

PCGK: Pressure Case Gamma
PCDC: Pressure Case Directional



1 : 600 / 1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	25-Dec-14	26-Dec-14			
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)	1,239.99	4,813.18			
Log End Depth (TVD, ft)	4,813.18	5,634.30			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	25-Dec-14 01:26	25-Dec-14 21:15			
Drill/Wipe End Date and Time	25-Dec-14 12:20	26-Dec-14 11:30			
Min Inc (deg) @ Depth (TVD, ft)	0.04 @ 1,291.99	7.01 @ 4,808.22			
Max Inc (deg) @ Depth (TVD, ft)	6.89 @ 4,760.57	84.44 @ 5,630.81			
Bit TFA(in2) / Bit Type	0.91 / PDC	0.91 / PDC			
Flow Rate (gpm)	582.00	581.62			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Fresh Water Gel	Fresh Water Gel			
Density (ppg) / Viscosity (spqt)	9.10 / 36.00	10.50 / 35.00			
Filtrate CL (ppm)	200.00	200.00			
pH / Fluid Loss (mptm)	8.10 / 0	8.20 / 0			
PV (cP) / YP (lbf2)	10 / 8.00	7 / 7.00			
% Solids / % Sand	10.2 / .1	6.6 / .1			
% 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) @ 100 ft	122.00 / 120M	172.00 / 150M			

Max Tool Temp (degF) / Source	129.00 / PCM	158.60 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ 158.60			
Lead MWD Engineer	Paul Kock	Paul Kock			
Customer Representative	Justin Fields	Justin Fields			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11303511	11303511			
Insert Serial Number	11055866	11055866			
Date and Time Initialized	24-Dec-14 12:33	24-Dec-14 12:33			
Date and Time Read	26-Dec-14 17:11	26-Dec-14 17:19			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	53.00	53.00			
Software Version	6.21	6.21			
Sub Serial Number	11303511	11303511			
Sonde Serial Number	12177554	12177554			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	5.30	317.60			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	46.53	45.90			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11303511	11303511			
Insert/Sonde Serial Number	11293319	11293319			

REMARKS

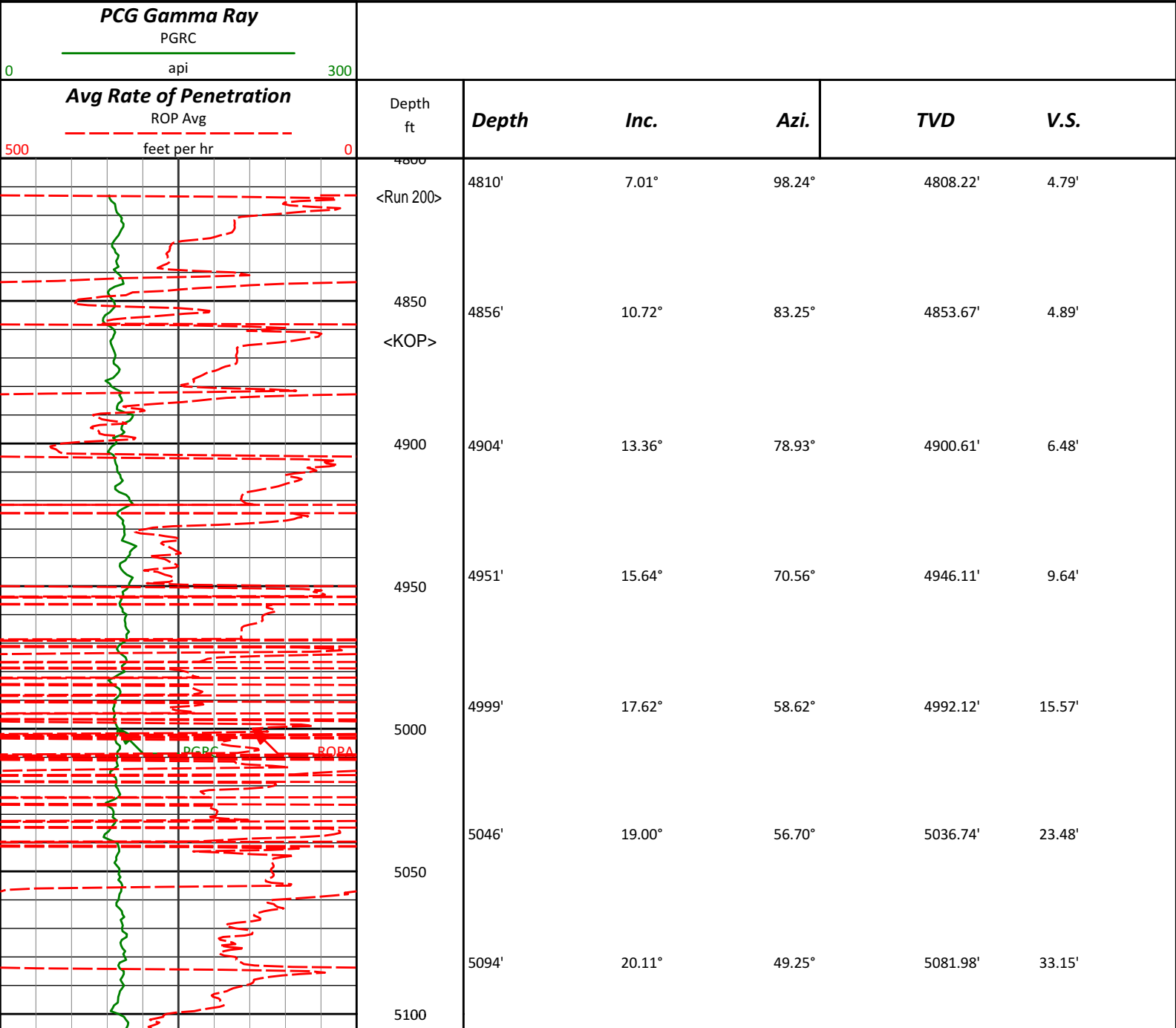
1. All depths are calibrated to the driller's pipe tally and are measured from the Rig drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
 - ROPA: Average Rate of Penetration is real time data.
 - PGRC: Smooth Pressure Case Gamma Ray Borehole corrected is recorded data.
4. The following smoothing parameters have been applied to the data:
 - 2" (1:600) log - 1 ft. interval, 3 ft. coercion distance, 5 ft. gap fill.
 - 5" (1:240) log for ROP - 0.5 ft. interval, 1.2 ft. coercion distance, 3 ft. gap fill.
 - 5" (1:240) log for Gamma Ray - 0.5 ft. interval, 0.6 ft. coercion distance, 3 ft. gap fill.
5. INSITE version 8.0.20

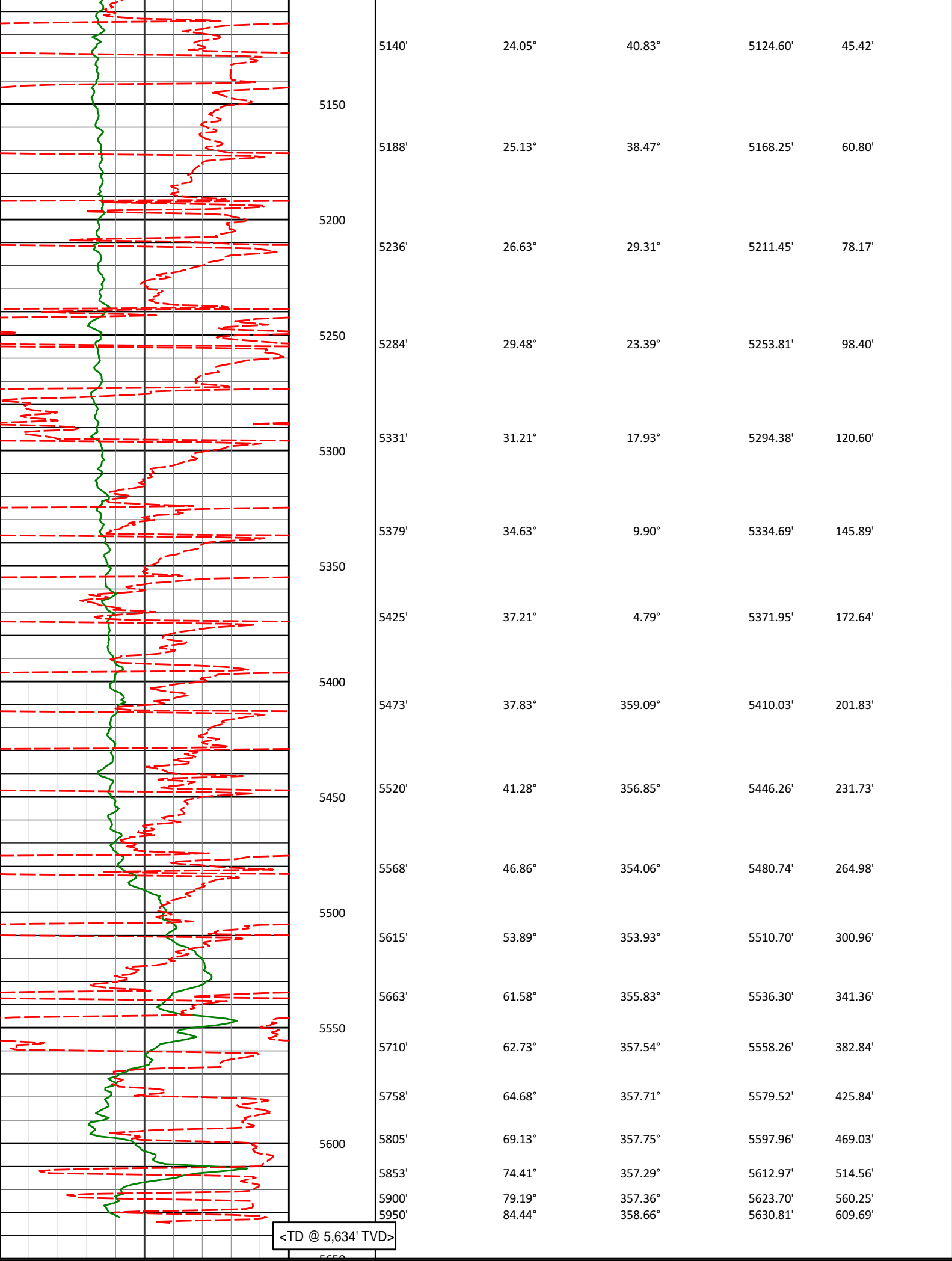
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TVD Detail Log 1:600

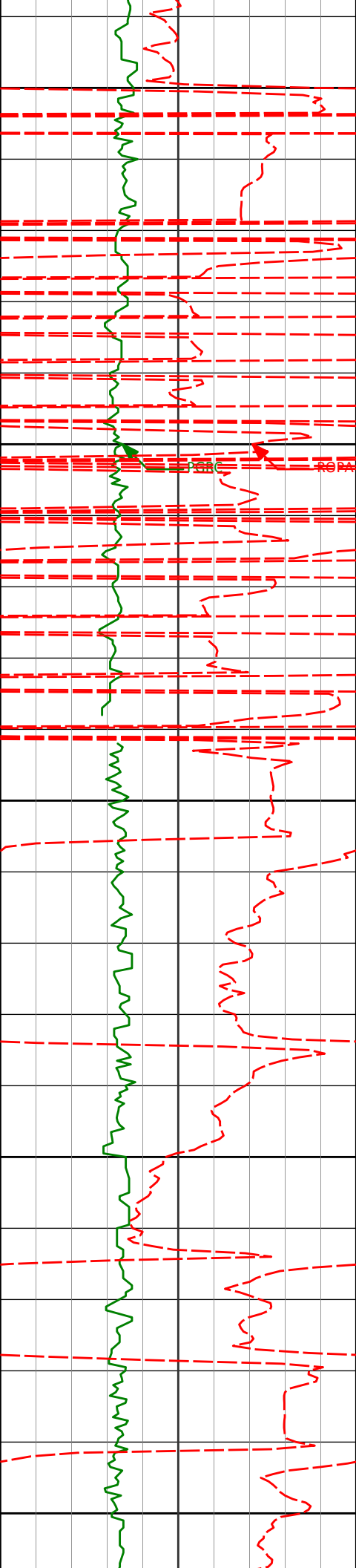
Noble Energy, Inc
Sharpe State LD02-77HN
H&P 273
T9N R58W



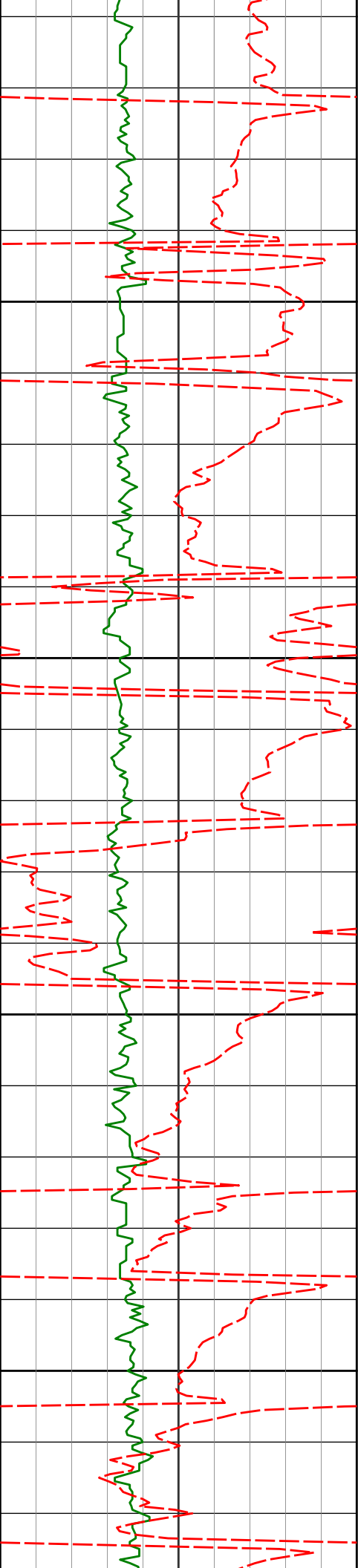


HALLIBURTON
Sperry Drilling Services
TVD Detail Log 1:240

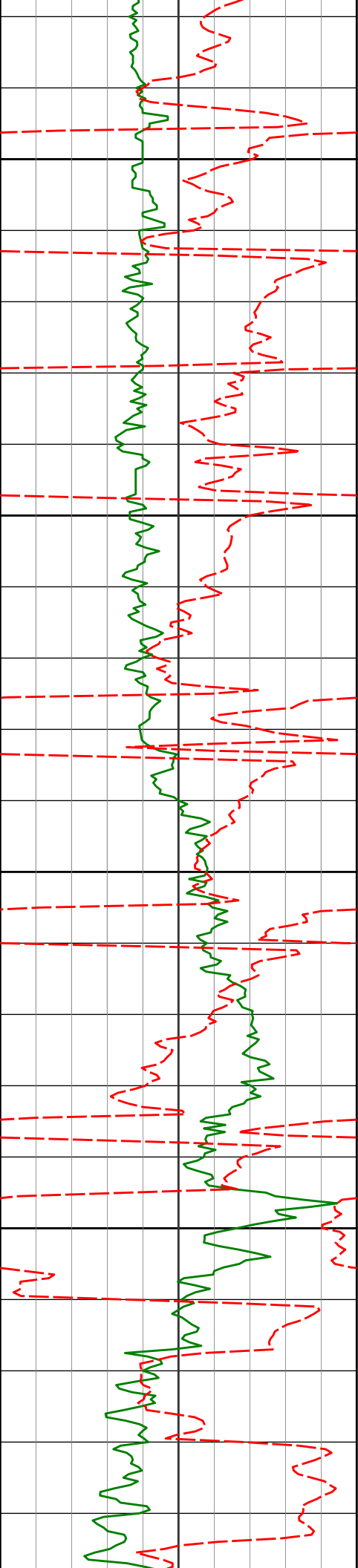
Noble Energy, Inc
Sharpe State LD02-77HN
H&P 273
T9N R58W



4951'	15.64°	70.56°	4946.11'	9.64'
4950				
4999'	17.62°	58.62°	4992.12'	15.57'
5000				
5046'	19.00°	56.70°	5036.74'	23.48'
5050				
5094'	20.11°	49.25°	5081.98'	33.15'
5100				
5140'	24.05°	40.83°	5124.60'	45.42'
5150				



	5188'	25.13°	38.47°	5168.25'	60.80'
5200					
	5236'	26.63°	29.31°	5211.45'	78.17'
5250					
	5284'	29.48°	23.39°	5253.81'	98.40'
5300	5331'	31.21°	17.93°	5294.38'	120.60'
	5379'	34.63°	9.90°	5334.69'	145.89'
5350					
	5425'	37.21°	4.79°	5371.95'	172.64'



5400

5473'

37.83°

359.09°

5410.03'

201.83'

5450

5520'

41.28°

356.85°

5446.26'

231.73'

5500

5568'

46.86°

354.06°

5480.74'

264.98'

5550

5615'

53.89°

353.93°

5510.70'

300.96'

5663'

61.58°

355.83°

5536.30'

341.36'

5710'

62.73°

357.54°

5558.26'

382.84'

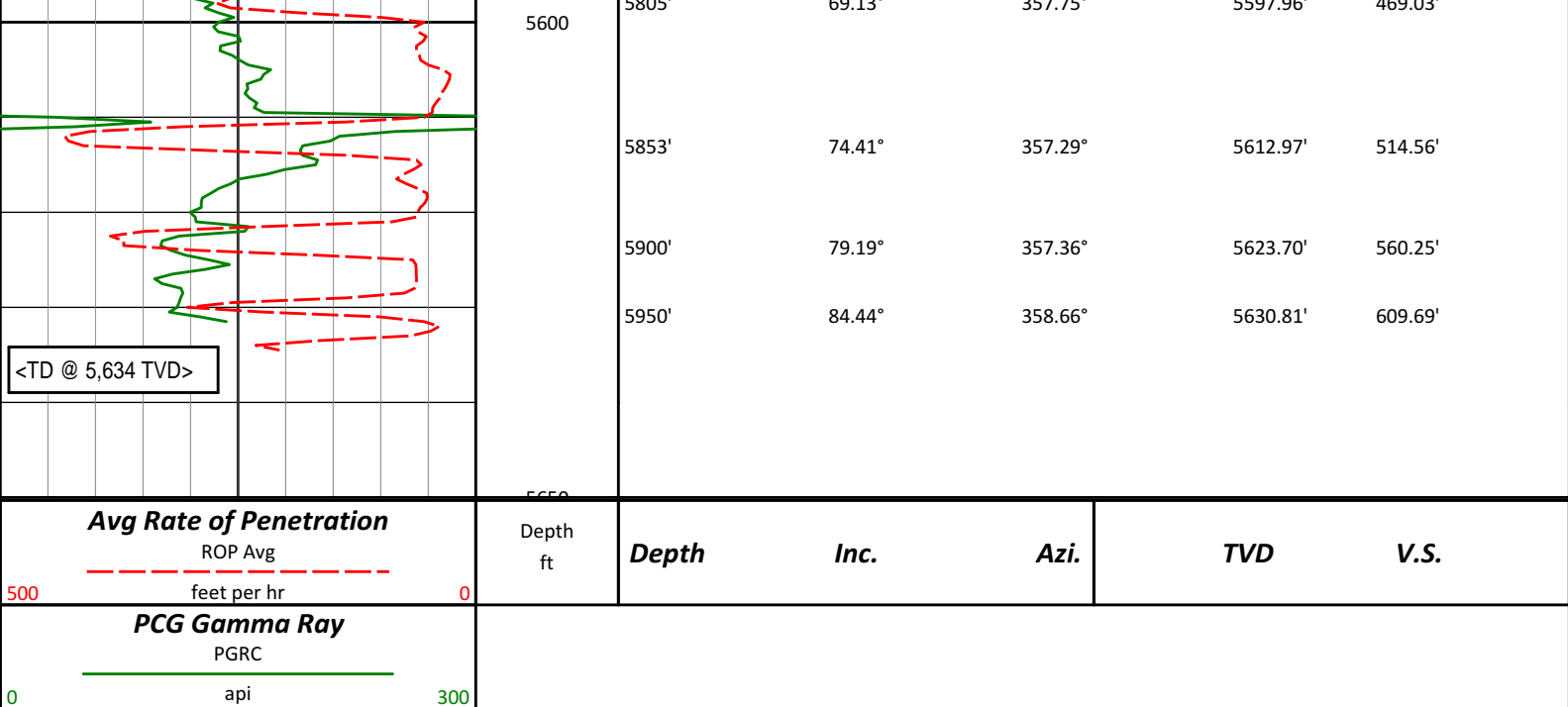
5758'

64.68°

357.71°

5579.52'

425.84'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Sharpe State LD02-77HN
Wattenberg
Weld Colorado
USA
CA-XX-0901957153

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
474.00	0.50	270.33	473.99	0.01 N	2.07 W	0.01	0.11
846.00	0.30	64.33	845.99	0.44 N	2.81 W	0.44	0.21
1292.00	0.04	200.38	1291.99	0.79 N	1.82 W	0.79	0.07
1570.00	0.64	157.91	1569.98	0.75 S	1.27 W	-0.75	0.22
1662.00	1.13	159.47	1661.97	2.08 S	0.76 W	-2.08	0.53
1847.00	1.53	143.48	1846.92	5.77 S	1.35 E	-5.77	0.29
2033.00	1.82	146.41	2032.84	10.23 S	4.46 E	-10.23	0.16
2126.00	0.76	115.00	2125.82	11.72 S	5.84 E	-11.72	1.33
2218.00	1.39	74.69	2217.80	11.68 S	7.47 E	-11.68	1.03
2312.00	1.23	78.36	2311.78	11.18 S	9.56 E	-11.18	0.19
2496.00	1.25	67.14	2495.73	10.00 S	13.34 E	-10.00	0.13
2588.00	1.31	69.88	2587.71	9.25 S	15.25 E	-9.25	0.10
2681.00	2.32	54.64	2680.66	7.79 S	17.78 E	-7.79	1.19
2774.00	2.23	55.05	2773.59	5.67 S	20.80 E	-5.67	0.10
2869.00	1.11	11.30	2868.55	3.71 S	22.49 E	-3.71	1.71
3058.00	0.66	340.80	3057.53	0.89 S	22.49 E	-0.89	0.34
3152.00	0.99	350.09	3151.52	0.42 N	22.18 E	0.42	0.37
3436.00	0.78	11.16	3435.49	4.71 N	22.13 E	4.71	0.13
3531.00	0.90	21.12	3530.48	6.03 N	22.52 E	6.03	0.20
3626.00	1.19	13.50	3625.46	7.68 N	23.02 E	7.68	0.34
3720.00	1.05	6.33	3719.44	9.49 N	23.34 E	9.49	0.21
3910.00	1.49	313.09	3909.40	12.91 N	21.73 E	12.91	0.63
4005.00	2.17	312.37	4004.35	14.96 N	19.50 E	14.96	0.72
4100.00	1.73	298.56	4099.30	16.86 N	16.91 E	16.86	0.67
4194.00	1.89	277.43	4193.25	17.74 N	14.12 E	17.74	0.73
4289.00	1.18	221.81	4288.22	17.22 N	11.92 E	17.22	1.65
4383.00	1.88	245.27	4382.19	15.85 N	9.87 E	15.85	0.99
4478.00	2.46	205.70	4477.13	13.36 N	7.57 E	13.36	1.65
4573.00	1.33	158.78	4572.08	10.50 N	7.08 E	10.50	1.93

4668.00	3.75	112.93	4666.98	8.26 N	10.34 E	8.26	3.14
4762.00	6.89	102.54	4760.57	5.84 N	18.68 E	5.84	3.47
4810.00	7.01	98.24	4808.22	4.79 N	24.39 E	4.79	1.11
4856.00	10.72	83.25	4853.67	4.89 N	31.41 E	4.89	9.43
4904.00	13.36	78.93	4900.61	6.48 N	41.29 E	6.48	5.81
4951.00	15.64	70.56	4946.11	9.64 N	52.60 E	9.64	6.57
4999.00	17.62	58.62	4992.12	15.57 N	64.90 E	15.57	8.21
5046.00	19.00	56.70	5036.74	23.48 N	77.37 E	23.48	3.21
5094.00	20.11	49.25	5081.98	33.15 N	90.16 E	33.15	5.68
5140.00	24.05	40.83	5124.60	45.42 N	102.29 E	45.42	10.98
5188.00	25.13	38.47	5168.25	60.80 N	115.02 E	60.80	3.04
5236.00	26.63	29.31	5211.45	78.17 N	126.64 E	78.17	8.88
5284.00	29.48	23.39	5253.81	98.40 N	136.60 E	98.40	8.30
5331.00	31.21	17.93	5294.38	120.60 N	144.94 E	120.60	6.92
5379.00	34.63	9.90	5334.69	145.89 N	151.12 E	145.89	11.55
5425.00	37.21	4.79	5371.95	172.64 N	154.53 E	172.64	8.59
5473.00	37.83	359.09	5410.03	201.83 N	155.51 E	201.83	7.34
5520.00	41.28	356.85	5446.26	231.73 N	154.43 E	231.73	7.95
5568.00	46.86	354.06	5480.74	264.98 N	151.74 E	264.98	12.31
5615.00	53.89	353.93	5510.70	300.96 N	147.95 E	300.96	14.97
5663.00	61.58	355.83	5536.30	341.36 N	144.36 E	341.36	16.36
5710.00	62.73	357.54	5558.26	382.84 N	141.96 E	382.84	4.04
5758.00	64.68	357.71	5579.52	425.84 N	140.18 E	425.84	4.07
5805.00	69.13	357.75	5597.96	469.03 N	138.47 E	469.03	9.48
5853.00	74.41	357.29	5612.97	514.56 N	136.49 E	514.56	11.03
5900.00	79.19	357.36	5623.70	560.25 N	134.36 E	560.25	10.17
5950.00	84.44	358.66	5630.81	609.69 N	132.64 E	609.69	10.82
6003.00	88.00	359.00	5634.30	662.56 N	131.56 E	662.56	6.74

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 0.00 DEGREES (GRID)
A TOTAL CORRECTION OF 6.93 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6003.00 FEET
IS 675.50 FEET ALONG 11.23 DEGREES (GRID)**

Surface surveys at 474 ft and 846 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Last survey is a projection from 5950 ft MD to TD at 6003 ft MD.