



1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	25-Jan-13	26-Jan-13			
Rig Bit Number	2	3			
Bit Size (in)	8.750	8.750			
Tool Nominal OD (in)	6.750	6.750			
Log Start Depth (TVD, ft)	1,445.00	5,201.98			
Log End Depth (TVD, ft)	5,201.98	5,993.56			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	25-Jan-13 10:52	26-Jan-13 02:53			
Drill/Wipe End Date and Time	25-Jan-13 18:59	26-Jan-13 14:30			
Min Inc (deg) @ Depth (TVD, ft)	.59 @ 1,663.00	.68 @ 5,201.98			
Max Inc (deg) @ Depth (TVD, ft)	17.30 @ 3,416.00	80.99 @ 5,986.50			
Bit TFA(in2) / Bit Type	.75 / PDC	.86 / PDC			
Flow Rate (gpm)	578.00	569.00			
Max AV (fpm) / CV (fpm) @ MWD	462.9 / 462.9	462.9 / 462.9			
Fluid Type	Fresh Water Gel	Fresh Water Gel			
Density (ppg) / Viscosity (spqt)	8.38 / 27.00	8.38 / 27.00			
Filtrate CL (ppm)	700.00	700.00			
pH / Fluid Loss (mptm)	8.30 / N/A	8.30 / N/A			
PV (cP) / YP (lbf2)	1 / 3.00	1 / 3.00			
% Solids / % Sand	0.40 / 0.10	0.40 / 0.10			
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A			
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Max Tool Temp (deg F) / S	125.50 / PDM	125.50 / PDM			

Max Tool Temp (degF) / Source	137.50 / PCM	165.58 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Robert Ley	Robert Ley			
Customer Representative	Charles Collver	Charles Collver			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.76	5.76			
Sub Serial Number	11341341	11341341			
Insert Serial Number	11227556	11227556			
Date and Time Initialized	24-Jan-13 17:31	01-Jan-70 00:00			
Date and Time Read	26-Jan-13 19:42	26-Jan-13 19:37			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	57.00	56.00			
Software Version	6.21	6.21			
Sub Serial Number	11341341	11341341			
Sonde Serial Number	10835184	10835184			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	300.27	270.54			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	49.72	48.59			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11341341	11341341			
Insert/Sonde Serial Number	11293270	11293270			

REMARKS

1. All depths are true vertical depths and are calibrated to the driller' pipe tally and are measured from the drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. The Following smoothing parameters have been applied to the data"

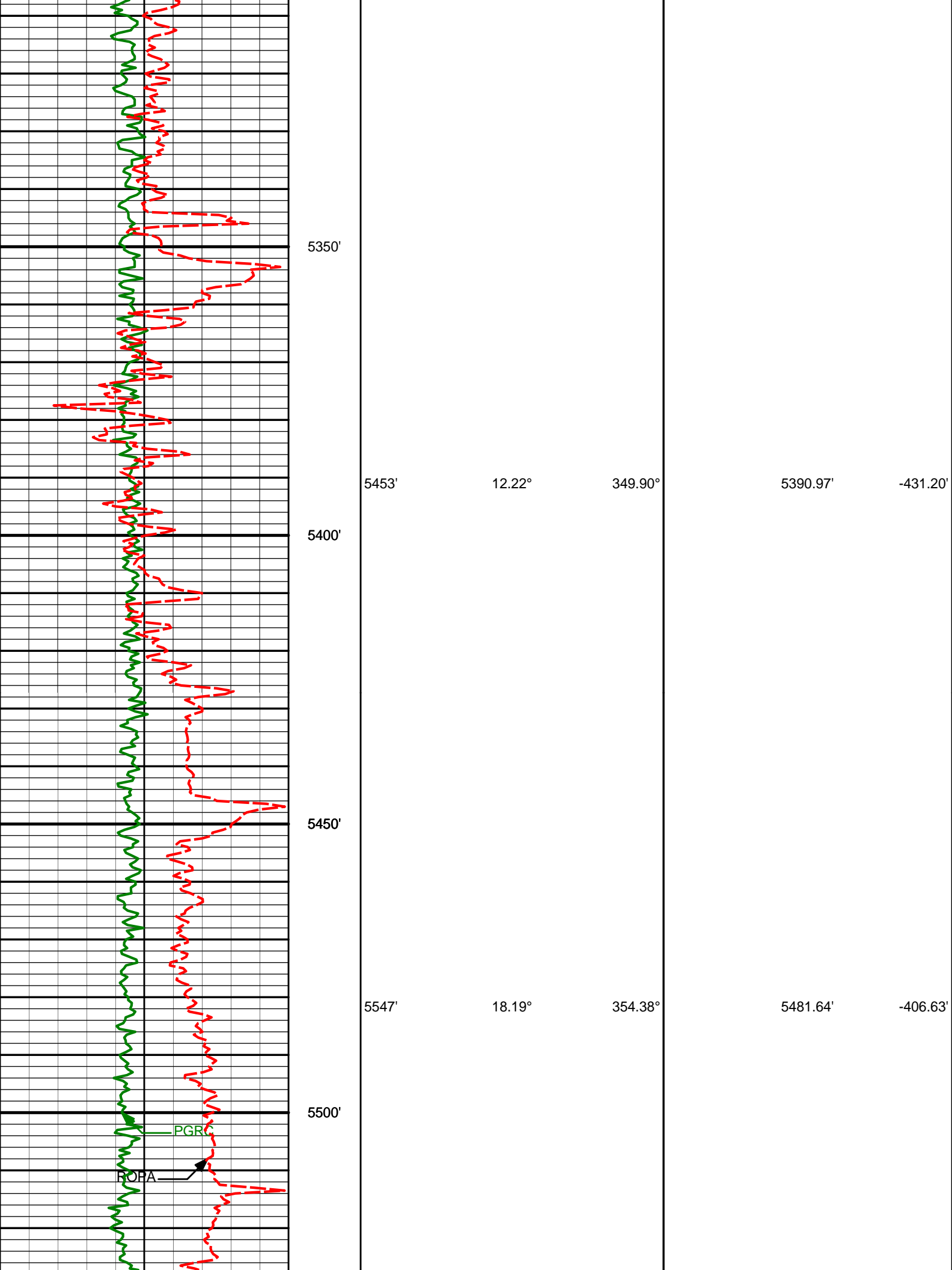
PGRC (Gamma Ray Corrected):
Interval Resolution: 0.5 feet
Coercion Distance: 0.6 feet
Gap Fill: 3.0 feet

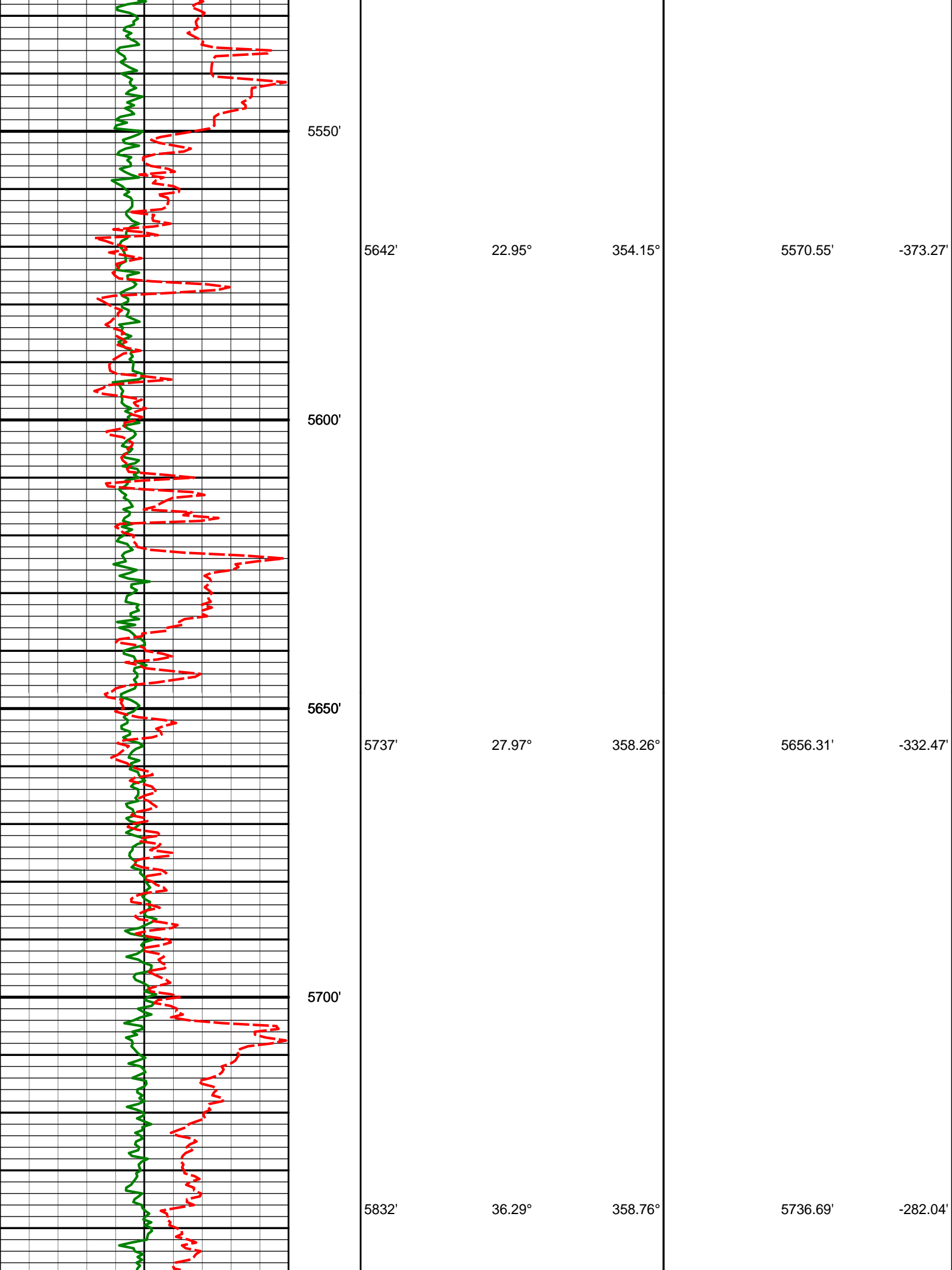
ROPA (Rate of Penetration):
Interval Resolution: 0.5 feet
Coercion Distance: 1.2 feet

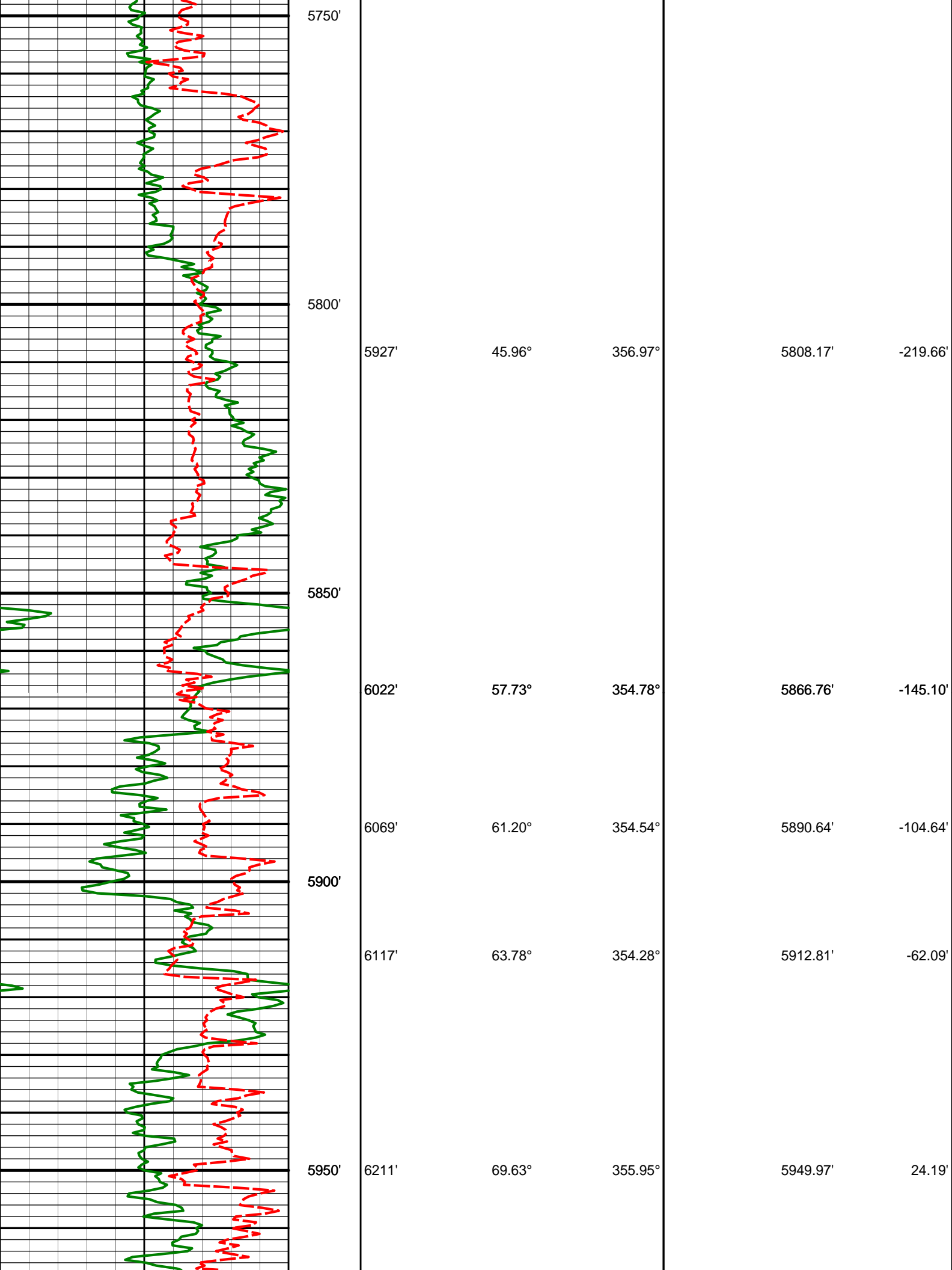
WARRANTY

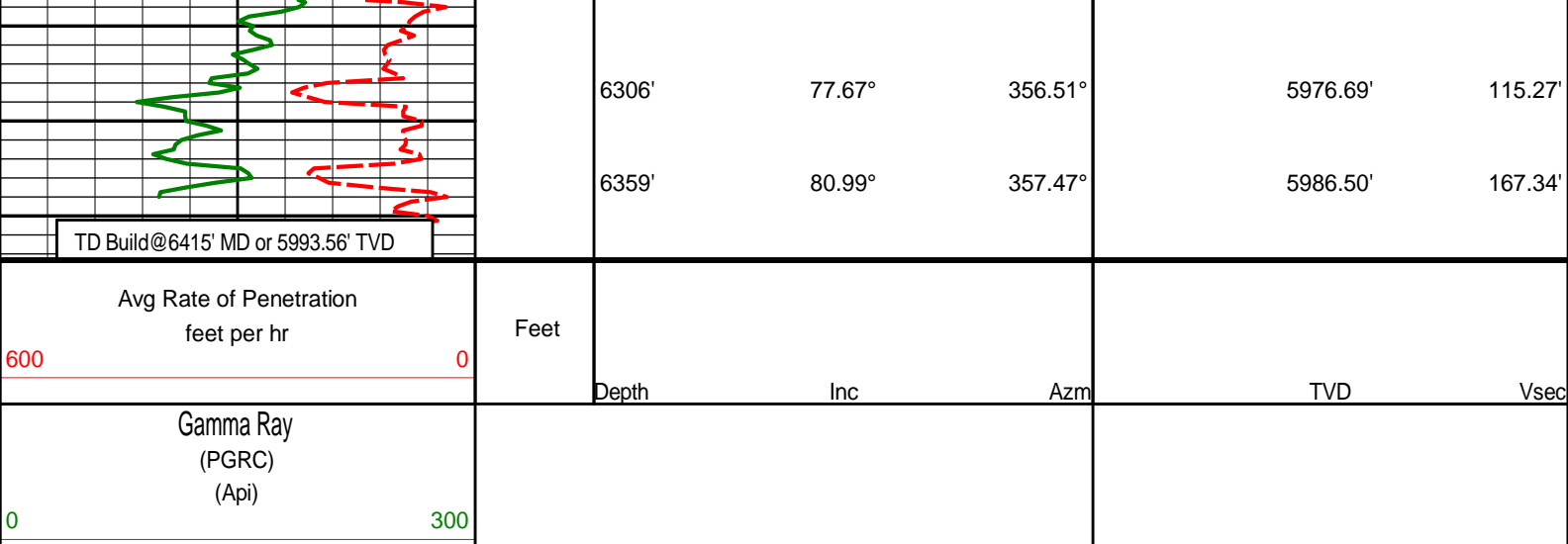
HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS

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HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Castor LC25-72HN
Wattenberg
Weld Colorado
USA
CA-XX-0900130261

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
1445.00	0.00	0.00	1445.00	0.00 N	0.00 E	0.00	TIE-IN
1663.00	0.59	323.25	1663.00	0.89 N	0.67 W	0.94	0.27
1758.00	2.44	208.37	1757.97	0.50 S	1.92 W	-0.37	2.88
1853.00	6.24	210.98	1852.68	6.70 S	5.54 W	-6.33	4.01
1948.00	7.87	207.80	1946.96	16.88 S	11.23 W	-16.12	1.76
2044.00	9.42	187.02	2041.89	30.50 S	15.26 W	-29.44	3.61
2138.00	11.16	185.38	2134.37	47.20 S	17.05 W	-45.99	1.87
2233.00	13.35	182.62	2227.20	67.31 S	18.42 W	-65.97	2.39
2328.00	14.50	192.49	2319.42	89.89 S	21.49 W	-88.29	2.77
2423.00	15.96	190.01	2411.08	114.37 S	26.34 W	-112.41	1.69
2518.00	15.32	190.04	2502.56	139.59 S	30.80 W	-137.29	0.68
2613.00	15.07	191.63	2594.24	164.05 S	35.47 W	-161.38	0.51
2708.00	14.86	190.87	2686.02	188.11 S	40.26 W	-185.08	0.31
2803.00	16.10	190.78	2777.57	213.01 S	45.02 W	-209.62	1.30
2897.00	17.25	199.54	2867.63	238.95 S	52.12 W	-235.04	2.94
2992.00	14.83	199.42	2958.93	263.69 S	60.87 W	-259.16	2.55
3087.00	14.39	198.79	3050.86	286.33 S	68.72 W	-281.24	0.49
3182.00	14.81	198.98	3142.79	308.99 S	76.47 W	-303.34	0.44
3276.00	15.05	207.20	3233.62	331.21 S	85.96 W	-324.90	2.27
3371.00	16.37	208.02	3325.07	354.00 S	97.89 W	-346.86	1.41
3466.00	17.30	211.95	3416.00	377.81 S	111.65 W	-369.72	1.55
3561.00	15.98	209.43	3507.02	401.18 S	125.55 W	-392.14	1.59
3656.00	13.58	211.69	3598.88	422.07 S	137.84 W	-412.18	2.59
3751.00	10.22	210.73	3691.82	438.81 S	148.01 W	-428.22	3.55
3846.00	7.50	208.17	3785.68	451.52 S	155.24 W	-440.43	2.89
3941.00	3.34	197.09	3880.23	459.64 S	158.98 W	-448.29	4.50
4036.00	2.05	110.19	3975.16	462.87 S	158.20 W	-451.56	4.02
4131.00	0.62	20.84	4070.14	462.97 S	156.43 W	-451.78	2.25
4510.00	1.26	14.43	4449.08	457.02 S	154.66 W	-445.96	0.17
4795.00	1.30	125.20	4734.04	455.84 S	151.23 W	-445.00	0.74
5080.00	0.77	93.59	5019.00	457.82 S	146.68 W	-447.28	0.27
5206.00	0.74	61.85	5144.99	457.49 S	145.11 W	-447.05	0.33
5263.00	0.68	49.83	5201.98	457.09 S	144.53 W	-446.69	0.28
5358.00	3.31	335.70	5296.93	454.23 S	145.23 W	-443.79	3.36
5453.00	12.22	349.90	5390.97	441.80 S	148.13 W	-431.20	9.52
5547.00	18.19	354.38	5481.64	417.39 S	151.31 W	-406.63	6.48
5642.00	22.05	354.45	5570.55	384.48 S	154.65 W	-373.27	5.04

5642.00	22.95	354.15	5570.55	384.18 S	154.65 W	-373.27	5.01
5737.00	27.97	358.26	5656.31	343.46 S	157.22 W	-332.47	5.59
5832.00	36.29	358.76	5736.69	293.00 S	158.51 W	-282.04	8.76
5927.00	45.96	356.97	5808.17	230.65 S	160.93 W	-219.66	10.26
6022.00	57.73	354.78	5866.76	156.29 S	166.41 W	-145.10	12.52
6069.00	61.20	354.54	5890.64	115.99 S	170.18 W	-104.64	7.39
6117.00	63.78	354.28	5912.81	73.62 S	174.33 W	-62.09	5.40
6211.00	69.63	355.95	5949.97	12.36 N	181.65 W	24.19	6.44
6306.00	77.67	356.51	5976.69	103.25 N	187.63 W	115.27	8.48
6359.00	80.99	357.47	5986.50	155.26 N	190.36 W	167.34	6.51

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 356.26 DEGREES (GRID)
A TOTAL CORRECTION OF 7.25 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6359.00 FEET
IS 245.64 FEET ALONG 309.20 DEGREES (GRID)**