

PCGK : Pressure Case Gamma
PCDC: Pressure Case Directional

1 : 600 / 1 : 240

Country : USA			
Field : Wattenberg			
Location : Lat: 40° 31' 24.89" North Long: 104° 23' 15.61" West			
Well : Crow Creek State AC36-76HN			
Company : Noble Energy			
Rig : H&P 315			
LOCATION			
Latitude : 40° 31' 24.89" North Longitude : 104° 23' 15.61" West			
UTM Easting = 3,309,222.734 ft UTM Northing = 1,435,520.504 ft			
Company : Noble Energy			
Rig : H&P 315			
Well : Crow Creek State AC36-76HN			
Field : Wattenberg			
Country : USA			
API Number : 05-123-37132			
Permanent Datum : Ground Level			
Log Measured From : Drill Floor			
Drilling Measured From : Drill Floor			
Depth Logged : 649.00 ft			
Date Logged : 16-Oct-13			
Total Depth MD : 11,056.00 ft			
Spud Date : 15-Oct-13			
Run No.			
Size			
2			
3			
4			
Borehole Record (MD)			
From			
To			
Run No.			
Size			
7.000 in			
Casing Record (MD)			
Weight			
26.00 lbpf			
SURFACE			
6.962.00 ft			

MD LOG

Unit No. : **11610113**

Job No. : **CA-XX-090080837**

Plot Type : **Final**

Plot Date : **21-Oct-13**
WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	17-Oct-13	18-Oct-13	21-Oct-13		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.750		
Log Start Depth (MD, ft)	649.00	5,972.00	6,969.00		
Log End Depth (MD, ft)	5,972.00	6,969.00	11,056.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	16-Oct-13 05:00	17-Oct-13 08:45	19-Oct-13 13:10		
Drill/Wipe End Date and Time	16-Oct-13 22:45	18-Oct-13 00:00	21-Oct-13 02:00		
Min Inc (deg) @ Depth (MD, ft)	0.10 @ 1,458.00	1.31 @ 5,943.00	86.64 @ 7,037.00		
Max Inc (deg) @ Depth (MD, ft)	12.56 @ 3,072.00	80.41 @ 6,915.00	93.67 @ 8,840.00		
Bit TFA(in2) / Bit Type	0.75 / PDC	.75 / PDC	0.75 / PDC		
Flow Rate (gpm)	594.41	560.81	282.00		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.70 / 28.00	9.93 / 38.00	9.20 / 31.00		
Filtrate CL (ppm)	1,300.00	1,200.00	1,600.00		
pH / Fluid Loss (mptm)	9.20 / 0	8.80 / 0	9.20 / 0		
PV (cP) / YP (Ihf2)	3 / 4.00	13 / 12.00	7 / 6.00		
% Solids / % Sand	2.3 / .2	11.60 / 0.20	4.70 / 0.15		
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A		
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		

Max Tool Temp (degF) / Source	145.90 / PCM	160.83 / PCM	218.14 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Paul Kock	Paul Kock	Paul Kock		
Customer Representative	Steve Record	Steve Record	Steve Record		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11404299	11404299	12134682		
Insert Serial Number	12001055	12001055	11680895		
Date and Time Initialized	15-Oct-13 21:14	15-Oct-13 21:14	18-Oct-13 17:43		
Date and Time Read	18-Oct-13 07:57	18-Oct-13 08:29	21-Oct-13 15:30		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	54.12	52.25	60.57		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11404299	11404299	12134682		
Sonde Serial Number	12177609	12177609	11638477		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	287.34	279.70	201.00		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	49.12	47.25	55.59		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11404299	11404299	12134682		
Insert/Sonde Serial Number	11293274	11293274	11292594		

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:
 - All 2" (1:600) logs - 1 ft. interval, 3 ft. coercion distance.
 - All 5" (1:240) logs - .5 ft. interval, .6 ft. coercion distance.
5. INSITE version 8.0.0
6. Gamma presented inside casing from 6922 ft. MD to 6969 ft. MD.

WARRANTY

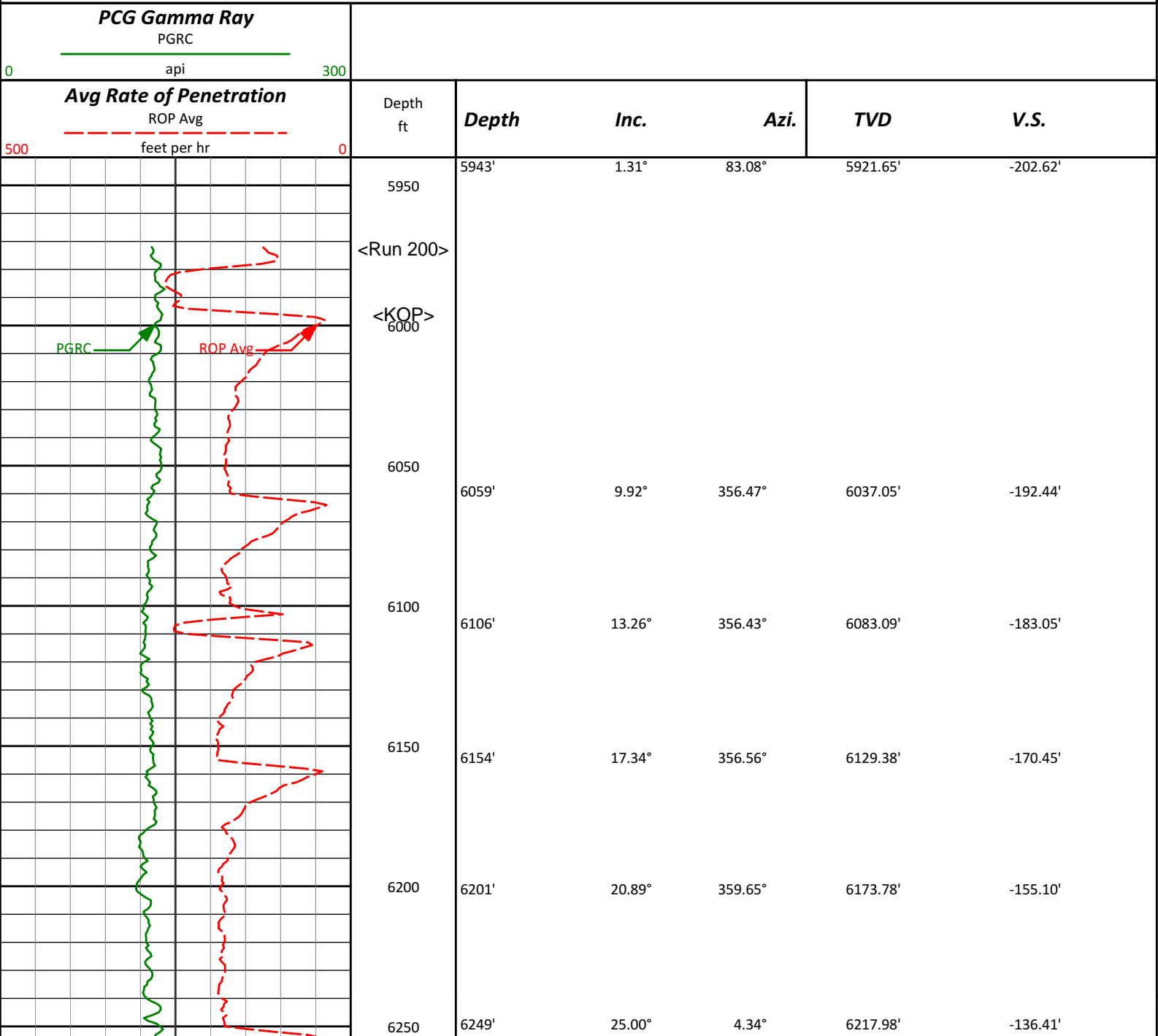
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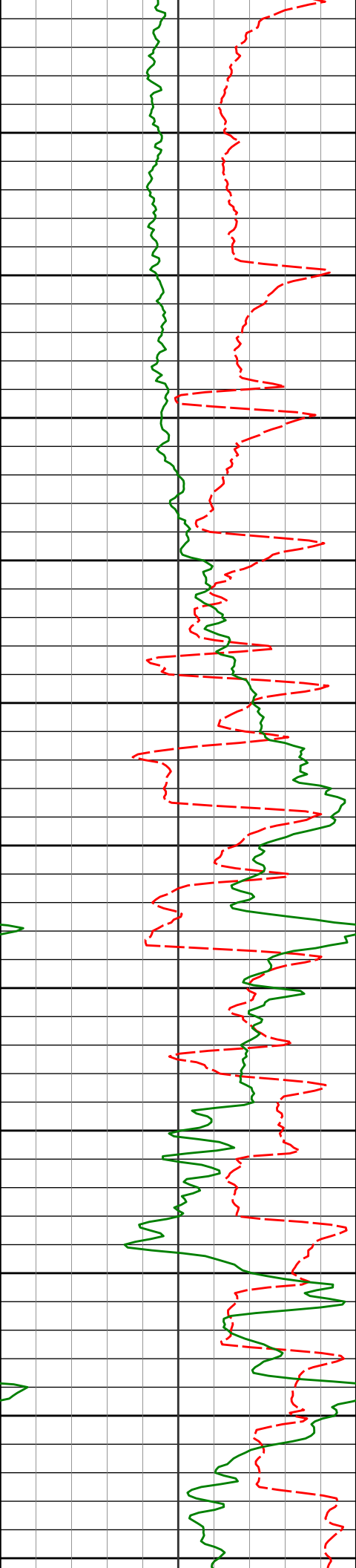
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HALLIBURTON
Sperry Drilling Services

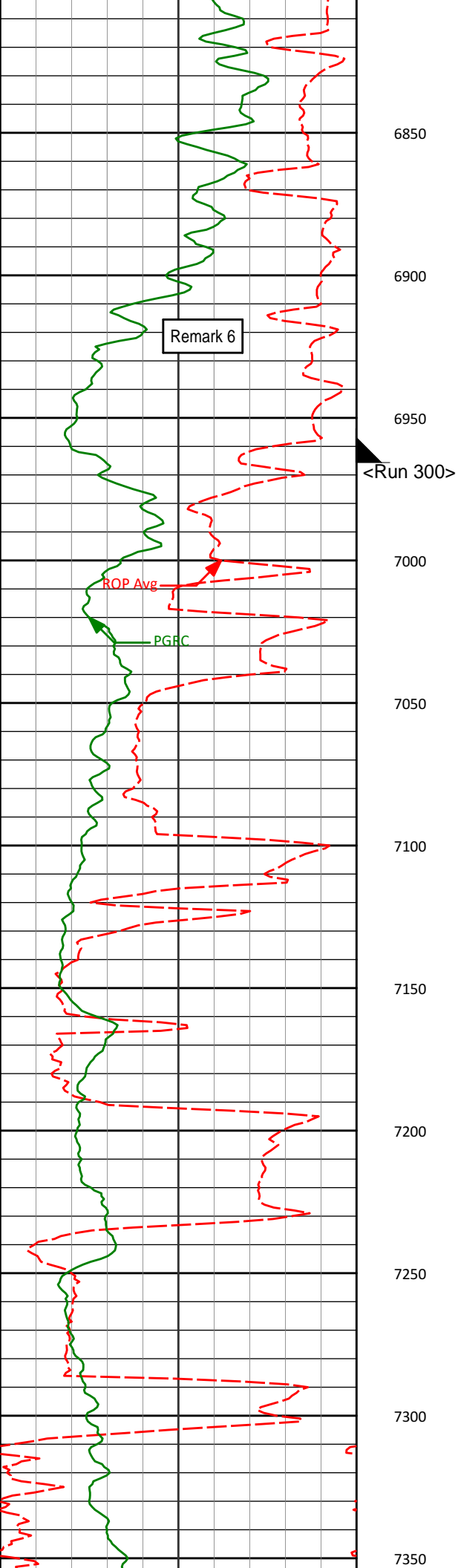
MD Main Log 1:600

Noble Energy, Inc
Crow Creek State AC36-76HN
H&P 315
T7N R63W

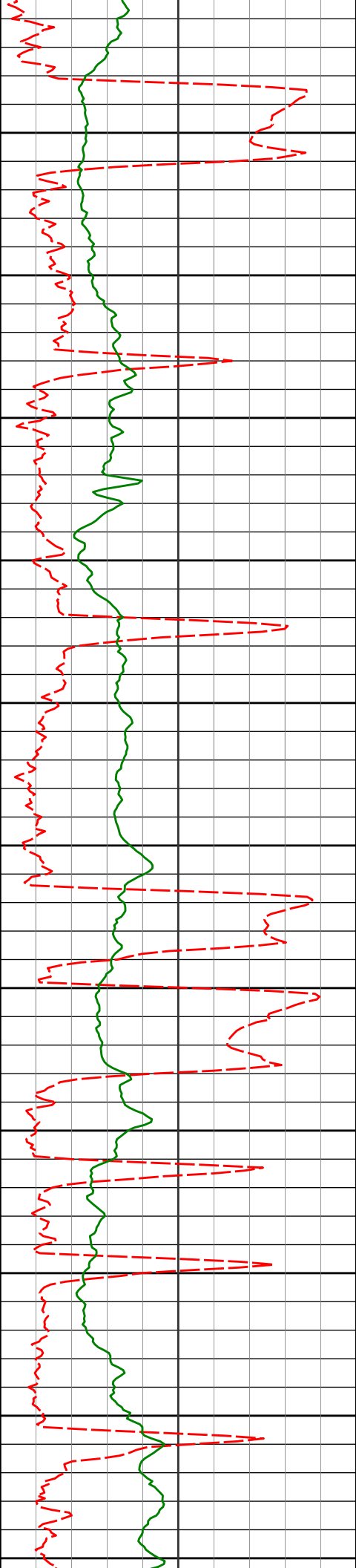




6300	6296'	29.55°	3.62°	6259.74'	-114.89'
6350	6344'	33.38°	6.74°	6300.68'	-89.89'
6400	6391'	37.69°	5.33°	6338.92'	-62.64'
6450	6439'	42.71°	1.14°	6375.58'	-31.69'
6500	6486'	47.13°	358.91°	6408.85'	1.47'
6550	6534'	49.93°	357.36°	6440.64'	37.34'
6600	6581'	52.91°	357.78°	6469.94'	73.96'
6650	6629'	58.14°	357.44°	6497.11'	113.39'
6700	6676'	60.41°	357.59°	6521.12'	153.66'
6750	6724'	62.40°	359.17°	6544.09'	195.71'
6800	6771'	65.21°	359.05°	6564.84'	237.82'



6819'	70.39°	359.71°	6582.97'	282.20'
6850				
6866'	75.20°	0.23°	6596.86'	327.05'
6900				
6915'	80.41°	0.63°	6607.21'	374.91'
6950				
<Run 300>	<7" casing set at 6962' MD>			
7000				
7037'	86.64°	358.80°	6620.96'	495.96'
7050				
7100				
7132'	87.79°	358.62°	6625.58'	590.68'
7150				
7200				
7227'	92.16°	359.69°	6625.62'	685.53'
7250				
7300				
7322'	92.37°	1.53°	6621.87'	780.42'
7350				



7400

7416'

89.51°

1.27°

6620.33'

874.39'

7450

7500

7511'

90.03°

1.87°

6620.72'

969.38'

7550

7600

7606'

91.97°

3.29°

6619.06'

1064.36'

7650

7700

7701'

90.37°

2.49°

6617.11'

1159.33'

7750

7800

7796'

88.46°

0.39°

6618.08'

1254.31'

7850

7900

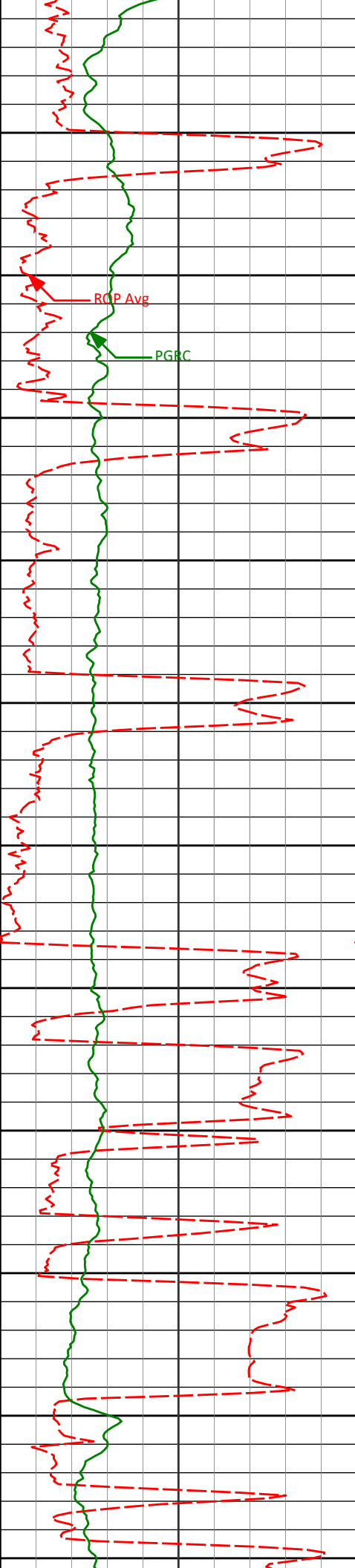
7891'

87.48°

359.74°

6621.45'

1349.18'



7950

7986'

88.21°

359.00°

6625.02'

1444.01'

8000

8050

8081'

89.23°

357.55°

6627.14'

1538.77'

8100

8150

8175'

89.63°

3.40°

6628.08'

1632.68'

8200

8250

8270'

89.45°

4.01°

6628.84'

1727.64'

8300

8350

8365'

87.29°

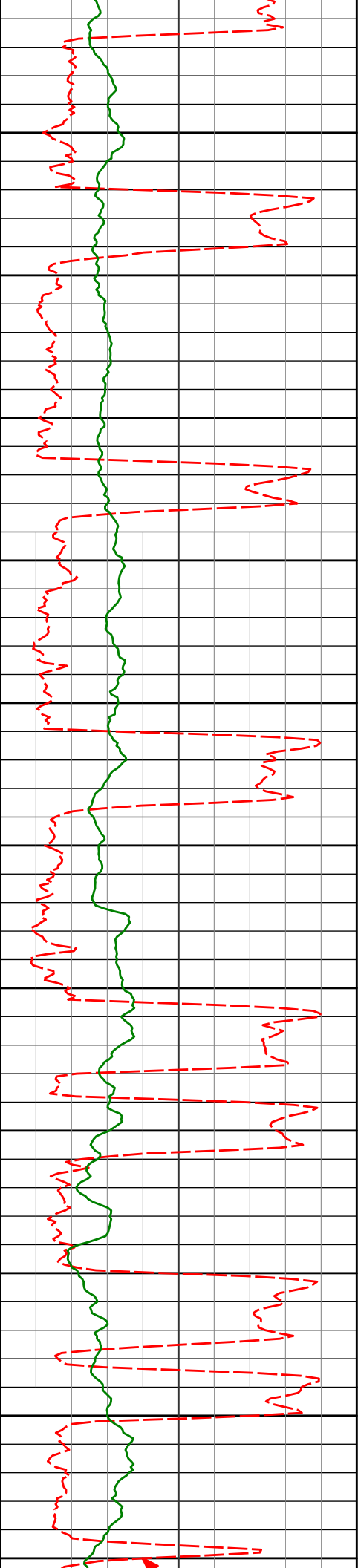
0.86°

6631.55'

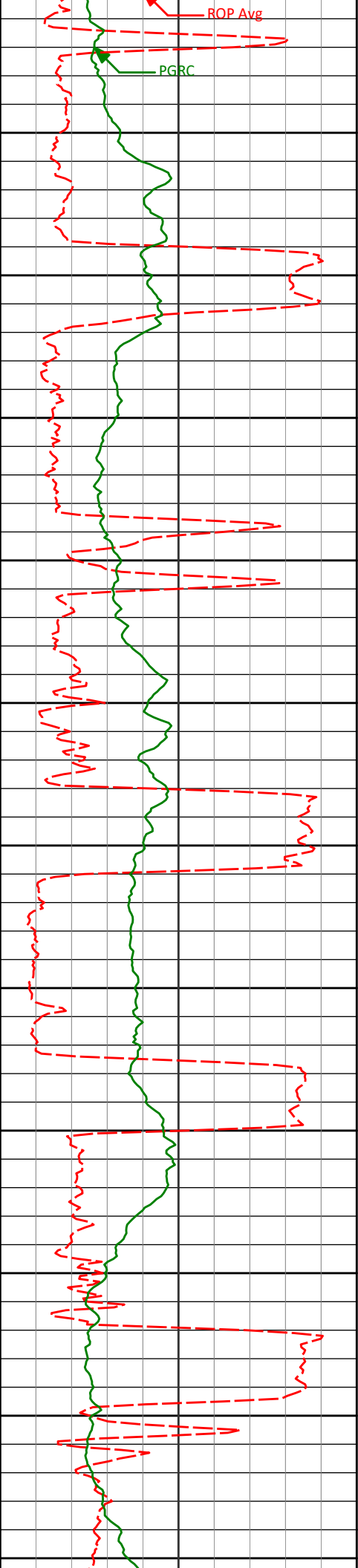
1822.58'

8400

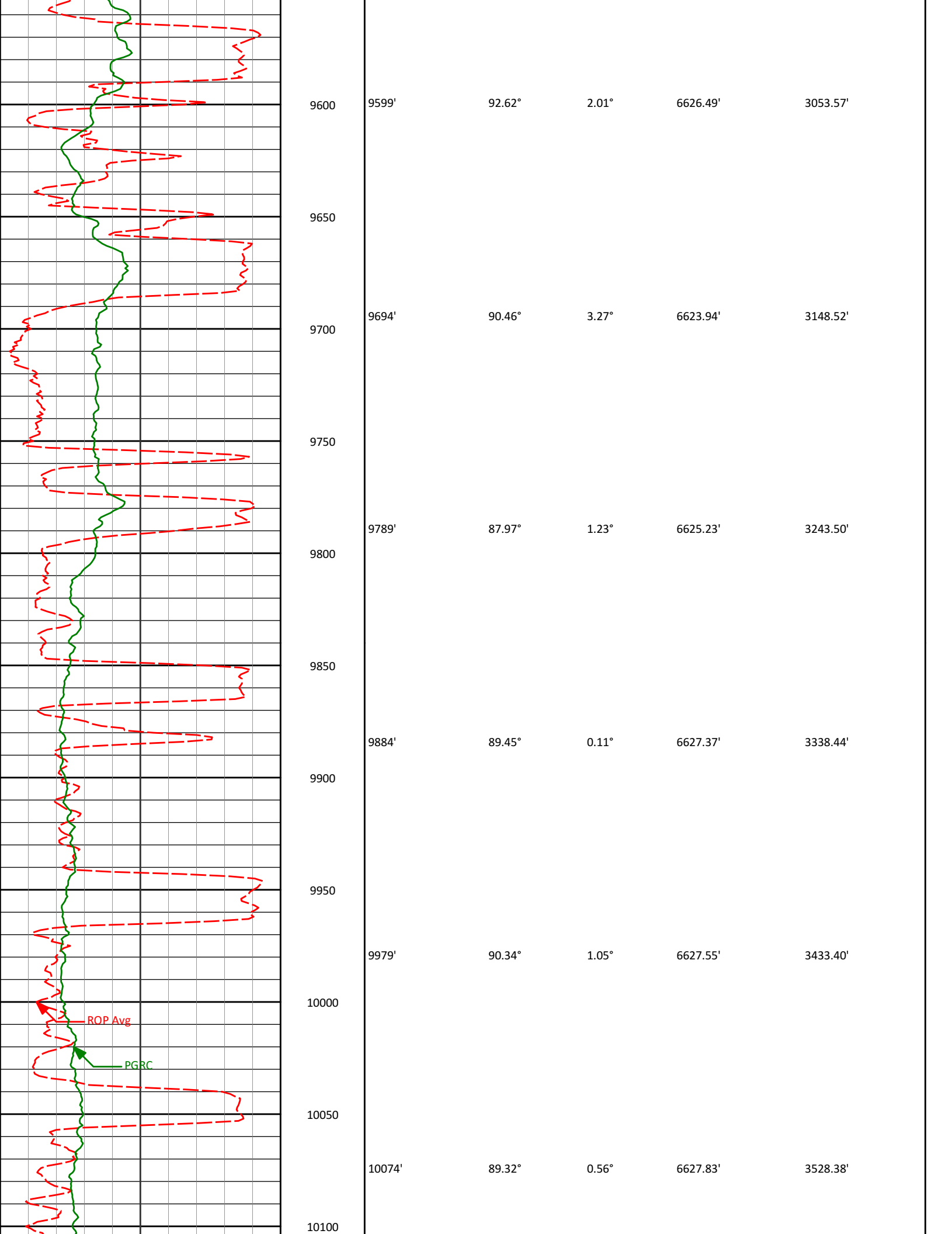
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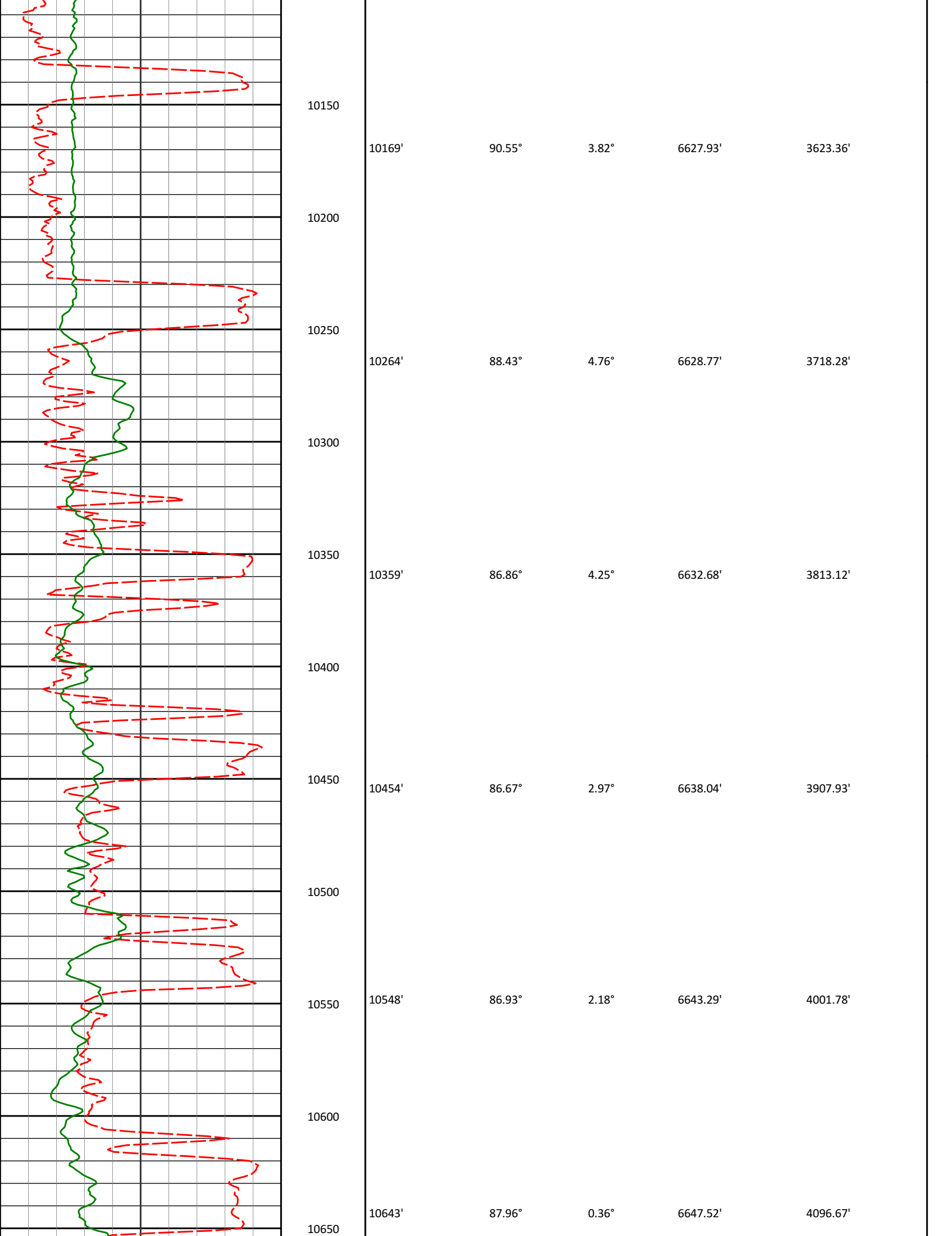


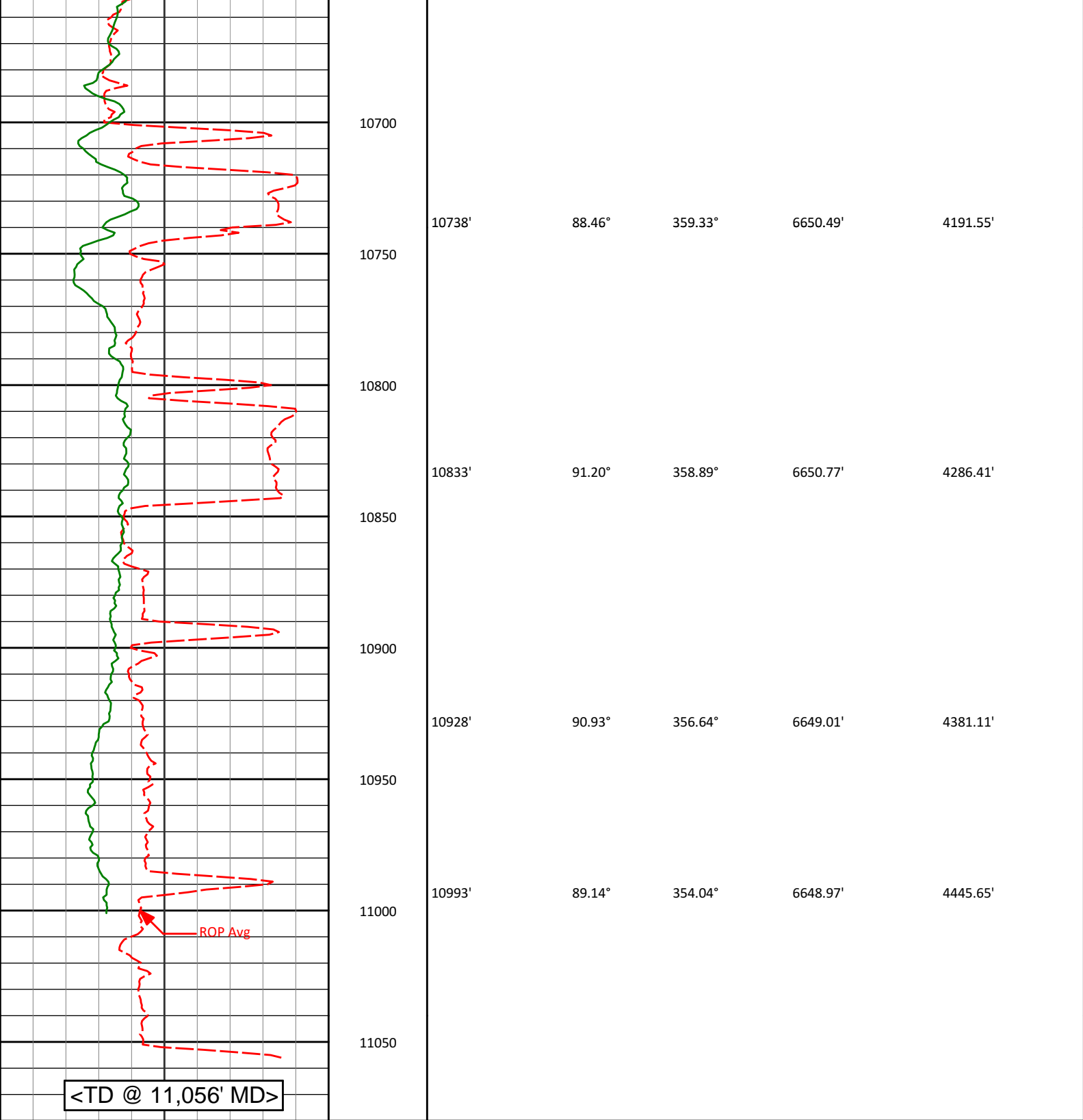
8460'	88.15°	357.86°	6635.32'	1917.39'
8555'	90.19°	357.24°	6636.70'	2012.07'
8650'	88.89°	356.26°	6637.46'	2106.65'
8745'	90.34°	355.52°	6638.10'	2201.09'
8840'	93.67°	357.45°	6634.78'	2295.55'
8935'	91.76°	1.02°	6630.27'	2390.31'



9030'	91.48°	0.77°	6627.59'	2485.25'
9050				
9100				
9125'	90.00°	0.42°	6626.36'	2580.20'
9150				
9200				
9220'	88.86°	358.89°	6627.30'	2675.11'
9250				
9300				
9314'	89.78°	359.73°	6628.42'	2768.99'
9350				
9400				
9409'	89.07°	357.68°	6629.37'	2863.81'
9450				
9500				
9504'	90.89°	359.87°	6629.40'	2958.64'
9550				







<div><div>Avg Rate of Penetration</div><div>ROP Avg</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>						

PCG Gamma Ray					
PGRC					
api					
Avg Rate of Penetration					
ROP Avg					
feet per hr					
Depth					
ft					
<i>Depth Inc. Azi. TVD V.S.</i>					
5943'					
1.31°					
83.08°					
5921.65'					
-202.62'					
5950					
<Run 200>					
<KOP> 6000					
PGRC					
ROP Avg					
6050					
6059'					
9.92°					
356.47°					
6037.05'					
-192.44'					
6100					
6106'					
13.26°					
356.43°					
6083.09'					
-183.05'					



6150

6154'

17.34°

356.56°

6129.38'

-170.45'

6200

6201'

20.89°

359.65°

6173.78'

-155.10'

6250

6249'

25.00°

4.34°

6217.98'

-136.41'

6300

6296'

29.55°

3.62°

6259.74'

-114.89'

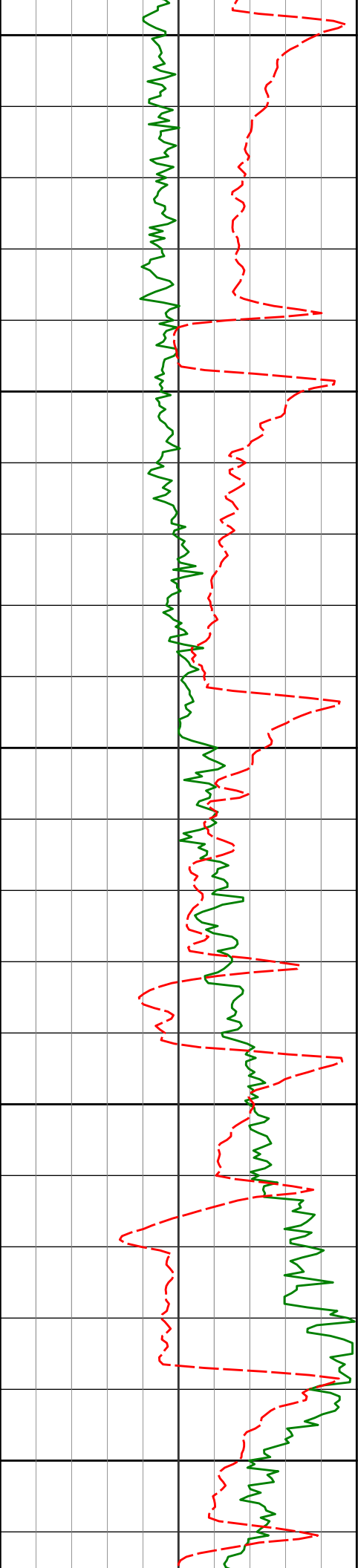
6344'

33.38°

6.74°

6300.68'

-89.89'



6350

6391'

37.69°

5.33°

6338.92'

-62.64'

6400

6439'

42.71°

1.14°

6375.58'

-31.69'

6450

6486'

47.13°

358.91°

6408.85'

1.47'

6500

6534'

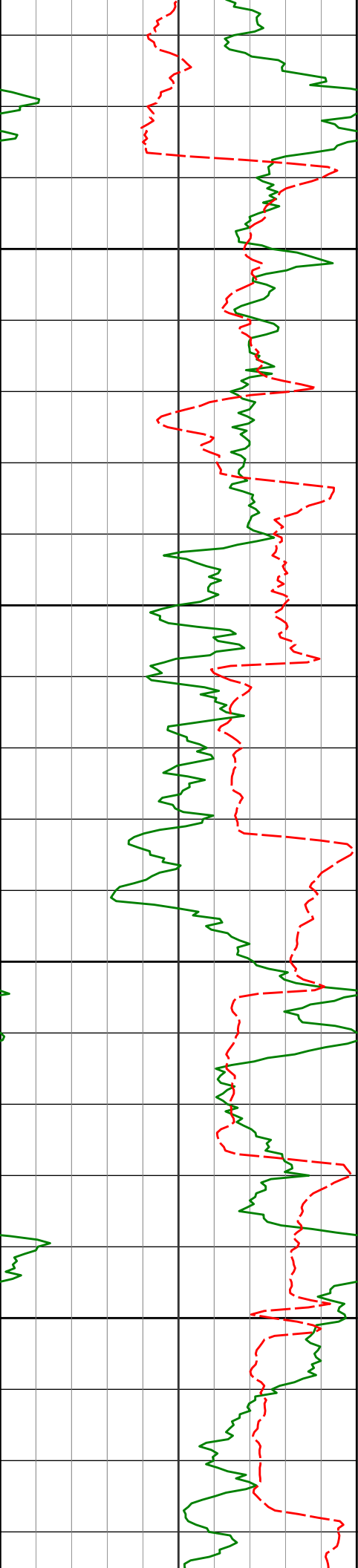
49.93°

357.36°

6440.64'

37.34'

6550



6581'

52.91°

357.78°

6469.94'

73.96'

6600

6629'

58.14°

357.44°

6497.11'

113.39'

6650

6676'

60.41°

357.59°

6521.12'

153.66'

6700

6724'

62.40°

359.17°

6544.09'

195.71'

6750

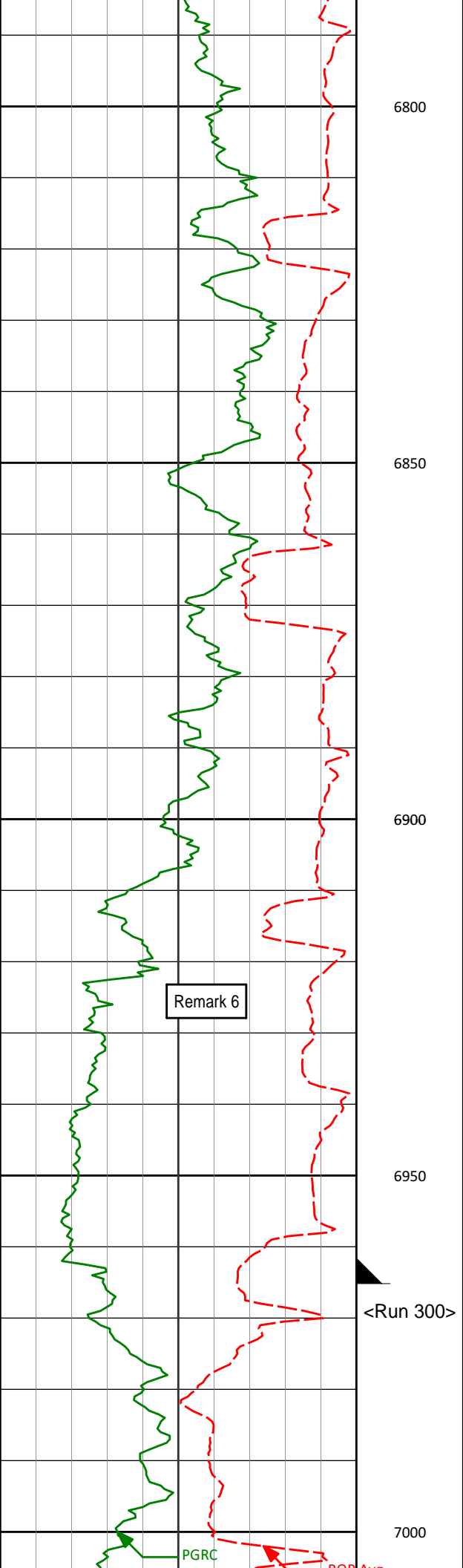
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65.21°

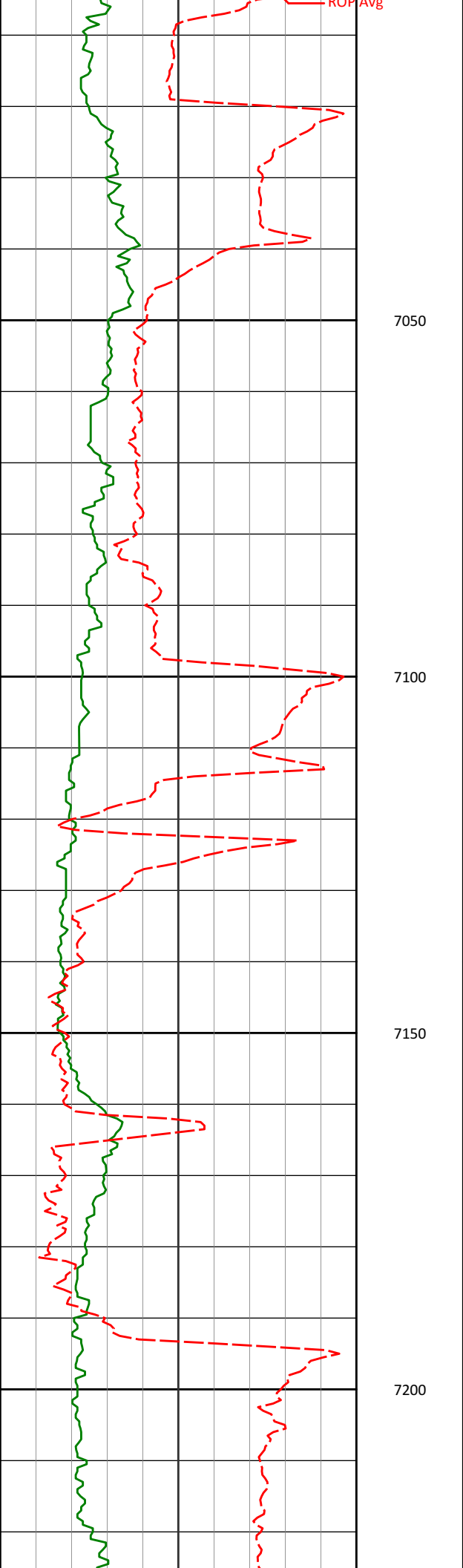
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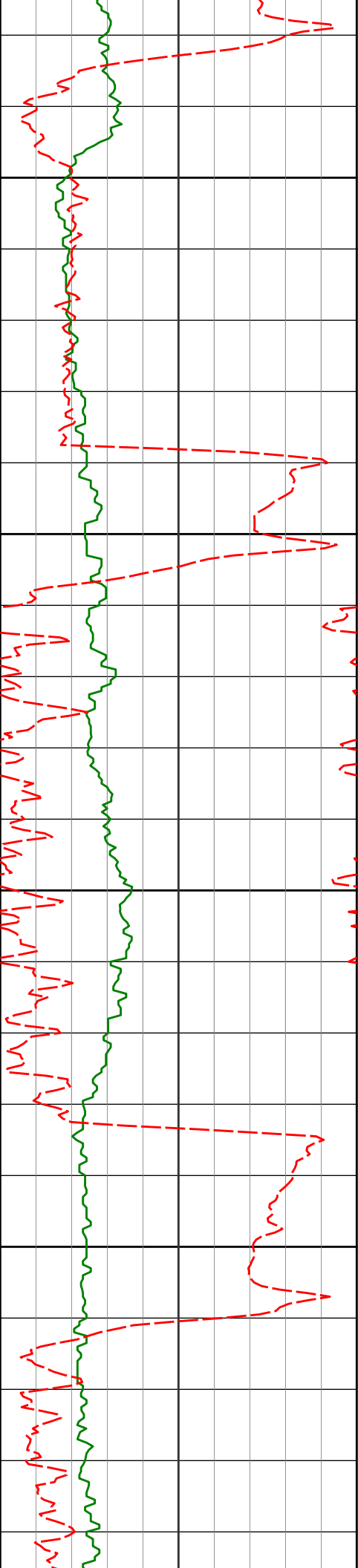
6564.84'

237.82'



6800					
6819'	70.39°	359.71°	6582.97'	282.20'	
6850					
6866'	75.20°	0.23°	6596.86'	327.05'	
6900					
6915'	80.41°	0.63°	6607.21'	374.91'	
6950					
7000					





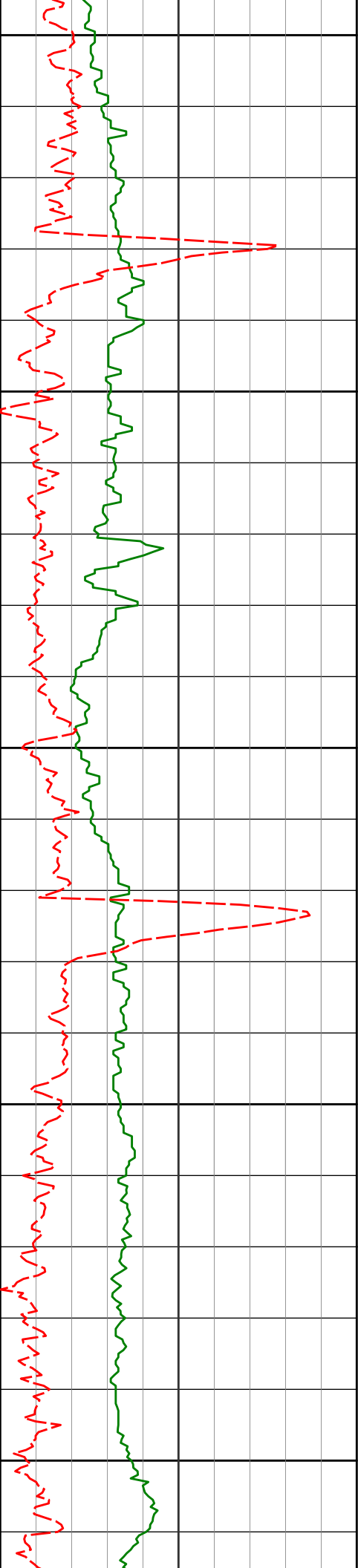
7250

7300

7350

7400

7227'	92.16°	359.69°	6625.62'	685.53'
7322'	92.37°	1.53°	6621.87'	780.42'
7416'	89.51°	1.27°	6620.33'	874.39'



7450

7500

7550

7600

7650

7511'

90.03°

1.87°

6620.72'

969.38'

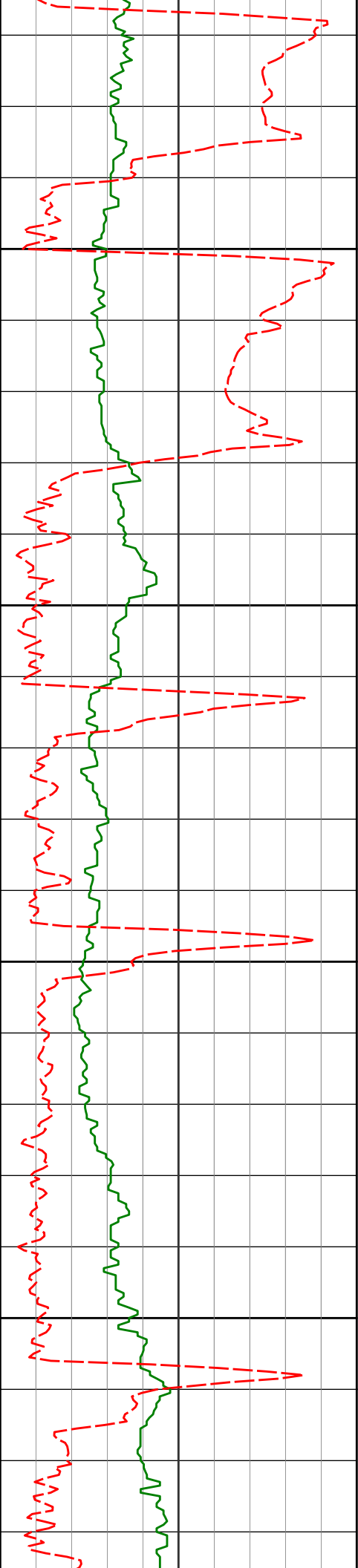
7606'

91.97°

3.29°

6619.06'

1064.36'



7700

7701'

90.37°

2.49°

6617.11'

1159.33'

7750

7800

7796'

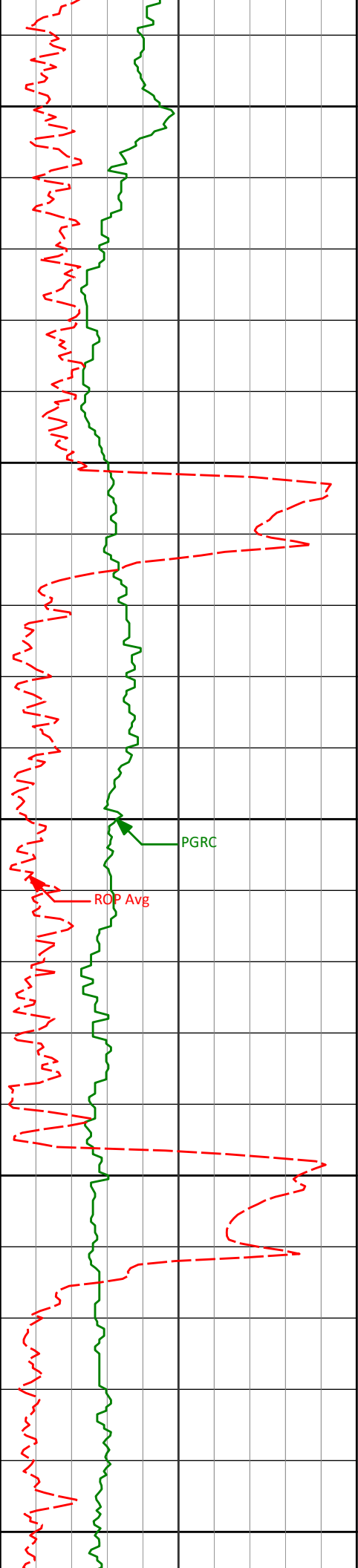
88.46°

0.39°

6618.08'

1254.31'

7850



7891'	87.48°	359.74°	6621.45'	1349.18'
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7900

7950

7986'	88.21°	359.00°	6625.02'	1444.01'
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8000

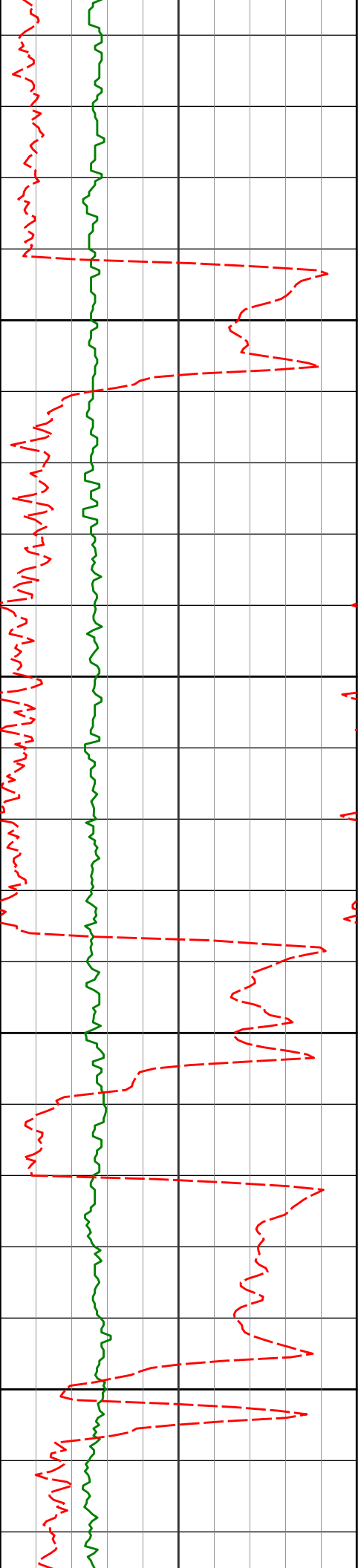
PGRC

ROP Avg

8050

8081'	89.23°	357.55°	6627.14'	1538.77'
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8100



8150

8175'

89.63°

3.40°

6628.08'

1632.68'

8200

8250

8270'

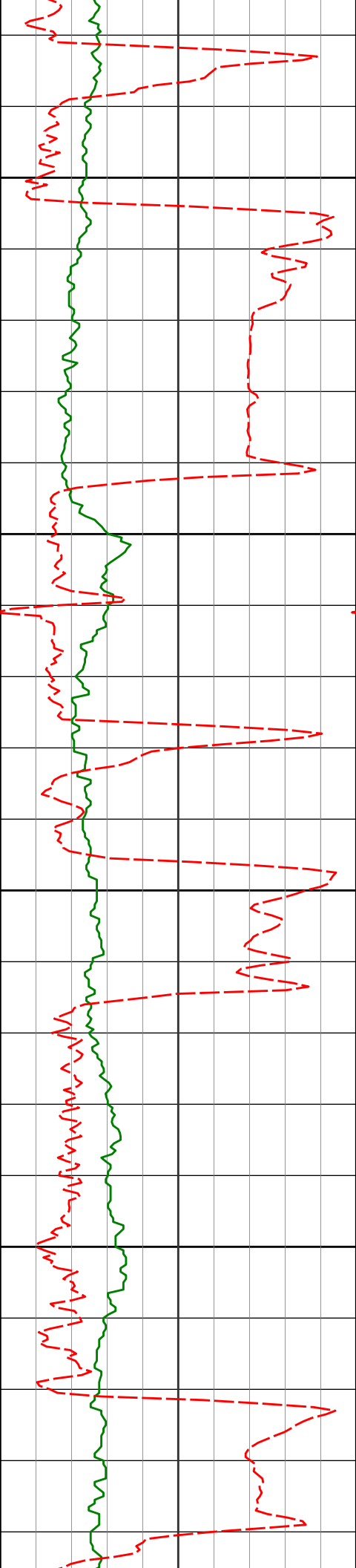
89.45°

4.01°

6628.84'

1727.64'

8300



8350

8365'

87.29°

0.86°

6631.55'

1822.58'

8400

8450

8460'

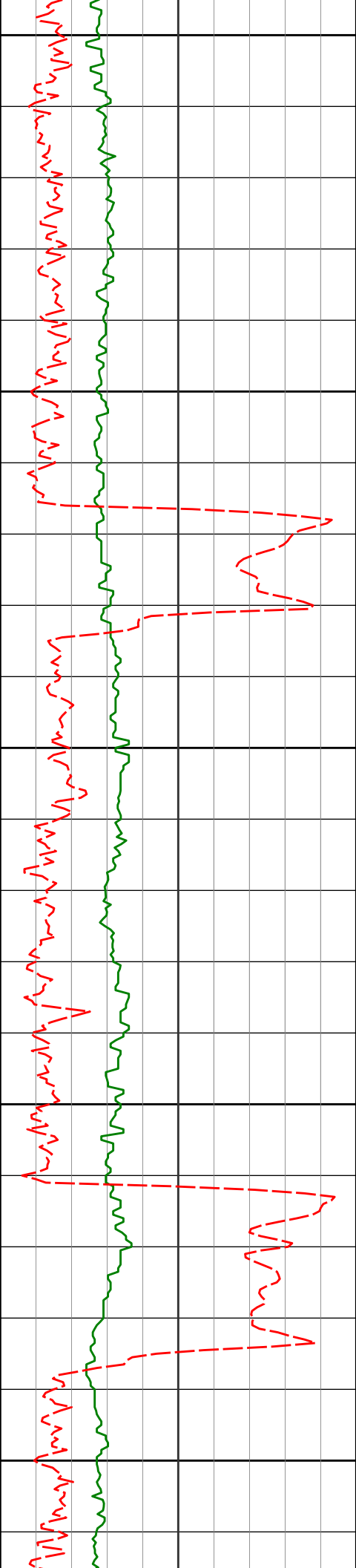
88.15°

357.86°

6635.32'

1917.39'

8500



8550

8555'	90.19°	357.24°	6636.70'	2012.07'
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8600

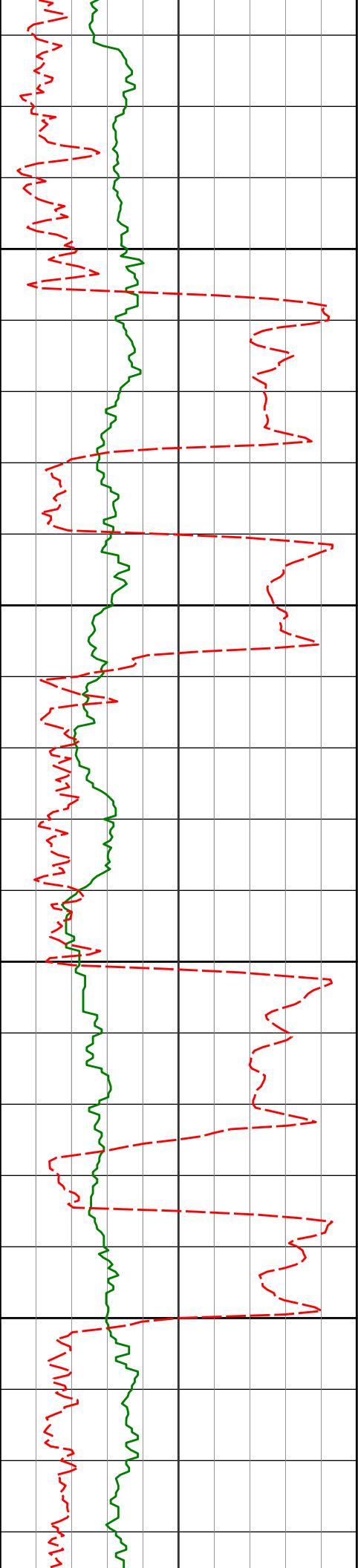
8650

8650'	88.89°	356.26°	6637.46'	2106.65'
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8700

8750

8745'	90.34°	355.52°	6638.10'	2201.09'
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8800

8840'

93.67°

357.45°

6634.78'

2295.55'

8850

8900

8935'

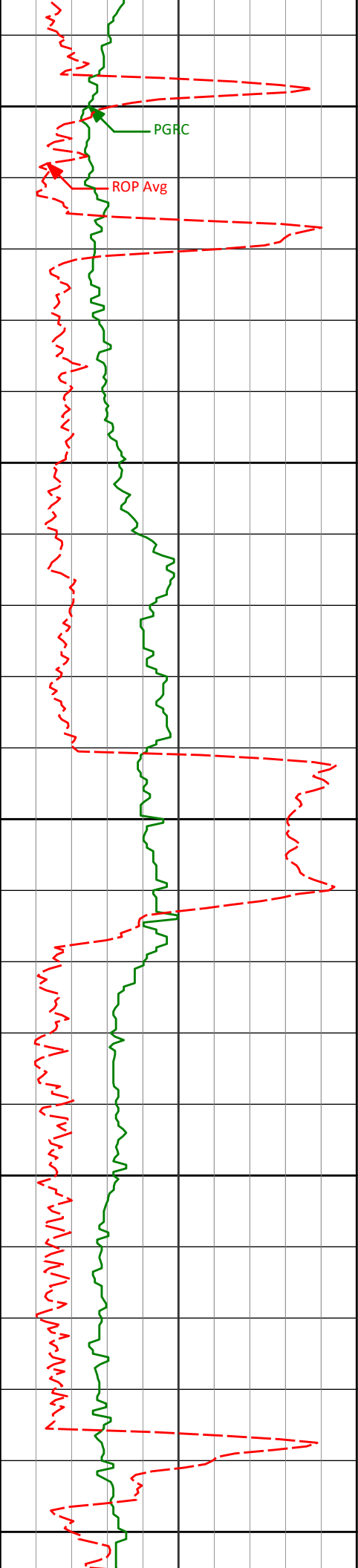
91.76°

1.02°

6630.27'

2390.31'

8950



9000

PGRC

ROP Avg

9050

9100

9150

9200

9030'

91.48°

0.77°

6627.59'

2485.25'

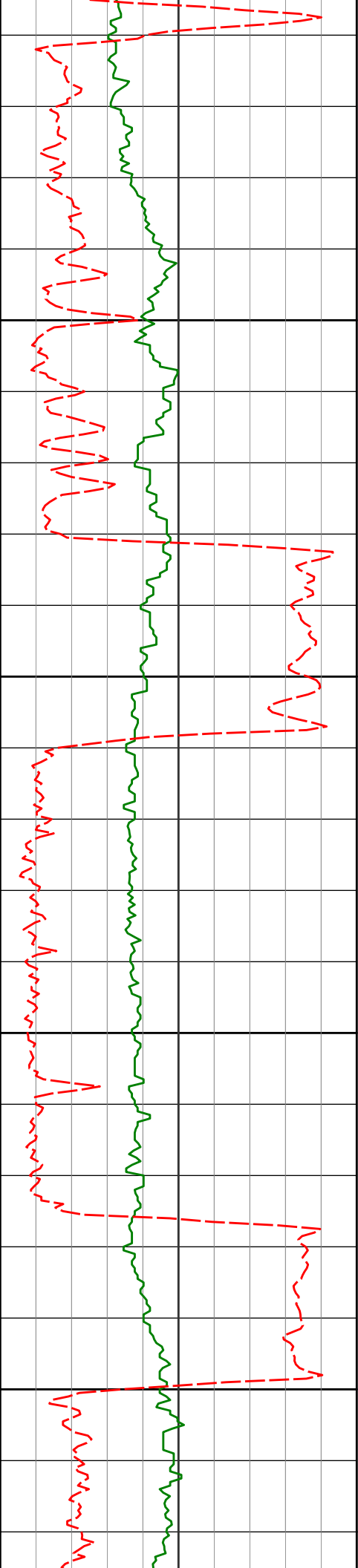
9125'

90.00°

0.42°

6626.36'

2580.20'



9220'

88.86°

358.89°

6627.30'

2675.11'

9250

9300

9314'

89.78°

359.73°

6628.42'

2768.99'

9350

9400

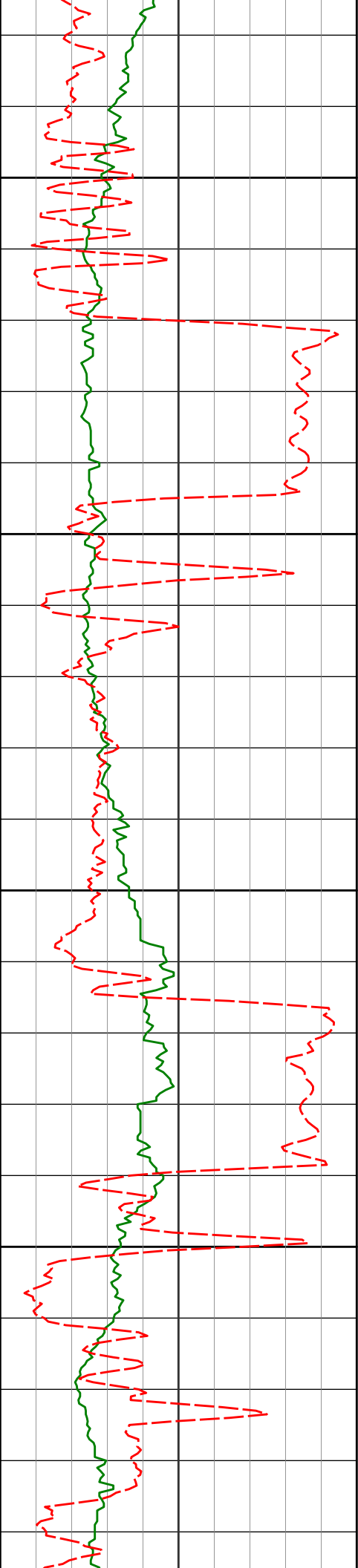
9409'

89.07°

357.68°

6629.37'

2863.81'



9450

9500

9550

9600

9504'

90.89°

359.87°

6629.40'

2958.64'

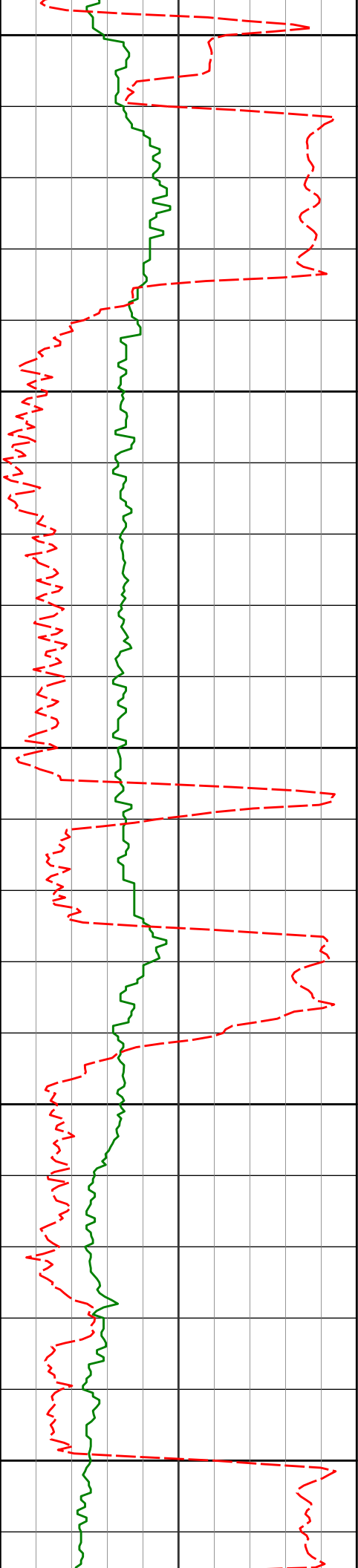
9599'

92.62°

2.01°

6626.49'

3053.57'



9650

9694'

90.46°

3.27°

6623.94'

3148.52'

9700

9750

9789'

87.97°

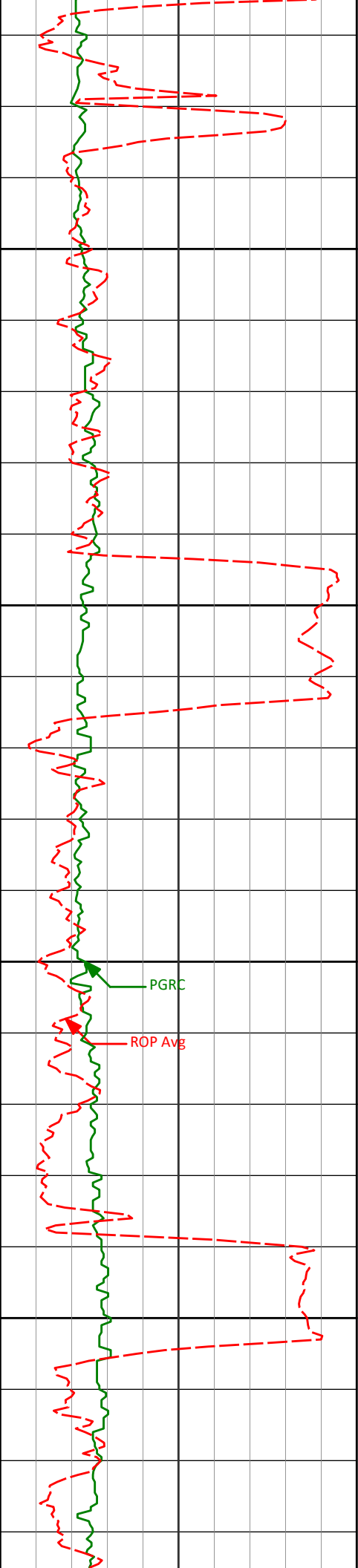
1.23°

6625.23'

3243.50'

9800

9850



9900

9950

10000

10050

9884'

89.45°

0.11°

6627.37'

3338.44'

9979'

90.34°

1.05°

6627.55'

3433.40'

10074'

89.32°

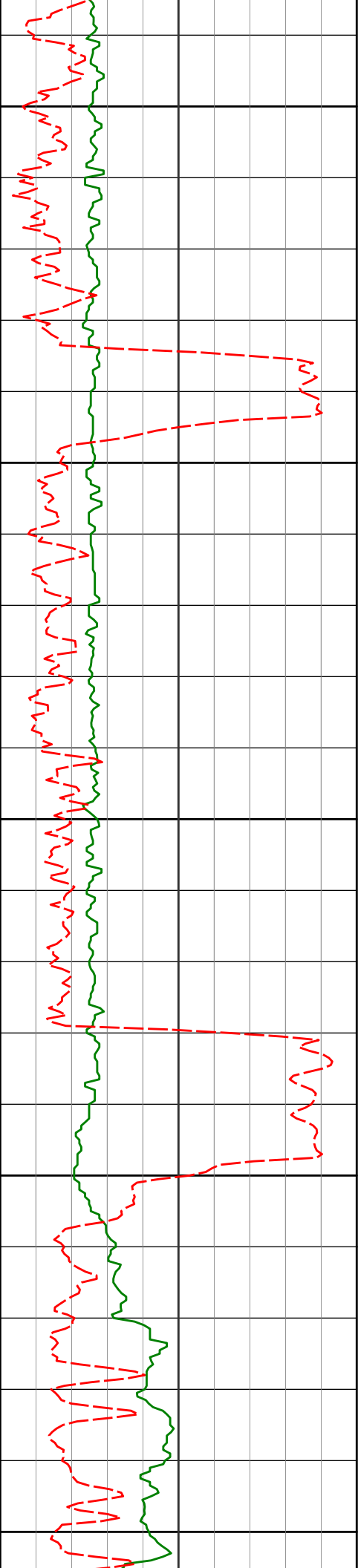
0.56°

6627.83'

3528.38'

PGRC

ROP Avg



10100

10150

10200

10250

10300

10169'

90.55°

3.82°

6627.93'

3623.36'

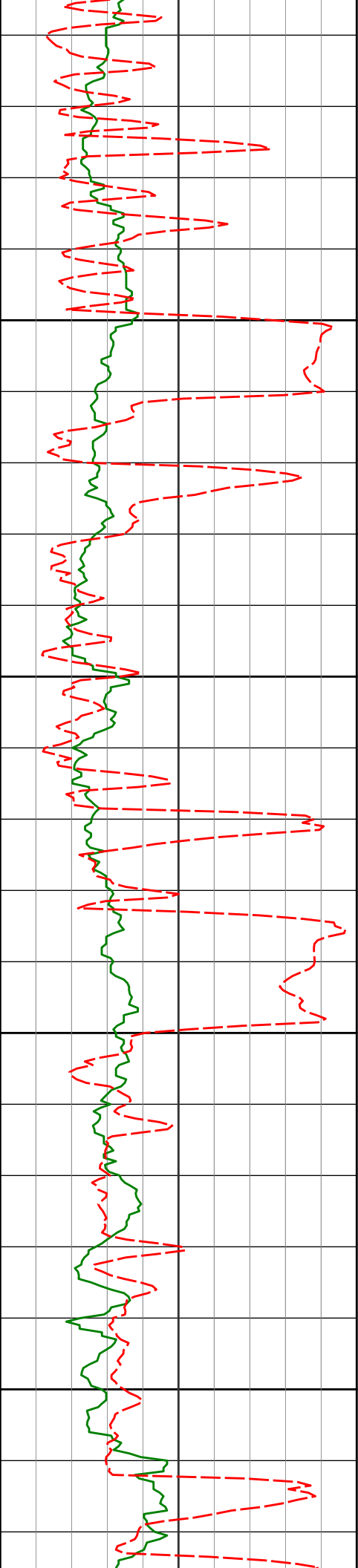
10264'

88.43°

4.76°

6628.77'

3718.28'



10350

10359'

86.86°

4.25°

6632.68'

3813.12'

10400

10450

10454'

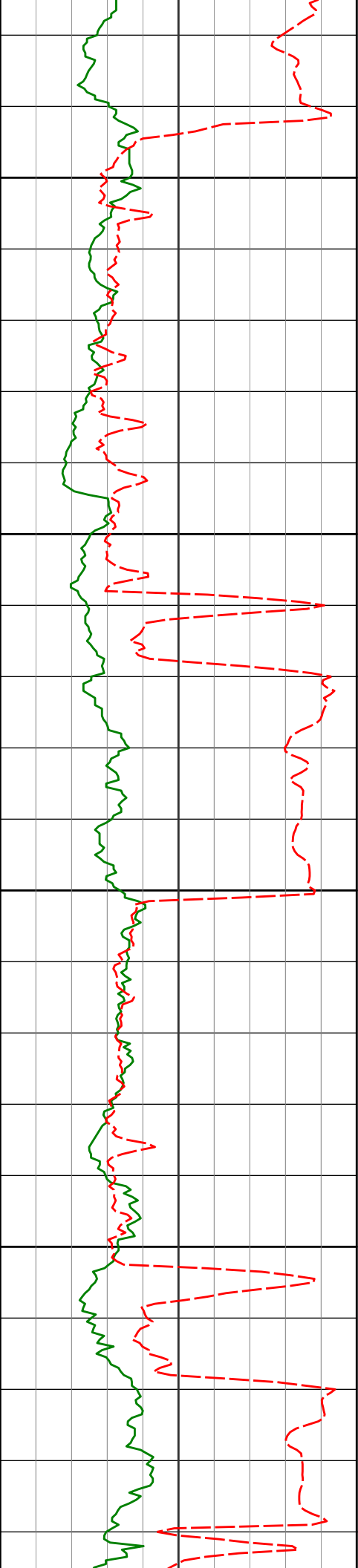
86.67°

2.97°

6638.04'

3907.93'

10500



10550

10600

10650

10700

10548'

10643'

10738'

86.93°

87.96°

88.46°

2.18°

0.36°

359.33°

6643.29'

6647.52'

6650.49'

4001.78'

4096.67'

4191.55'



10750

10800

10833'

10850

10900

10928'

10950

91.20°

358.89°

6650.77'

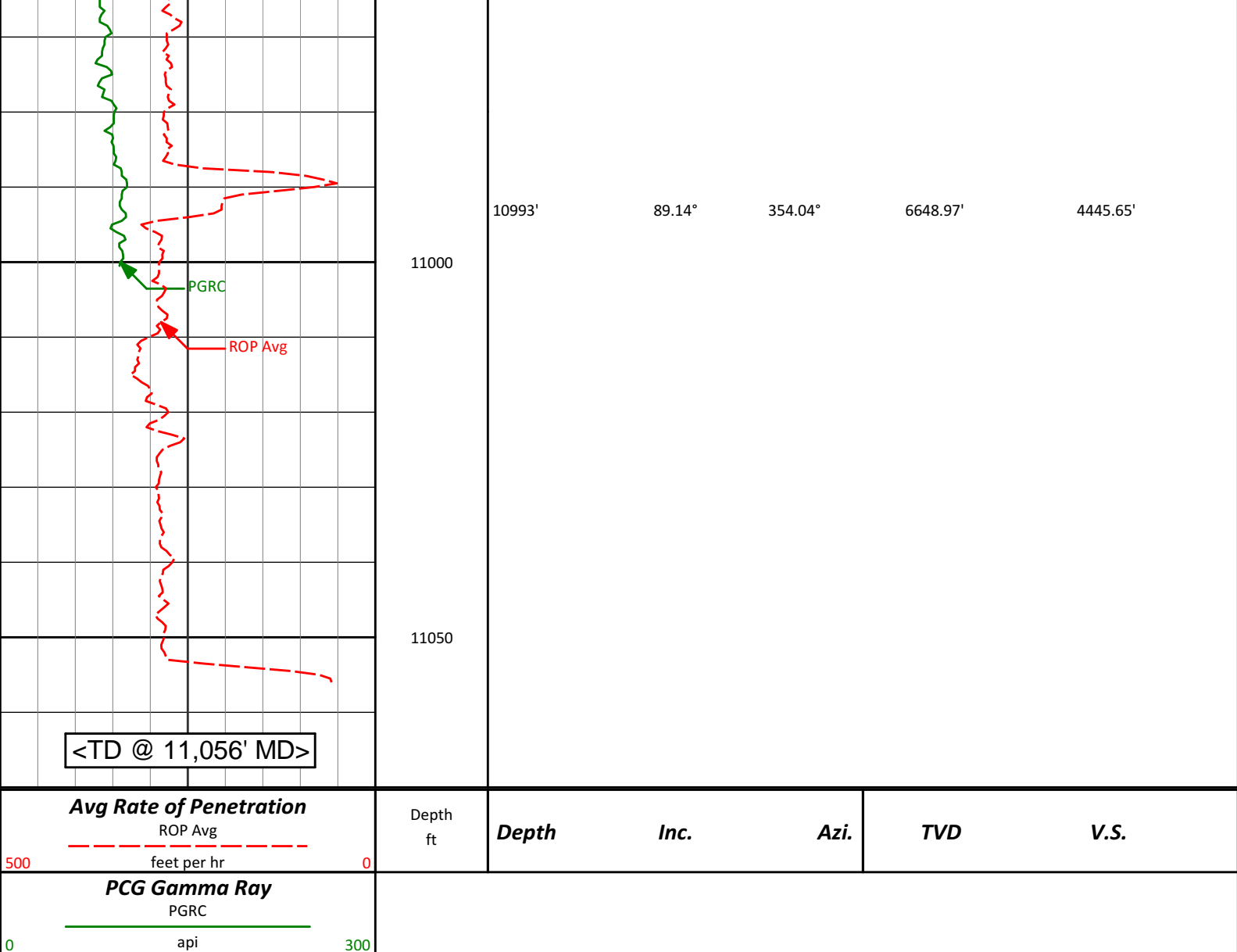
4286.41'

90.93°

356.64°

6649.01'

4381.11'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Crow Creek State AC36-76HN
Wattenberg
Weld Colorado
USA
CA-XX-0900808837

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
322.00	0.50	335.57	322.00	1.28 N	0.58 W	1.26	0.16
609.00	0.30	313.67	608.99	2.94 N	1.64 W	2.88	0.09
717.00	0.25	243.31	716.99	3.03 N	2.06 W	2.95	0.30
808.00	0.34	149.19	807.99	2.71 N	2.09 W	2.63	0.48
901.00	0.28	263.89	900.99	2.45 N	2.18 W	2.36	0.56
994.00	0.25	259.62	993.99	2.39 N	2.59 W	2.29	0.04
1086.00	0.46	235.84	1085.98	2.14 N	3.09 W	2.03	0.27
1180.00	0.20	287.66	1179.98	1.98 N	3.56 W	1.85	0.39
1273.00	0.47	171.29	1272.98	1.65 N	3.65 W	1.52	0.63
1366.00	0.28	162.59	1365.98	1.06 N	3.53 W	0.93	0.22
1458.00	0.10	155.89	1457.98	0.78 N	3.43 W	0.65	0.19
1552.00	0.32	160.11	1552.00	0.45 N	3.20 W	0.32	0.24

1533.00	0.33	160.11	1532.98	0.43 N	3.30 W	0.33	0.24
1648.00	0.31	129.61	1647.98	0.03 N	3.01 W	-0.08	0.18
1743.00	0.33	182.40	1742.98	0.41 S	2.82 W	-0.52	0.30
1838.00	0.37	132.43	1837.97	0.89 S	2.61 W	-0.99	0.31
1933.00	0.66	127.39	1932.97	1.43 S	1.95 W	-1.50	0.31
2028.00	0.55	105.85	2027.96	1.89 S	1.07 W	-1.93	0.26
2123.00	0.51	119.82	2122.96	2.23 S	0.26 W	-2.23	0.14
2218.00	1.03	66.54	2217.95	2.10 S	0.89 E	-2.06	0.87
2313.00	2.74	108.95	2312.90	2.50 S	3.82 E	-2.35	2.21
2408.00	3.82	134.72	2407.75	5.46 S	8.22 E	-5.16	1.90
2503.00	5.65	139.65	2502.42	11.26 S	13.50 E	-10.75	1.97
2597.00	7.94	147.50	2595.76	20.26 S	19.99 E	-19.51	2.63
2692.00	9.46	148.27	2689.66	32.43 S	27.62 E	-31.39	1.60
2787.00	11.32	150.24	2783.10	47.17 S	36.35 E	-45.80	2.00
2882.00	10.77	148.10	2876.34	62.80 S	45.67 E	-61.08	0.72
2977.00	10.24	147.96	2969.75	77.50 S	54.84 E	-75.42	0.57
3072.00	12.56	147.11	3062.87	93.33 S	64.93 E	-90.87	2.45
3167.00	11.86	145.70	3155.72	110.07 S	76.04 E	-107.19	0.80
3262.00	11.29	142.95	3248.79	125.55 S	87.15 E	-122.26	0.83
3357.00	10.15	141.20	3342.12	139.50 S	98.00 E	-135.80	1.25
3452.00	8.33	139.54	3435.89	151.27 S	107.71 E	-147.20	1.94
3546.00	6.91	142.76	3529.06	160.95 S	115.55 E	-156.58	1.58
3641.00	7.13	144.84	3623.34	170.31 S	122.40 E	-165.69	0.35
3736.00	7.93	145.03	3717.52	180.50 S	129.55 E	-175.61	0.85
3831.00	6.94	140.07	3811.73	190.27 S	136.99 E	-185.10	1.24
3926.00	6.28	134.80	3906.09	198.34 S	144.36 E	-192.89	0.94
4021.00	3.24	124.05	4000.76	203.50 S	150.28 E	-197.83	3.32
4116.00	1.53	77.08	4095.68	204.72 S	153.74 E	-198.92	2.59
4211.00	1.52	293.67	4190.67	203.93 S	153.82 E	-198.13	3.05
4496.00	3.30	309.78	4475.41	197.16 S	144.05 E	-191.73	0.66
4591.00	1.90	295.05	4570.31	194.75 S	140.52 E	-189.44	1.62
4686.00	3.21	316.47	4665.21	192.15 S	137.26 E	-186.97	1.68
4780.00	2.24	320.32	4759.10	188.83 S	134.27 E	-183.75	1.04
4875.00	1.64	269.06	4854.06	187.42 S	131.73 E	-182.44	1.86
4971.00	1.76	159.30	4950.03	188.82 S	130.88 E	-183.87	2.90
5065.00	1.25	152.22	5044.00	191.08 S	131.87 E	-186.10	0.58
5350.00	2.66	163.60	5328.83	200.19 S	135.19 E	-195.07	0.51
5445.00	1.96	164.59	5423.75	203.87 S	136.24 E	-198.71	0.74
5540.00	1.08	80.08	5518.72	205.28 S	137.56 E	-200.08	2.26
5635.00	0.87	95.76	5613.71	205.20 S	139.16 E	-199.94	0.36
5825.00	1.33	128.17	5803.68	206.71 S	142.34 E	-201.33	0.40
5916.00	1.24	125.88	5894.65	207.94 S	143.97 E	-202.50	0.12
5943.00	1.31	83.08	5921.65	208.08 S	144.51 E	-202.62	3.45
6059.00	9.92	356.47	6037.05	197.92 S	145.21 E	-192.44	8.56
6106.00	13.26	356.43	6083.09	188.50 S	144.62 E	-183.05	7.11
6154.00	17.34	356.56	6129.38	175.87 S	143.85 E	-170.45	8.50
6201.00	20.89	359.65	6173.78	160.49 S	143.38 E	-155.10	7.85
6249.00	25.00	4.34	6217.98	141.81 S	144.09 E	-136.41	9.37
6296.00	29.55	3.62	6259.74	120.33 S	145.58 E	-114.89	9.71
6344.00	33.38	6.74	6300.68	95.40 S	147.87 E	-89.89	8.67
6391.00	37.69	5.33	6338.92	68.24 S	150.73 E	-62.64	9.35
6439.00	42.71	1.14	6375.58	37.32 S	152.41 E	-31.69	11.87
6486.00	47.13	358.91	6408.85	4.15 S	152.40 E	1.47	9.97
6534.00	49.93	357.36	6440.64	31.79 N	151.22 E	37.34	6.31
6581.00	52.91	357.78	6469.94	68.49 N	149.67 E	73.96	6.38
6629.00	58.14	357.44	6497.11	108.01 N	148.01 E	113.39	10.93
6676.00	60.41	357.59	6521.12	148.38 N	146.26 E	153.66	4.84
6724.00	62.40	359.17	6544.09	190.50 N	145.08 E	195.71	5.05
6771.00	65.21	359.05	6564.84	232.67 N	144.42 E	237.82	5.98
6819.00	70.39	359.71	6582.97	277.09 N	143.94 E	282.20	10.88
6866.00	75.20	0.23	6596.86	321.97 N	143.92 E	327.05	10.29
6915.00	80.41	0.63	6607.21	369.85 N	144.28 E	374.91	10.66
7037.00	86.64	358.80	6620.96	491.01 N	143.66 E	495.96	5.32
7132.00	87.79	358.62	6625.58	585.87 N	141.52 E	590.68	1.22
7227.00	92.16	359.69	6625.62	680.83 N	140.12 E	685.53	4.74
7322.00	92.37	1.53	6621.87	775.75 N	141.13 E	780.42	1.95
7416.00	89.51	1.27	6620.33	869.70 N	143.43 E	874.39	3.05
7511.00	90.03	1.87	6620.72	964.66 N	146.04 E	969.38	0.83
7606.00	91.97	3.29	6619.06	1059.54 N	150.31 E	1064.36	2.53
7701.00	90.37	2.49	6617.11	1154.40 N	155.10 E	1159.33	1.88
7796.00	88.46	0.39	6618.08	1249.35 N	157.49 E	1254.31	2.99
7891.00	87.48	359.74	6621.45	1344.29 N	157.60 E	1349.18	1.24

7986.00	88.21	359.00	6625.02	1439.22 N	156.56 E	1444.01	1.09
8081.00	89.23	357.55	6627.14	1534.15 N	153.70 E	1538.77	1.87
8175.00	89.63	3.40	6628.08	1628.10 N	154.48 E	1632.68	6.24
8270.00	89.45	4.01	6628.84	1722.90 N	160.62 E	1727.64	0.66
8365.00	87.29	0.86	6631.55	1817.76 N	164.65 E	1822.58	4.02
8460.00	88.15	357.86	6635.32	1912.66 N	163.59 E	1917.39	3.28
8555.00	90.19	357.24	6636.70	2007.56 N	159.53 E	2012.07	2.24
8650.00	88.89	356.26	6637.46	2102.40 N	154.15 E	2106.65	1.71
8745.00	90.34	355.52	6638.10	2197.15 N	147.35 E	2201.09	1.71
8840.00	93.67	357.45	6634.78	2291.90 N	141.52 E	2295.55	4.05
8935.00	91.76	1.02	6630.27	2386.76 N	140.26 E	2390.31	4.26
9030.00	91.48	0.77	6627.59	2481.71 N	141.74 E	2485.25	0.40
9125.00	90.00	0.42	6626.36	2576.70 N	142.73 E	2580.20	1.60
9220.00	88.86	358.89	6627.30	2671.69 N	142.16 E	2675.11	2.01
9314.00	89.78	359.73	6628.42	2765.67 N	141.03 E	2768.99	1.33
9409.00	89.07	357.68	6629.37	2860.64 N	138.90 E	2863.81	2.28
9504.00	90.89	359.87	6629.40	2955.60 N	136.87 E	2958.64	3.00
9599.00	92.62	2.01	6626.49	3050.54 N	138.43 E	3053.57	2.89
9694.00	90.46	3.27	6623.94	3145.40 N	142.82 E	3148.52	2.63
9789.00	87.97	1.23	6625.23	3240.30 N	146.55 E	3243.50	3.39
9884.00	89.45	0.11	6627.37	3335.27 N	147.65 E	3338.44	1.95
9979.00	90.34	1.05	6627.55	3430.26 N	148.62 E	3433.40	1.37
10074.00	89.32	0.56	6627.83	3525.25 N	149.95 E	3528.38	1.19
10169.00	90.55	3.82	6627.93	3620.16 N	153.59 E	3623.36	3.66
10264.00	88.43	4.76	6628.77	3714.89 N	160.69 E	3718.28	2.45
10359.00	86.86	4.25	6632.68	3809.51 N	168.15 E	3813.12	1.73
10454.00	86.67	2.97	6638.04	3904.17 N	174.11 E	3907.93	1.37
10548.00	86.93	2.18	6643.29	3997.93 N	178.33 E	4001.78	0.88
10643.00	87.96	0.36	6647.52	4092.80 N	180.43 E	4096.67	2.20
10738.00	88.46	359.33	6650.49	4187.76 N	180.18 E	4191.55	1.20
10833.00	91.20	358.89	6650.77	4282.73 N	178.70 E	4286.41	2.93
10928.00	90.93	356.64	6649.01	4377.64 N	175.00 E	4381.11	2.38
10993.00	89.14	354.04	6648.97	4442.42 N	169.71 E	4445.65	4.86
11056.00	89.14	354.04	6649.92	4505.07 N	163.17 E	4508.02	0.01

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 2.11 DEGREES (GRID)
A TOTAL CORRECTION OF 7.67 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11056.00 FEET
IS 4508.02 FEET ALONG 2.07 DEGREES (GRID)**

Surface surveys at 322 ft and 609 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Last survey is a projection from 10993 ft MD to TD at 11056 ft MD.