

PCGK : Pressure Case Gamma
PCDC: Pressure Case Directional

1 : 600 / 1 : 240

Country : USA			
Field : Wattenberg			
Location : Lat: 40°24' 2.02" North Long: 104°31' 6.74" West			
Well : Holman B15-66HN			
Company : Noble Energy			
Rig : H&P 315			
LOCATION			
Latitude : 40°24' 2.02" North Longitude : 104°31' 6.74" West			
UTM Easting = 3,273,338.935 ft UTM Northing = 1,390,277.080 ft			
Company : Noble Energy			
Rig : H&P 315			
Well : Holman B15-66HN			
Field : Wattenberg			
Country : USA			
API Number : 05-123-37201			
Other Services Directional Drilling			
Permanent Datum : Ground Level			
Elevation : 4584.00 ft			
Log Measured From : Drill Floor			
24.00 ft Above Permanent Datum			
Drilling Measured From : Drill Floor			
Elev. : N/A			
KB : N/A			
DF : 4608.00 ft			
GL : 4584.00 ft			
WD : N/A			
Depth Logged : 647.00 ft To 12,684.00 ft			
Date Logged : 25-Aug-13 To 31-Aug-13			
Total Depth MD : 12,684.00 ft TVD : 6,585.06 ft			
Spud Date : 25-Aug-13			
Unit No. : 11610113			
Job No. : CA-XX-0900671436			
Plot Type : Final			
Plot Date : 31-Aug-13			
Run No.			
Size			
From			
To			
8.750 in			
647.00 ft			
5,976.00 ft			
8.750 in			
5,976.00 ft			
6,979.00 ft			
6.125 in			
6,979.00 ft			
12,684.00 ft			
Run No.			
Size			
From			
To			
7.000 in			
26.00 lbpf			
SURFACE			
6,975.00 ft			

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	26-Aug-13	27-Aug-13	31-Aug-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)	647.00	5,976.00	6,979.00		
Log End Depth (MD, ft)	5,976.00	6,979.00	12,684.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	25-Aug-13 21:30	26-Aug-13 22:30	29-Aug-13 01:45		
Drill/Wipe End Date and Time	26-Aug-13 12:30	27-Aug-13 12:30	31-Aug-13 03:00		
Min Inc (deg) @ Depth (MD, ft)	.22 @ 5,163.00	.87 @ 5,941.00	87.97 @ 10,922.00		
Max Inc (deg) @ Depth (MD, ft)	13.86 @ 2,694.00	82.49 @ 6,925.00	91.94 @ 12,060.00		
Bit TFA(in2) / Bit Type	.77 / PDC	.75 / PDC	.75 / PDC		
Flow Rate (gpm)	596.04	595.42	283.66		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Native/Spud Mud	Native/Spud Mud	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.90 / 29.00	10.15 / 38.00	9.30 / 33.00		
Filtrate CL (ppm)	1,600.00	1,600.00	2,100.00		
pH / Fluid Loss (mptm)	10.80 / 10	9.10 / 0	8.70 / 9		
PV (cP) / YP (Ihf2)	5 / 5.00	10 / 9.00	8 / 5.00		
% Solids / % Sand	4.1 / 0.25	9.90 / 0.25	5.70 / 0.20		
% 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	162.80 / PCM	185.02 / PCM	245.03 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Henry Schmeidler	Henry Schmeidler	Henry Schmeidler		
Customer Representative	Bryant Dear	Bryant Dear	Martin Suarez		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11254959	11254959	11730099		
Insert Serial Number	11619996	11619996	11619996		
Date and Time Initialized	25-Aug-13 15:05	25-Aug-13 15:05	27-Aug-13 21:34		
Date and Time Read	27-Aug-13 17:57	27-Aug-13 18:02	31-Aug-13 16:10		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	54.11	52.27	61.10		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11254959	11254959	11730099		
Sonde Serial Number	11145701	11145701	11145701		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	336.00	48.39	30.25		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	49.11	47.27	56.12		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11254959	11254959	11730099		
Insert/Sonde Serial Number	12035849	12035849	12035849		

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 7.4.2

WARRANTY

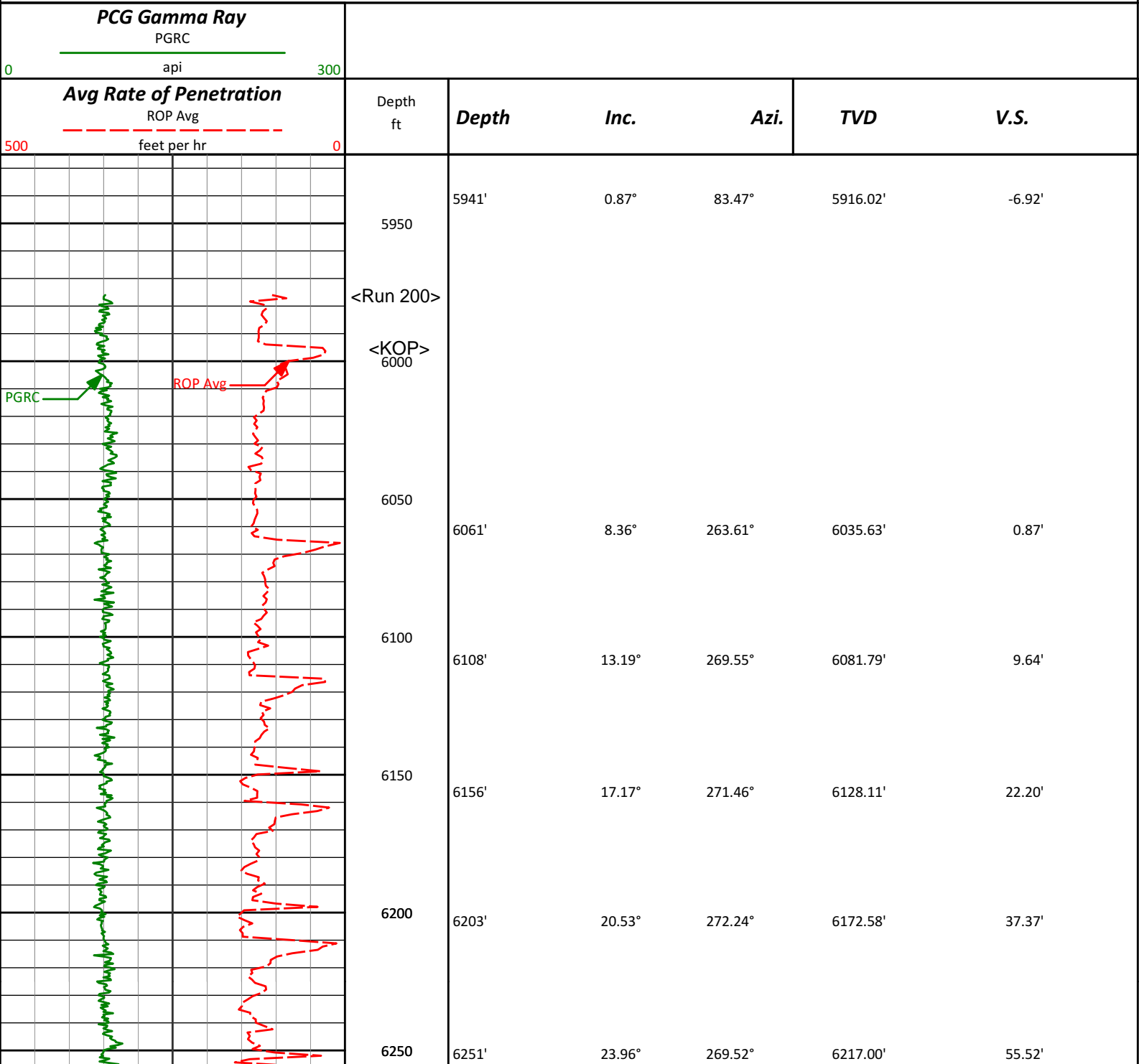
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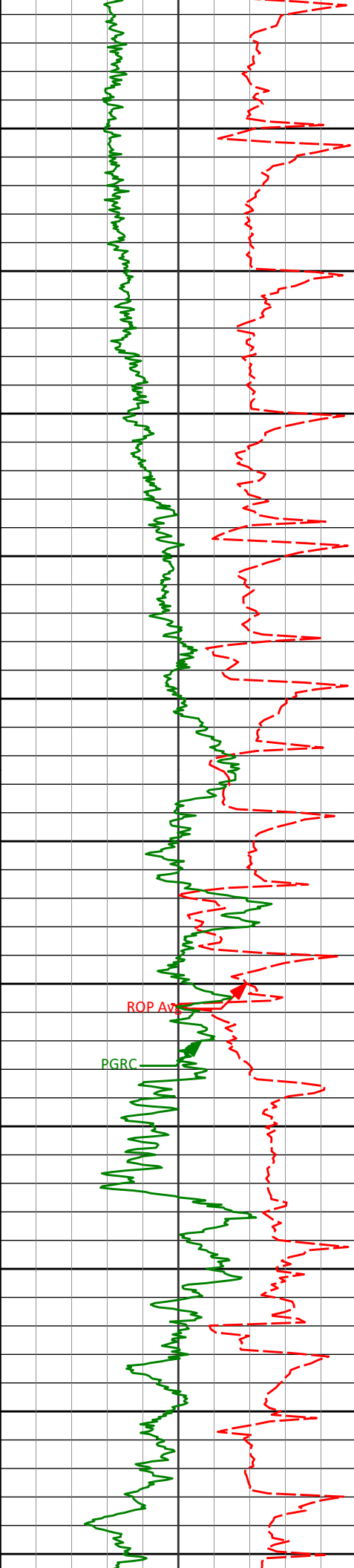
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HALLIBURTON
Sperry Drilling Services

MD Main Log 1:600

Noble Energy, Inc
Holman B15-66HN
H&P 315
T5N R64W





6300

6298'

27.48°

266.27°

6259.34'

75.90'

6350

6346'

32.29°

267.30°

6300.95'

99.79'

6400

6392'

37.48°

270.50°

6338.67'

126.08'

6450

6440'

43.30°

271.04°

6375.21'

157.16'

6500

6487'

47.56°

270.75°

6408.19'

190.62'

6550

6535'

51.32°

269.78°

6439.40'

227.08'

6600

6582'

52.97°

268.93°

6468.24'

264.18'

6650

6630'

55.25°

269.13°

6496.37'

303.07'

6700

6677'

61.14°

269.93°

6521.13'

342.99'

6750

6725'

67.47°

270.46°

6541.94'

386.22'

6800

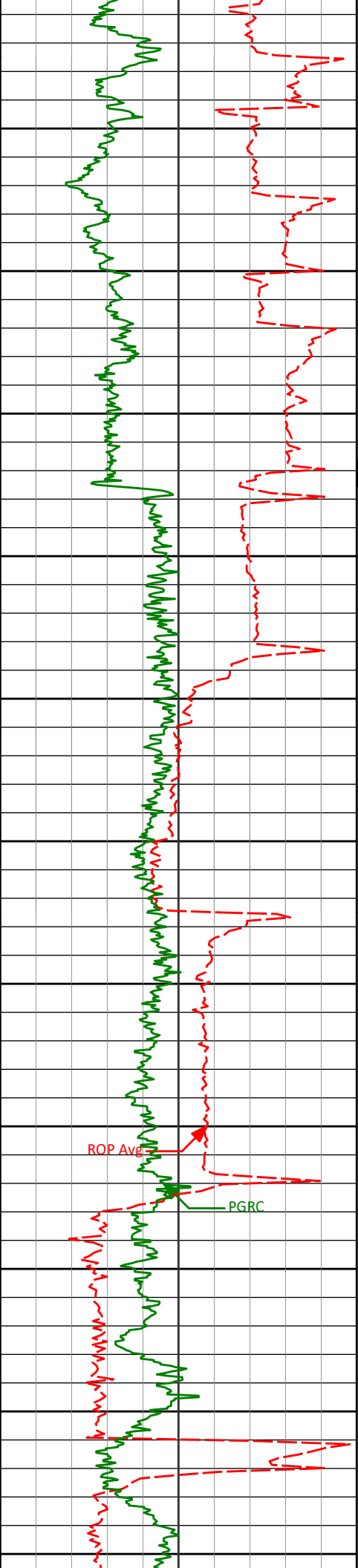
6772'

71.15°

270.74°

6558.54'

430.17'



6820'

6850

6867'

6900

6925'

6950

<7" casing set at 6975' MD>

<Run 300>

7000

7050

7064'

7100

7150

7156'

7200

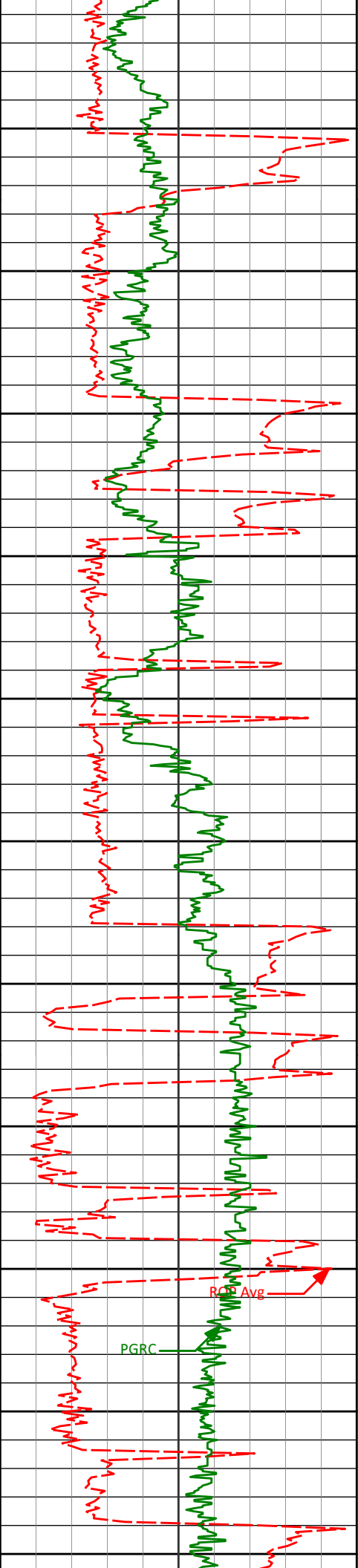
7249'

7300

7341'

7350

6820'	75.10°	270.75°	6572.47'	476.08'
6850				
6867'	78.26°	269.75°	6583.30'	521.80'
6900				
6925'	82.49°	267.15°	6592.99'	578.96'
6950				
<7" casing set at 6975' MD>				
<Run 300>				
7000				
7050				
7064'	88.52°	264.71°	6603.88'	717.21'
7100				
7150				
7156'	89.35°	264.70°	6605.59'	808.90'
7200				
7249'	90.43°	263.79°	6605.77'	901.53'
7300				
7341'	91.11°	264.64°	6604.54'	993.15'
7350				



7400

7433'

91.02°

264.93°

6602.83'

1084.84'

7450

7500

7526'

91.26°

267.39°

6600.98'

1177.67'

7550

7600

7618'

91.51°

267.05°

6598.75'

1269.58'

7650

7700

7710'

90.49°

267.72°

6597.15'

1361.51'

7750

7800

7804'

88.77°

267.16°

6597.75'

1455.46'

7850

7900

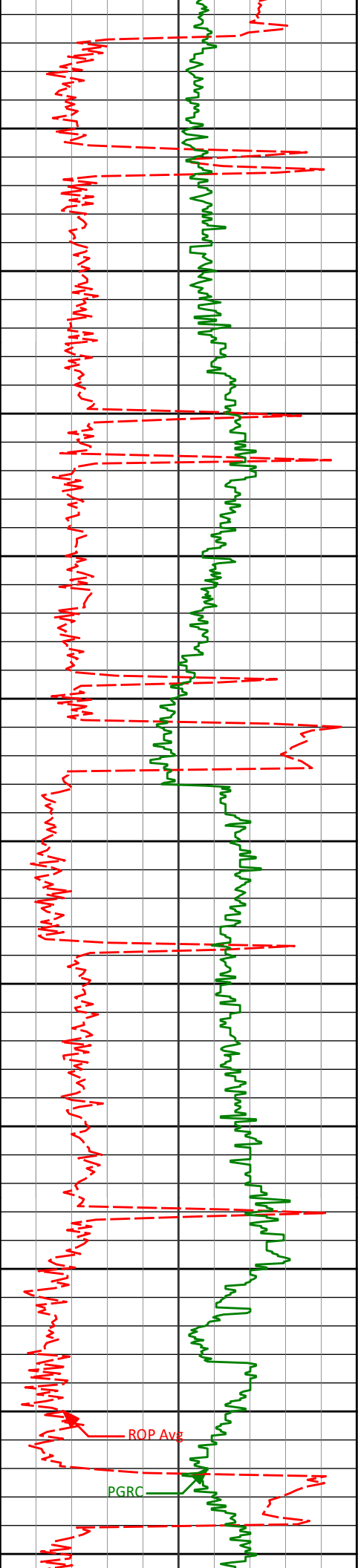
7897'

89.29°

267.07°

6599.33'

1548.37'



7950

7989'

88.80°

267.44°

6600.86'

1640.30'

8000

8050

8083'

89.78°

267.24°

6602.03'

1734.23'

8100

8150

8177'

89.17°

267.16°

6602.89'

1828.16'

8200

8250

8270'

89.60°

267.27°

6603.89'

1921.09'

8300

8350

8363'

90.43°

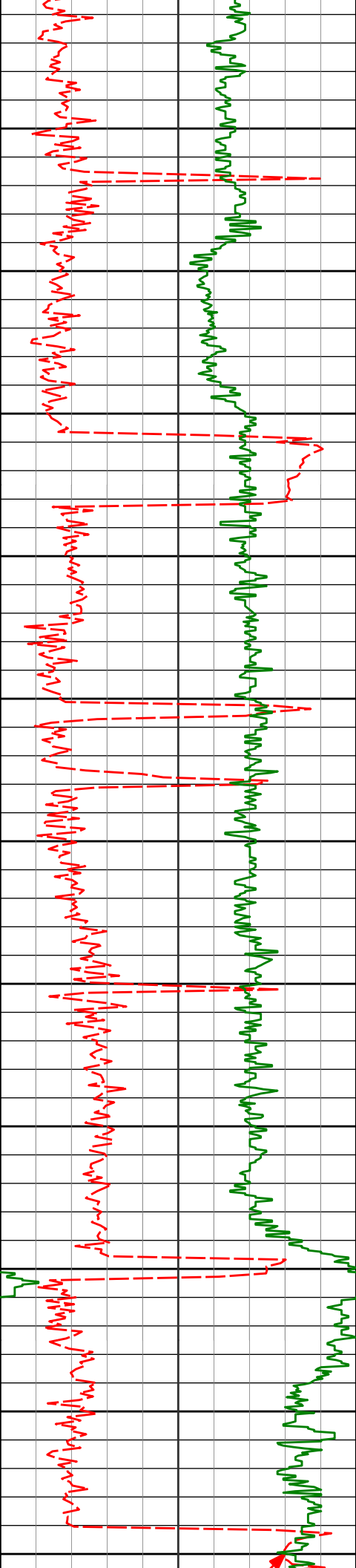
267.27°

6603.86'

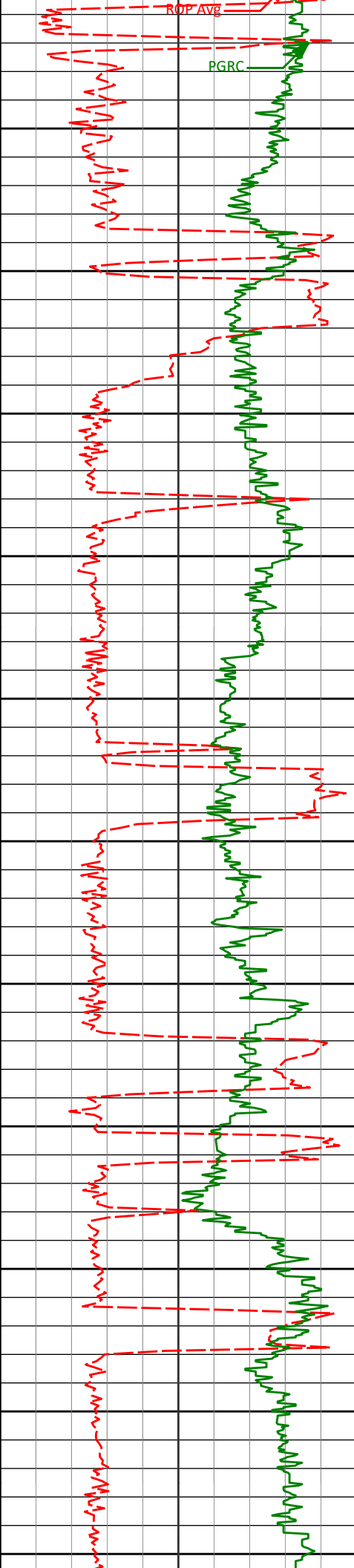
2014.03'

8400

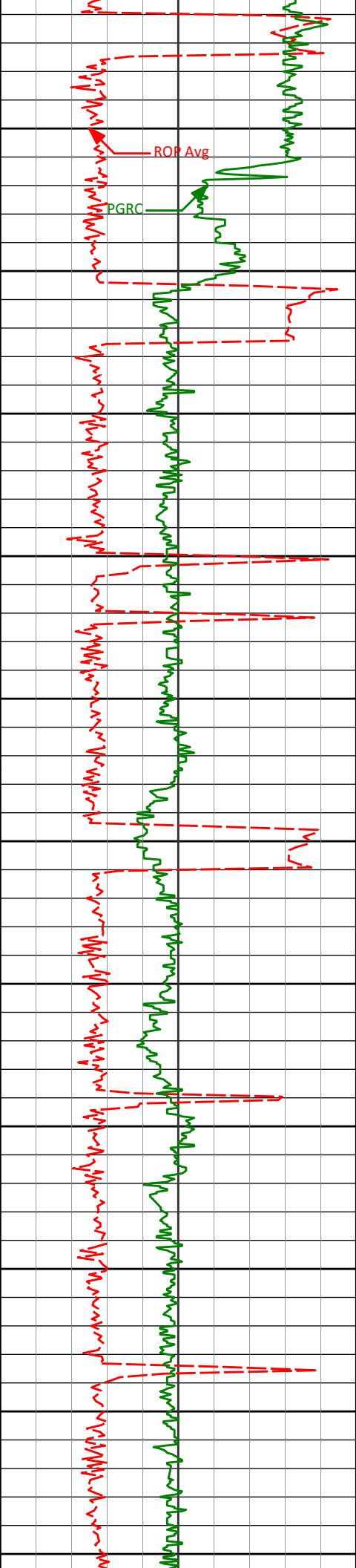
8450



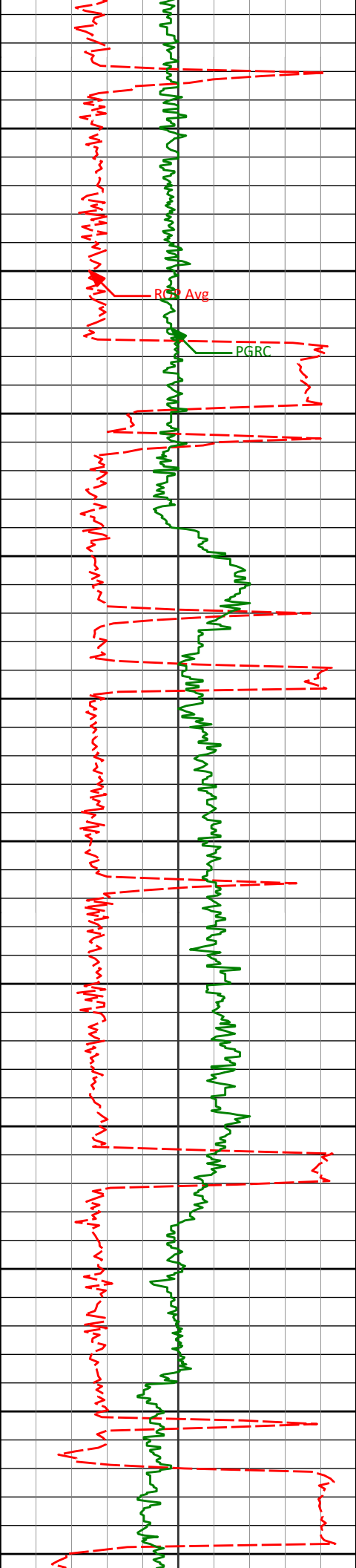
8450	8458'	89.88°	266.64°	6603.60'	2108.95'
8550	8553'	90.68°	266.47°	6603.14'	2203.83'
8600					
8650	8645'	89.57°	266.69°	6602.94'	2295.73'
8700					
8750	8740'	90.06°	266.17°	6603.25'	2390.60'
8800					
8850	8835'	90.43°	265.47°	6602.84'	2485.42'
8900					
8950	8930'	91.66°	265.51°	6601.11'	2580.19'
9000					



9024'	90.58°	265.09°	6599.27'	2673.94'
9050				
9100				
9119'	90.34°	266.50°	6598.51'	2768.75'
9150				
9200				
9214'	91.60°	266.48°	6596.90'	2863.62'
9250				
9300				
9309'	91.20°	266.43°	6594.58'	2958.47'
9350				
9400				
9404'	90.46°	268.53°	6593.20'	3053.40'
9450				
9500				
9499'	90.28°	266.89°	6592.59'	3148.36'
9550				



9600	9594'	90.46°	267.04°	6591.98'	3243.27'
9650					
9700	9688'	88.92°	266.97°	6592.48'	3337.19'
9750					
9800	9783'	90.15°	267.73°	6593.25'	3432.13'
9850					
9900	9878'	88.64°	266.86°	6594.26'	3527.06'
9950					
10000	9973'	89.48°	266.68°	6595.82'	3621.95'
10050					
10100	10068'	89.97°	266.02°	6596.27'	3716.82'



10150

10200

10250

10300

10350

10400

10450

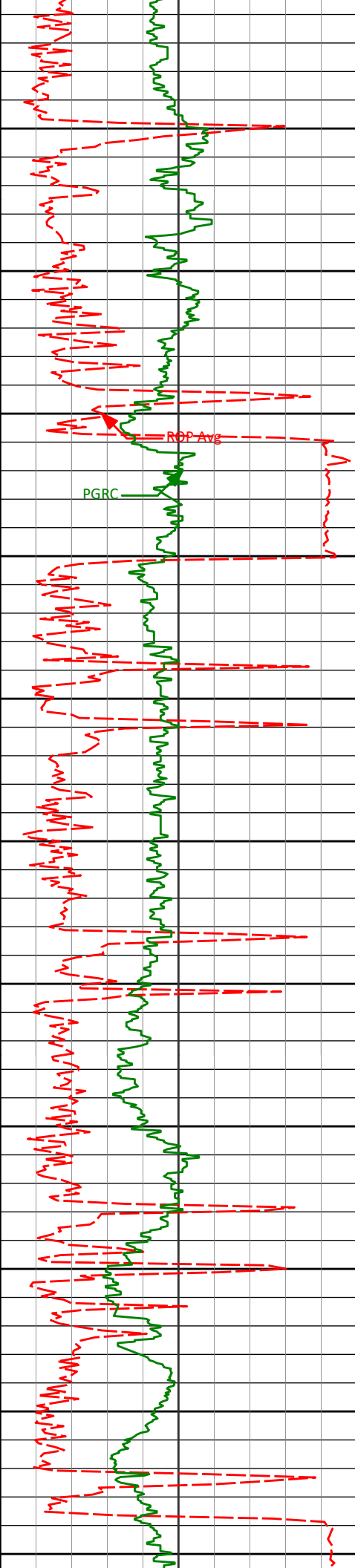
10500

10550

10600

10650

10163'	89.35°	262.87°	6596.84'	3811.46'
10258'	90.37°	265.59°	6597.07'	3906.07'
10353'	90.77°	265.31°	6596.12'	4000.85'
10447'	91.39°	264.79°	6594.35'	4094.57'
10542'	91.48°	264.58°	6591.97'	4189.22'
10637'	90.37°	265.48°	6590.44'	4283.94'



10700

10732'

91.14°

265.72°

6589.19'

4378.73'

10750

10800

10827'

90.43°

266.15°

6587.89'

4473.55'

10850

10900

10922'

87.97°

265.45°

6589.21'

4568.35'

10950

11000

11017'

89.44°

264.82°

6591.36'

4663.07'

11050

11100

11111'

90.55°

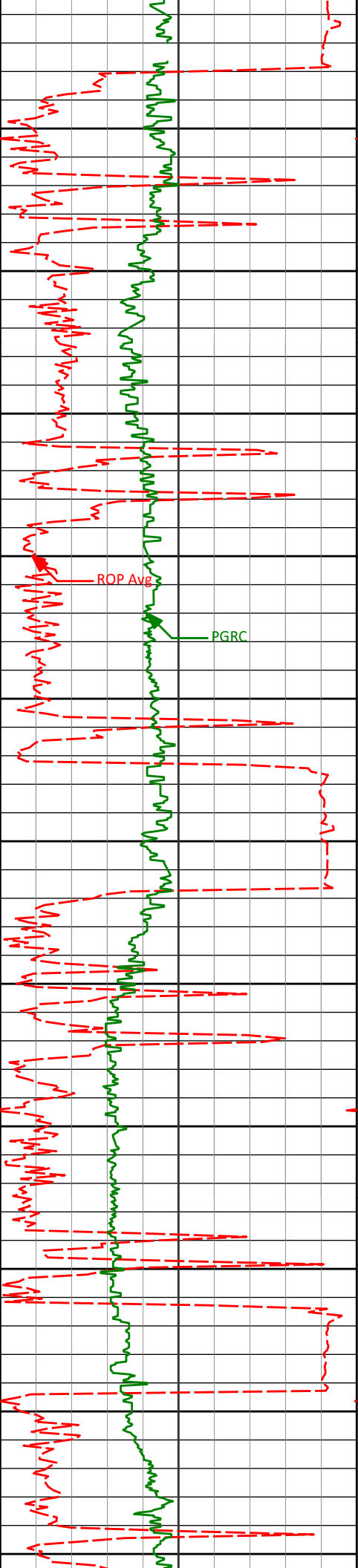
263.99°

6591.37'

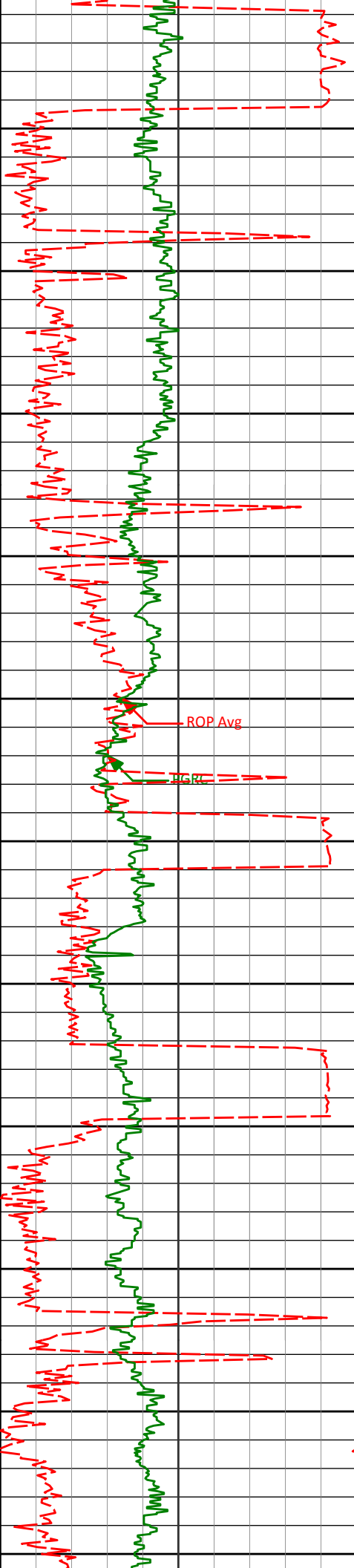
4756.72'

11150

11200



	11206'	90.06°	265.25°	6590.86'	4851.39'
11250					
11300	11301'	88.77°	266.37°	6591.83'	4946.20'
11350					
11400	11396'	90.28°	265.16°	6592.62'	5041.01'
11450					
11500	11491'	89.32°	265.46°	6592.95'	5135.77'
11550					
11600	11586'	88.36°	266.03°	6594.87'	5230.57'
11650					
11700	11681'	89.91°	266.56°	6596.31'	5325.42'
11750					



11800

11850

11900

11950

12000

12050

12100

12150

12200

12250

12300

11776'

90.77°

268.57°

6595.74'

5420.37'

11871'

90.59°

267.50°

6594.62'

5515.33'

11966'

91.70°

267.43°

6592.72'

5610.26'

12060'

91.94°

268.26°

6589.73'

5704.18'

12155'

90.15°

269.26°

6588.00'

5799.16'

12250'

91.08°

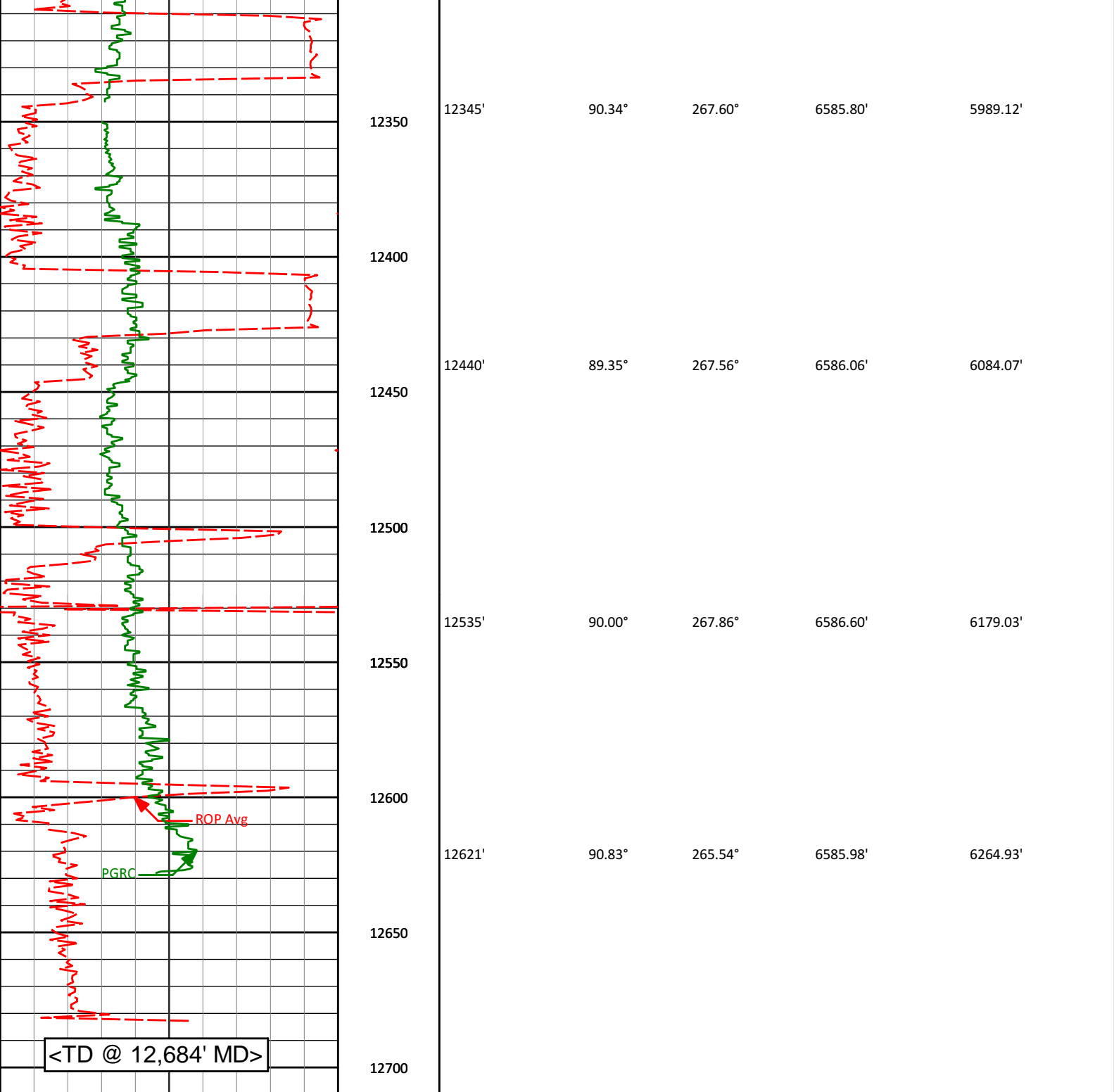
268.94°

6586.98'

5894.15'

ROP Avg

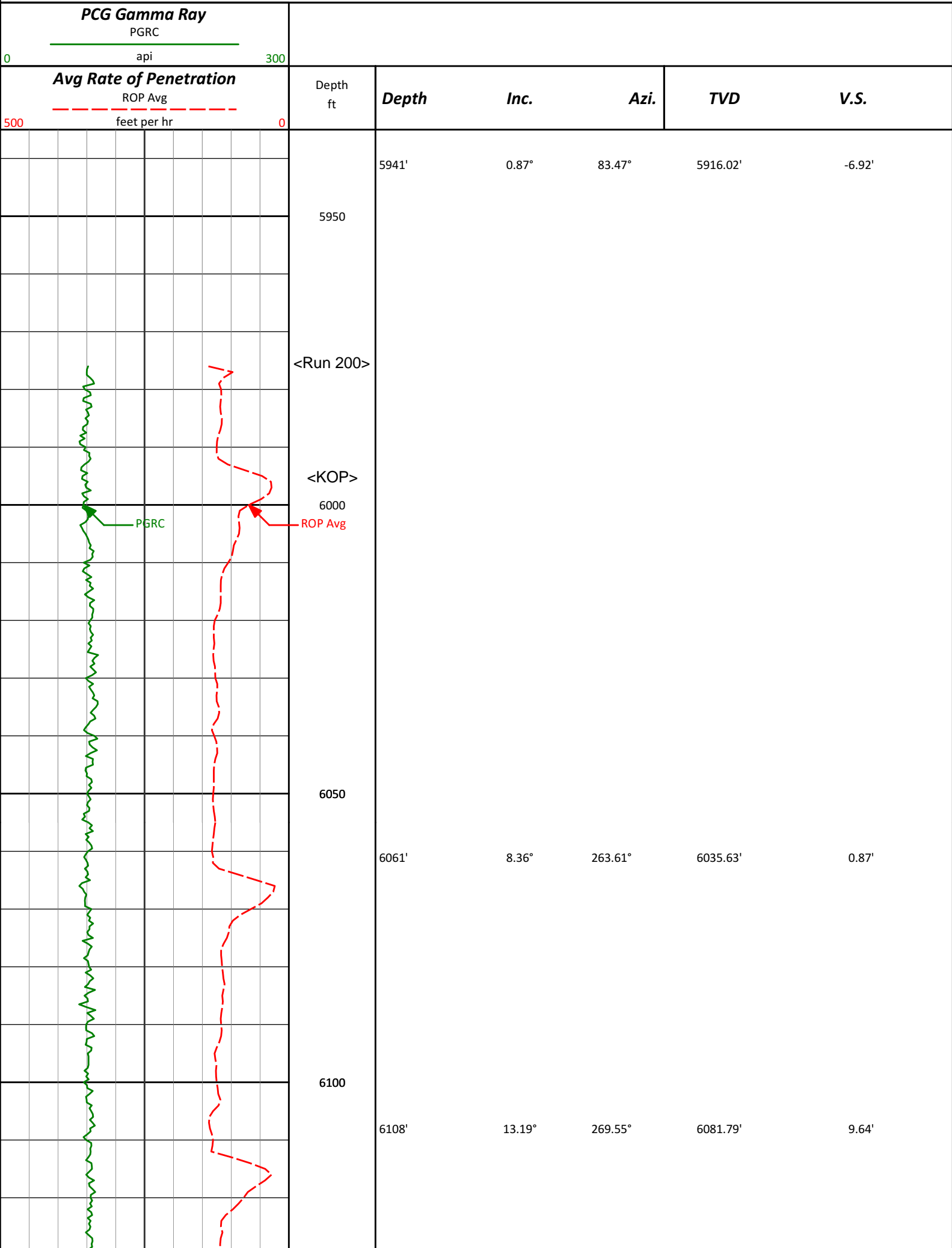
ROP

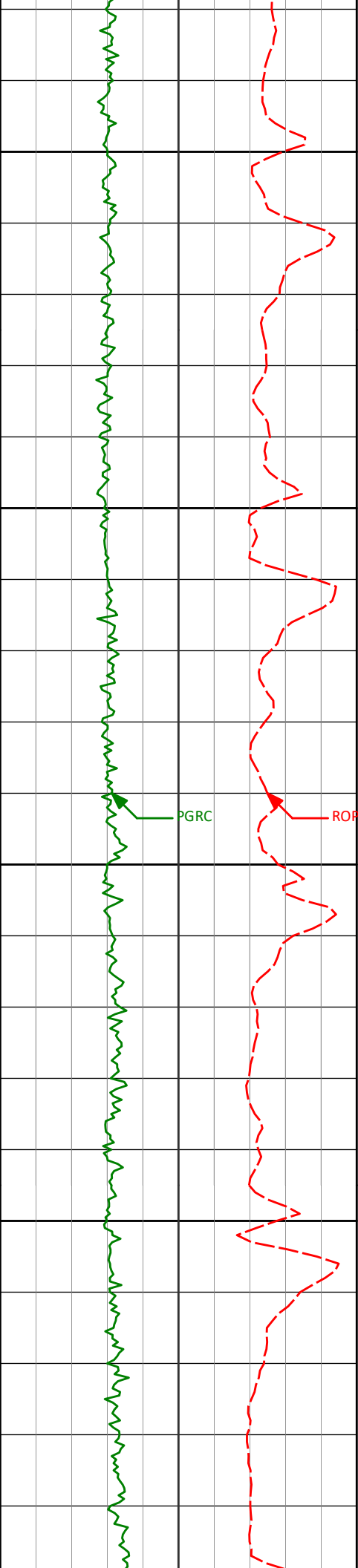


<div><div>Avg Rate of Penetration</div><div>ROP Avg</div><div>feet per hr</div><div>5000</div></div>		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
<div><div>PCG Gamma Ray</div><div>PGRC</div><div>api</div><div>0300</div></div>							

HALLIBURTON
Sperry Drilling Services
MD Detail Log 1:240

Noble Energy, Inc
Holman B15-66HN
H&P 315
7711 2011





6150

6156'

17.17°

271.46°

6128.11'

22.20'

6200

6203'

20.53°

272.24°

6172.58'

37.37'

6250

6251'

23.96°

269.52°

6217.00'

55.52'

6300

6298'

27.48°

266.27°

6259.34'

75.90'

6346'

32.29°

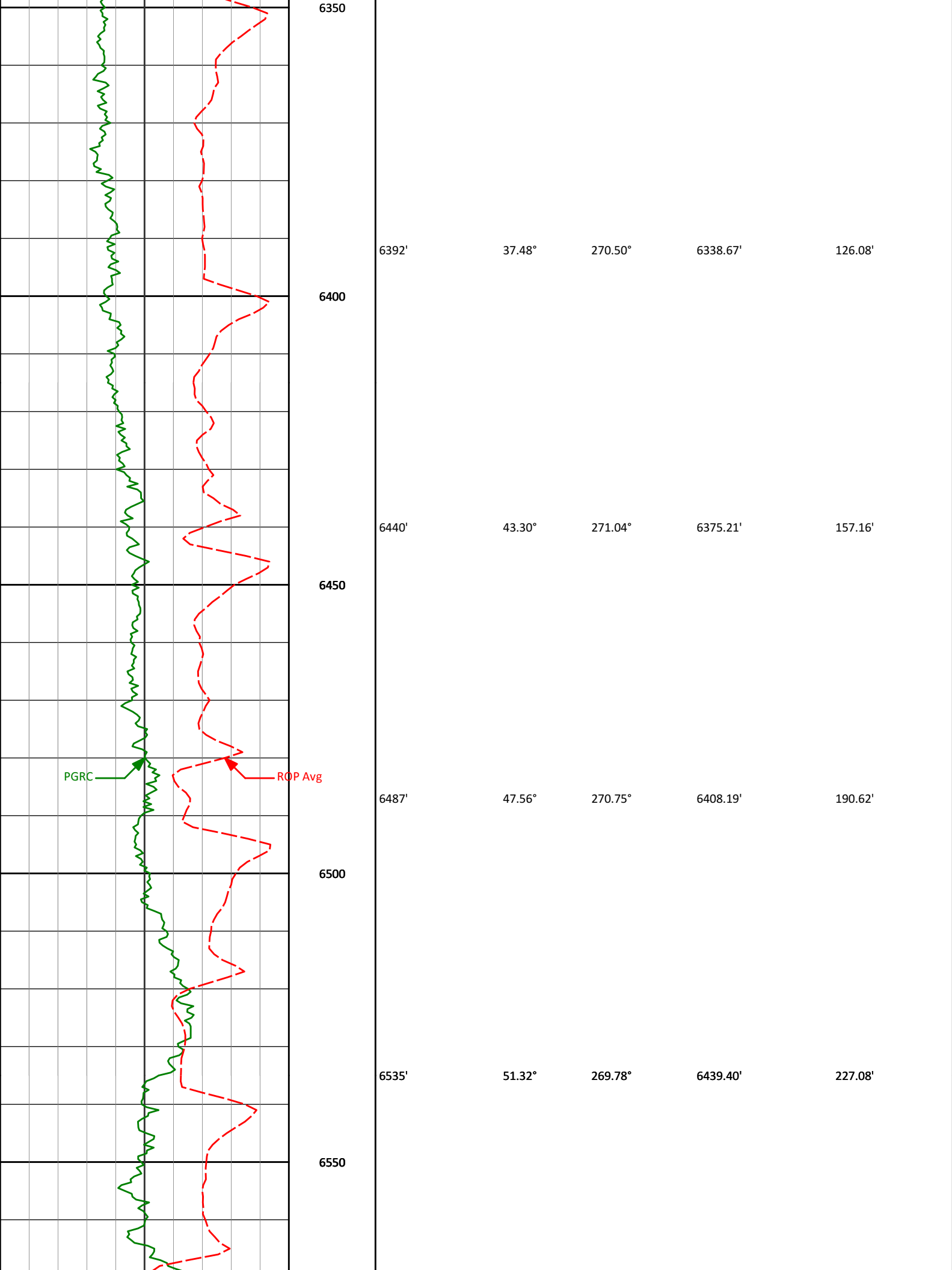
267.30°

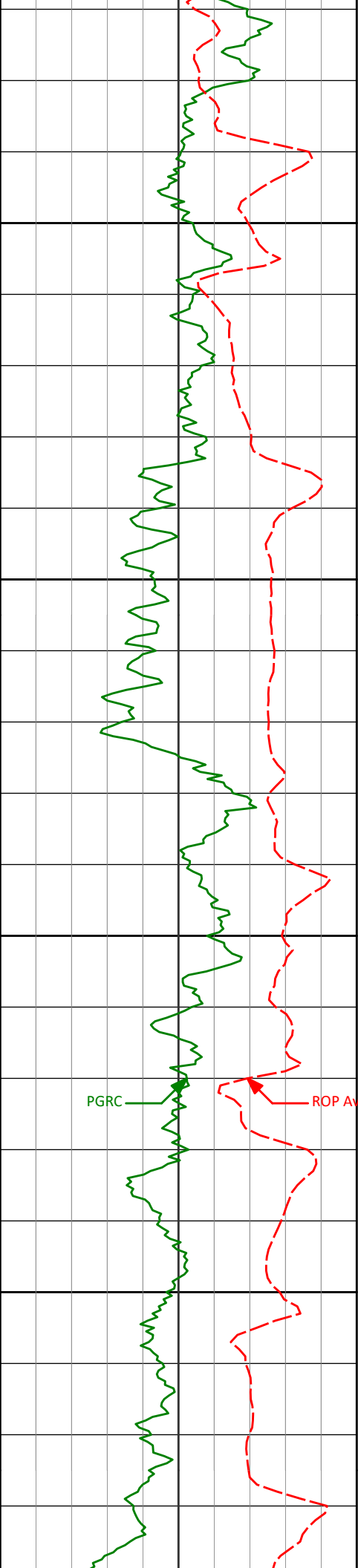
6300.95'

99.79'

PGRC

ROF Avg





6600

6650

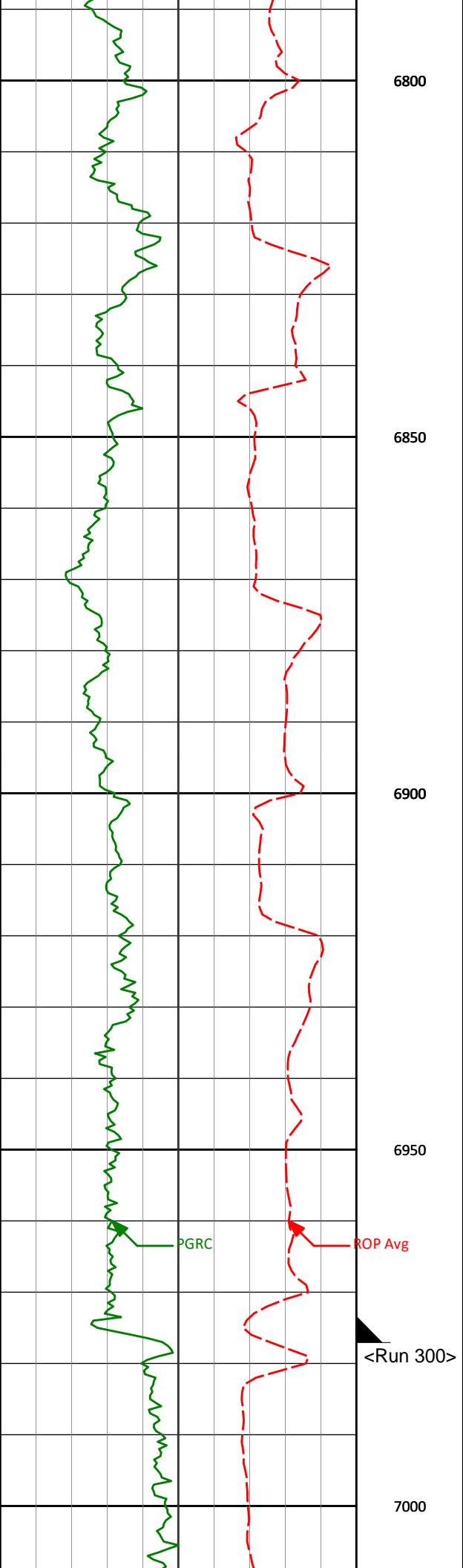
6700

6750

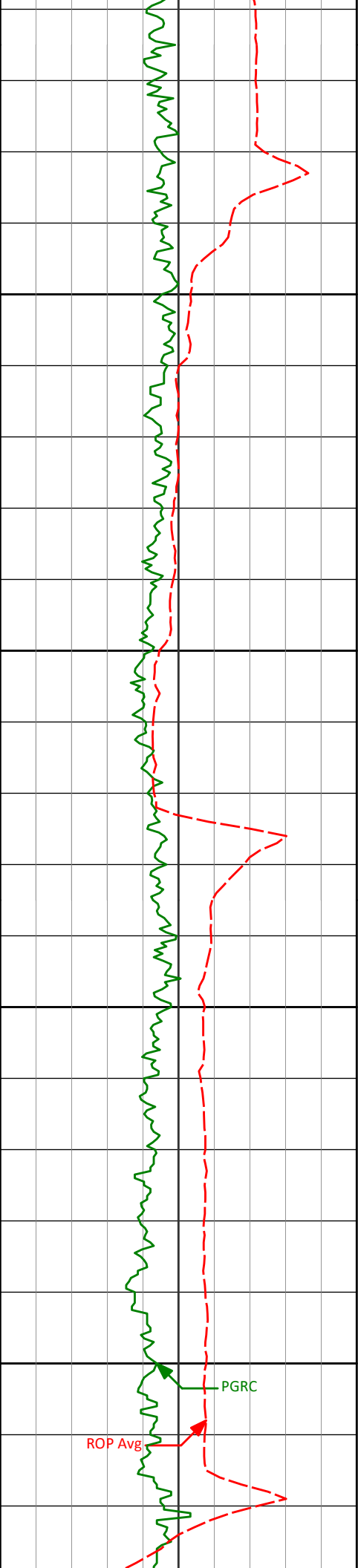
PGRC

ROP Avg

6582'	52.97°	268.93°	6468.24'	264.18'
6630'	55.25°	269.13°	6496.37'	303.07'
6677'	61.14°	269.93°	6521.13'	342.99'
6725'	67.47°	270.46°	6541.94'	386.22'
6772'	71.15°	270.74°	6558.54'	430.17'



6800				
6820'	75.10°	270.75°	6572.47'	476.08'
6850				
6867'	78.26°	269.75°	6583.30'	521.80'
6900				
6925'	82.49°	267.15°	6592.99'	578.96'
6950				
6975'				
7000				



7050

7064'

88.52°

264.71°

6603.88'

717.21'

7100

7150

7156'

89.35°

264.70°

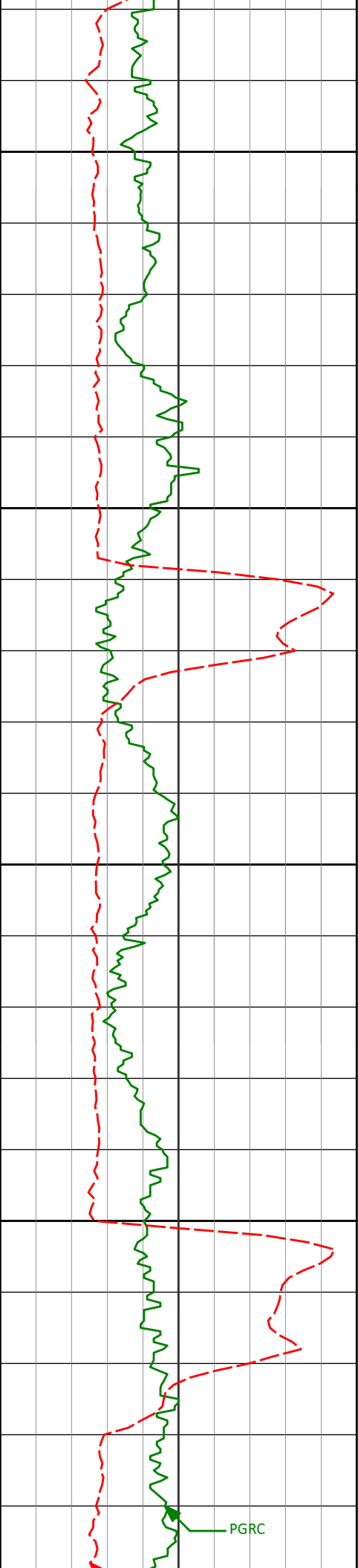
6605.59'

808.90'

7200

PGRC

ROP Avg



7250

7249'

90.43°

263.79°

6605.77'

901.53'

7300

7341'

91.11°

264.64°

6604.54'

993.15'

7350

7400

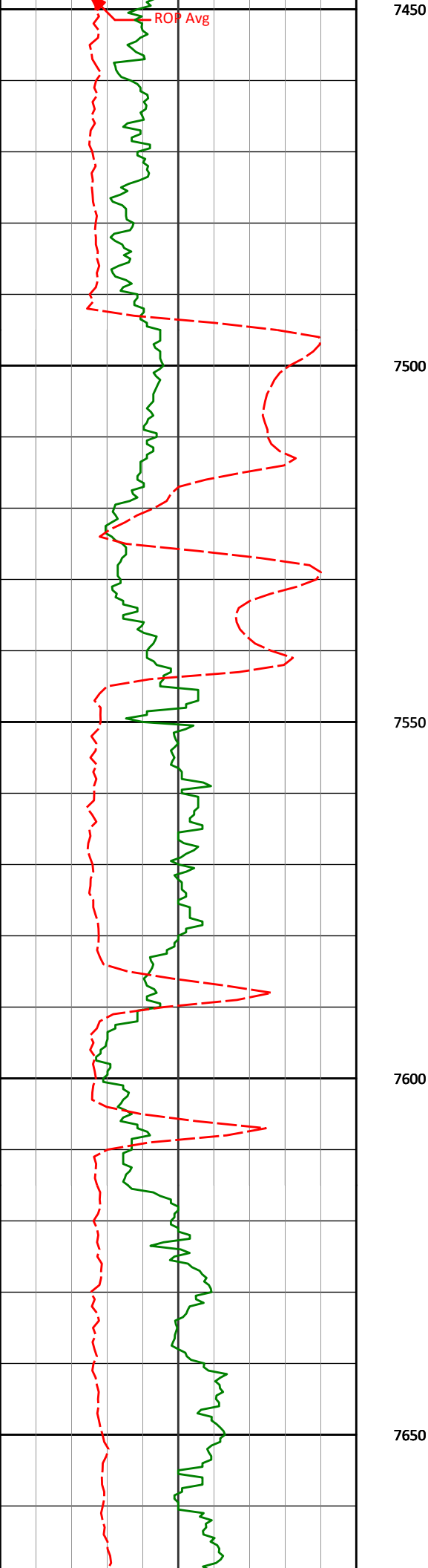
7433'

91.02°

264.93°

6602.83'

1084.84'



7526'

91.26°

267.39°

6600.98'

1177.67'

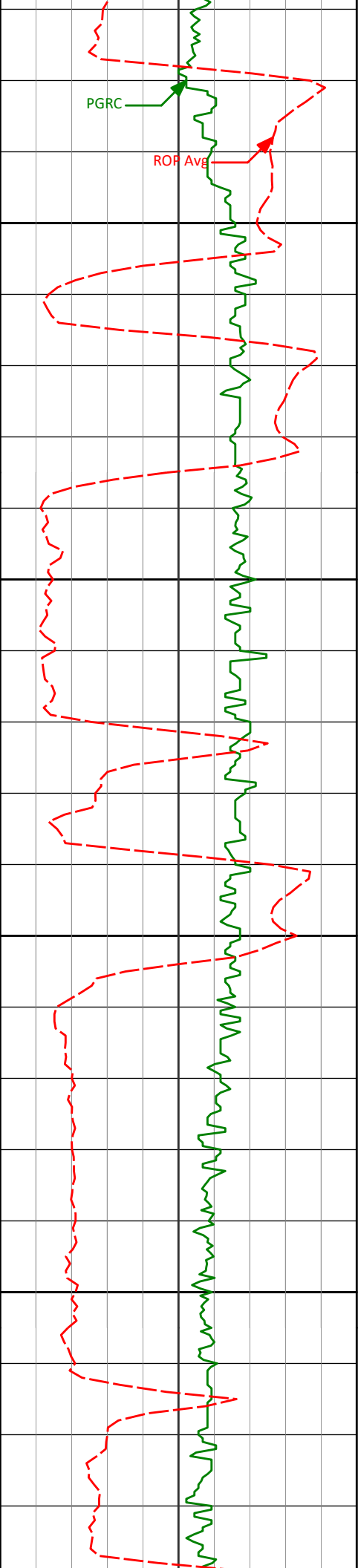
7618'

91.51°

267.05°

6598.75'

1269.58'



7700

7710'

90.49°

267.72°

6597.15'

1361.51'

7750

7800

7804'

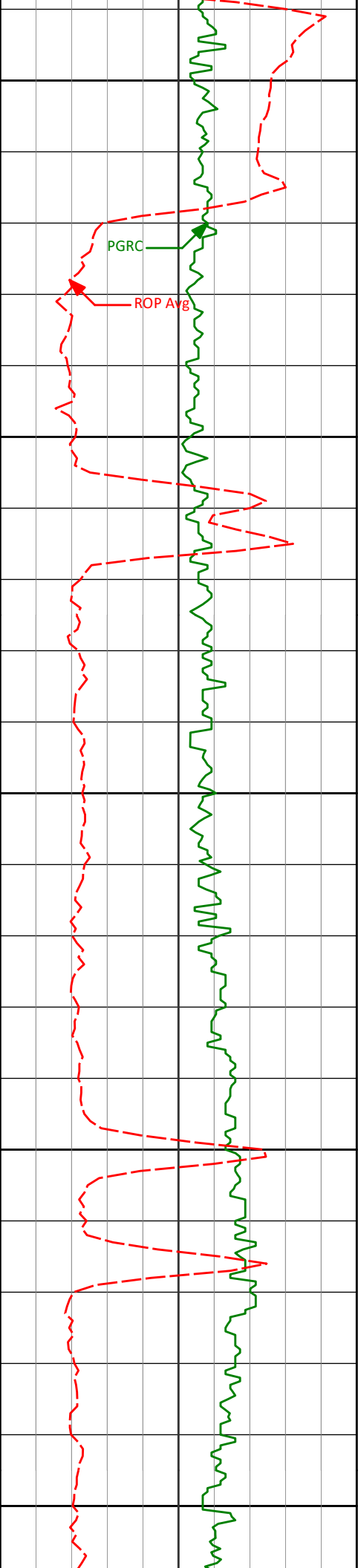
88.77°

267.16°

6597.75'

1455.46'

7850



7900

7950

8000

8050

8100

7897'

89.29°

267.07°

6599.33'

1548.37'

7989'

88.80°

267.44°

6600.86'

1640.30'

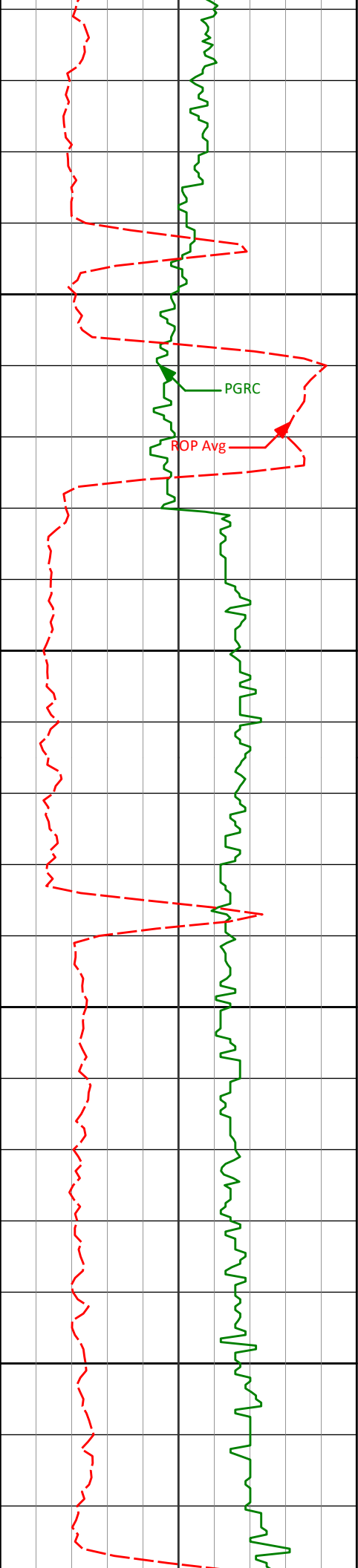
8083'

89.78°

267.24°

6602.03'

1734.23'



8150

PGRC

ROP Avg

8200

8250

8300

8177'

89.17°

267.16°

6602.89'

1828.16'

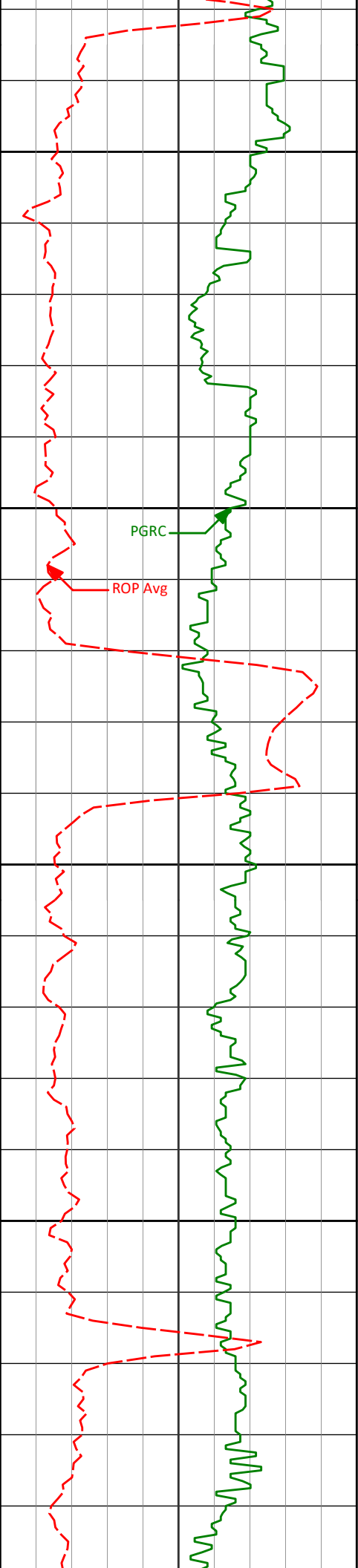
8270'

89.60°

267.27°

6603.89'

1921.09'



8350

8363' 90.43° 267.27° 6603.86' 2014.03'

8400

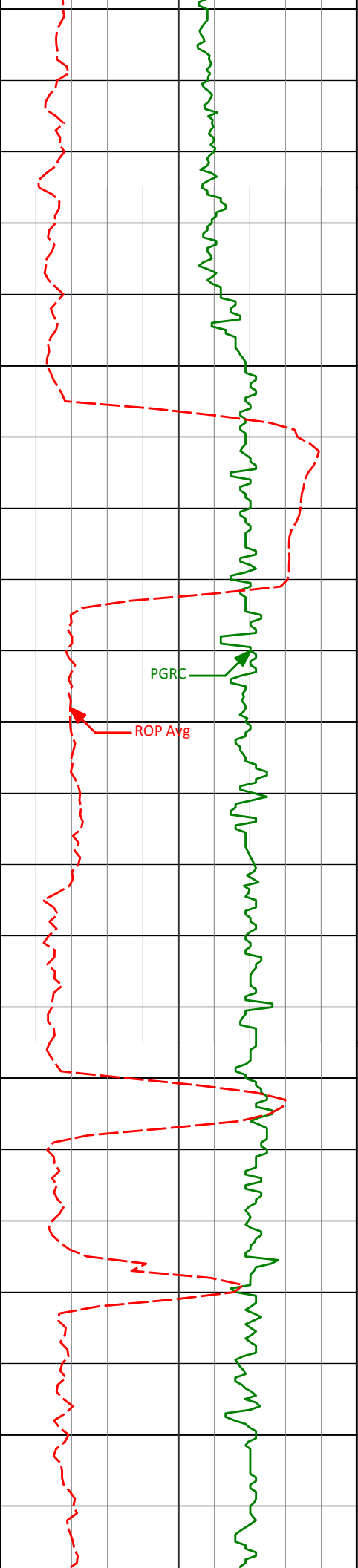
PGRC

ROP Avg

8450

8458' 89.88° 266.64° 6603.60' 2108.95'

8500



8550

8553'

90.68°

266.47°

6603.14'

2203.83'

8600

8650

8645'

89.57°

266.69°

6602.94'

2295.73'

8700

8750

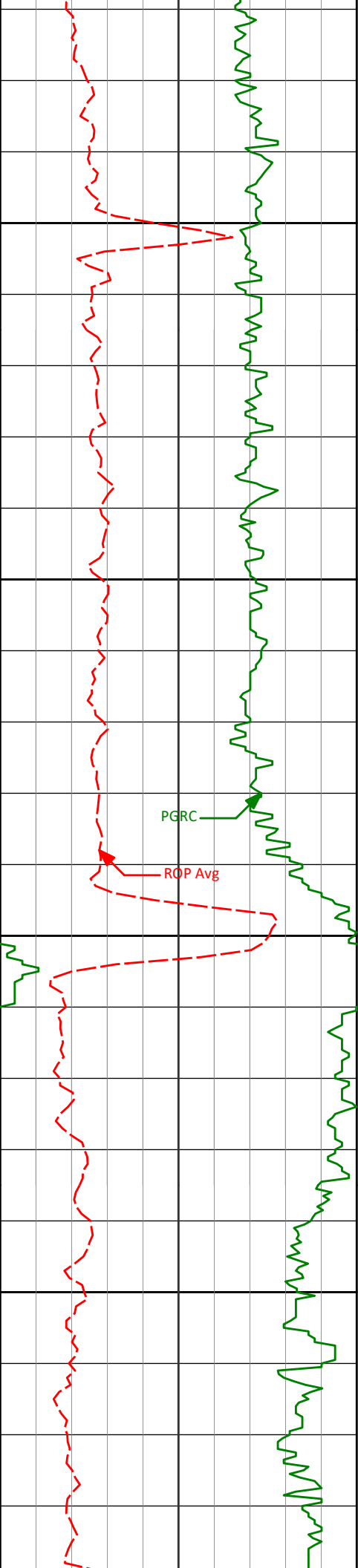
8740'

90.06°

266.17°

6603.25'

2390.60'



8800

8835'

90.43°

265.47°

6602.84'

2485.42'

8850

PGRC

ROP Avg

8900

8930'

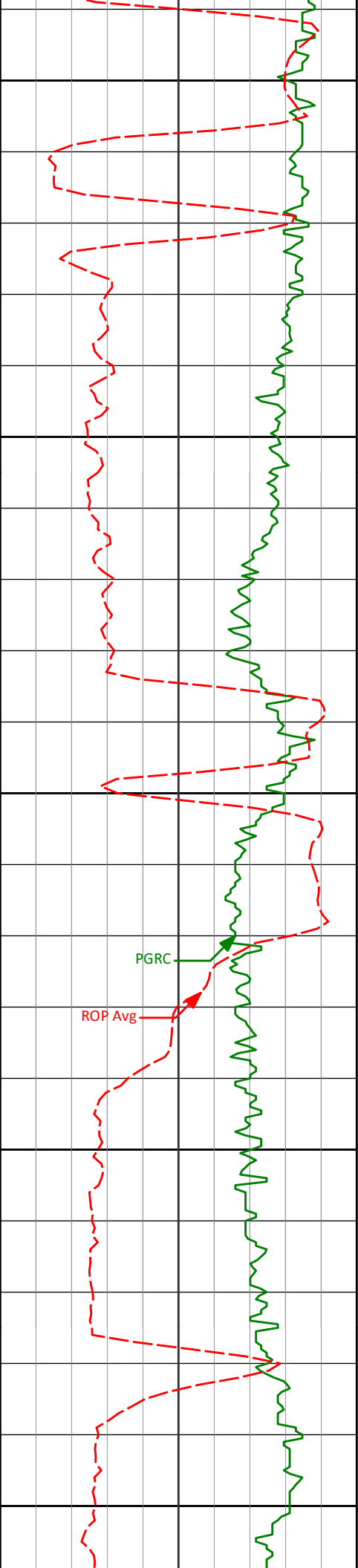
91.66°

265.51°

6601.11'

2580.19'

8950



9000

9024'

90.58°

265.09°

6599.27'

2673.94'

9050

9100

9119'

90.34°

266.50°

6598.51'

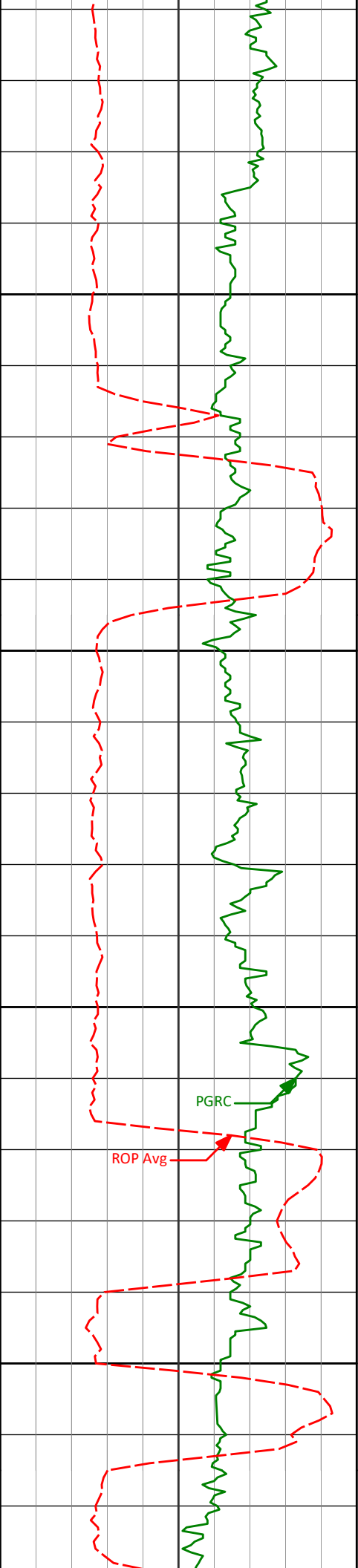
2768.75'

9150

9200

PGRC

ROP Avg



9250

9300

9350

9400

PGRC

ROP Avg

9214'

91.60°

266.48°

6596.90'

2863.62'

9309'

91.20°

266.43°

6594.58'

2958.47'

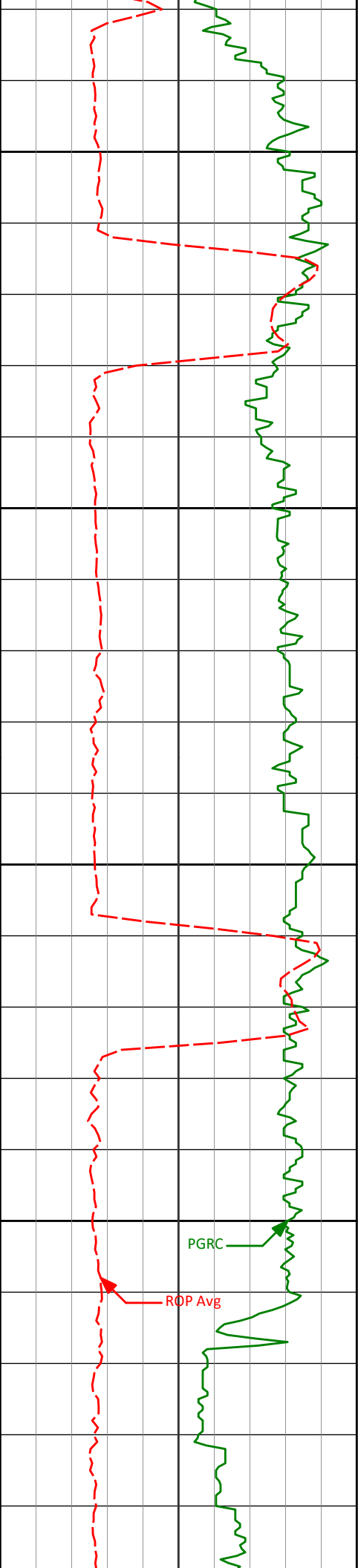
9404'

90.46°

268.53°

6593.20'

3053.40'



9450

9500

9550

9600

PGRC

ROP Avg

9499'

90.28°

266.89°

6592.59'

3148.36'

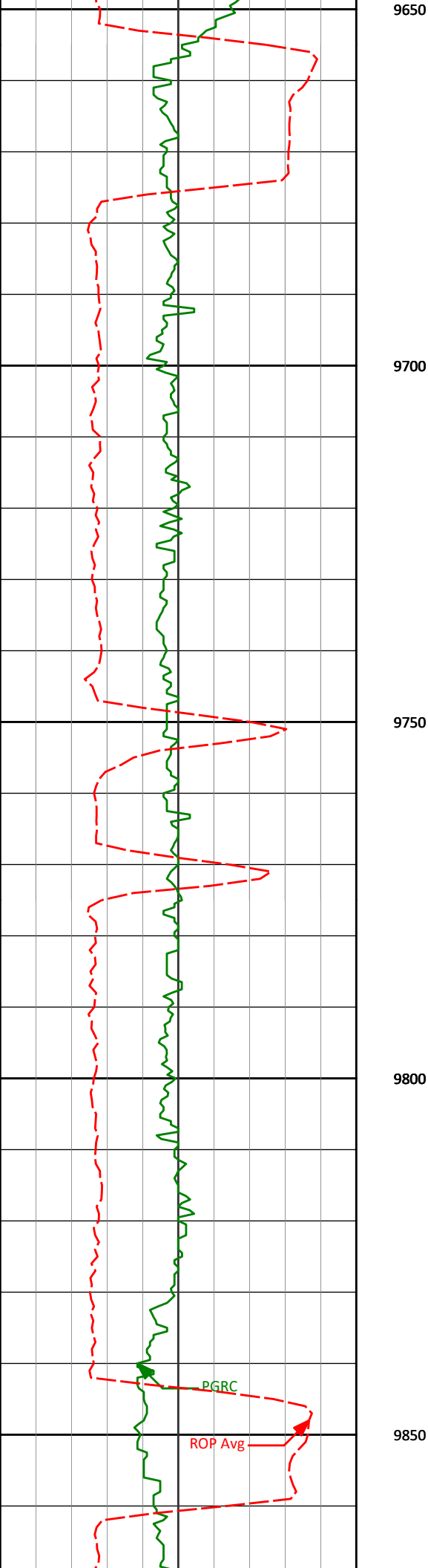
9594'

90.46°

267.04°

6591.98'

3243.27'



9688'

88.92°

266.97°

6592.48'

3337.19'

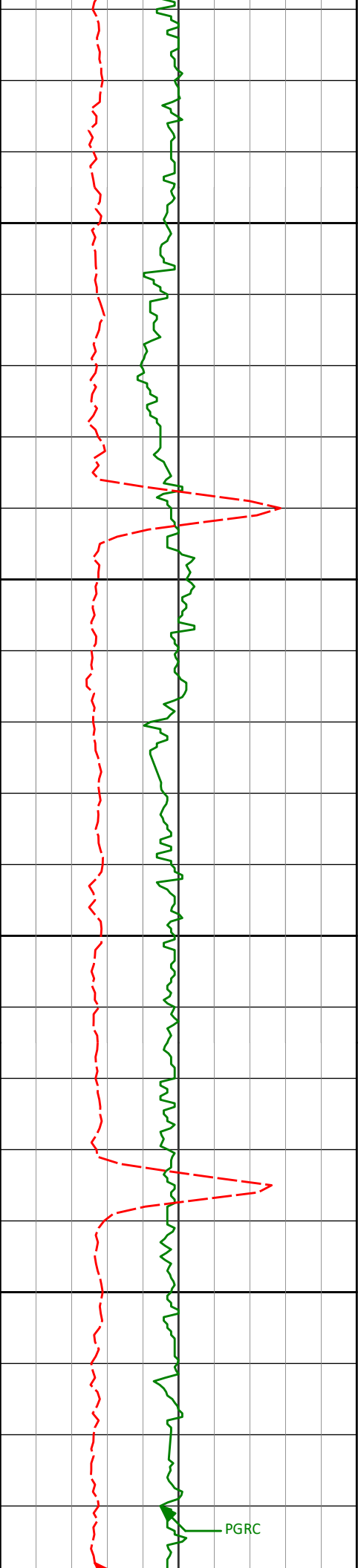
9783'

90.15°

267.73°

6593.25'

3432.13'



9878'

88.64°

266.86°

6594.26'

3527.06'

9900

9950

9973'

89.48°

266.68°

6595.82'

3621.95'

10000

10050

10068'

89.97°

266.02°

6596.27'

3716.82'

PGRC



10163'

89.35°

262.87°

6596.84'

3811.46'

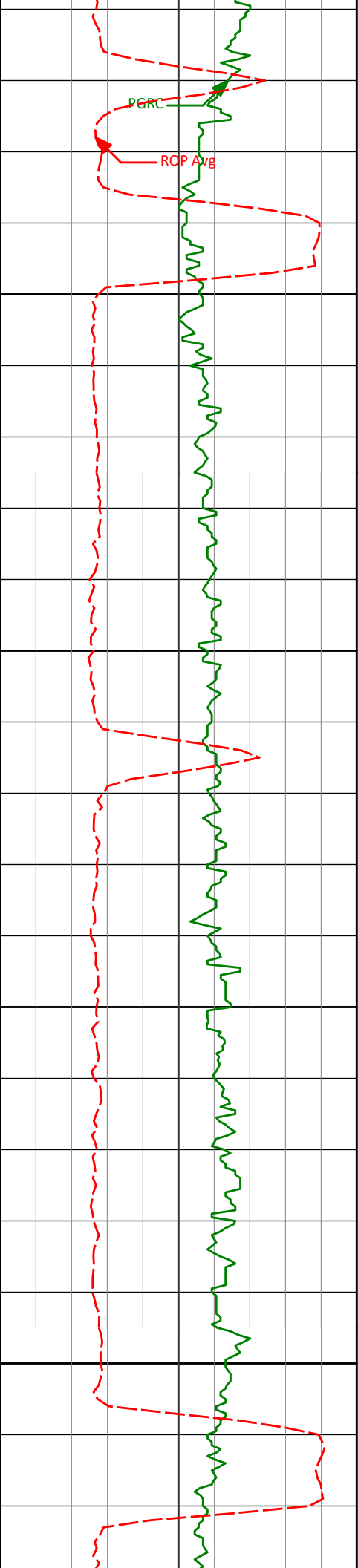
10258'

90.37°

265.59°

6597.07'

3906.07'



10350

10353'

90.77°

265.31°

6596.12'

4000.85'

10400

10450

10447'

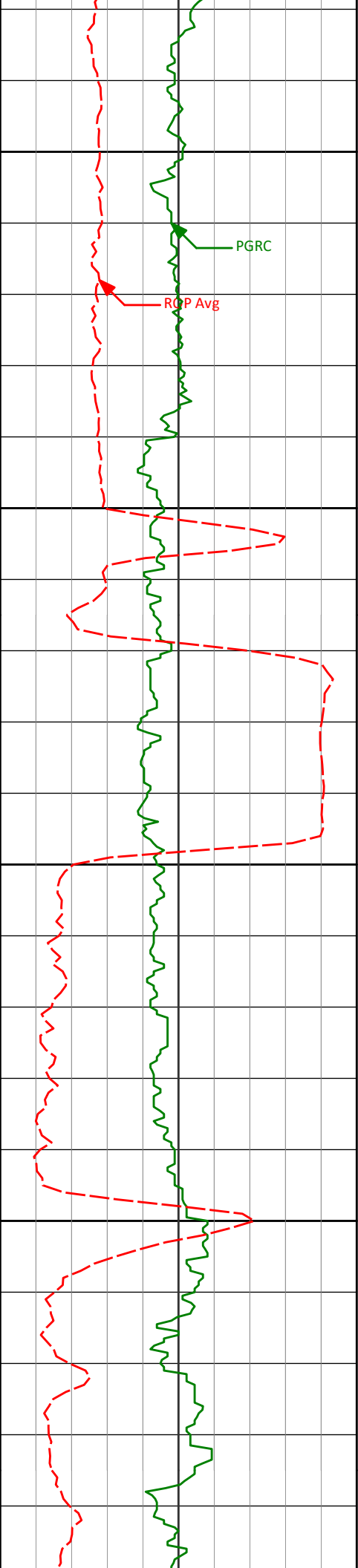
91.39°

264.79°

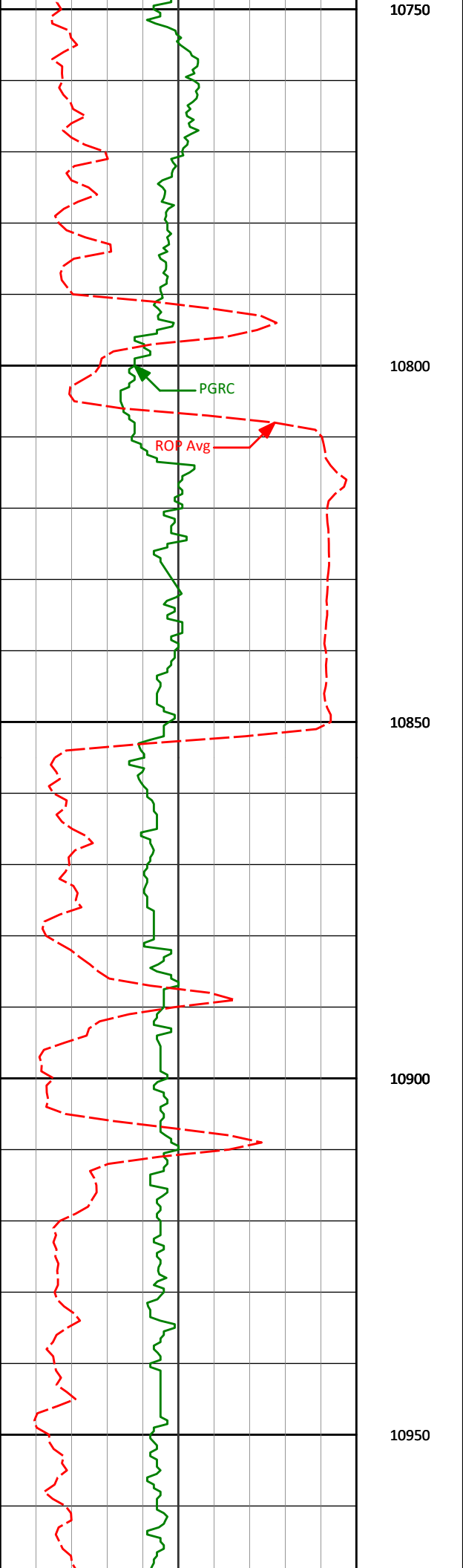
6594.35'

4094.57'

10500



10542'	91.48°	264.58°	6591.97'	4189.22'
10550				
10600				
10637'	90.37°	265.48°	6590.44'	4283.94'
10650				
10700				
10732'	91.14°	265.72°	6589.19'	4378.73'



10827'

90.43°

266.15°

6587.89'

4473.55'

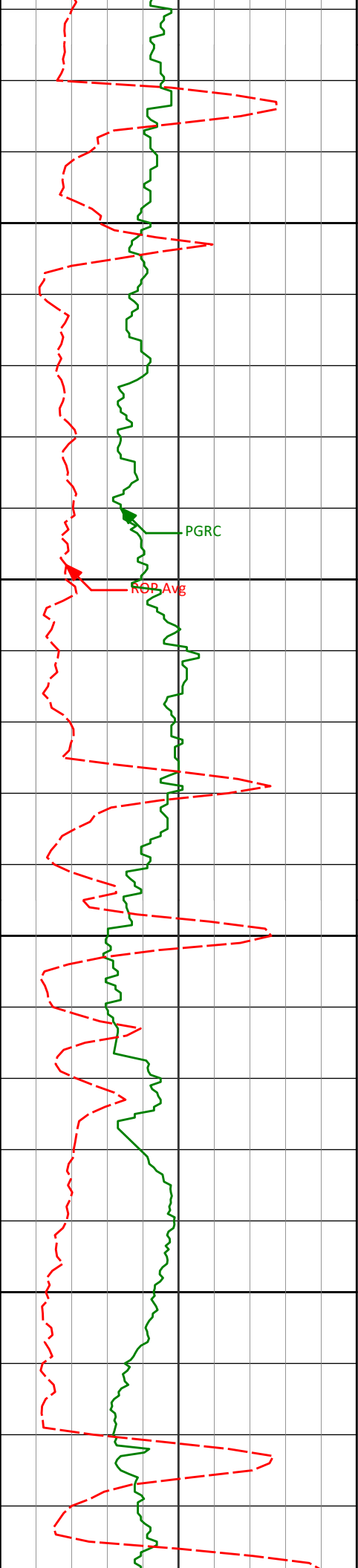
10922'

87.97°

265.45°

6589.21'

4568.35'



11000

11017'

89.44°

264.82°

6591.36'

4663.07'

11050

ROP Avg

PGRC

11100

11111'

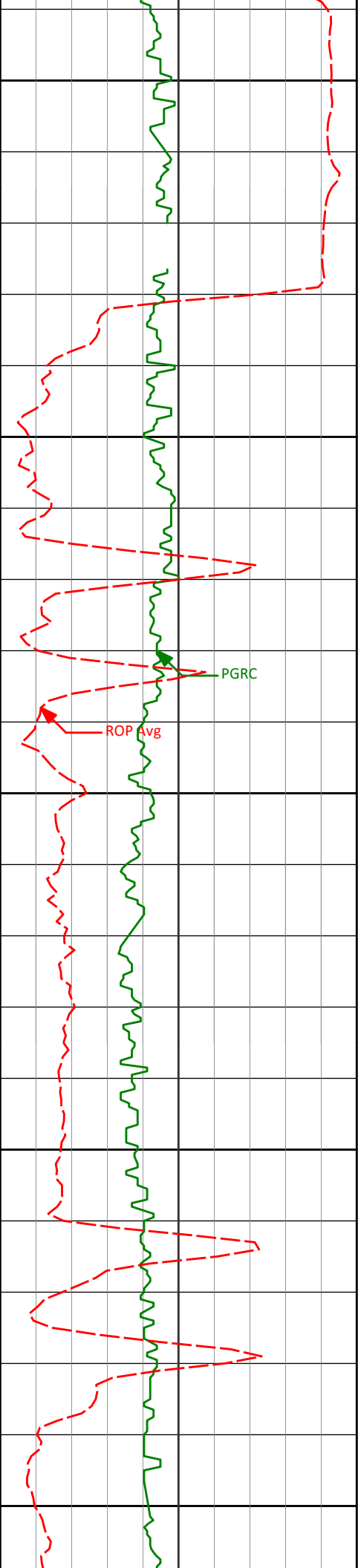
90.55°

263.99°

6591.37'

4756.72'

11150



11200

11206'

90.06°

265.25°

6590.86'

4851.39'

11250

11300

11301'

88.77°

266.37°

6591.83'

4946.20'

11350

11400

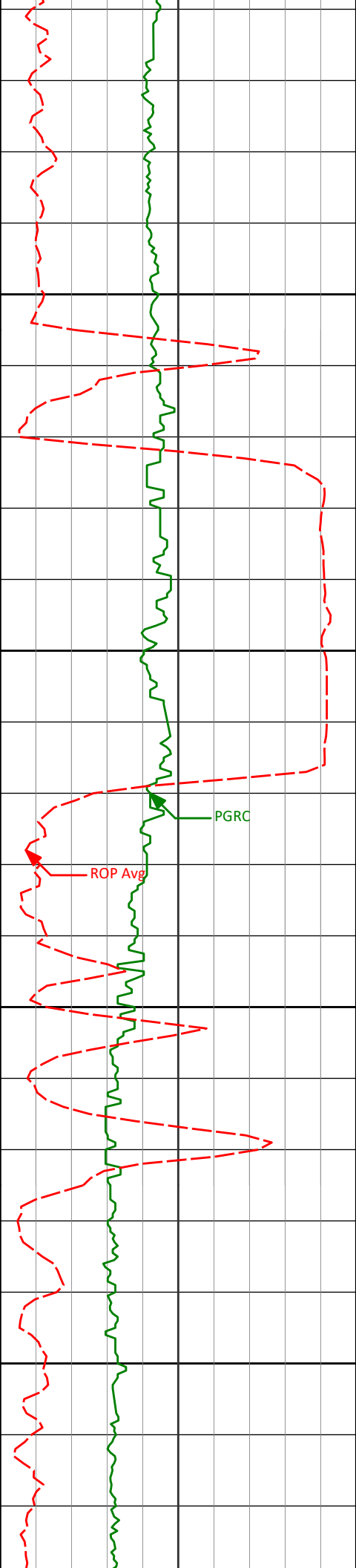
11396'

90.28°

265.16°

6592.62'

5041.01'



11450

11491'

89.32°

265.46°

6592.95'

5135.77'

11500

11550

11586'

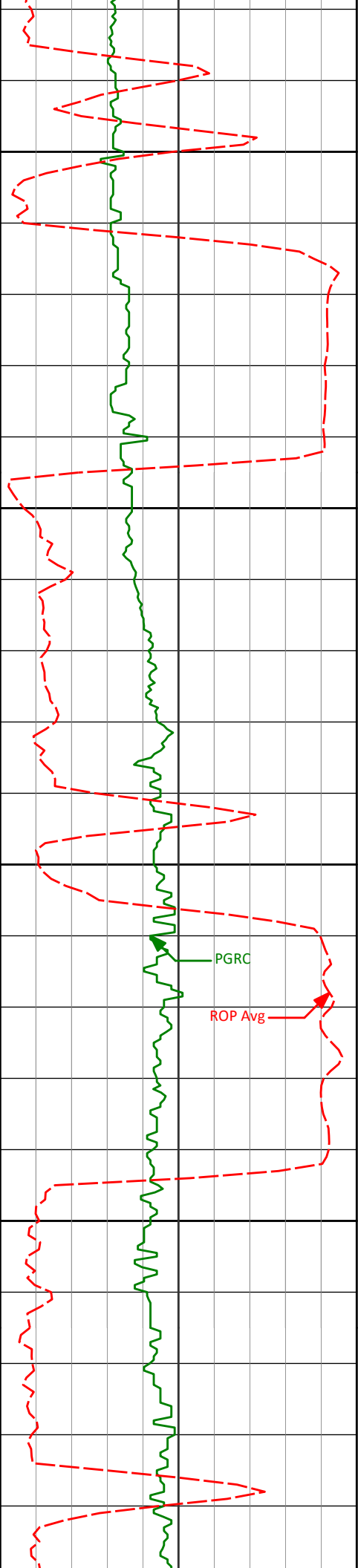
88.36°

266.03°

6594.87'

5230.57'

11600



11650

11681'

89.91°

266.56°

6596.31'

5325.42'

11700

11750

PGRC

ROP Avg

11776'

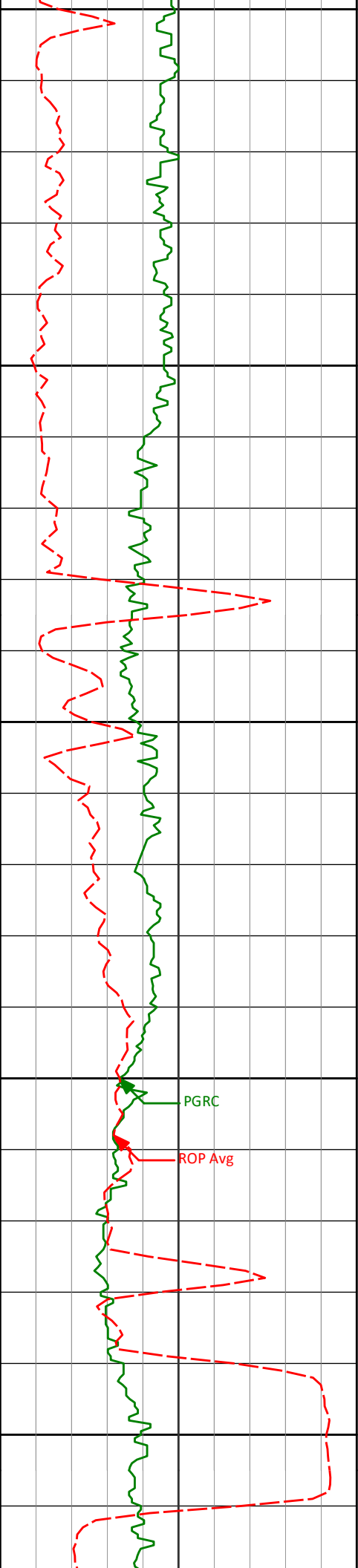
90.77°

268.57°

6595.74'

5420.37'

11800



11850

11871'

90.59°

267.50°

6594.62'

5515.33'

11900

11950

11966'

91.70°

267.43°

6592.72'

5610.26'

12000

PGRC

ROP Avg

12050

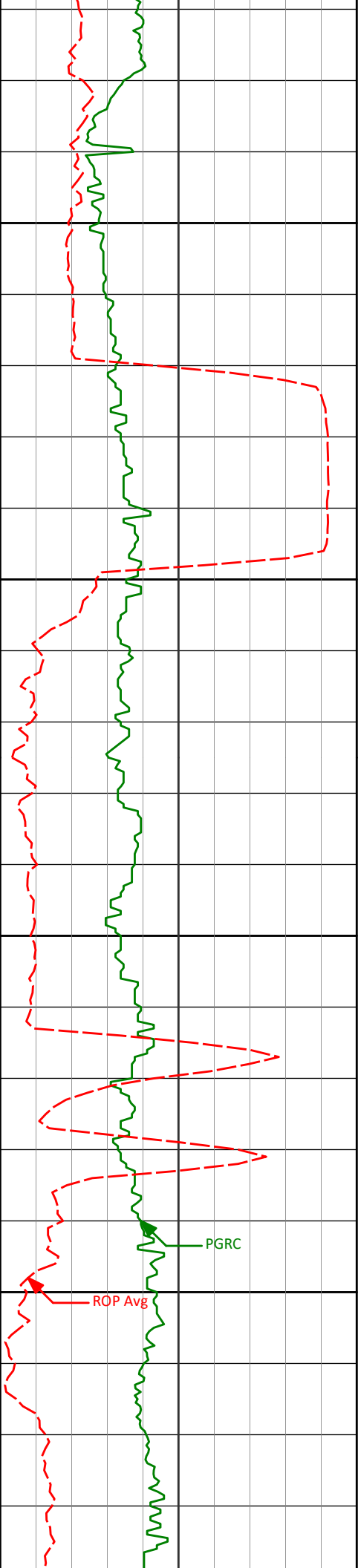
12060'

91.94°

268.26°

6589.73'

5704.18'



12100

12150

12200

12250

12155'

90.15°

269.26°

6588.00'

5799.16'

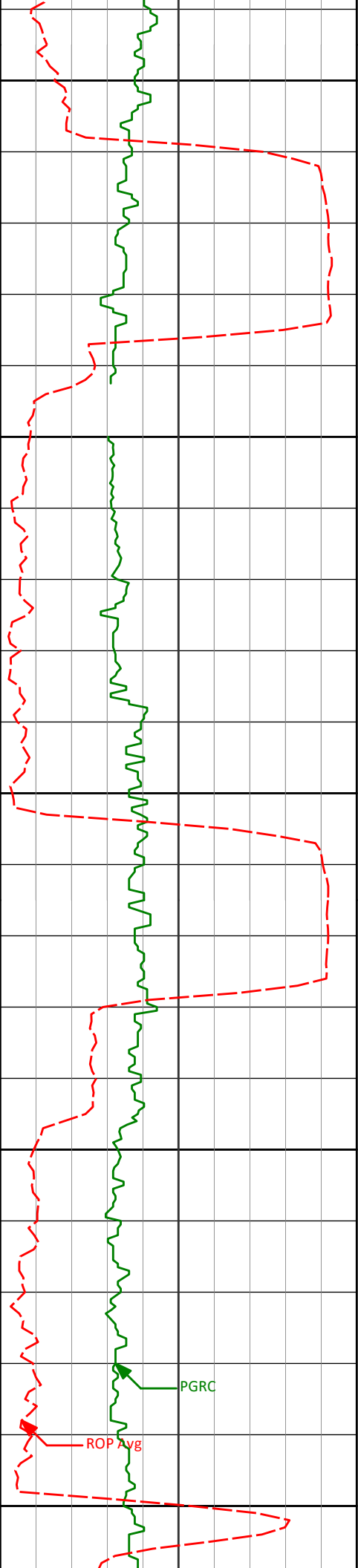
12250'

91.08°

268.94°

6586.98'

5894.15'



12300

12345'

90.34°

267.60°

6585.80'

5989.12'

12350

12400

12440'

89.35°

267.56°

6586.06'

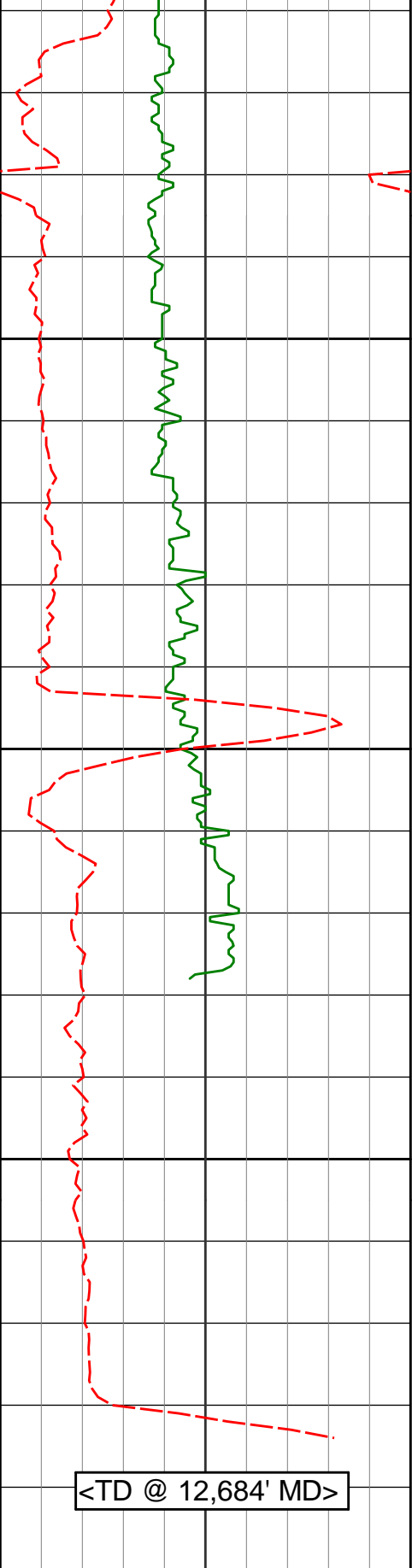
6084.07'

12450

PGRC

ROP Avg

12500



12535' 90.00° 267.86° 6586.60' 6179.03'

12550

12600

12621' 90.83° 265.54° 6585.98' 6264.93'

12650

<TD @ 12,684' MD>

<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.
500	0						
<div><div>PCG Gamma Ray</div><div>PGRC</div><div>api</div></div>							
0	300						



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Holman B15-66HN
Wattenberg
Weld Colorado
USA
CA-XX-0900671436

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
330.00	0.30	29.23	330.00	0.75 N	0.42 E	-0.43	0.09
615.00	0.30	276.53	615.00	1.49 N	0.04 E	-0.06	0.18
716.00	0.36	299.67	715.99	1.68 N	0.49 W	0.47	0.14
808.00	0.64	17.82	807.99	2.31 N	0.59 W	0.56	0.72
900.00	0.50	351.30	899.99	3.20 N	0.49 W	0.45	0.32
994.00	0.61	354.55	993.98	4.10 N	0.60 W	0.55	0.12
1087.00	0.53	49.19	1086.98	4.87 N	0.32 W	0.27	0.57
1179.00	0.69	350.06	1178.97	5.70 N	0.10 W	0.03	0.67
1273.00	0.47	43.37	1272.97	6.53 N	0.07 E	-0.15	0.59
1366.00	0.55	31.79	1365.97	7.19 N	0.57 E	-0.65	0.14
1460.00	0.42	9.73	1459.96	7.91 N	0.86 E	-0.96	0.24
1555.00	1.64	27.69	1554.95	9.46 N	1.56 E	-1.66	1.31
1650.00	3.40	23.10	1649.85	13.26 N	3.29 E	-3.44	1.86
1745.00	4.14	7.19	1744.65	19.25 N	4.83 E	-5.05	1.34
1840.00	6.05	357.57	1839.27	27.65 N	5.04 E	-5.36	2.20
1935.00	7.12	353.50	1933.64	38.51 N	4.16 E	-4.61	1.23
2030.00	9.10	356.82	2027.69	51.86 N	3.08 E	-3.68	2.14
2125.00	10.12	352.96	2121.35	67.64 N	1.64 E	-2.42	1.27
2219.00	9.89	356.17	2213.93	83.89 N	0.09 E	-1.06	0.64
2314.00	11.96	1.44	2307.20	101.88 N	0.21 W	-0.97	2.42
2409.00	10.77	358.39	2400.34	120.59 N	0.21 W	-1.18	1.40
2504.00	11.83	2.29	2493.50	139.19 N	0.07 W	-1.53	1.37
2599.00	13.71	6.66	2586.14	160.11 N	1.63 E	-3.47	2.22
2694.00	13.86	6.17	2678.41	182.60 N	4.15 E	-6.26	0.20
2789.00	12.23	4.04	2770.95	203.96 N	6.09 E	-8.44	1.79
2884.00	11.48	1.84	2863.93	223.44 N	7.10 E	-9.67	0.92
2979.00	9.65	358.78	2957.31	240.85 N	7.23 E	-10.01	2.01
3074.00	8.52	358.41	3051.12	255.85 N	6.87 E	-9.81	1.19
3169.00	6.33	0.53	3145.32	268.12 N	6.72 E	-9.81	2.32
3264.00	4.79	358.84	3239.87	277.32 N	6.69 E	-9.88	1.63
3359.00	3.89	357.41	3334.59	284.51 N	6.46 E	-9.74	0.95
3454.00	3.69	357.59	3429.39	290.78 N	6.19 E	-9.54	0.21
3549.00	2.51	13.08	3524.25	295.86 N	6.53 E	-9.94	1.51
3644.00	1.50	346.40	3619.19	299.10 N	6.71 E	-10.15	1.42
3739.00	0.94	19.08	3714.17	301.04 N	6.67 E	-10.14	0.92
4023.00	0.44	294.28	3998.15	303.69 N	6.44 E	-9.94	0.35
4308.00	1.54	271.33	4283.11	304.23 N	1.61 E	-5.12	0.40
4593.00	0.37	147.66	4568.08	303.54 N	1.72 W	-1.77	0.62
4878.00	0.97	161.16	4853.05	300.48 N	0.45 W	-3.01	0.22
5163.00	0.22	14.95	5138.04	298.73 N	0.47 E	-3.91	0.41
5447.00	0.82	141.93	5422.03	297.66 N	1.86 E	-5.29	0.34
5732.00	0.62	327.58	5707.03	297.35 N	2.29 E	-5.72	0.50
5920.00	0.93	110.59	5895.02	297.67 N	3.18 E	-6.60	0.78
5941.00	0.87	83.47	5916.02	297.63 N	3.49 E	-6.92	2.03
6061.00	8.36	263.61	6035.63	296.76 N	4.29 W	0.87	7.69
6108.00	13.19	269.55	6081.79	296.34 N	13.05 W	9.64	10.53
6156.00	17.17	271.46	6128.11	296.48 N	25.61 W	22.20	8.36
6203.00	20.53	272.24	6172.58	296.98 N	40.79 W	37.37	7.17
6251.00	23.96	269.52	6217.00	297.22 N	58.95 W	55.52	7.46
6298.00	27.48	266.27	6259.34	296.44 N	79.32 W	75.90	8.07
6346.00	32.29	267.30	6300.95	295.11 N	103.19 W	99.79	10.08
6392.00	37.48	270.50	6338.67	294.66 N	129.48 W	126.08	11.96
6440.00	43.30	271.04	6375.21	295.08 N	160.57 W	157.16	12.15
6487.00	47.56	270.75	6408.19	295.60 N	194.04 W	190.62	9.07
6535.00	51.82	268.78	6463.42	295.78 N	228.76 W	225.28	7.88

6535.00	51.32	269.78	6439.40	295.76 N	230.50 W	227.08	7.98
6582.00	52.97	268.93	6468.24	295.34 N	267.60 W	264.18	3.79
6630.00	55.25	269.13	6496.37	294.68 N	306.48 W	303.07	4.76
6677.00	61.14	269.93	6521.13	294.37 N	346.41 W	342.99	12.61
6725.00	67.47	270.46	6541.94	294.52 N	389.64 W	386.22	13.22
6772.00	71.15	270.74	6558.54	294.98 N	433.60 W	430.17	7.85
6820.00	75.10	270.75	6572.47	295.58 N	479.52 W	476.08	8.23
6867.00	78.26	269.75	6583.30	295.77 N	525.25 W	521.80	7.03
6925.00	82.49	267.15	6592.99	294.22 N	582.39 W	578.96	8.53
7064.00	88.52	264.71	6603.88	284.38 N	720.54 W	717.21	4.68
7156.00	89.35	264.70	6605.59	275.89 N	812.13 W	808.90	0.90
7249.00	90.43	263.79	6605.77	266.56 N	904.66 W	901.53	1.52
7341.00	91.11	264.64	6604.54	257.29 N	996.18 W	993.15	1.18
7433.00	91.02	264.93	6602.83	248.93 N	1087.78 W	1084.84	0.33
7526.00	91.26	267.39	6600.98	242.70 N	1180.55 W	1177.67	2.66
7618.00	91.51	267.05	6598.75	238.24 N	1272.41 W	1269.58	0.46
7710.00	90.49	267.72	6597.15	234.05 N	1364.30 W	1361.51	1.33
7804.00	88.77	267.16	6597.75	229.85 N	1458.20 W	1455.46	1.92
7897.00	89.29	267.07	6599.33	225.17 N	1551.07 W	1548.37	0.57
7989.00	88.80	267.44	6600.86	220.76 N	1642.95 W	1640.30	0.67
8083.00	89.78	267.24	6602.03	216.40 N	1736.84 W	1734.23	1.06
8177.00	89.17	267.16	6602.89	211.81 N	1830.72 W	1828.16	0.65
8270.00	89.60	267.27	6603.89	207.29 N	1923.61 W	1921.09	0.48
8363.00	90.43	267.27	6603.86	202.86 N	2016.50 W	2014.03	0.89
8458.00	89.88	266.64	6603.60	197.81 N	2111.37 W	2108.95	0.88
8553.00	90.68	266.47	6603.14	192.10 N	2206.19 W	2203.83	0.86
8645.00	89.57	266.69	6602.94	186.62 N	2298.03 W	2295.73	1.23
8740.00	90.06	266.17	6603.25	180.70 N	2392.84 W	2390.60	0.75
8835.00	90.43	265.47	6602.84	173.78 N	2487.59 W	2485.42	0.83
8930.00	91.66	265.51	6601.11	166.31 N	2582.28 W	2580.19	1.30
9024.00	90.58	265.09	6599.27	158.61 N	2675.94 W	2673.94	1.23
9119.00	90.34	266.50	6598.51	151.64 N	2770.68 W	2768.75	1.51
9214.00	91.60	266.48	6596.90	145.83 N	2865.49 W	2863.62	1.33
9309.00	91.20	266.43	6594.58	139.95 N	2960.28 W	2958.47	0.42
9404.00	90.46	268.53	6593.20	135.78 N	3055.17 W	3053.40	2.34
9499.00	90.28	266.89	6592.59	131.98 N	3150.09 W	3148.36	1.74
9594.00	90.46	267.04	6591.98	126.95 N	3244.95 W	3243.27	0.25
9688.00	88.92	266.97	6592.48	122.04 N	3338.82 W	3337.19	1.64
9783.00	90.15	267.73	6593.25	117.65 N	3433.71 W	3432.13	1.52
9878.00	88.64	266.86	6594.26	113.17 N	3528.60 W	3527.06	1.83
9973.00	89.48	266.68	6595.82	107.81 N	3623.43 W	3621.95	0.90
10068.00	89.97	266.02	6596.27	101.77 N	3718.24 W	3716.82	0.87
10163.00	89.35	262.87	6596.84	92.57 N	3812.78 W	3811.46	3.38
10258.00	90.37	265.59	6597.07	83.02 N	3907.29 W	3906.07	3.06
10353.00	90.77	265.31	6596.12	75.49 N	4001.98 W	4000.85	0.51
10447.00	91.39	264.79	6594.35	67.38 N	4095.61 W	4094.57	0.86
10542.00	91.48	264.58	6591.97	58.58 N	4190.18 W	4189.22	0.24
10637.00	90.37	265.48	6590.44	50.35 N	4284.80 W	4283.94	1.50
10732.00	91.14	265.72	6589.19	43.06 N	4379.51 W	4378.73	0.85
10827.00	90.43	266.15	6587.89	36.33 N	4474.27 W	4473.55	0.87
10922.00	87.97	265.45	6589.21	29.37 N	4568.99 W	4568.35	2.69
11017.00	89.44	264.82	6591.36	21.32 N	4663.62 W	4663.07	1.68
11111.00	90.55	263.99	6591.37	12.15 N	4757.17 W	4756.72	1.47
11206.00	90.06	265.25	6590.86	3.25 N	4851.75 W	4851.39	1.42
11301.00	88.77	266.37	6591.83	3.69 S	4946.49 W	4946.20	1.80
11396.00	90.28	265.16	6592.62	10.71 S	5041.22 W	5041.01	2.04
11491.00	89.32	265.46	6592.95	18.48 S	5135.90 W	5135.77	1.06
11586.00	88.36	266.03	6594.87	25.52 S	5230.62 W	5230.57	1.18
11681.00	89.91	266.56	6596.31	31.66 S	5325.41 W	5325.42	1.72
11776.00	90.77	268.57	6595.74	35.70 S	5420.31 W	5420.37	2.30
11871.00	90.59	267.50	6594.62	38.96 S	5515.25 W	5515.33	1.14
11966.00	91.70	267.43	6592.72	43.16 S	5610.14 W	5610.26	1.17
12060.00	91.94	268.26	6589.73	46.69 S	5704.02 W	5704.18	0.92
12155.00	90.15	269.26	6588.00	48.74 S	5798.98 W	5799.16	2.16
12250.00	91.08	268.94	6586.98	50.24 S	5893.96 W	5894.15	1.04
12345.00	90.34	267.60	6585.80	53.10 S	5988.91 W	5989.12	1.61
12440.00	89.35	267.56	6586.06	57.12 S	6083.82 W	6084.07	1.04
12535.00	90.00	267.86	6586.60	60.91 S	6178.74 W	6179.03	0.75
12621.00	90.83	265.54	6585.98	65.86 S	6264.59 W	6264.93	2.87
12684.00	90.83	265.54	6585.06	70.76 S	6327.39 W	6327.79	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 269.34 DEGREES (GRID)
A TOTAL CORRECTION OF 7.83 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 12684.00 FEET
IS 6327.79 FEET ALONG 269.36 DEGREES (GRID)

Surface surveys at 330 ft and 615 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Last survey is a projection from 12621 ft MD to TD at 12684 ft MD.

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