION

MWD Run Number	800	900	1000	1100	
Date run completed	27-May-05	28-May-05	31-May-05	04-Jun-05	
Rig Bit Number	12	13	14	15	
Bit Size (mm)	311	311	311	216	
Tool Nominal OD (mm)	203	203	203	171	
Log Start Depth (MD, m)	1,146.0	1,157.0	1,274.0	1,998.0	
Log End Depth (MD, m)	1,157.0	1,274.0	1,998.0	2,404.0	
Drill or Wipe	Drilling	Drilling	Drilling	Drilling	
Drill/Wipe Start Date and Time	27-May-05 00:00	27-May-05 19:55	29-May-05 00:45	02-Jun-05 14:51	
Drill/Wipe End Date and Time	27-May-05 07:25	28-May-05 10:40	30-May-05 16:04	04-Jun-05 03:31	
Min Inc (deg) @ Depth (MD, m)	3.91 @ 1,133.97	5.08 @ 1,166.38	10.53 @ 1,287.27	76.66 @ 2,020.94	
Max Inc (deg) @ Depth (MD, m)	3.91 @ 1,133.97	10.24 @ 1,250.01	76.28 @ 1,975.04	87.78 @ 2,193.21	
Bit TFA(in2) / Bit Type	1.11 / HYC DS43GTS	1.11 / Sec XL12D	1.77 / DBS FS2663	0.98 / Sec FMF3553	
Flow Rate (gpm)	866	843	960	745	
Max AV (mpm) / CV (mpm) @ MWD	75.4 / 178.6	79.3 / 164.9	87 / 176	224 / 220	
Fluid Type	KCl/Polymer	KCl/Polymer	KCl/Polymer	Flo Pro	
Density (sg) / Viscosity (spqt)	1.3 / 68	1.3 / 60	1.3 / 69	1.3 / 57	
Filtrate CL (ppm)	46,000	46,000	46,000	120,000	
pH / Fluid Loss (mptm)	11 / 11	10.8 / 10.8	8.5 / 8.5	9.7 / 9.7	
PV (cp) / YP (lhf2)	18 / 42	16 / 37	20 / 43	17 / 41	
% Solids / % Sand	12 / 0.01	13 / 0.1	14 / 0.1	15 / 0.25	
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A	
Rm @ Measured Temp (degC)	0.11 @ 19.4	0.11 @ 20.0	0.12 @ 21.7	0.06 @ 23.3	
Rmf @ Measured Temp (degC)	0.08 @ 19.4	0.10 @ 20.0	0.09 @ 23.3	0.04 @ 23.9	
Rmc @ Measured Temp (degC)	0.28 @ 20.0	0.16 @ 18.9	0.17 @ 21.1	0.09 @ 20.0	
Max Tool Temp (degC) / Source	57.0 / EWR-P4	58.0 / EWR-P4	76.0 / HCIM	78.0 / EWR-P4	
Rm @ Max Tool Temp (degC)	0.06 @ 57.0	0.06 @ 58.0	0.05 @ 76.0	0.03 @ 78.0	
Lead MWD Engineer	A.Rule	A. Rule	A.Rule	A.Rule	
Customer Representative	C.Wise	C.Wise	C.Wise	R.King	

SENSOR INFORMATION

Downhole Processor Information

Tool Type	HCIM	HCIM	HCIM	HCIM	
Software Version	68.18	68.18	68.18	68.18	
Sub Serial Number	198838	198838	198838	10630413	
Insert Serial Number	163155	163155	163155	093281	
Logging String Serial Number	90072522XH1WRG	DM90072522	DM90072522	90073263HWRG6	
Date and Time Initialized	26-May-05 12:49	27-May-05 11:11	28-May-05 18:32	02-Jun-05 09:19	
Date and Time Read	27-May-05 10:26	28-May-05 15:49	31-May-05 23:02	04-Jun-05 15:29	

Directional Sensor Information

Tool Type	DM	DM	DM	DM	
Distance From Bit (m)	20.91	22.98	19.97	8.97	
Software Version	3.15	3.15	3.15	3.15	
Sub Serial Number	128402	128402	128402	Flex773864	
Sonde Serial Number	581139	581139	581139	149865	
Sensor ID Number	N/A	N/A	N/A	N/A	
Survey String Serial Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	101.30	272.43	N/A	N/A	

Gamma Ray Sensor Information

Tool Type	DGR	DGR	DGR	DGR	
Distance From Bit (m)	12.09	14.16	11.15	11.44	
Recorded Sample Period (sec)	12	12	12	12	
Software Version	N/A	N/A	N/A	N/A	
Sub Serial Number	059984	059984	059984	078523	
Insert/Sonde Serial Number	151078	151078	151078	126021	

Drillstring Dynamics Sensor Information

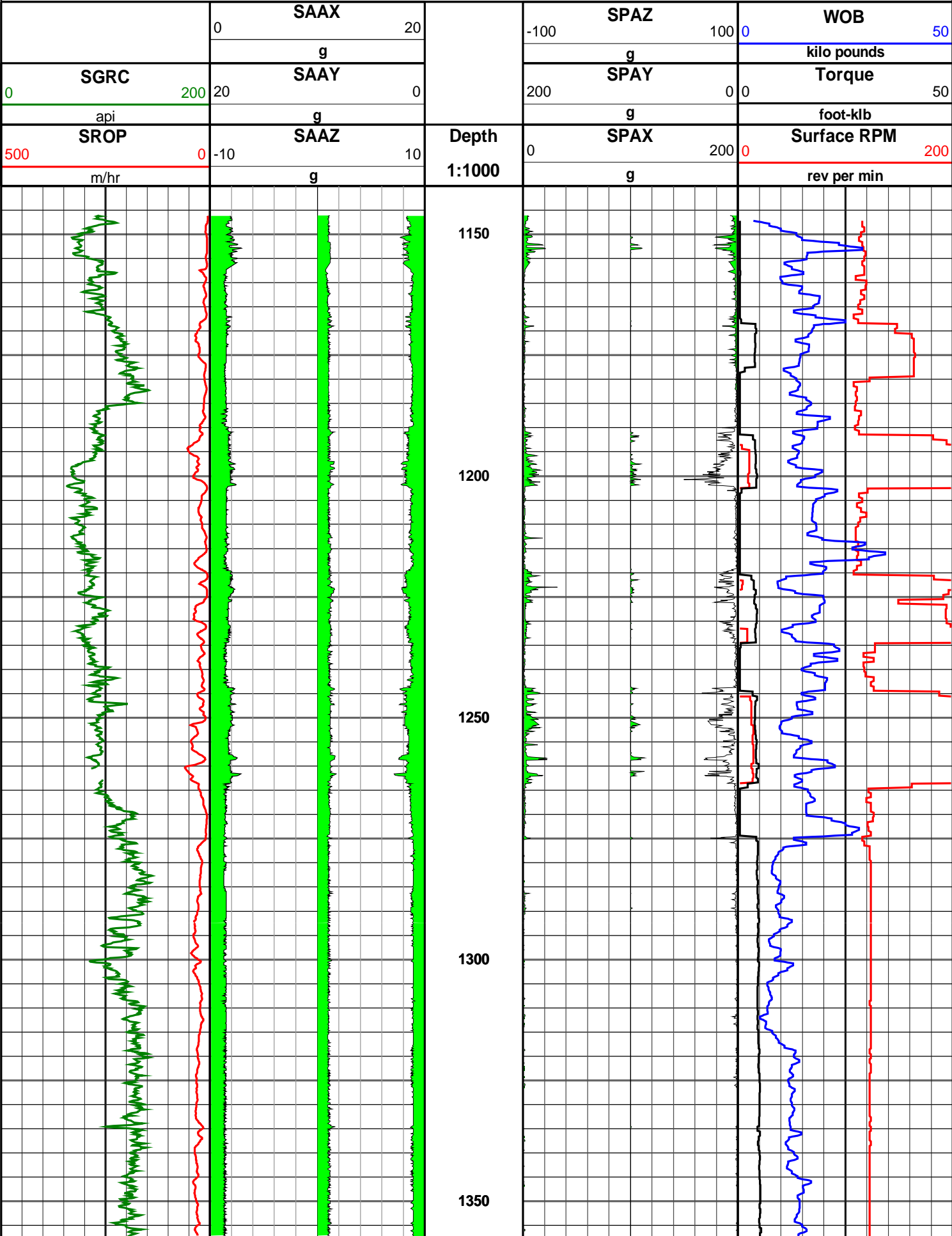
Tool Type	DDS	DDS	DDS		
Distance From Bit (m)	0	0	0		
Recorded Sample Period (sec)	12	12	12		
Software Version	.50	.50	.50		
Sub Serial Number	059984	059984	059984		
Insert Serial Number	0	0	0		
Sensor ID Number	126	126	126		

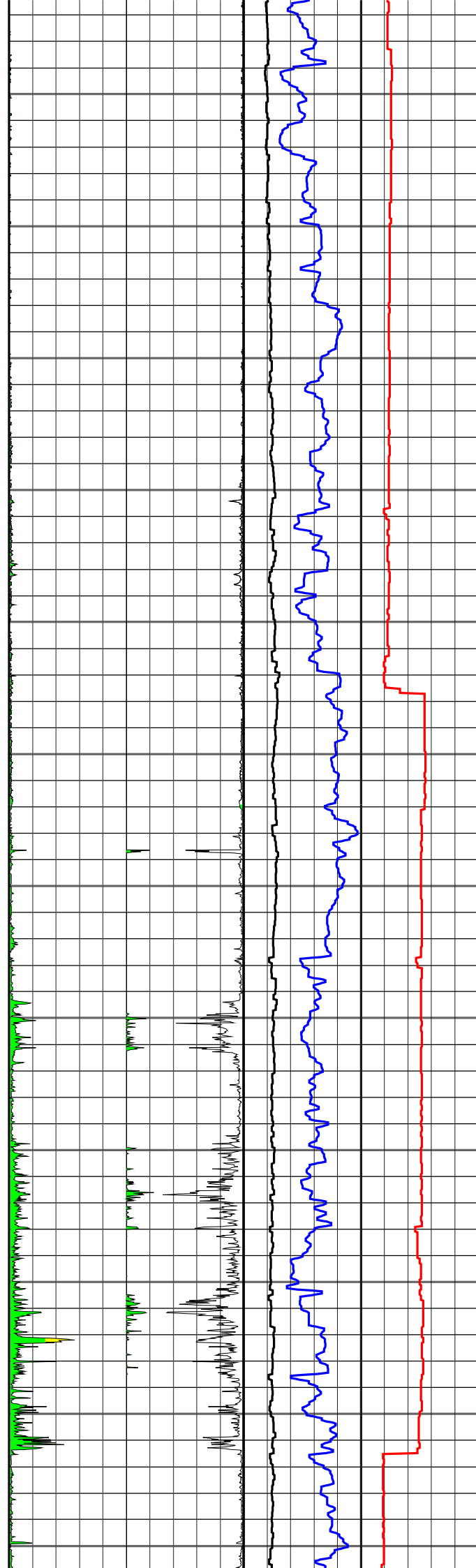
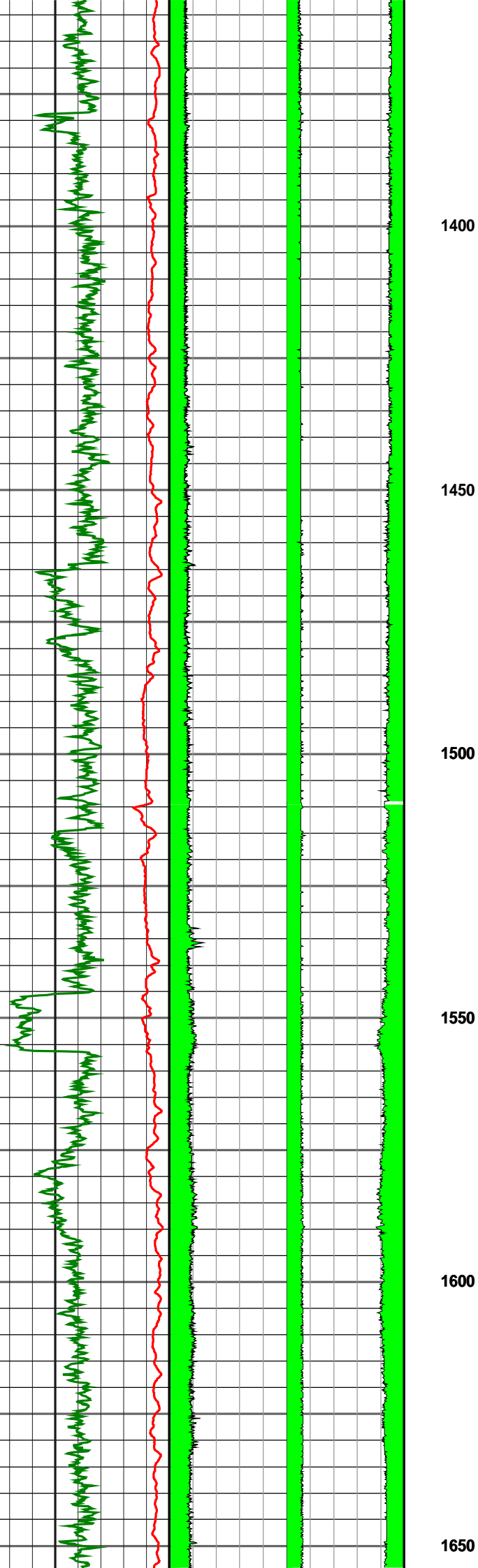
REMARKS

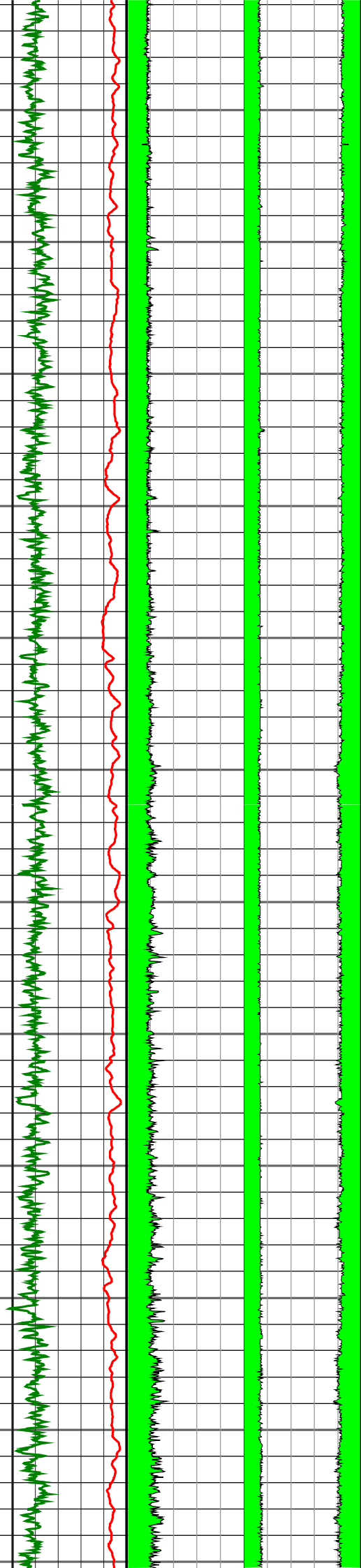
1. All depths are bit depths and referenced to the drillers pipe tally
2. AV/CV is calculated at the MWD collar using the Power Law for water based muds and the Bingham's Plastic Law for oil based muds.
3. Curve mnemonics are:
 SGRC - Smoothed Gamma Ray Combined, api
 SROP - Smoothed Rate of Penetration, m/hr
 SAAX - Smoothed Average X-Axis Accelerometer, g's
 SAAZ - Smoothed Average Z-Axis Accelerometer, g's
 SPAX - Smoothed Peak X-Axis Accelerometer, g's
 SPAY - Smoothed Peak Y-Axis Accelerometer, g's
 SPAZ - Smoothed Peak Z-Axis Accelerometer, g's
 WOB - Weight on Bit, klb
 RPM - Surface Drillstring Revolutions Per Minute, rpm
 TORQUE - Surface Torque, ft-klbs
4. Casino-4DW2 was kicked off from Casino-4 at 1146.0 mMDRT
5. SDL data presented was acquired by Geoservices.
6. DDS tool was not run on Run 1100

WARRANTY

HALLIBURTON ENERGY SERVICES (HES) WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HES CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES SHOULD ANY SUCH INFORMATION OR INTERPRETATION BE RELIED UPON AS THE SOLE BASIS FOR ANY DRILLING, COMPLETION, PRODUCTION, OR FINANCIAL DECISION OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING VENTURE, DRILLING RIG OR ITS CREW OR ANY OTHER THIRD PARTY. THE CUSTOMER HAS FULL RESPONSIBILITY FOR ALL DRILLING, COMPLETION AND PRODUCTION OPERATION. HES MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE SERVICES RENDERED. IN NO EVENT WILL HES BE LIABLE FOR FAILURE TO OBTAIN ANY PARTICULAR RESULTS OR FOR ANY DAMAGES, INCLUDING, BUT NOT LIMITED TO, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, RESULTING FROM THE USE OF ANY INFORMATION OR INTERPRETATION PROVIDED BY HES.







1700

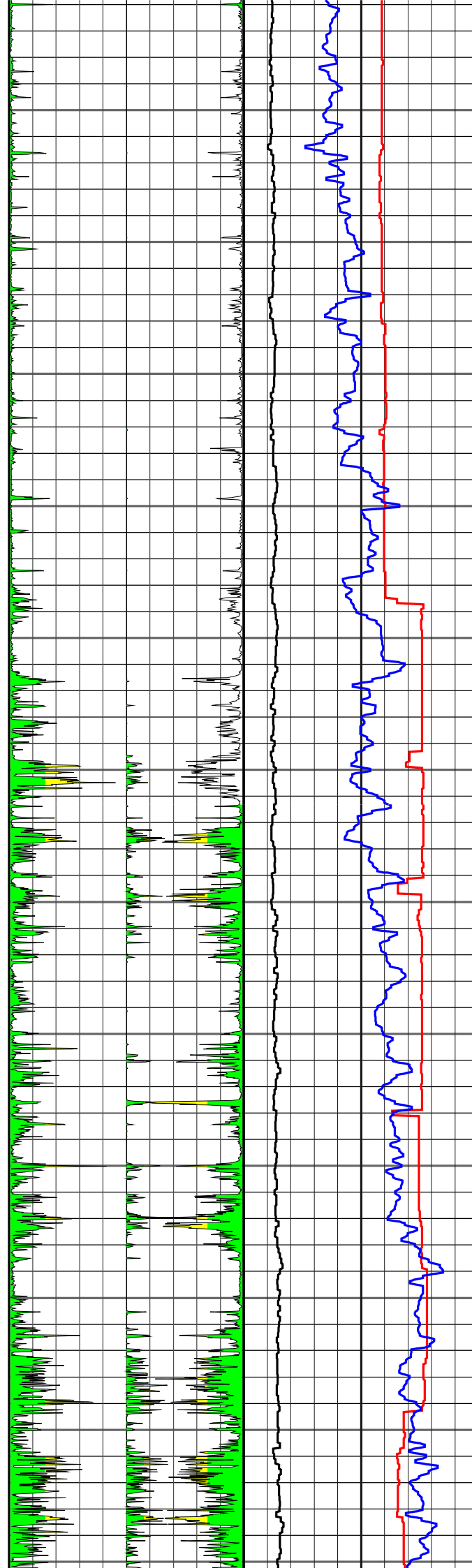
1750

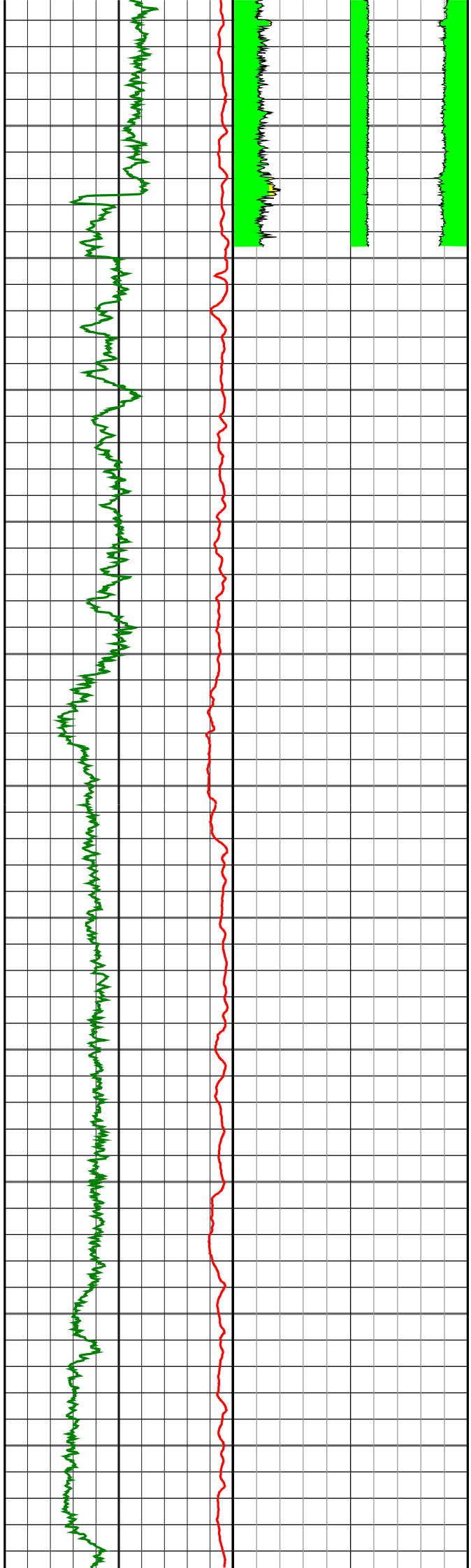
1800

1850

1900

1950





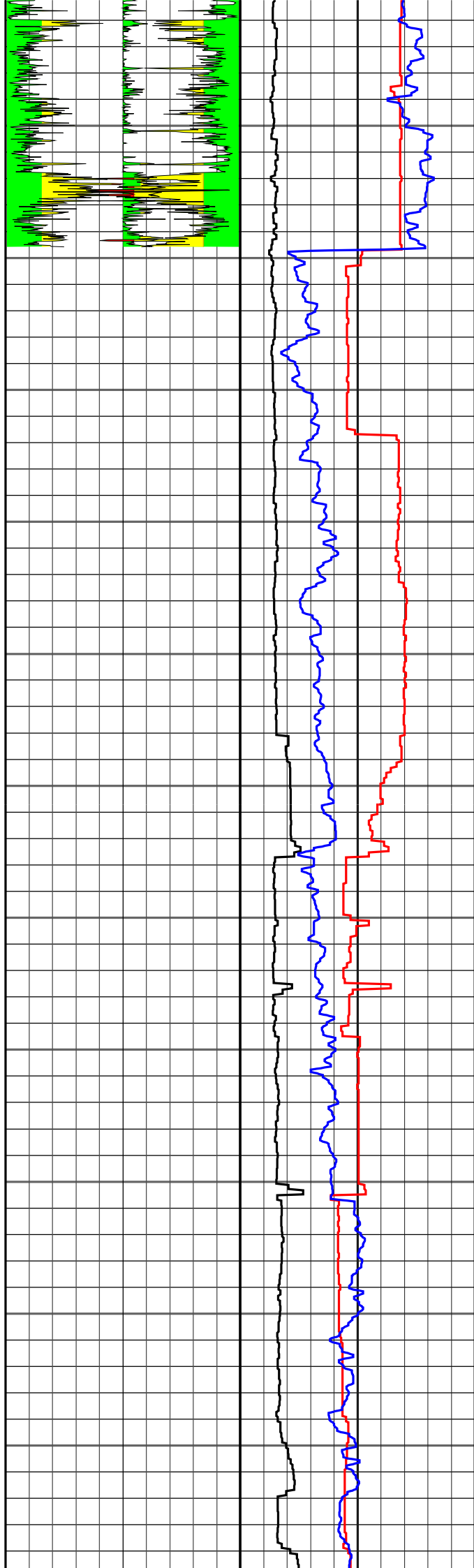
2000

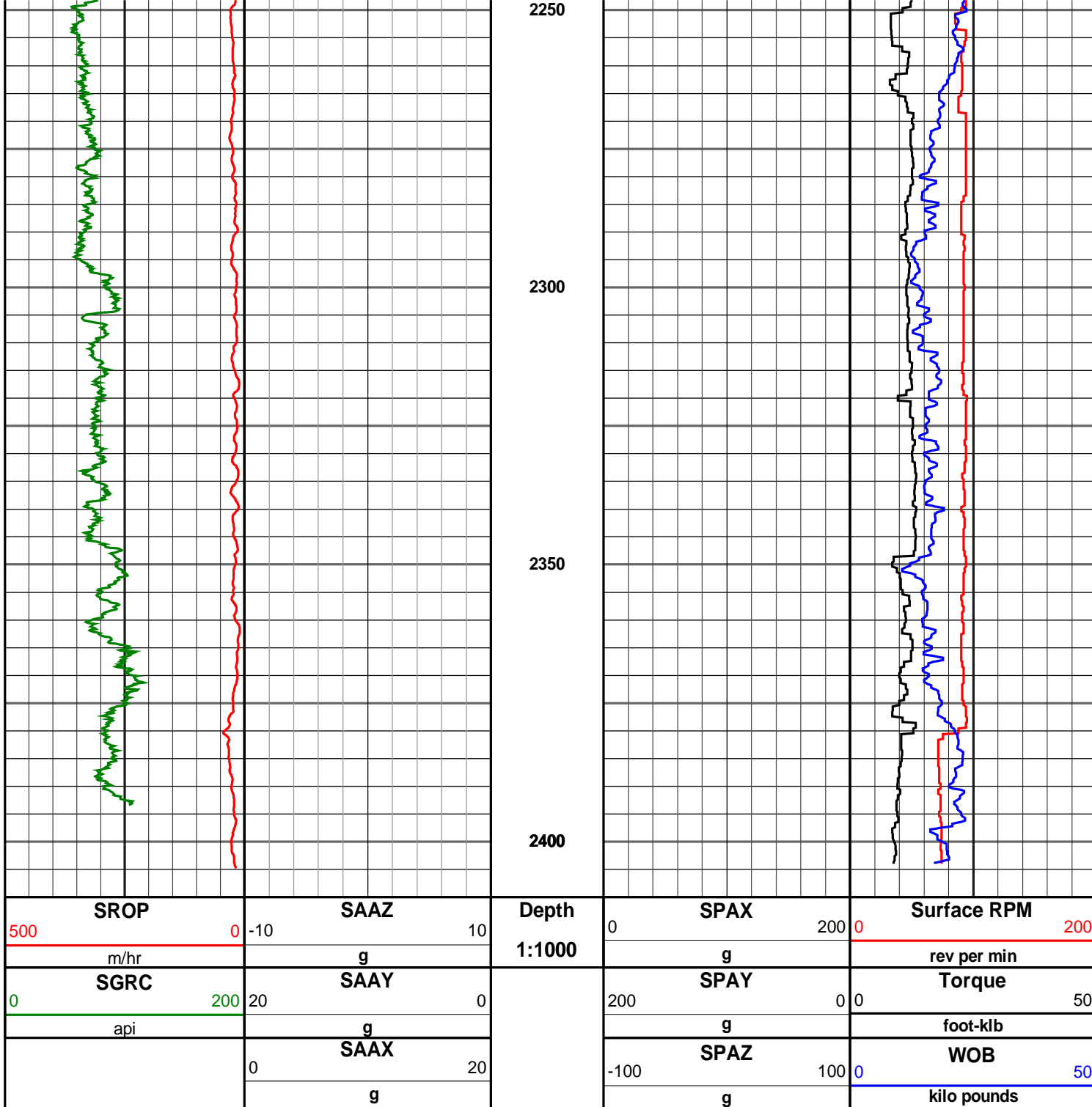
2050

2100

2150

2200





HALLIBURTON

DIRECTIONAL SURVEY REPORT

Santos Ltd
Casino-4DW2
Casino
Victoria
Australia

AU-FE-0003735541

RT to LAT = 22.0m. All surveys corrected for BHA sag.

Measured Depth (metres)	Inclination (degrees)	Direction (degrees)	Vertical Depth (metres)	Latitude (metres)	Departure (metres)	Vertical Section (metres)	Dogleg (deg/30m)
-------------------------------	--------------------------	------------------------	-------------------------------	----------------------	-----------------------	---------------------------------	---------------------

Casino-4DW2

<i>Measured Depth (metres)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (metres)</i>	<i>Latitude (metres)</i>	<i>Departure (metres)</i>	<i>Vertical Section (metres)</i>	<i>Dogleg (deg/30m)</i>
1146.000	4.50	204.71	1145.630	2.700 S	1.750 E	-2.565	TIE-IN
1166.380	5.08	197.94	1165.939	4.285 S	1.138 E	-2.528	1.19
1196.520	6.90	204.40	1195.913	7.203 S	0.021 W	-2.432	1.93
1225.280	9.13	213.00	1224.392	10.691 S	1.978 W	-1.779	2.63
1250.010	10.24	216.17	1248.769	14.111 S	4.344 W	-0.719	1.49
1257.460	10.16	218.79	1256.101	15.158 S	5.146 W	-0.320	1.90
1287.270	10.53	234.54	1285.433	18.788 S	9.013 W	2.080	2.86
1314.960	11.47	254.15	1312.623	21.009 S	13.724 W	5.754	4.16
1342.920	12.82	274.39	1339.969	21.531 S	19.494 W	11.002	4.76
1371.810	14.63	289.92	1368.043	20.042 S	26.123 W	17.741	4.25
1403.350	16.96	298.16	1398.394	16.513 S	33.925 W	26.279	3.07
1430.210	19.64	303.85	1423.895	12.148 S	41.130 W	34.539	3.59
1460.580	23.39	309.06	1452.146	5.504 S	50.054 W	45.191	4.15
1487.440	26.26	311.42	1476.522	1.789 N	58.651 W	55.758	3.39
1515.920	30.69	310.65	1501.551	10.696 N	68.895 W	68.422	4.68
1544.450	35.01	308.80	1525.514	20.572 N	80.803 W	82.981	4.66
1574.020	39.48	307.90	1549.047	31.668 N	94.839 W	99.955	4.57
1601.660	43.46	306.39	1569.754	42.710 N	109.431 W	117.434	4.45
1630.500	47.12	305.12	1590.041	54.678 N	126.065 W	137.148	3.92
1659.470	51.07	302.67	1609.008	66.872 N	144.241 W	158.390	4.52
1688.150	54.91	300.23	1626.271	78.807 N	163.778 W	180.823	4.50
1716.830	59.06	298.06	1641.895	90.507 N	184.781 W	204.554	4.74
1745.430	62.89	296.17	1655.770	101.895 N	207.039 W	229.359	4.38
1775.140	65.13	291.82	1668.794	112.742 N	231.430 W	255.986	4.55
1803.180	66.82	288.55	1680.212	121.573 N	255.465 W	281.591	3.67
1832.100	67.00	288.55	1691.554	130.036 N	280.686 W	308.187	0.19
1861.050	70.00	287.81	1702.163	138.438 N	306.274 W	335.107	3.19
1889.710	70.27	288.54	1711.901	146.845 N	331.884 W	362.049	0.77
1918.350	71.02	288.14	1721.393	155.348 N	357.532 W	389.061	0.88
1946.760	73.24	288.85	1730.111	163.925 N	383.173 W	416.090	2.45
1975.040	76.28	287.89	1737.544	172.522 N	409.065 W	443.362	3.37
2020.940	76.66	287.87	1748.282	186.223 N	451.536 W	487.960	0.25
2049.610	78.96	288.67	1754.336	195.009 N	478.144 W	515.971	2.54
2078.360	82.52	288.53	1758.961	204.058 N	505.033 W	544.334	3.72
2107.040	86.73	289.13	1761.647	213.272 N	532.053 W	572.876	4.45
2135.830	87.47	289.13	1763.104	222.695 N	559.218 W	601.627	0.77
2164.510	87.78	290.18	1764.292	232.333 N	586.203 W	630.281	1.14
2193.210	87.78	290.62	1765.404	242.330 N	613.083 W	658.959	0.46
2221.710	87.29	289.70	1766.630	252.143 N	639.812 W	687.432	1.10
2250.280	85.93	289.24	1768.319	261.649 N	666.700 W	715.950	1.51
2279.030	86.30	289.25	1770.267	271.104 N	693.781 W	744.632	0.39
2307.850	85.37	288.38	1772.360	280.374 N	720.988 W	773.370	1.32
2336.650	82.20	287.82	1775.478	289.268 N	748.198 W	801.983	3.35
2365.230	80.01	287.52	1779.897	297.838 N	775.101 W	830.196	2.32
2394.210	79.83	287.71	1784.969	306.473 N	802.296 W	858.706	0.27
2404.000	79.83	287.71	1786.697	309.404 N	811.475 W	868.335	0.00

CALCULATION BASED ON MINIMUM CURVATURE METHOD

**SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT
TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT**

**VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 289.90 DEGREES (GRID)
A TOTAL CORRECTION OF 12.01 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 2404.000 METRES
IS 868.460 METRES ALONG 290.87 DEGREES (GRID)**

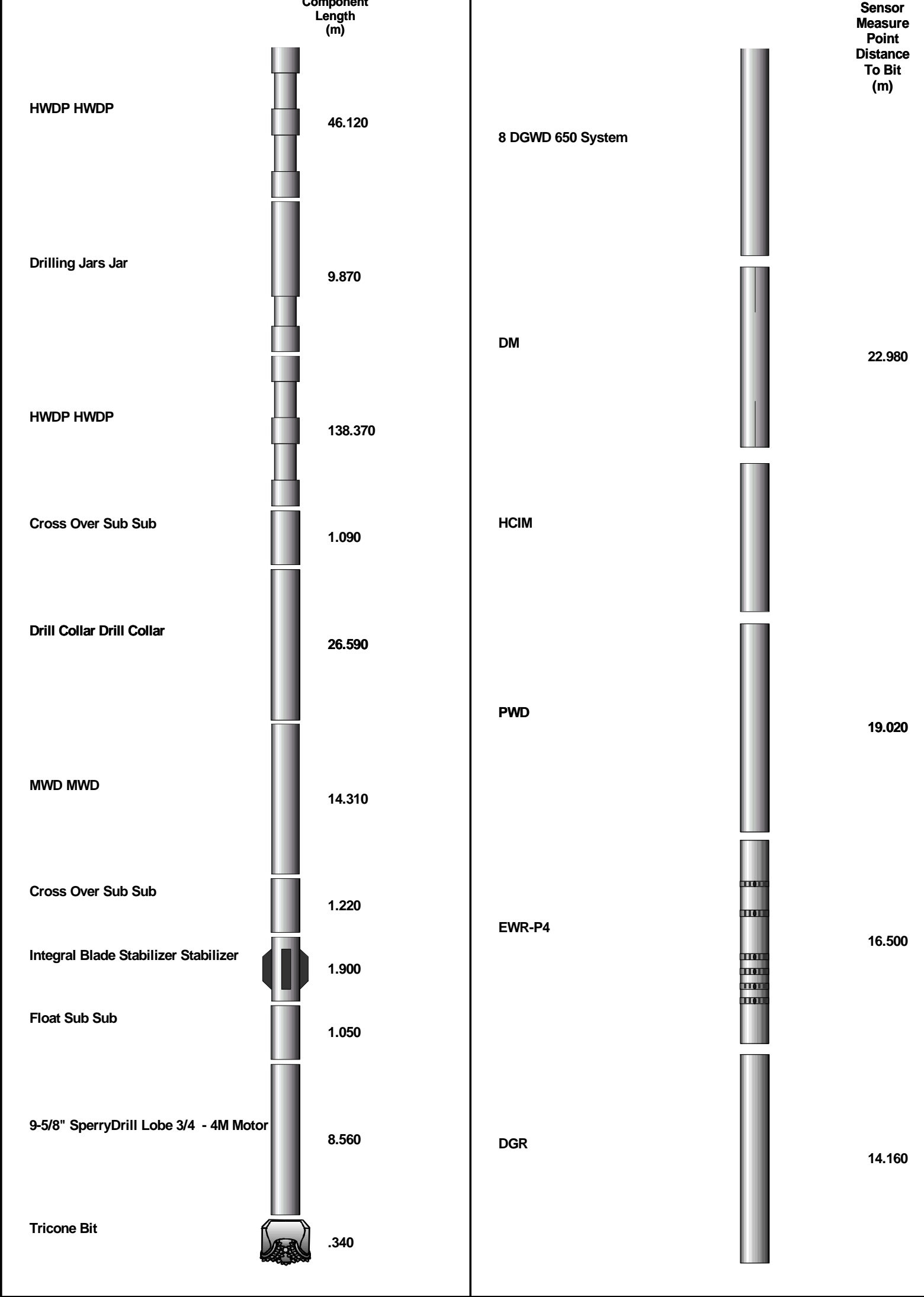
MWD RUN 800 - BHA

MWD RUN 800 - MWD

Component
Length
(m)

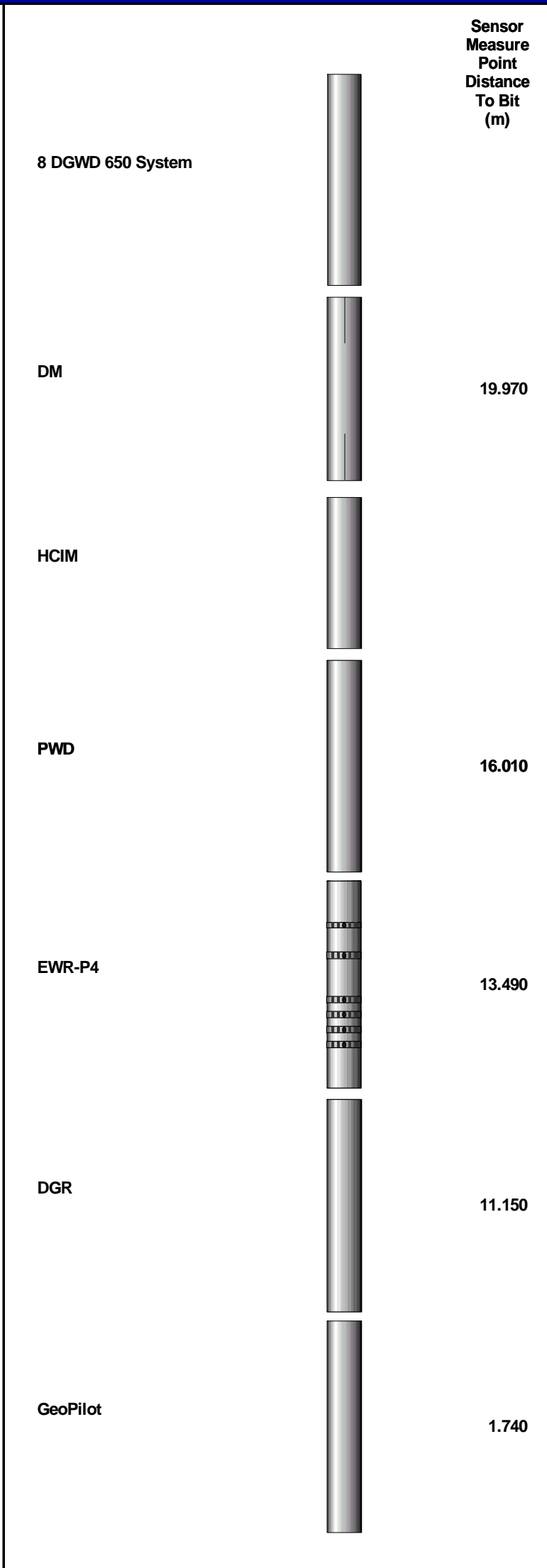
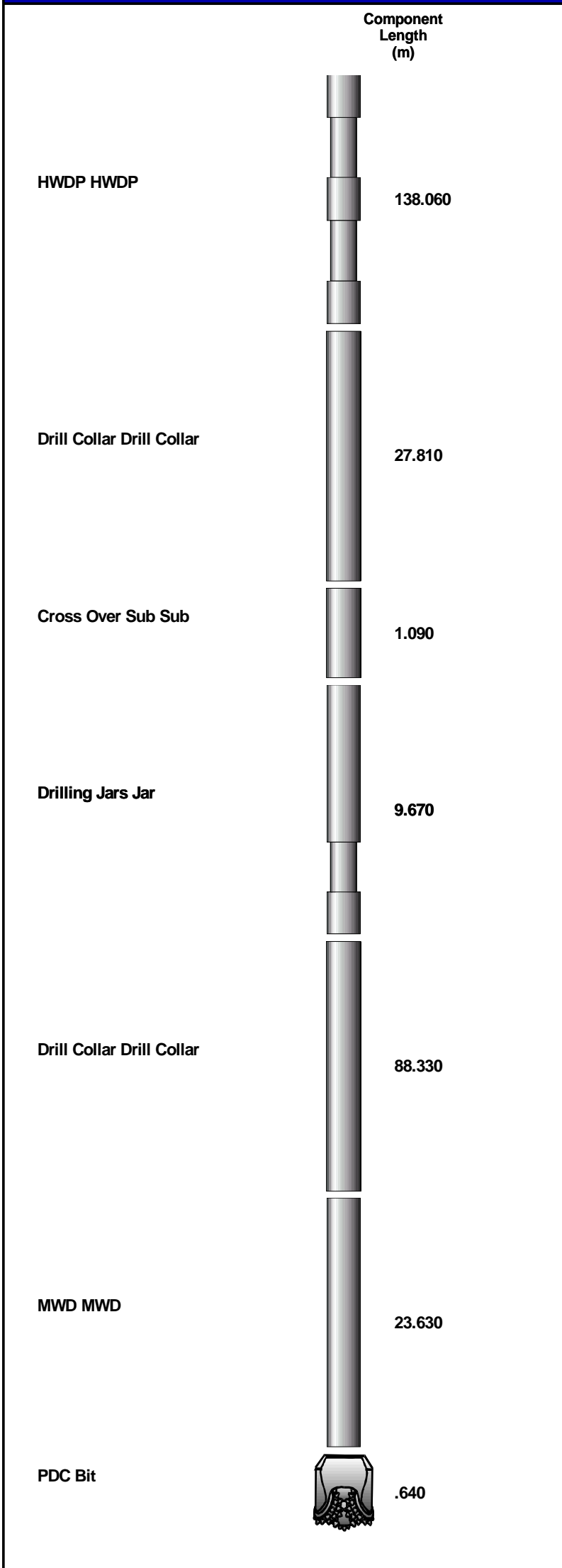
Sensor
Measure

MWD RUN 900 - BHA			MWD RUN 900 - MWD		
Component	Length (m)	Point Distance To Bit (m)	Component	Length (m)	Point Distance To Bit (m)
HWDP HWDP	46.120		8 DGWD 650 System		
Drilling Jars Jar	9.870				
			DM		20.910
HWDP HWDP	138.370				
Cross Over Sub Sub	1.090		HCIM		
Drill Collar Drill Collar	26.590				
			PWD		16.950
MWD MWD	17.310				
Cross Over Sub Sub	1.220		EWR-P4		14.430
Float Sub Sub	1.050				
9-5/8" SperryDrill Lobe 3/4 - 4M Motor	8.560		DGR		12.090
Tricone Bit	.170				



MWD RUN 1000 - BHA

MWD RUN 1000 - MWD



MWD RUN 1100 - BHA

MWD RUN 1100 - MWD

	Component Length (m)		Sensor Measure Point Distance To Bit (m)
HWDP HWDP	46.120	8 DGWD 650 System	
		CNP	24.520
		SLD	
Drilling Jars Jar	9.240	HCIM	
HWDP HWDP	55.280	PWD	16.310
		EWR-P4	13.780
		DGR	11.436
Float Sub Sub	.790	DM	8.970
MWD MWD	28.670	GeoPilot	1.420
PDC Bit	.420		

--	--