

PCGK: Pressure Case Gamma
PCDC: Pressure Case Directional


Country		: USA					
Field		: Wattenberg					
Location		: Lat: 40° 46' 57.61" North Long: 103° 51' 41.29" West					
Well		: Rohn State LD03-66-1HN					
Company		: Noble Energy					
Rig		: H&P 273					
LOCATION		Latitude : 40° 46' 57.61" North Longitude : 103° 51' 41.29" West		UTM Easting = 3,453,745.700 ft UTM Northing = 1,532,165.010 ft		Other Services Directional Drilling	
Permanent Datum		: Ground Level		Elevation : 4705.00 ft		Elev. KB N/A	
Log Measured From		: Drill Floor		24.00 ft Above Permanent Datum		DF 4729.00 ft GL 4705.00 ft WD N/A	
Drilling Measured From		: Drill Floor		TVD LOG			
Depth Logged		: 1,219.99 ft To 5,634.60 ft		Unit No. : 11703717		Job No. :CA-XX-0901584425	
Date Logged		: 26-Aug-14 To 27-Aug-14		Plot Type : Final			
Total Depth MD		: 6,049.00 ft TVD : 5,634.60 ft		Plot Date : 27-Aug-14			
Spud Date		: 25-Aug-14					
Run No.		Borehole Record (TVD)		Run No.		Borehole Record (TVD)	
		Size From To				Size From To	
2		8.750 in 1,219.99 ft 4,948.04 ft					
3		8.750 in 4,948.04 ft 5,634.60 ft					

Max Tool Temp (degF) / Source	145.90 / PCM	167.00 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Paul Kock	Paul Kock			
Customer Representative	Dave Nielsen	Justin Fields			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11404261	11404261			
Insert Serial Number	11400908	11400908			
Date and Time Initialized	25-Aug-14 22:04	25-Aug-14 22:04			
Date and Time Read	27-Aug-14 12:33	27-Aug-14 12:59			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	53.77	53.30			
Software Version	6.21	6.21			
Sub Serial Number	11404261	11404261			
Sonde Serial Number	11638501	11638501			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	293.63	22.41			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	48.67	48.20			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11404261	11404261			
Insert/Sonde Serial Number	11120589	11120589			

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

WARRANTY

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Sperry Drilling Services

TVD Detail Log 1:600

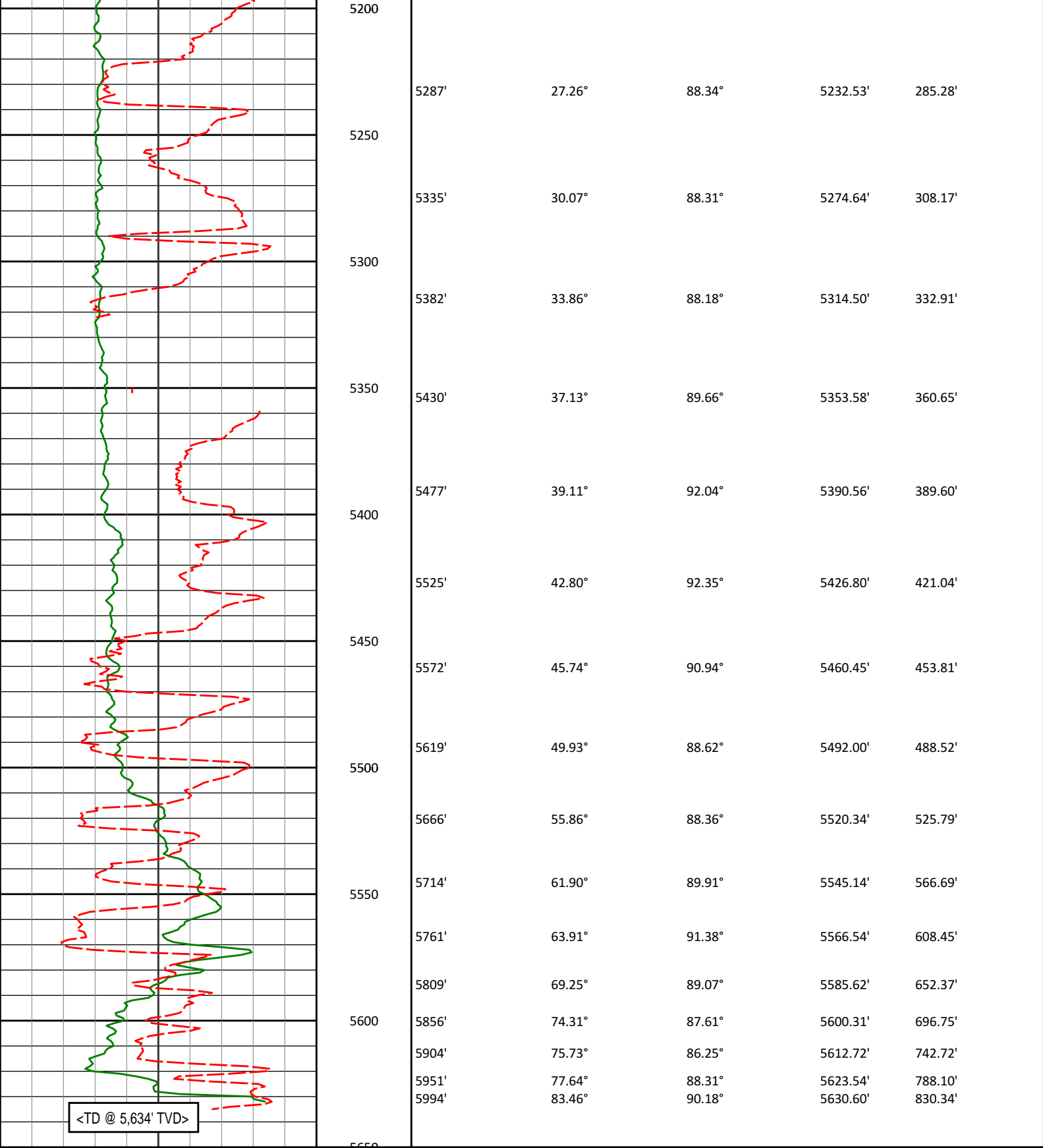
Noble Energy, Inc

Rohn State LD03-66-1HN

H&P 273

T9N R58W

PCG Gamma Ray PGRC								
0 300 api								
Avg Rate of Penetration ROPA		Depth ft	Depth	Inc.	Azi.	TVD	V.S.	
500 0 feet per hr								
		4950	4956'	0.99°	143.76°	4912.04'	221.48'	
		<Run 200> 4950						
			5003'	0.72°	145.53°	4959.03'	221.93'	
		5000 <KOP>	5051'	2.34°	101.79°	5007.02'	223.09'	
			5050	5098'	7.22°	96.19°	5053.84'	227.00'
			5100	5146'	13.46°	100.86°	5101.04'	235.57'
			5150	5193'	18.39°	102.20°	5146.22'	248.35'
				5240'	23.65°	95.85°	5190.08'	265.14'

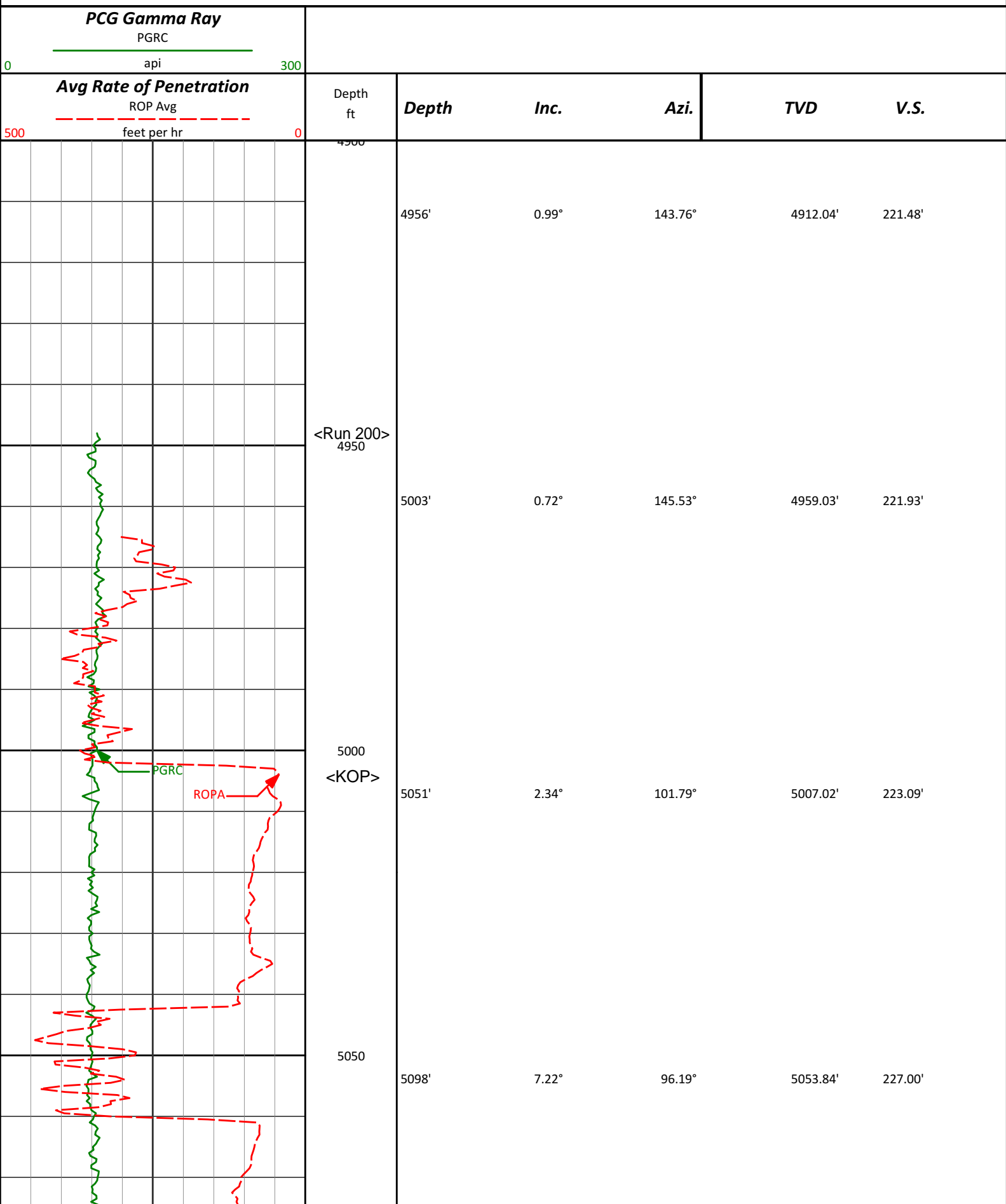


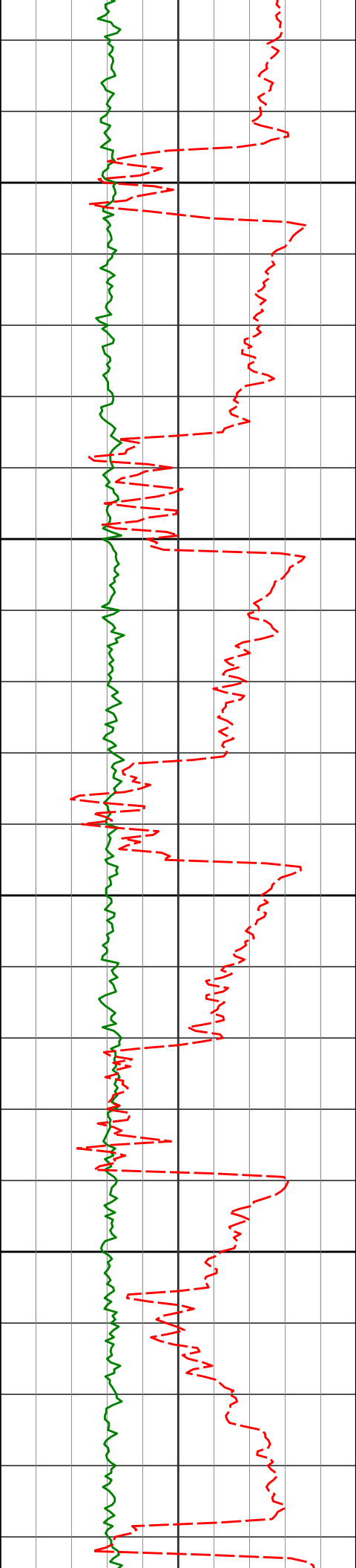
<TD @ 5,634' TVD>

<div><div>Avg Rate of Penetration</div><div>ROPA</div><div>feet per hr</div></div>		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
<div><div>PCG Gamma Ray</div><div>PGRC</div><div>api</div></div>							

TVD Detail Log 1:240

Noble Energy, Inc
Rohn State LD03-66-1HN
H&P 273
T9N R58W





5100

5146'

13.46°

100.86°

5101.04'

235.57'

5150

5193'

18.39°

102.20°

5146.22'

248.35'

5200

5240'

23.65°

95.85°

5190.08'

265.14'

5250

5287'

27.26°

88.34°

5232.53'

285.28'

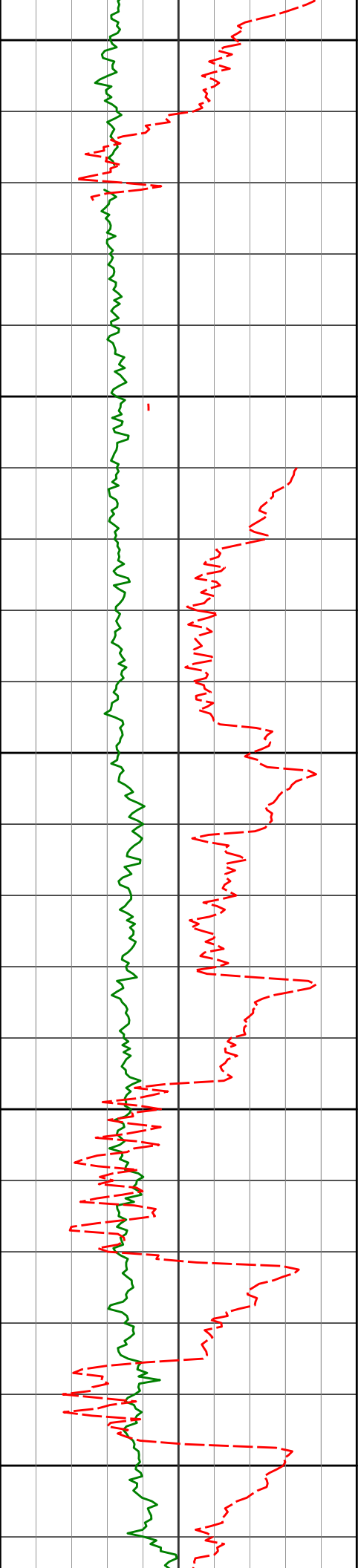
5335'

30.07°

88.31°

5274.64'

308.17'



5300

5382'

33.86°

88.18°

5314.50'

332.91'

5350

5430'

37.13°

89.66°

5353.58'

360.65'

5400

5477'

39.11°

92.04°

5390.56'

389.60'

5450

5525'

42.80°

92.35°

5426.80'

421.04'

5450

5572'

45.74°

90.94°

5460.45'

453.81'

5500

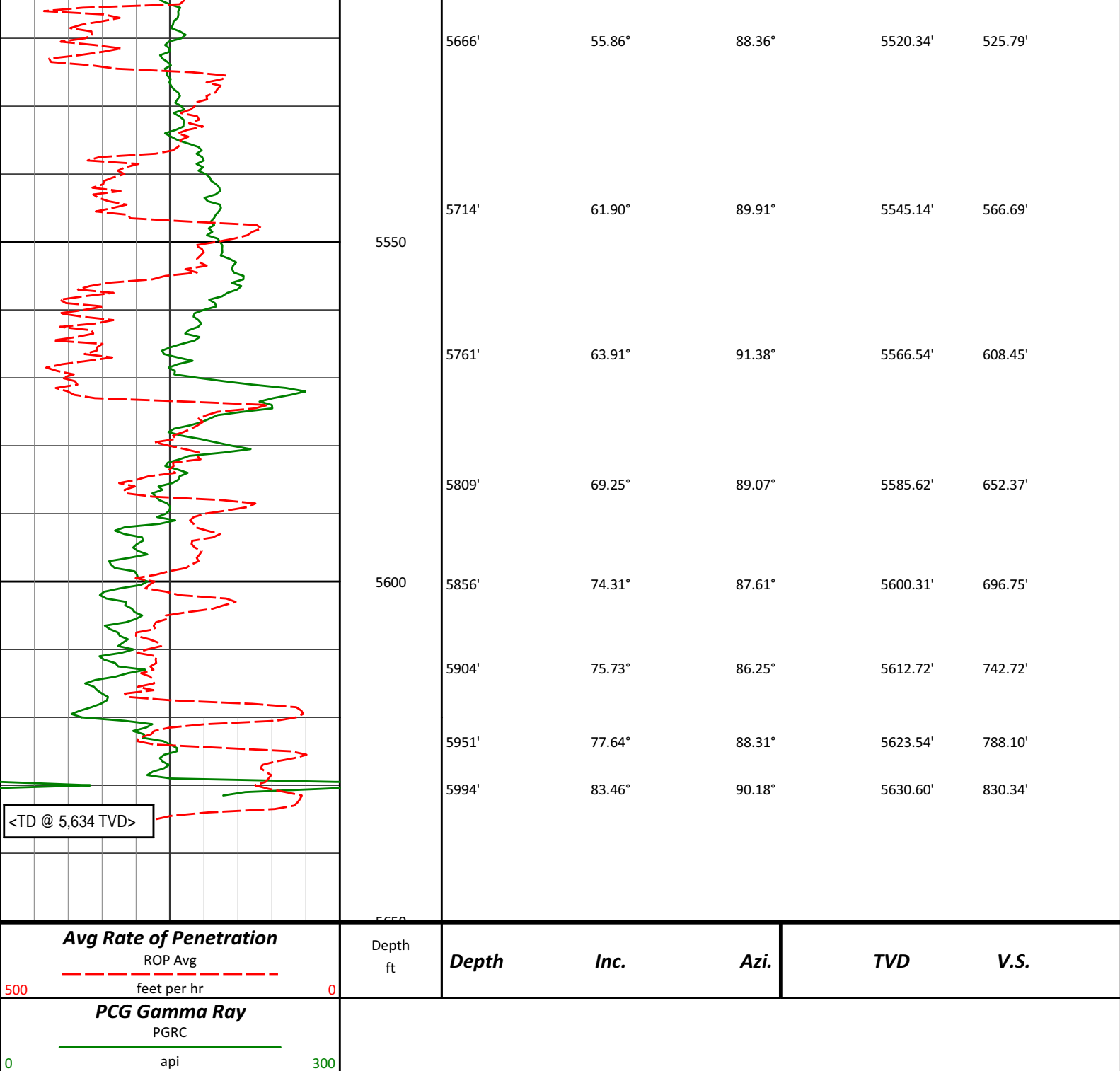
5619'

49.93°

88.62°

5492.00'

488.52'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

**Noble Energy
Rohn State LD03-66-1HN
Wattenberg
Weld Colorado
USA
CA-XX-0901584425**

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
350.00	0.20	31.59	350.00	0.52 N	0.32 E	0.28	0.06
750.00	0.00	193.99	750.00	1.12 N	0.69 E	0.60	0.05

1200.00	0.60	327.59	1199.99	3.10 N	0.58 W	-0.81	0.13
1273.00	0.73	288.10	1272.99	3.57 N	1.23 W	-1.49	0.64
1458.00	0.74	288.73	1457.97	4.32 N	3.48 W	-3.80	0.01
1551.00	0.61	281.62	1550.96	4.62 N	4.54 W	-4.88	0.16
1644.00	0.86	177.88	1643.96	4.02 N	5.00 W	-5.29	1.26
1737.00	1.80	149.49	1736.93	2.07 N	4.24 W	-4.38	1.20
1832.00	2.60	146.93	1831.86	1.02 S	2.30 W	-2.22	0.85
1926.00	4.36	151.45	1925.69	5.95 S	0.57 E	1.02	1.89
2021.00	6.09	152.96	2020.29	13.61 S	4.59 E	5.60	1.82
2116.00	8.08	151.10	2114.56	23.94 S	10.10 E	11.88	2.11
2210.00	9.60	150.29	2207.44	36.53 S	17.18 E	19.89	1.62
2305.00	11.20	151.49	2300.88	51.52 S	25.51 E	29.32	1.70
2400.00	11.76	153.22	2393.97	68.27 S	34.28 E	39.33	0.69
2494.00	13.04	152.21	2485.78	86.21 S	43.54 E	49.92	1.37
2589.00	13.07	153.24	2578.33	105.28 S	53.37 E	61.16	0.25
2684.00	11.95	152.30	2671.07	123.57 S	62.77 E	71.92	1.20
2779.00	13.19	156.20	2763.79	142.20 S	71.72 E	82.25	1.58
2873.00	11.41	156.23	2855.63	160.52 S	79.79 E	91.68	1.89
2968.00	11.85	161.22	2948.68	178.36 S	86.72 E	99.94	1.15
3063.00	13.57	163.71	3041.35	198.29 S	92.99 E	107.69	1.90
3158.00	14.36	163.37	3133.54	220.28 S	99.48 E	115.83	0.84
3253.00	13.37	160.34	3225.78	241.91 S	106.55 E	124.52	1.29
3347.00	13.85	160.01	3317.14	262.72 S	114.06 E	133.57	0.51
3442.00	13.60	157.54	3409.42	283.73 S	122.21 E	143.28	0.67
3537.00	14.06	156.47	3501.67	304.62 S	131.08 E	153.71	0.55
3632.00	11.63	157.46	3594.29	324.05 S	139.36 E	163.43	2.57
3727.00	10.29	155.60	3687.55	340.61 S	146.53 E	171.83	1.46
3822.00	8.25	152.91	3781.31	354.41 S	153.14 E	179.46	2.19
3916.00	7.77	151.49	3874.39	366.00 S	159.25 E	186.43	0.56
4010.00	6.80	149.35	3967.63	376.37 S	165.12 E	193.06	1.07
4105.00	5.79	146.09	4062.06	385.18 S	170.66 E	199.25	1.13
4200.00	4.48	144.18	4156.68	392.17 S	175.50 E	204.61	1.39
4295.00	3.38	141.76	4251.45	397.38 S	179.41 E	208.90	1.17
4389.00	2.47	138.31	4345.33	401.07 S	182.47 E	212.23	0.98
4484.00	1.97	150.42	4440.26	404.02 S	184.64 E	214.62	0.72
4579.00	2.29	156.67	4535.19	407.18 S	186.20 E	216.41	0.42
4674.00	2.24	157.14	4630.12	410.64 S	187.68 E	218.14	0.06
4769.00	1.18	155.62	4725.07	413.24 S	188.80 E	219.46	1.12
4863.00	1.14	148.67	4819.05	414.92 S	189.69 E	220.47	0.16
4936.00	0.89	143.39	4892.04	416.00 S	190.40 E	221.27	0.37
4956.00	0.99	143.76	4912.04	416.26 S	190.60 E	221.48	0.53
5003.00	0.72	145.53	4959.03	416.83 S	191.00 E	221.93	0.58
5051.00	2.34	101.79	5007.02	417.28 S	192.14 E	223.09	3.94
5098.00	7.22	96.19	5053.84	417.80 S	196.01 E	227.00	10.40
5146.00	13.46	100.86	5101.04	419.18 S	204.51 E	235.57	13.12
5193.00	18.39	102.20	5146.22	421.78 S	217.13 E	248.35	10.51
5240.00	23.65	95.85	5190.08	424.31 S	233.77 E	265.14	12.19
5287.00	27.26	88.34	5232.53	424.96 S	253.92 E	285.28	10.29
5335.00	30.07	88.31	5274.64	424.28 S	276.93 E	308.17	5.87
5382.00	33.86	88.18	5314.50	423.52 S	301.80 E	332.91	8.05
5430.00	37.13	89.66	5353.58	423.01 S	329.65 E	360.65	7.05
5477.00	39.11	92.04	5390.56	423.45 S	358.66 E	389.60	5.25
5525.00	42.80	92.35	5426.80	424.66 S	390.09 E	421.04	7.69
5572.00	45.74	90.94	5460.45	425.59 S	422.88 E	453.81	6.59
5619.00	49.93	88.62	5492.00	425.43 S	457.70 E	488.52	9.63
5666.00	55.86	88.36	5520.34	424.45 S	495.16 E	525.79	12.63
5714.00	61.90	89.91	5545.14	423.85 S	536.22 E	566.69	12.89
5761.00	63.91	91.60	5566.54	424.40 S	578.06 E	608.45	5.33
5809.00	69.25	89.26	5585.62	424.72 S	622.08 E	652.37	11.99
5856.00	74.31	87.29	5600.31	423.36 S	666.69 E	696.75	11.48
5904.00	75.73	86.37	5612.72	420.80 S	712.99 E	742.72	3.49
5951.00	77.64	88.08	5623.54	418.59 S	758.66 E	788.10	5.39
5994.00	83.46	90.80	5630.60	418.18 S	801.06 E	830.34	14.90
6049.00	88.20	90.50	5634.60	418.80 S	855.89 E	885.07	8.64

VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 94.33 DEGREES (GRID)
A TOTAL CORRECTION OF 6.99 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6049.00 FEET
IS 952.86 FEET ALONG 116.07 DEGREES (GRID)

Surface surveys at 350 ft, 750 ft and 1200 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Last survey is a projection from 5994 ft MD to TD at 6049 ft MD.

Date Printed: 27 August 2014