

PCGK : Pressure Case Gamma
PCDC: Pressure Case Directional

1 : 600 / 1 : 240

Country : USA			
Field : Wattenberg			
Location : Lat: 40°24' 42.08" North Long: 104°31' 34.54" West			
Well : Jenkins B11-79-1HCM			
Company : Noble Energy			
Rig : H&P 315			
LOCATION			
Latitude : 40°24' 42.08" North Longitude : 104°31' 34.54" West			
UTM Easting = 3,271,144,156 ft UTM Northing = 1,394,307,354 ft			
Other Services Directional Drilling			
Permanent Datum : Ground Level		Elev. KB N/A	
Log Measured From : Drill Floor		DF 4629.00 ft GL 4603.00 ft WD N/A	
Drilling Measured From : Drill Floor			
MD LOG			
Depth Logged : 795.00 ft To 14,173.00 ft		Unit No. : 11610113	
Date Logged : 31-May-13 To 07-Jun-13		Job No. :CA-XX-0900343457	
Total Depth MD : 14,173.00 ft TVD: 6,776.44 ft		Plot Type : Final	
Spud Date : 30-May-13		Plot Date : 08-Jun-13	
Run No.		Borehole Record (MD)	
Size		Run No.	
From		Size	
To		From	
Run No.		To	
2 8,750 in 795.00 ft 6,072.00 ft			
3 8,750 in 6,072.00 ft 7,126.00 ft			
4 6,125 in 7,126.00 ft 13,243.00 ft			
5 6,125 in 13,243.00 ft 14,173.00 ft			
Size		Casing Record (MD)	
From		Weight	
To		From	
Run No.		To	
7.000 in		26.00 lbpf	
SURFACE		7,121.00 ft	
		</	

Max Tool Temp (degF) / Source	154.30 / PCM	177.64 / PCM	247.20 / PCM	247.78 / PCM	
Rm @ Max Tool Temp (degF)	N/A @ 154.30	N/A @ 177.64	N/A @ 247.20	N/A @ 247.78	
Lead MWD Engineer	Paul Kock	Paul Kock	Paul Kock	Paul Kock	
Customer Representative	Bryant Dear	Bryant Dear	Bryant Dear	Bryant Dear	

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM	PCM	
Software Version	5.84	5.84	5.84	5.84	
Sub Serial Number	11341333	11341333	12145490	11341333	
Insert Serial Number	11400829	11400829	11145605	11400829	
Date and Time Initialized	30-May-13 14:45	30-May-13 14:45	02-Jun-13 21:24	06-Jun-13 14:26	
Date and Time Read	02-Jun-13 04:37	02-Jun-13 04:51	06-Jun-13 15:33	08-Jun-13 03:05	
ECMB SW Version	N/A	N/A	N/A	N/A	

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	56.63	52.11	61.13	61.09	
Software Version	6.21	6.21	6.21	6.21	
Sub Serial Number	11341333	11341333	12145490	11341333	
Sonde Serial Number	11638536	11638536	10919505	11638536	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	53.22	312.53	325.14	169.81	

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG	PCG	
Distance From Bit (ft)	51.63	47.11	56.15	56.11	
Recorded Sample Period (sec)	10	10	10	10	
Software Version	8.15	8.15	8.15	8.15	
Sub Serial Number	11341333	11341333	12145490	11341333	
Insert/Sonde Serial Number	11681009	11681009	11579806	11681009	

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 7.4.20
6. End of Run 200. Gap between build and lateral section is due to Gamma sensor measure point to bit distance during the build run. Last Gamma datapoint is at 7080 ft. MD. Gamma cannot be measured within cased hole, and collection resumes after drilling through cement at 7126 ft MD.

WARRANTY

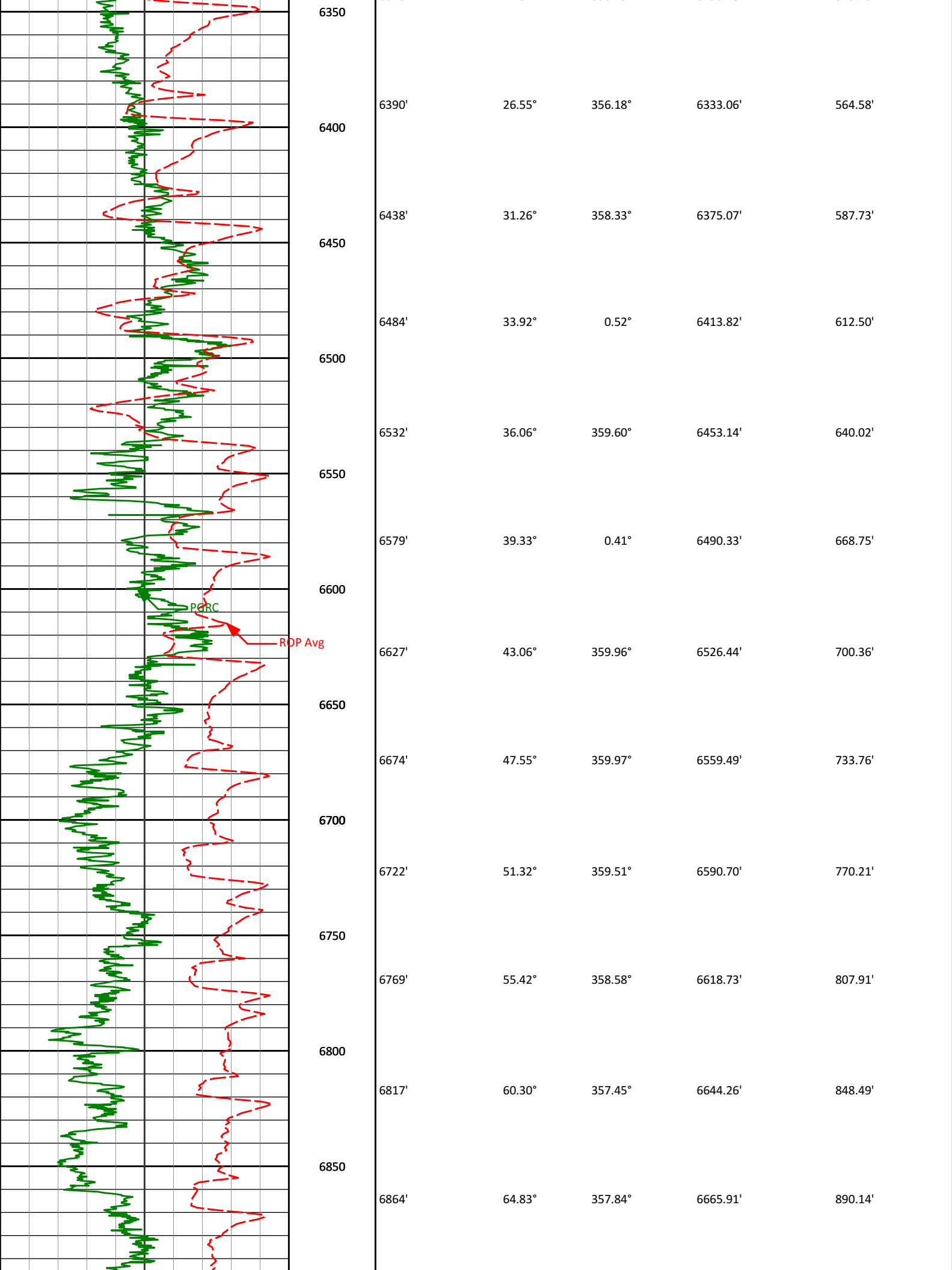
HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES SHOULD ANY SUCH INFORMATION OR INTERPRETATION BE RELIED UPON AS THE SOLE BASIS FOR ANY DRILLING, COMPLETION, PRODUCTION, OR FINANCIAL DECISION OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING VENTURE, DRILLING RIG OR ITS CREW OR ANY OTHER THIRD PARTY. THE CUSTOMER HAS FULL RESPONSIBILITY FOR ALL DRILLING, COMPLETION AND PRODUCTION OPERATION. HALLIBURTON MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE SERVICES RENDERED. IN NO EVENT WILL HALLIBURTON BE LIABLE FOR FAILURE TO OBTAIN ANY PARTICULAR RESULTS OR FOR ANY DAMAGES, INCLUDING, BUT NOT LIMITED TO, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, RESULTING FROM THE USE OF ANY INFORMATION OR INTERPRETATION PROVIDED BY HALLIBURTON.

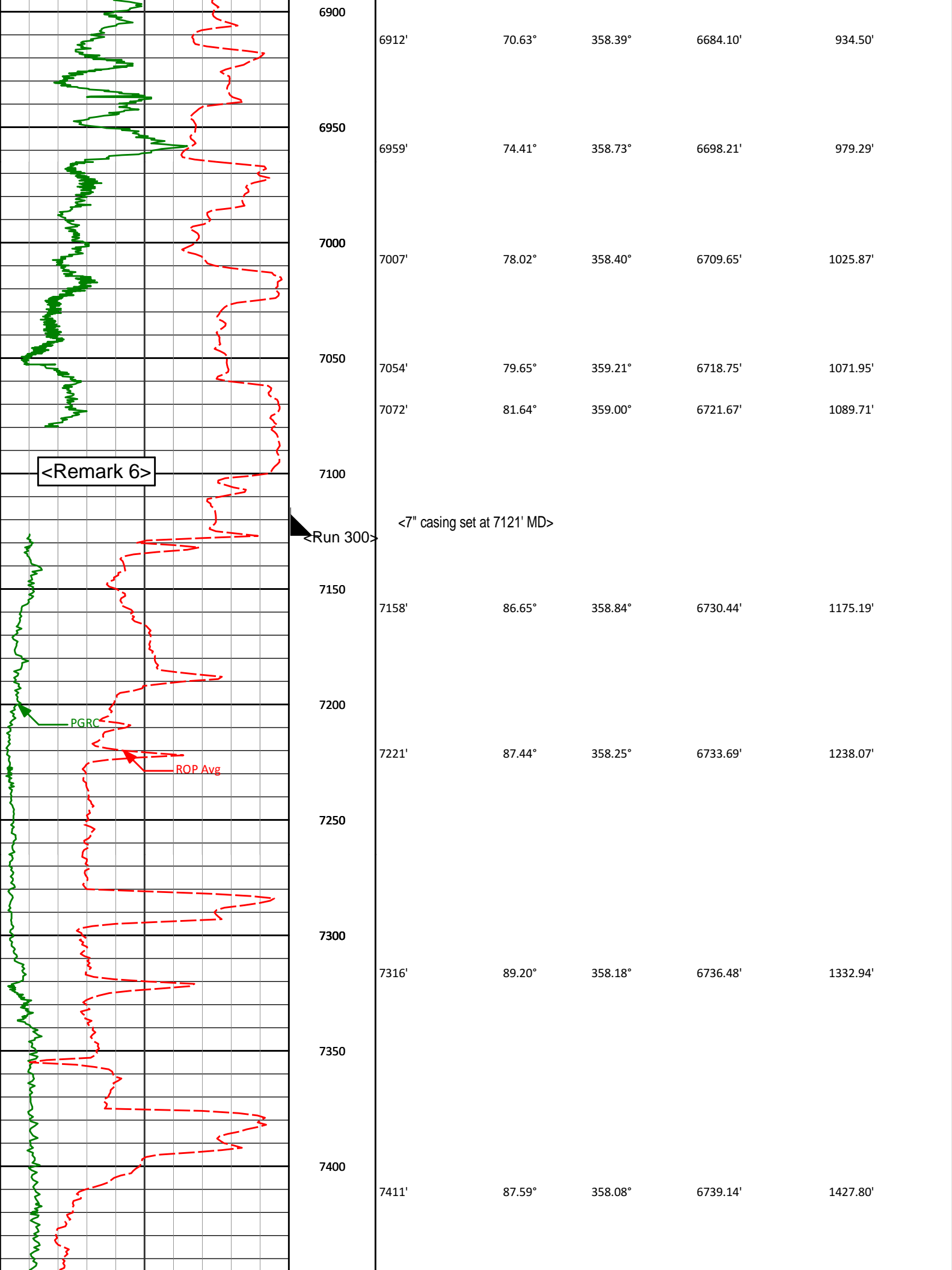
HALLIBURTON
Sperry Drilling Services

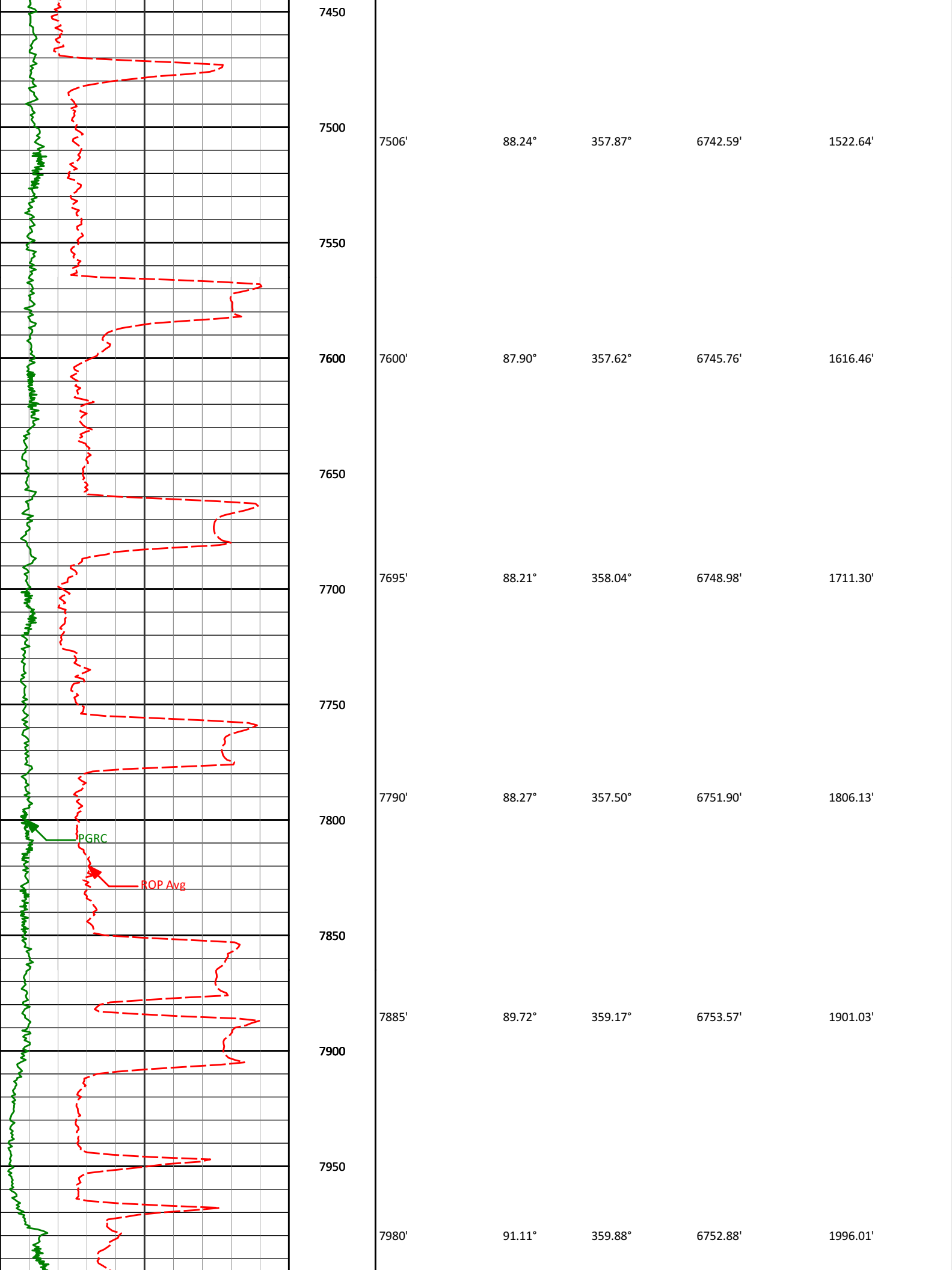
MD Main Log 1:600

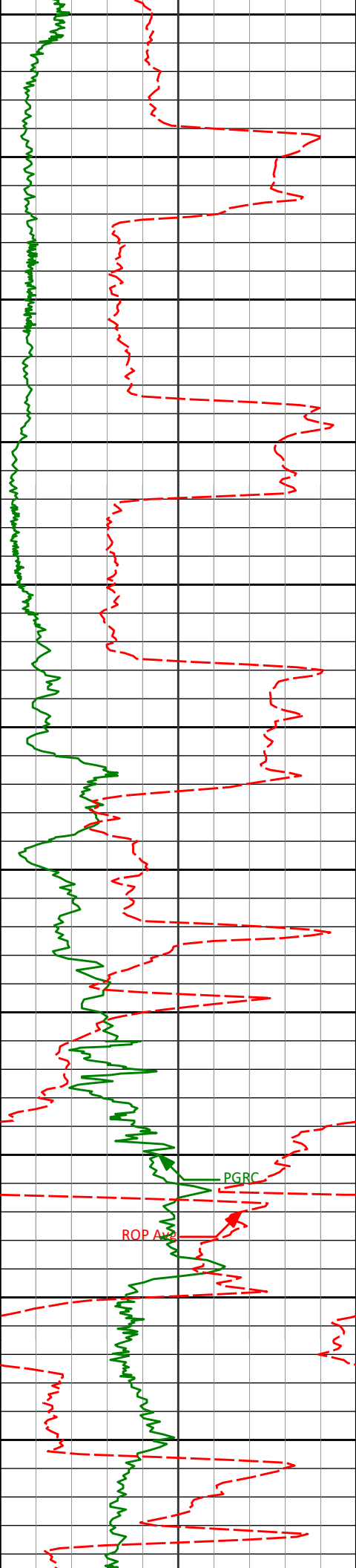
Noble Energy, Inc
Jenkins B11-79-1HCM
H&P 315
T5N R64W

PCG Gamma Ray PGRC 0300 api							
Avg Rate of Penetration ROP Avg 5000 feet per hr		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
		<Run 200>	6067'	0.65°	352.21°	6021.09'	492.62'
		6100					
		<KOP>					
		6150					
		6200	6200'	10.00°	356.95°	6153.37'	504.91'
		6250	6248'	14.60°	359.01°	6200.25'	515.12'
		6300	6295'	18.50°	357.66°	6245.30'	528.50'
			6343'	22.32°	356.45°	6290.28'	545.20'









8000

8050

8100

8150

8200

8250

8300

8350

8400

8450

8500

8075'

87.41°

359.87°

6754.11'

2090.98'

8168'

87.84°

359.79°

6757.96'

2183.89'

8261'

90.77°

0.88°

6759.09'

2276.87'

8354'

91.85°

359.23°

6756.96'

2369.83'

8447'

91.67°

0.57°

6754.10'

2462.78'

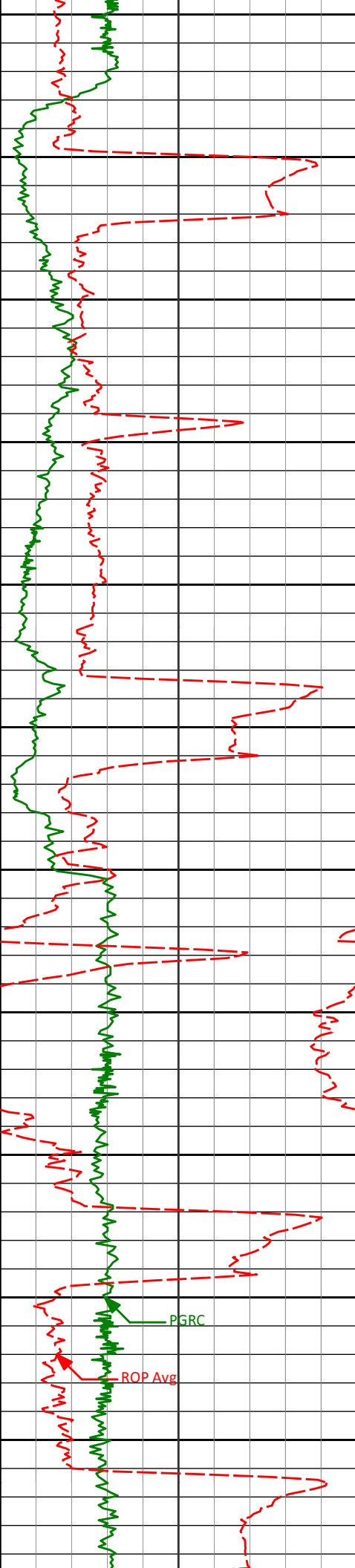
8539'

91.64°

1.25°

6751.45'

2554.74'



8550

8600

8650

8700

8750

8800

8850

8900

8950

9000

9050

8631'

90.28°

0.46°

6749.91'

2646.72'

8724'

89.01°

359.40°

6750.48'

2739.71'

8816'

90.52°

0.95°

6750.86'

2831.70'

8908'

90.12°

359.15°

6750.35'

2923.69'

9001'

89.26°

358.82°

6750.85'

3016.65'

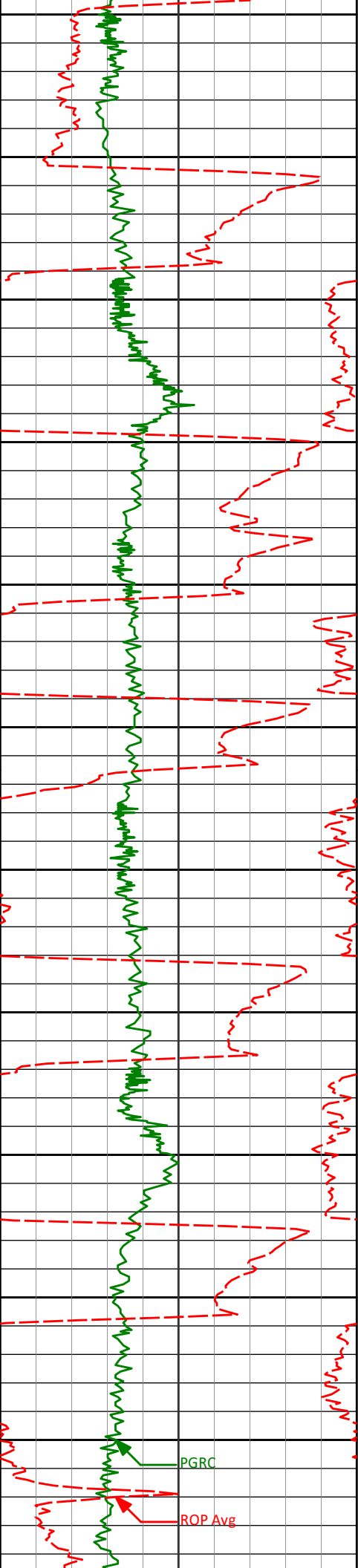
9094'

88.46°

359.15°

6752.70'

3109.59'



9100

9150

9200

9250

9300

9350

9400

9450

9500

9550

9600

9186'

86.45°

358.90°

6756.78'

3201.46'

9277'

88.33°

0.38°

6760.93'

3292.35'

9370'

90.06°

359.59°

6762.23'

3385.33'

9462'

91.29°

0.76°

6761.15'

3477.31'

9554'

91.33°

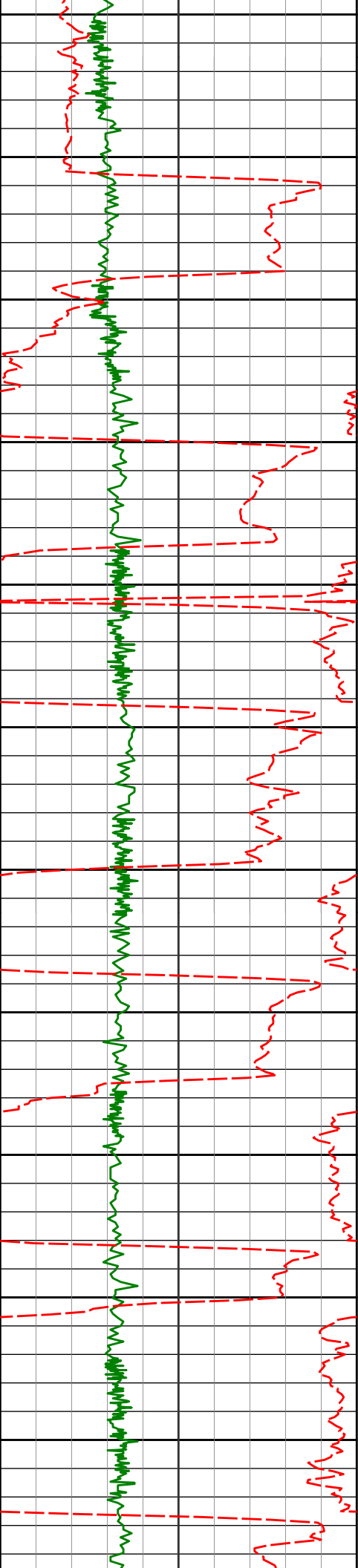
1.94°

6759.05'

3569.28'

PGRC

ROP Avg



9650

9700

9750

9800

9850

9900

9950

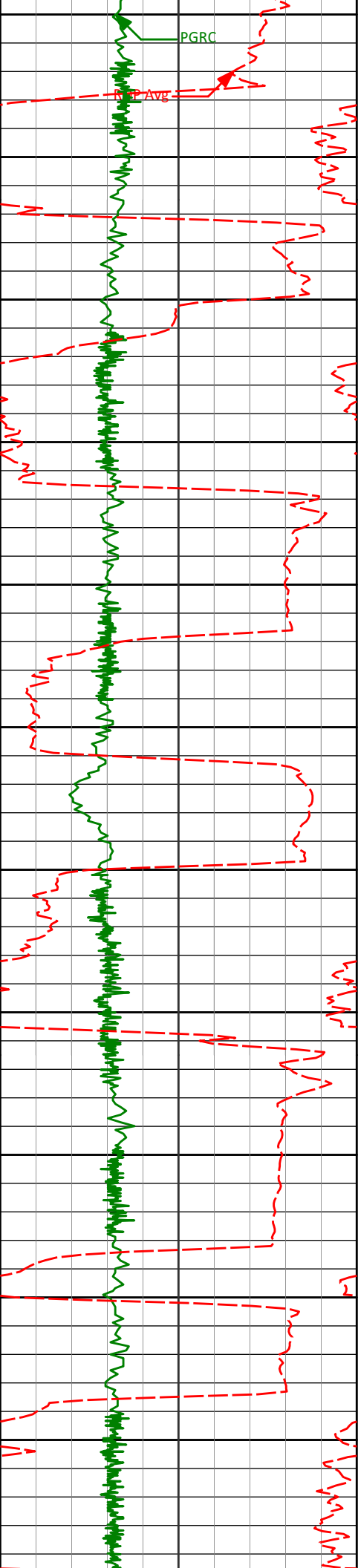
10000

10050

10100

10150

9648'	89.94°	359.76°	6758.01'	3663.27'
9741'	88.49°	358.98°	6759.28'	3756.23'
9834'	88.77°	358.48°	6761.50'	3849.15'
9927'	89.57°	359.61°	6762.85'	3942.11'
10022'	90.68°	0.81°	6762.64'	4037.10'
10117'	89.29°	359.79°	6762.67'	4132.09'



10200

10250

10300

10350

10400

10450

10500

10550

10600

10650

10700

10211'

90.12°

0.49°

6763.15'

4226.09'

10306'

90.52°

0.43°

6762.62'

4321.09'

10401'

90.59°

359.30°

6761.70'

4416.07'

10496'

89.26°

357.73°

6761.83'

4511.00'

10591'

87.69°

357.43°

6764.35'

4605.83'

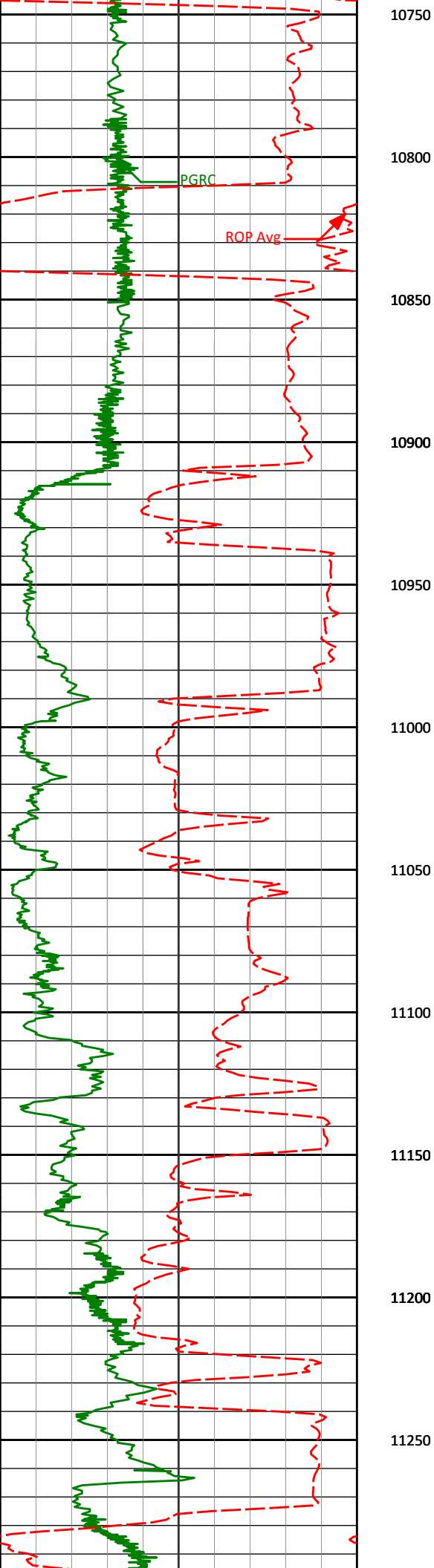
10686'

89.20°

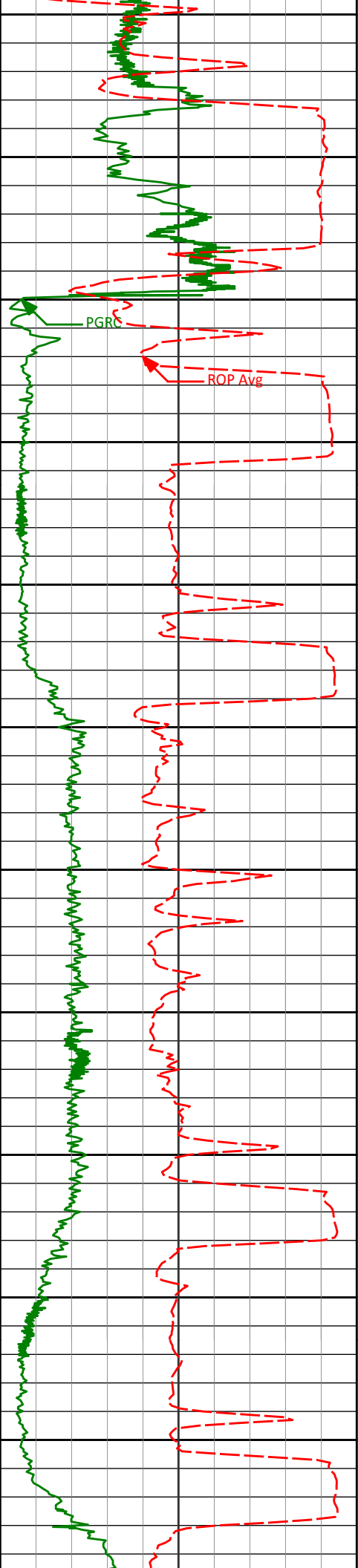
359.61°

6766.93'

4700.72'



10750				
10781'	89.48°	359.39°	6768.03'	4795.70'
10800				
10850				
10876'	91.30°	0.59°	6767.38'	4890.68'
10900				
10950				
10971'	92.47°	3.30°	6764.25'	4985.59'
11000				
11050				
11066'	92.87°	2.84°	6759.83'	5080.41'
11100				
11150				
11160'	93.02°	0.79°	6755.00'	5174.26'
11200				
11250				
11255'	92.40°	1.13°	6750.51'	5269.15'



11300

11350

11400

11450

11500

11550

11600

11650

11700

11750

11800

11350'

11445'

11540'

11635'

11729'

11824'

91.79°

89.41°

88.40°

91.05°

85.03°

85.74°

0.80°

0.73°

1.83°

2.41°

0.19°

359.33°

6747.04'

6746.04'

6747.86'

6748.31'

6751.53'

6759.17'

5364.08'

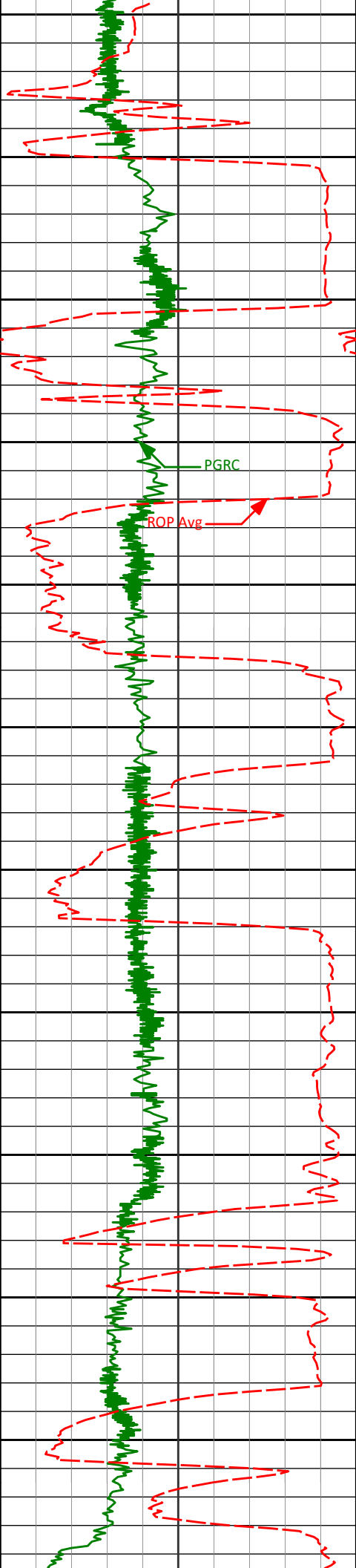
5459.07'

5554.04'

5649.00'

5742.89'

5837.57'



11850

11900

11950

12000

12050

12100

12150

12200

12250

12300

12350

11919'

12014'

12109'

12204'

12298'

12393'

85.18°

87.07°

88.12°

89.44°

91.54°

90.37°

358.39°

357.92°

357.92°

358.57°

357.98°

357.68°

6766.69'

6773.11'

6777.10'

6779.12'

6778.31'

6776.73'

5932.23'

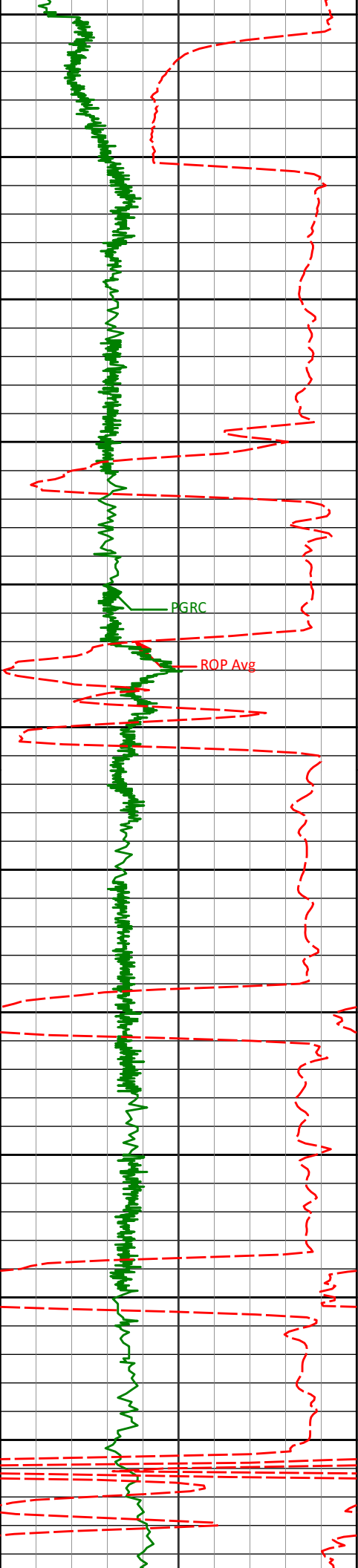
6026.92'

6121.72'

6216.62'

6310.53'

6405.40'



12400

12450

12488'

12500

12550

12583'

12600

12650

12678'

12700

12750

12773'

12800

12850

12900

87.78°

357.09°

6778.26'

6500.22'

88.61°

357.47°

6781.26'

6595.01'

87.81°

359.25°

6784.22'

6689.89'

89.72°

2.12°

6786.27'

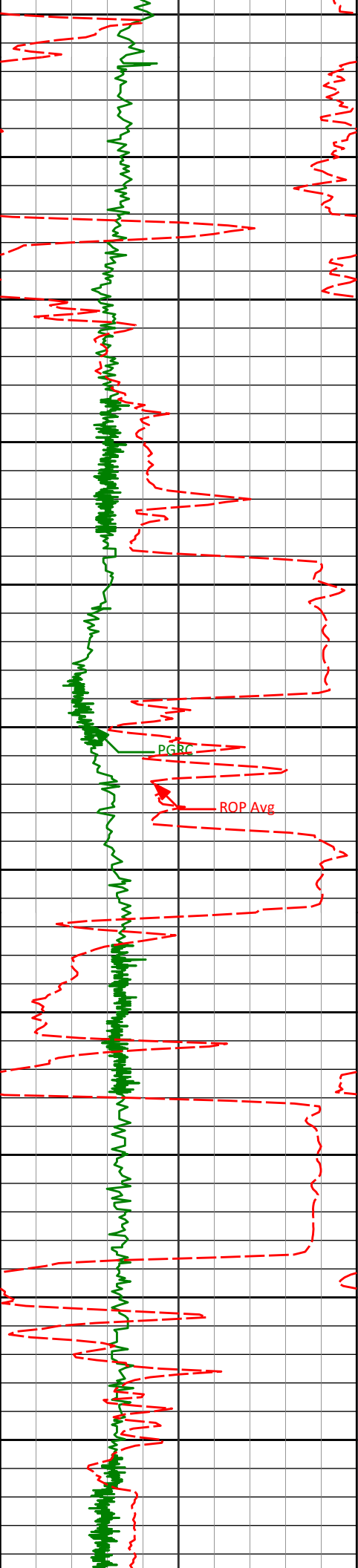
6784.85'

91.26°

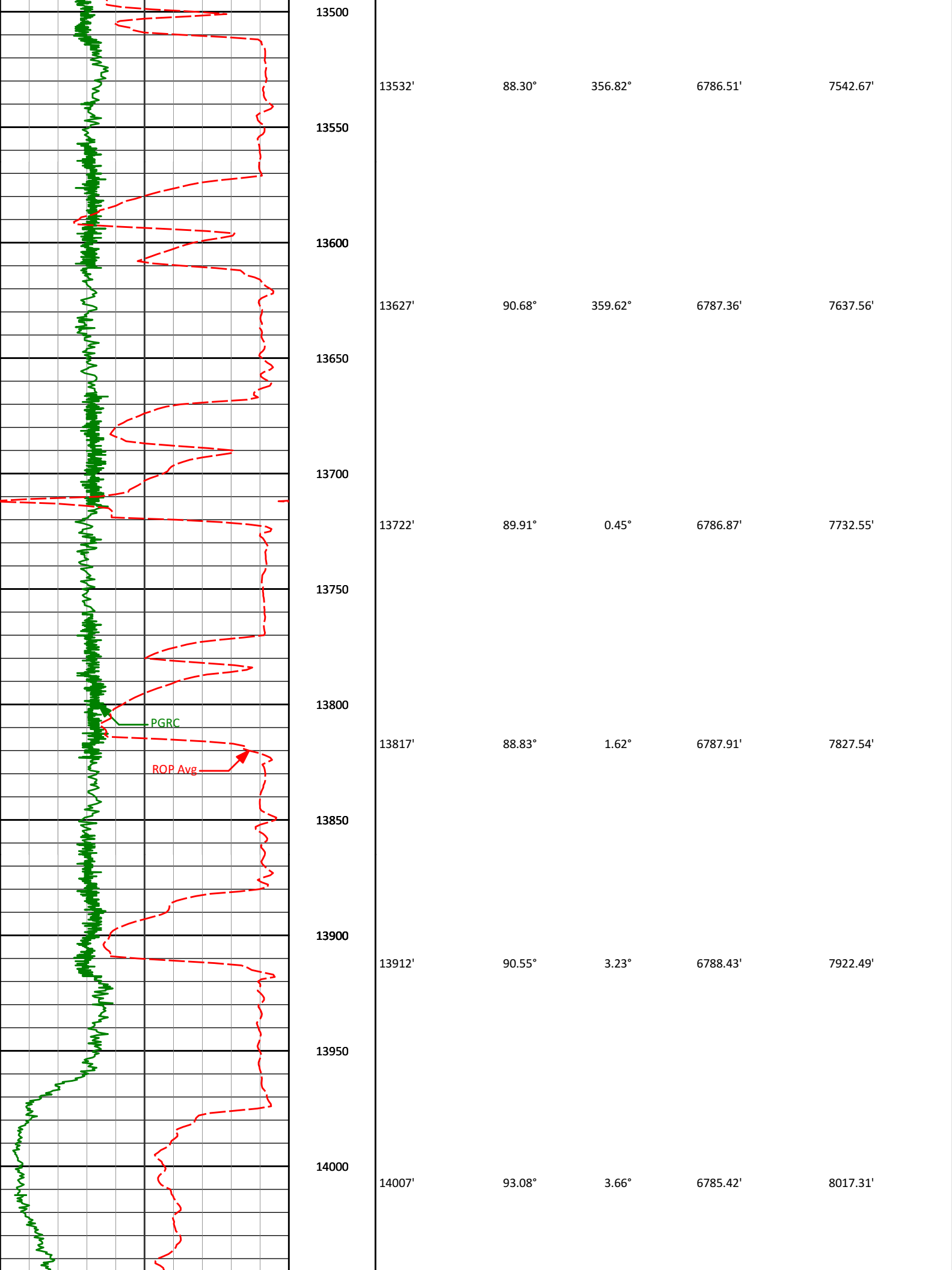
4.72°

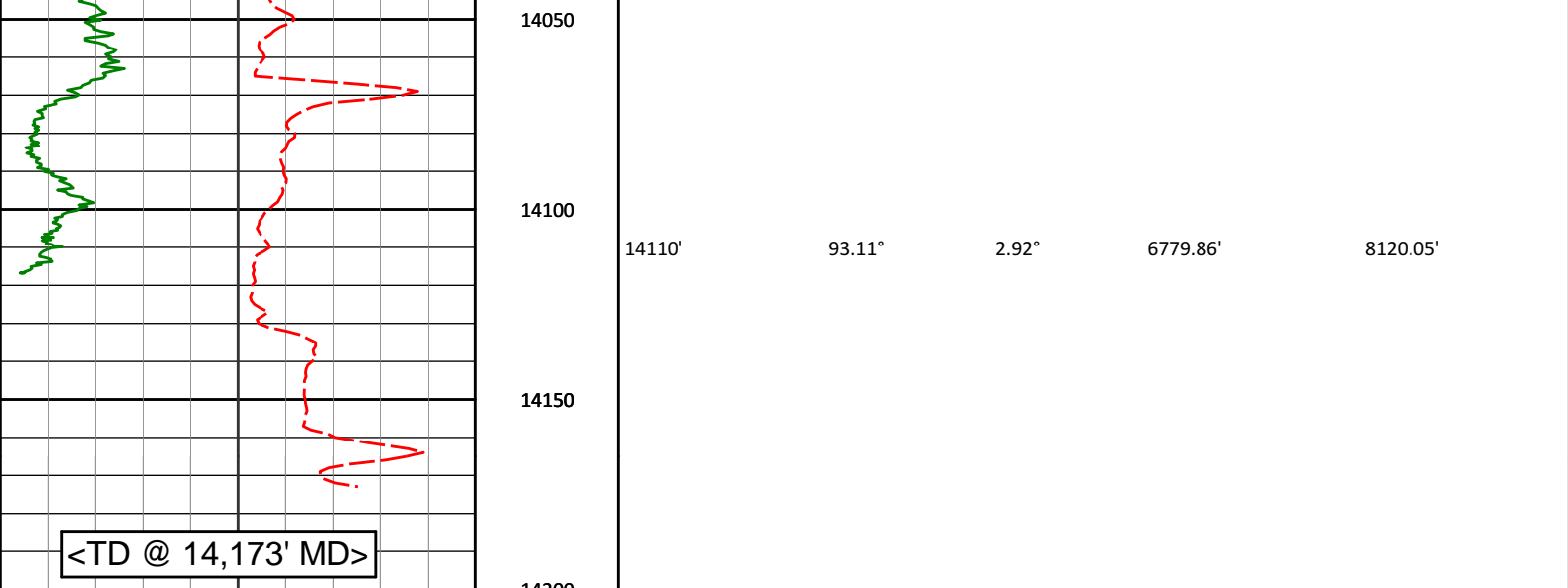
6785.47'

6878.73'



12950					
	12962'	91.79°	5.57°	6782.94'	6973.40'
13000					
13050					
	13057'	90.92°	3.70°	6780.69'	7068.13'
13100					
13150					
	13152'	89.57°	1.37°	6780.29'	7163.07'
13200					
<Run 400> 13250	13247'	87.90°	2.00°	6782.38'	7258.03'
13300					
13350					
13400					
	13437'	90.71°	356.73°	6785.69'	7447.90'
13450					





Avg Rate of Penetration ROP Avg feet per hr	Depth ft	Depth	Inc.	Azi.	TVD	V.S.
--	-------------	--------------	-------------	-------------	------------	-------------

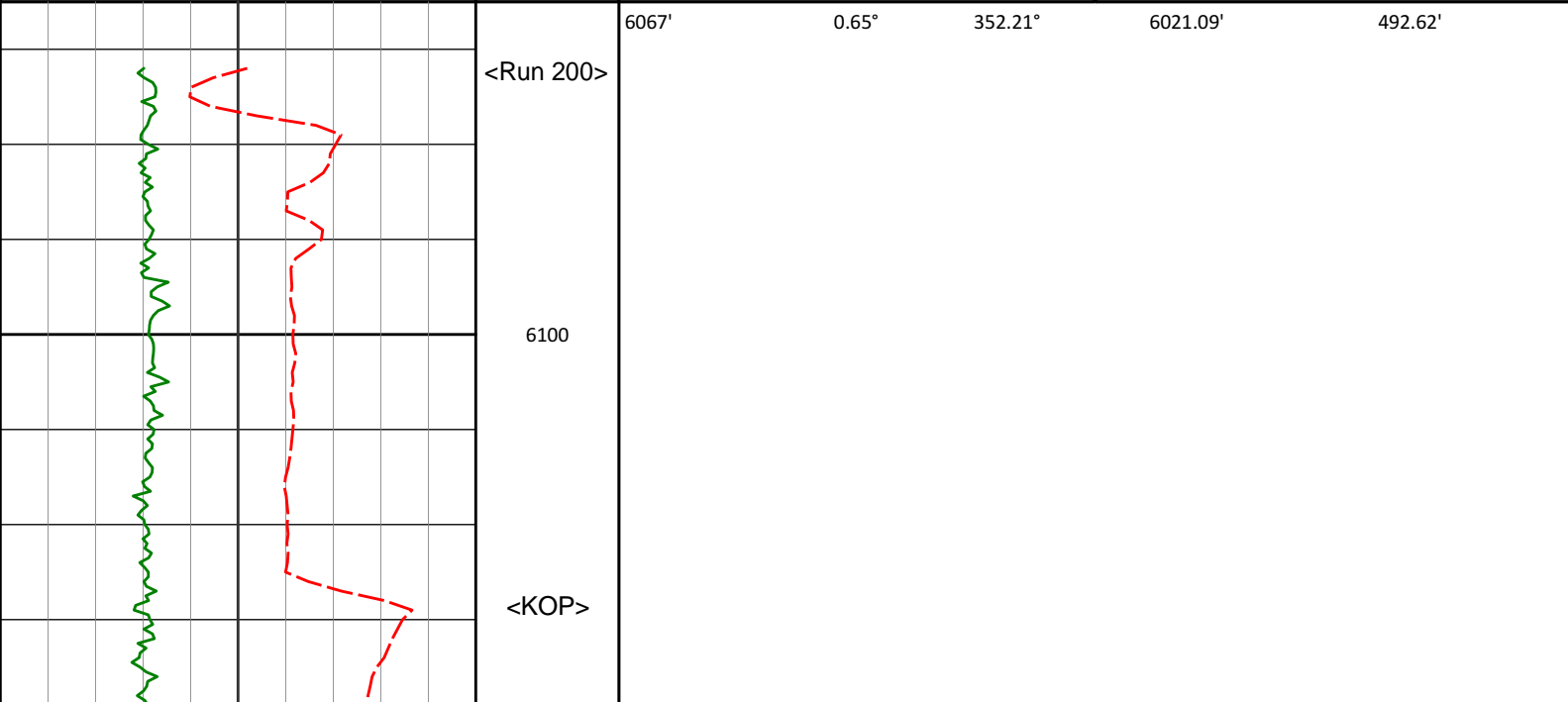
PCG Gamma Ray PGRC api	
-------------------------------------	--

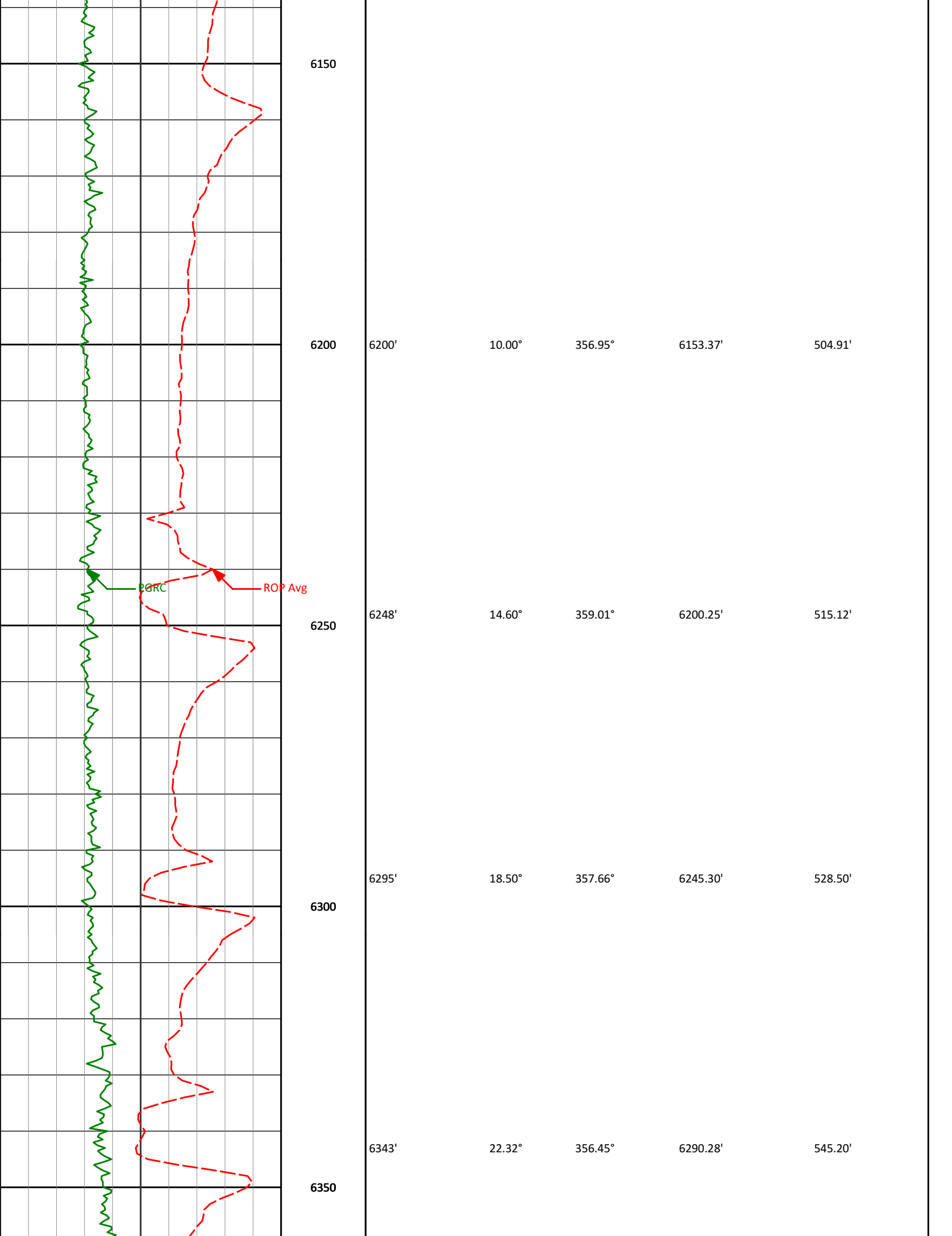
HALLIBURTON
Sperry Drilling Services
MD Detail Log 1:240

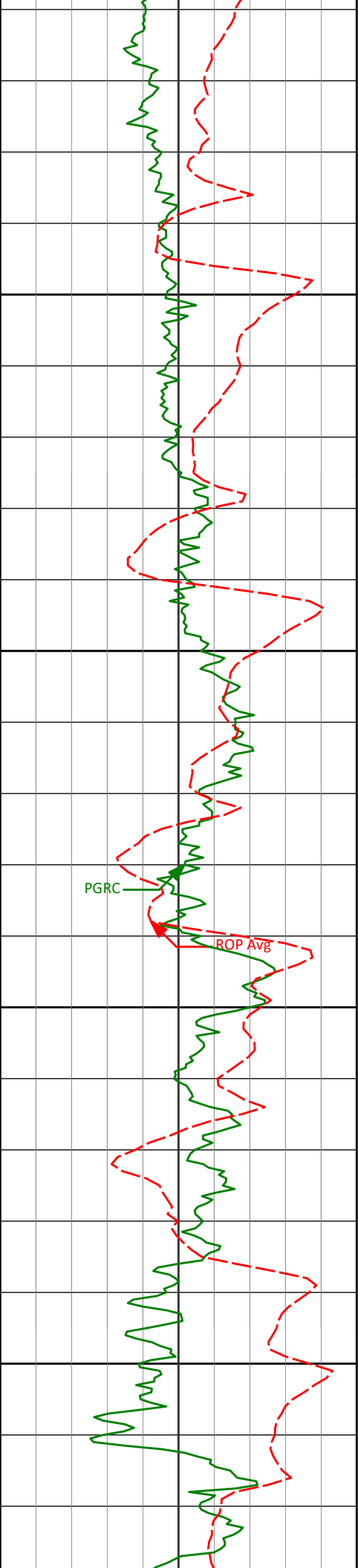
Noble Energy, Inc
Jenkins B11-79-1HCM
H&P 315
T5N R64W

PCG Gamma Ray PGRC api	
-------------------------------------	--

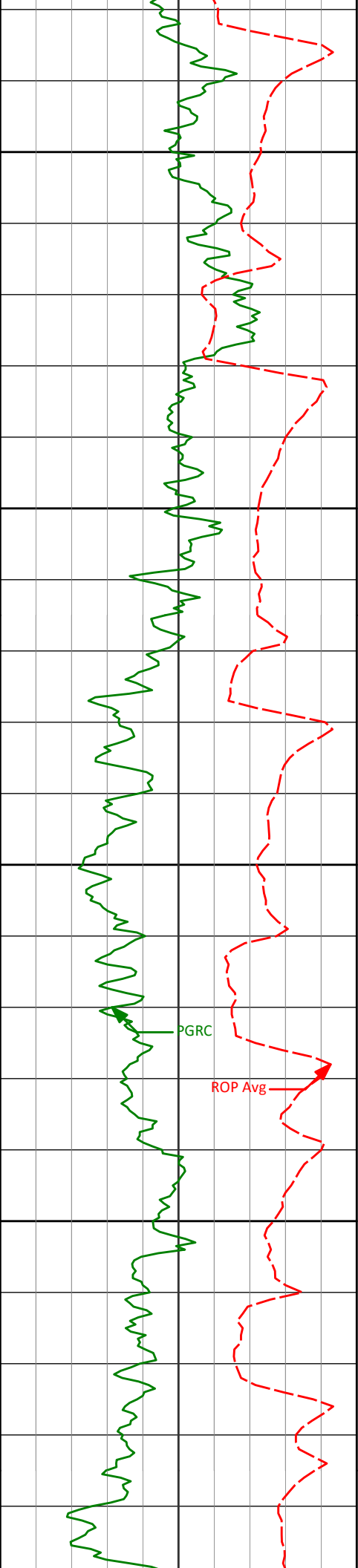
Avg Rate of Penetration ROP Avg feet per hr	Depth ft	Depth	Inc.	Azi.	TVD	V.S.
--	-------------	--------------	-------------	-------------	------------	-------------







	6390'	26.55°	356.18°	6333.06'	564.58'
6400					
	6438'	31.26°	358.33°	6375.07'	587.73'
6450					
	6484'	33.92°	0.52°	6413.82'	612.50'
6500					
	6532'	36.06°	359.60°	6453.14'	640.02'
6550					
	6570'	38.33°	0.44°	6488.33'	668.75'



6600

6650

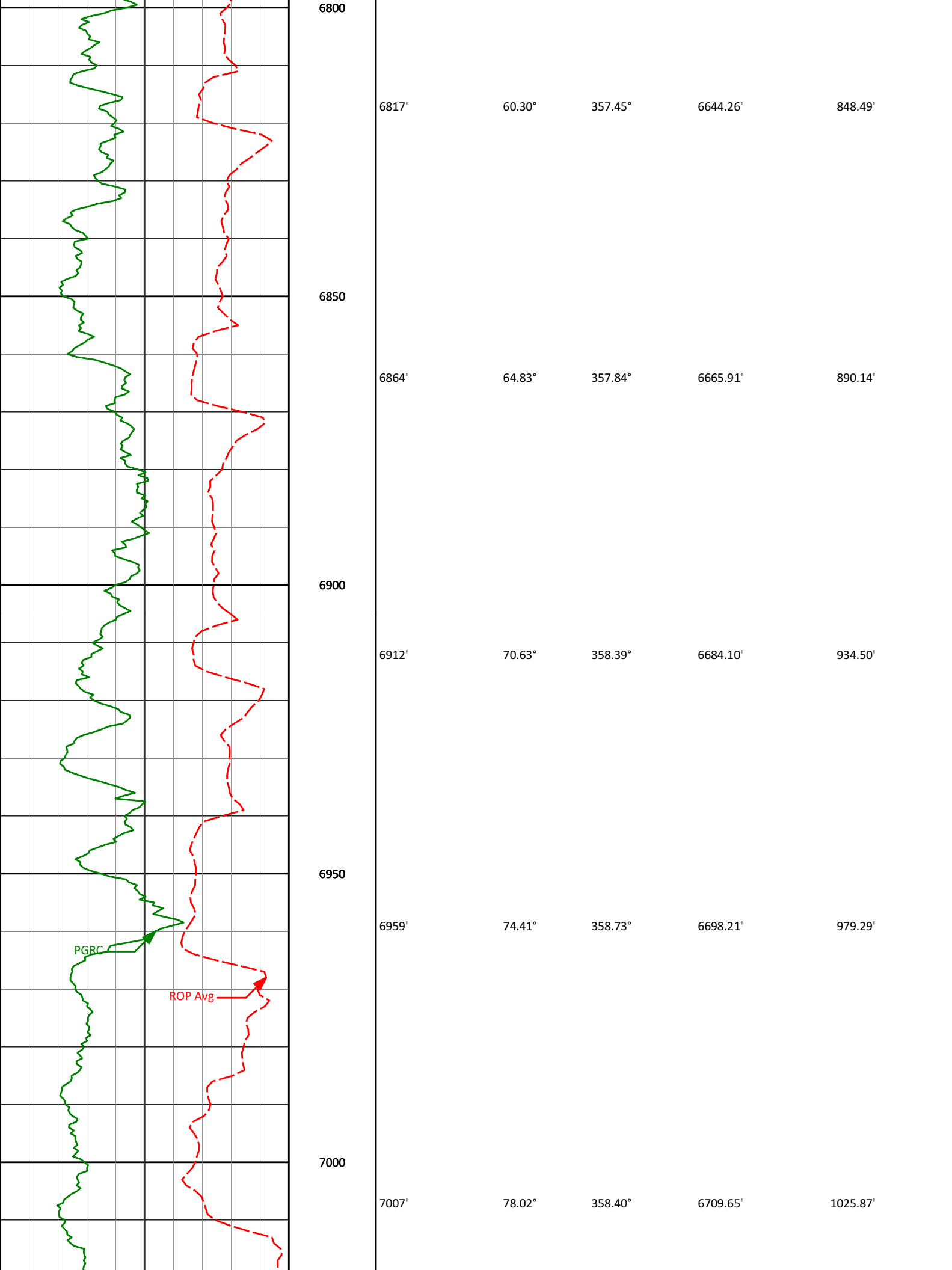
6700

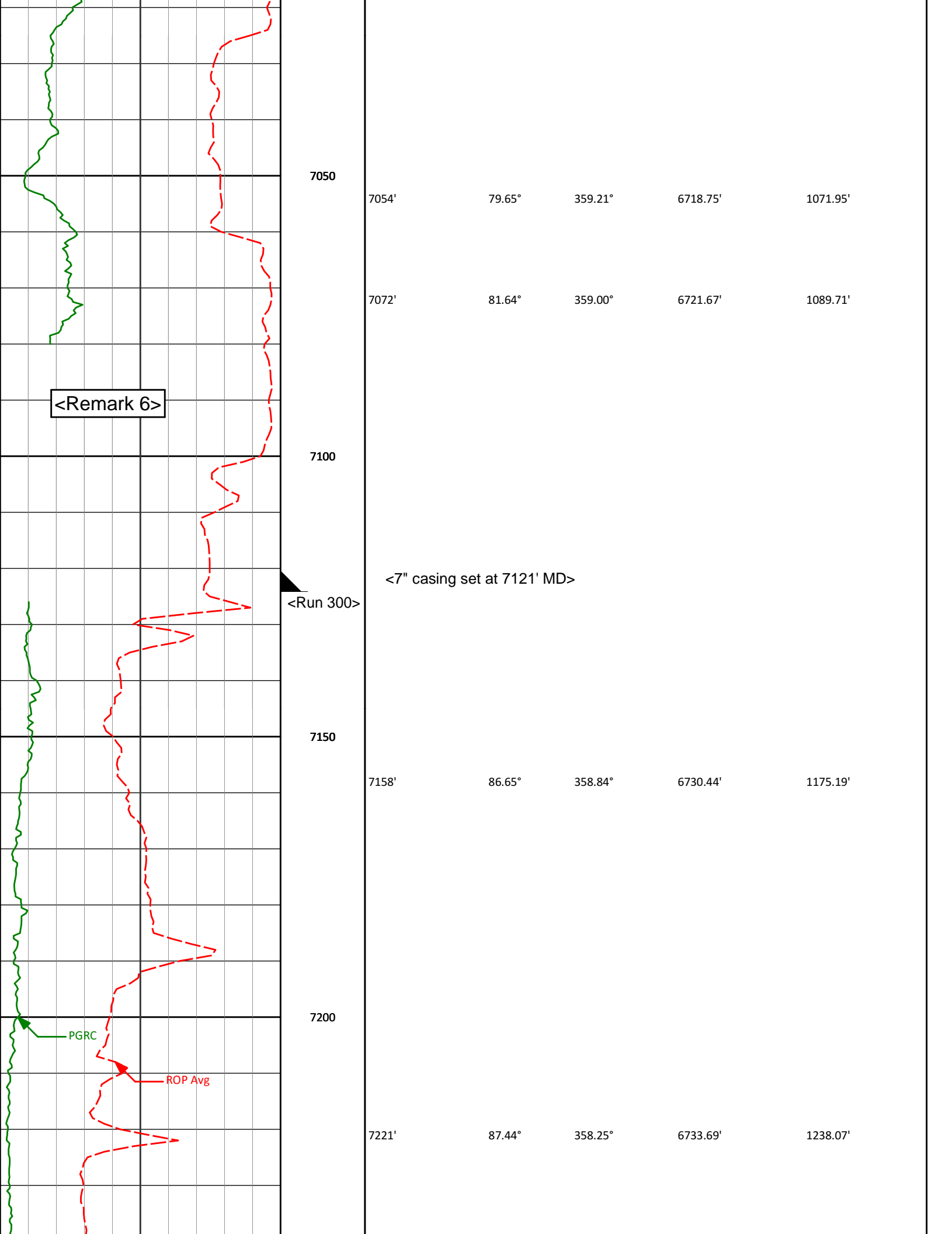
6750

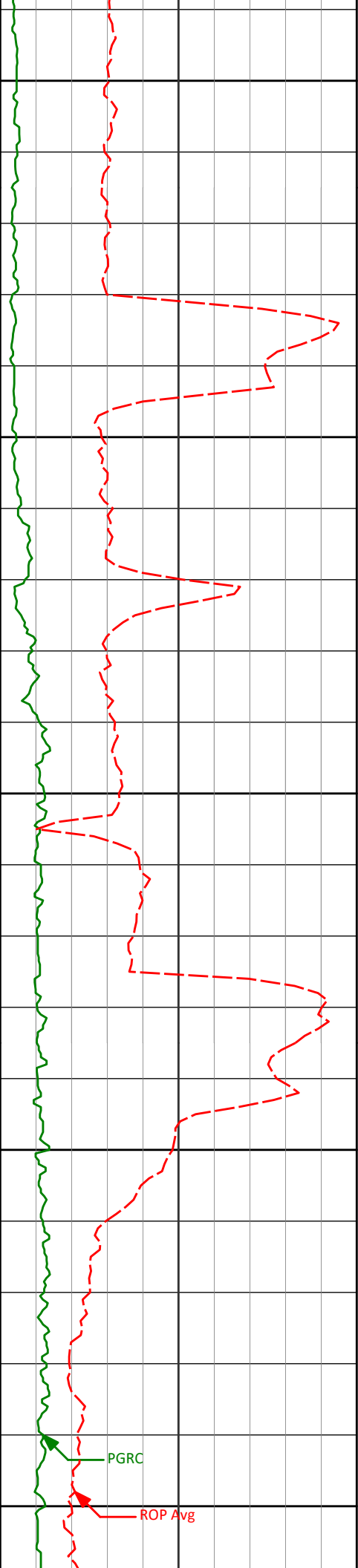
PGRC

ROP Avg

6579'	39.33°	0.41°	6490.33'	668.75'
6627'	43.06°	359.96°	6526.44'	700.36'
6674'	47.55°	359.97°	6559.49'	733.76'
6722'	51.32°	359.51°	6590.70'	770.21'
6769'	55.42°	358.58°	6618.73'	807.91'







7250

7300

7350

7400

7450

7316'

89.20°

358.18°

6736.48'

1332.94'

7411'

87.59°

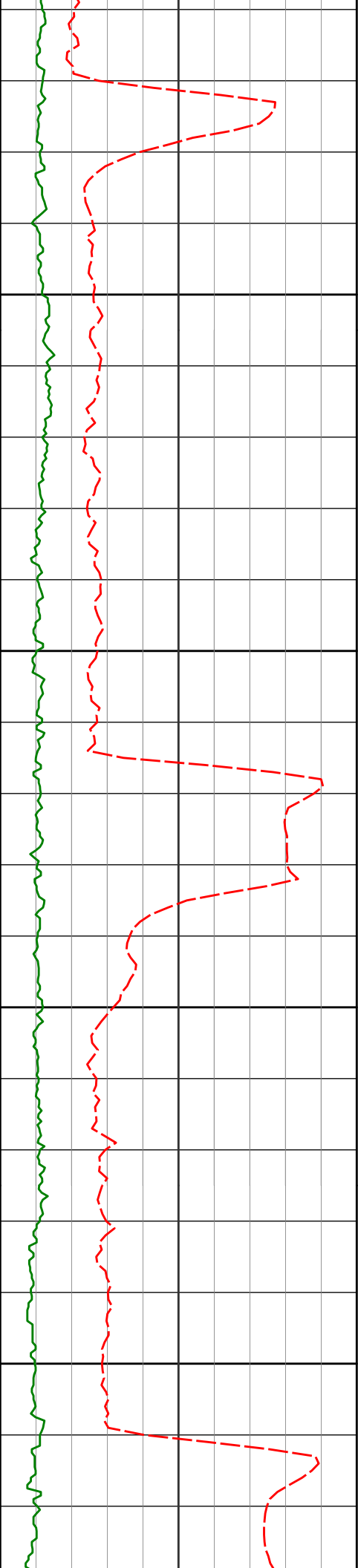
358.08°

6739.14'

1427.80'

PGRC

ROP Avg



7500

7506'

88.24°

357.87°

6742.59'

1522.64'

7550

7600

7600'

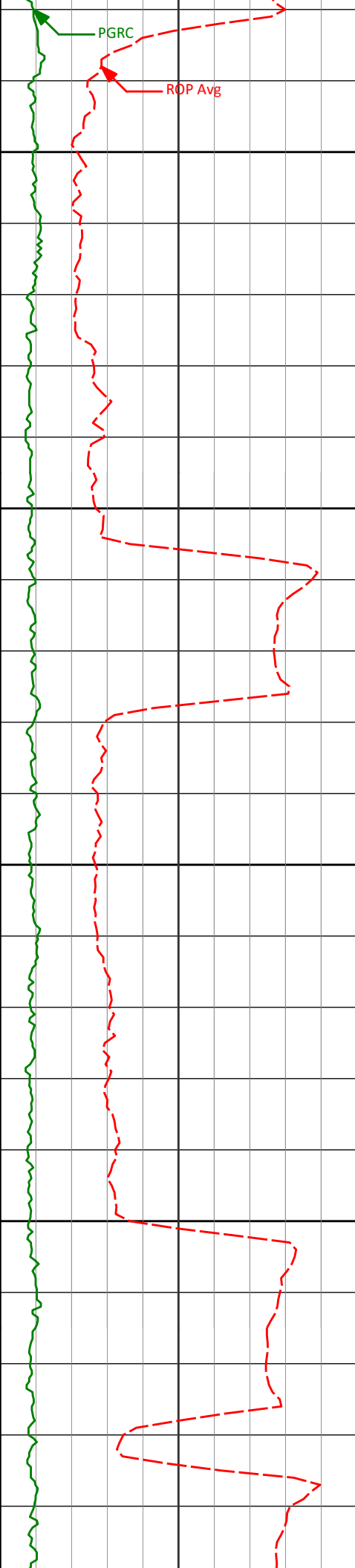
87.90°

357.62°

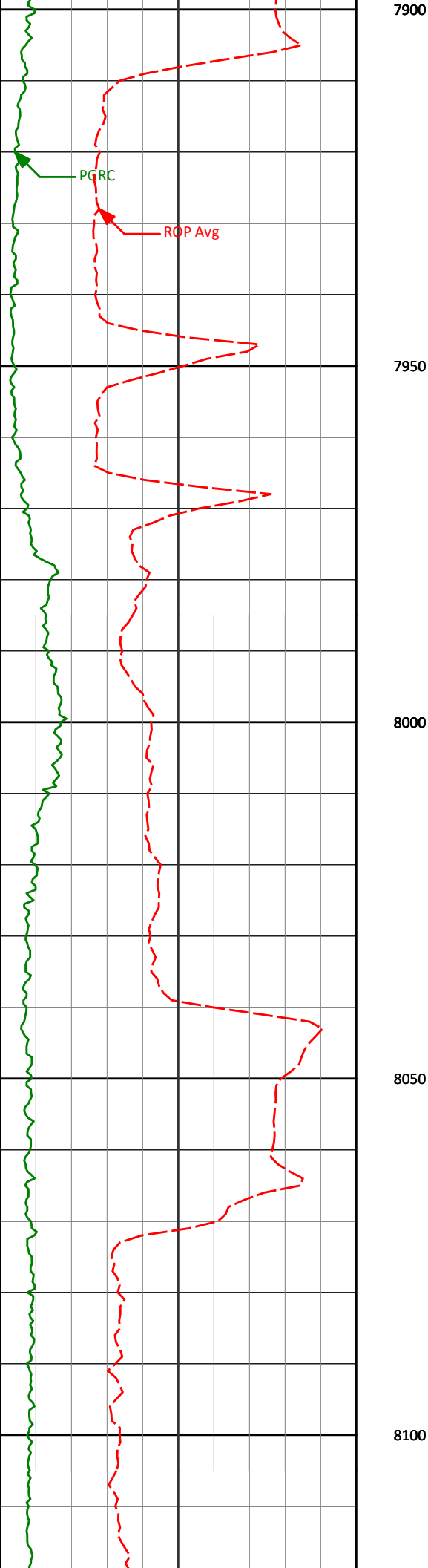
6745.76'

1616.46'

7650



7695'	88.21°	358.04°	6748.98'	1711.30'
7700				
7750				
7790'	88.27°	357.50°	6751.90'	1806.13'
7800				
7850				
7885'	89.72°	359.17°	6753.57'	1901.03'



7980'

91.11°

359.88°

6752.88'

1996.01'

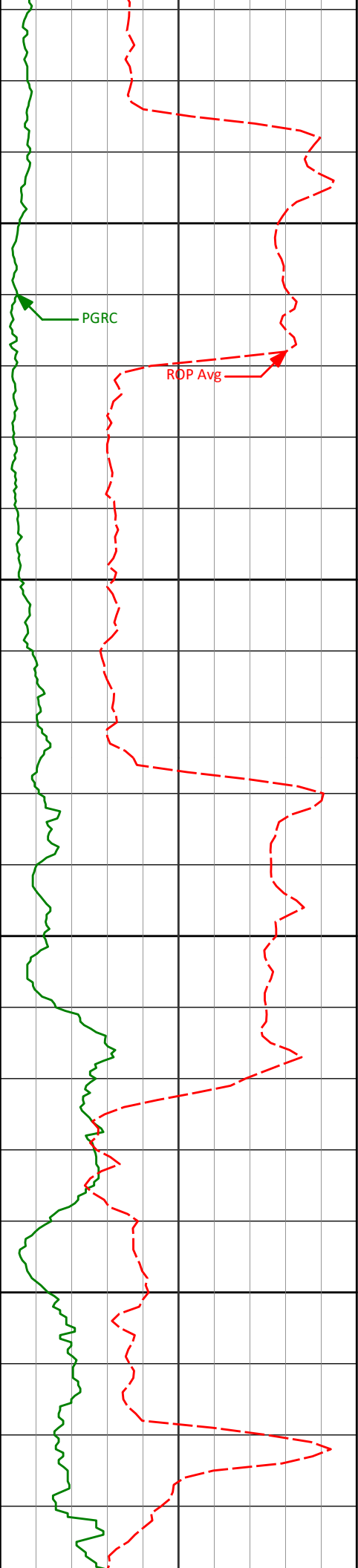
8075'

87.41°

359.87°

6754.11'

2090.98'



8150

8168'

87.84°

359.79°

6757.96'

2183.89'

8200

8250

8261'

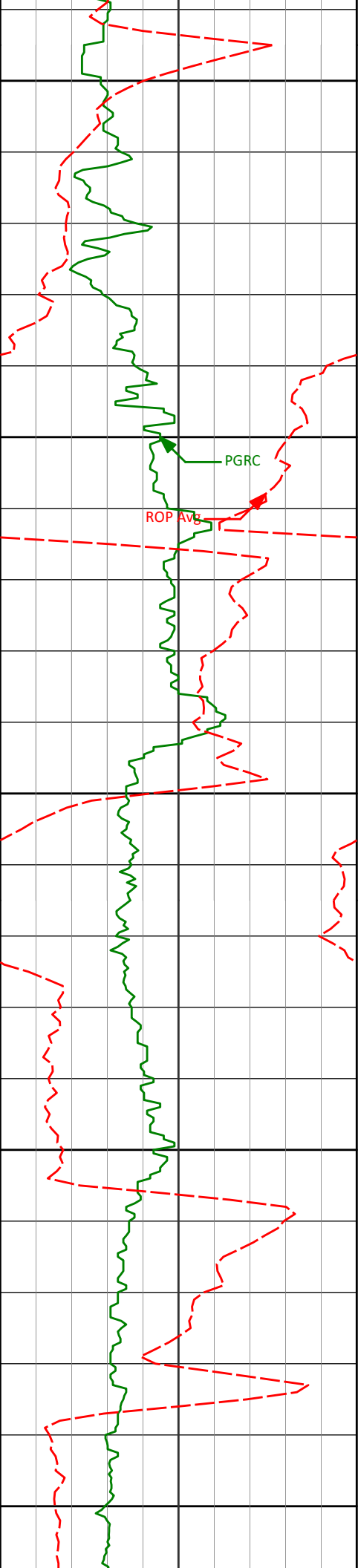
90.77°

0.88°

6759.09'

2276.87'

8300



8350

8354'	91.85°	359.23°	6756.96'	2369.83'
-------	--------	---------	----------	----------

8400

PGRC

ROP AVG

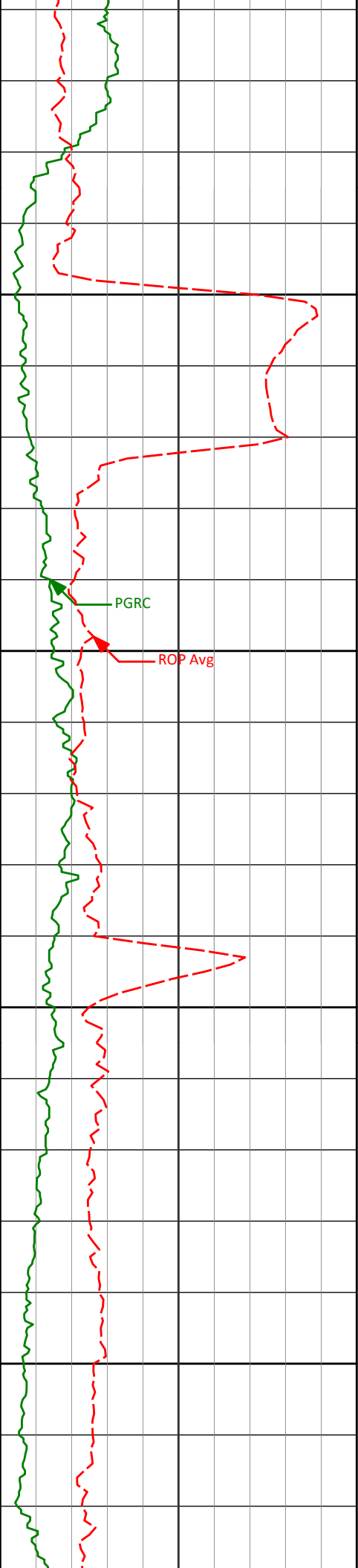
8450

8447'	91.67°	0.57°	6754.10'	2462.78'
-------	--------	-------	----------	----------

8500

8539'	91.64°	1.25°	6751.45'	2554.74'
-------	--------	-------	----------	----------

8550



8600

8631'

90.28°

0.46°

6749.91'

2646.72'

PGRC

ROP Avg

8650

8700

8724'

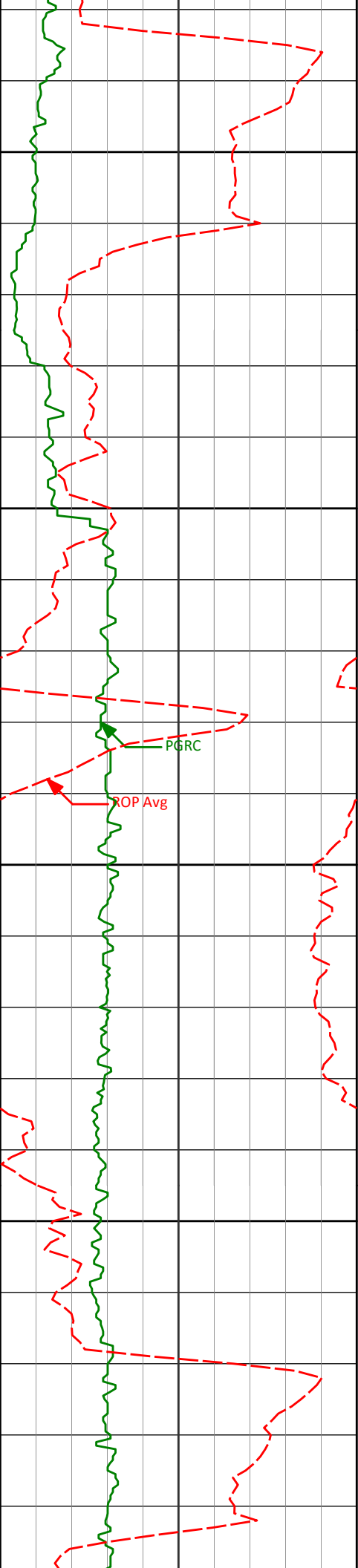
89.01°

359.40°

6750.48'

2739.71'

8750



8800

8816'

90.52°

0.95°

6750.86'

2831.70'

8850

PGRC

ROP Avg

8900

8908'

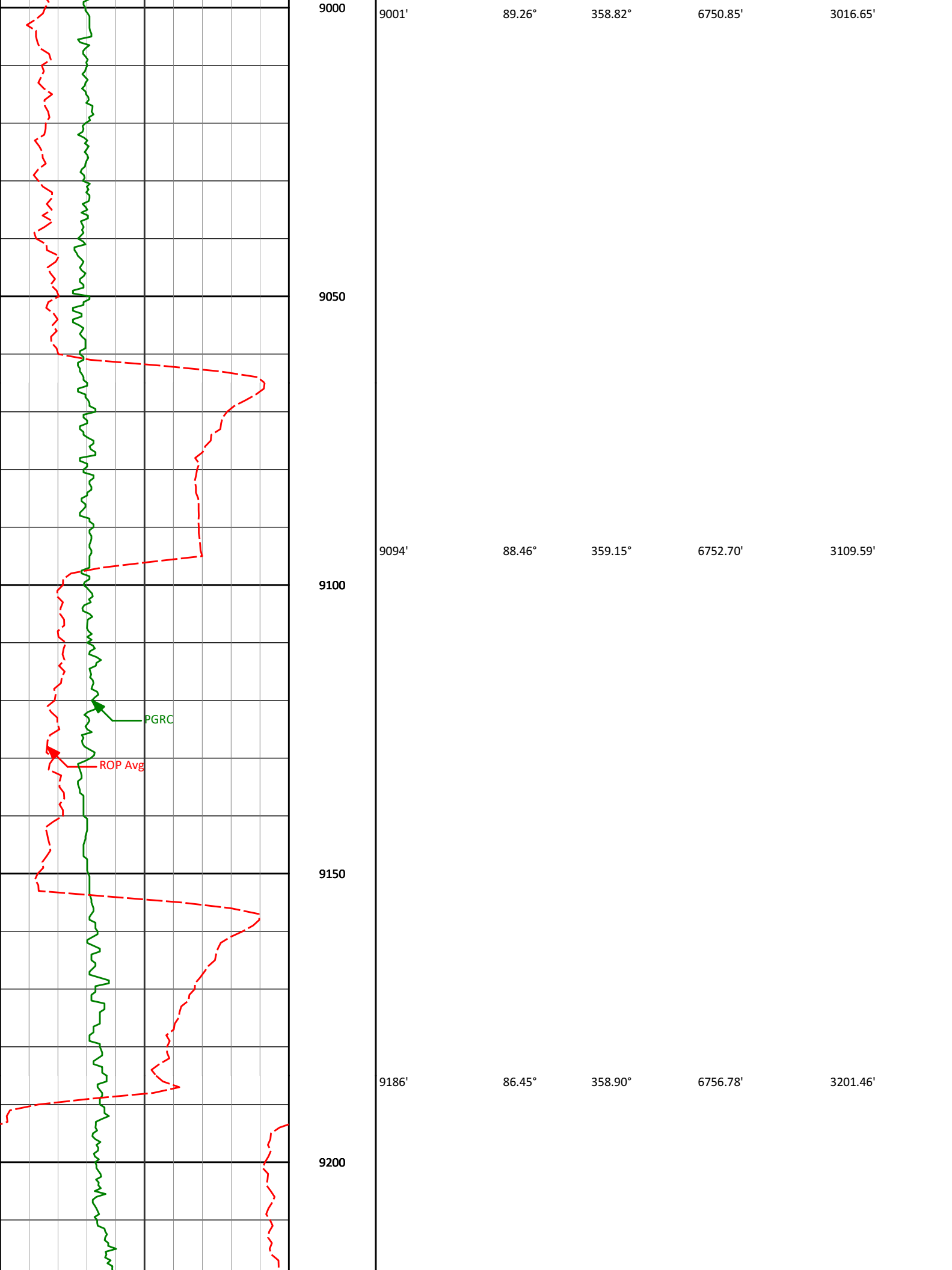
90.12°

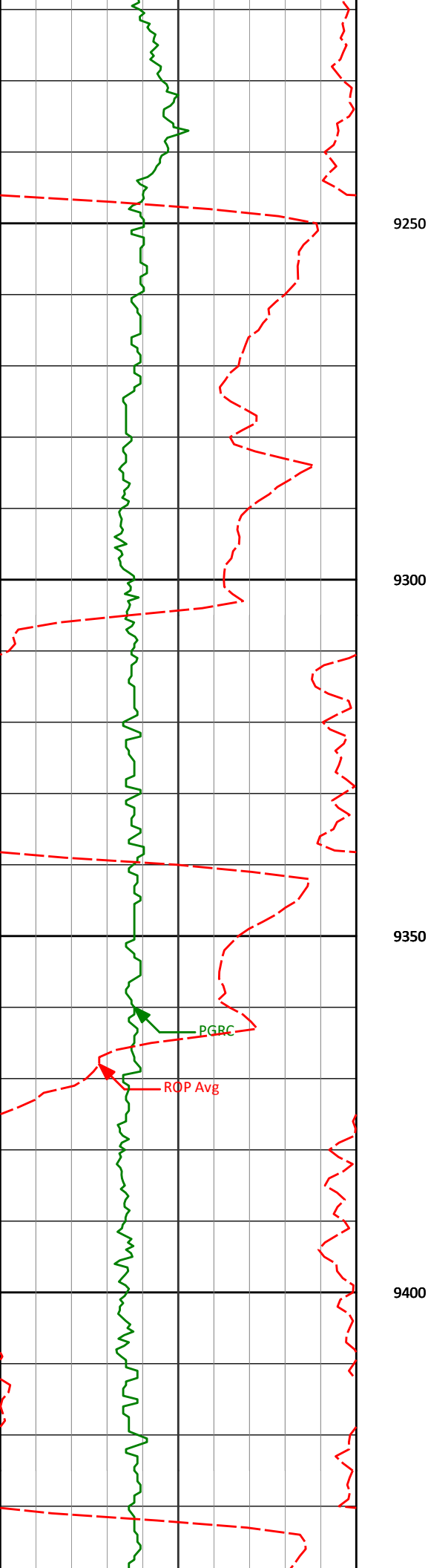
359.15°

6750.35'

2923.69'

8950





9277'

88.33°

0.38°

6760.93'

3292.35'

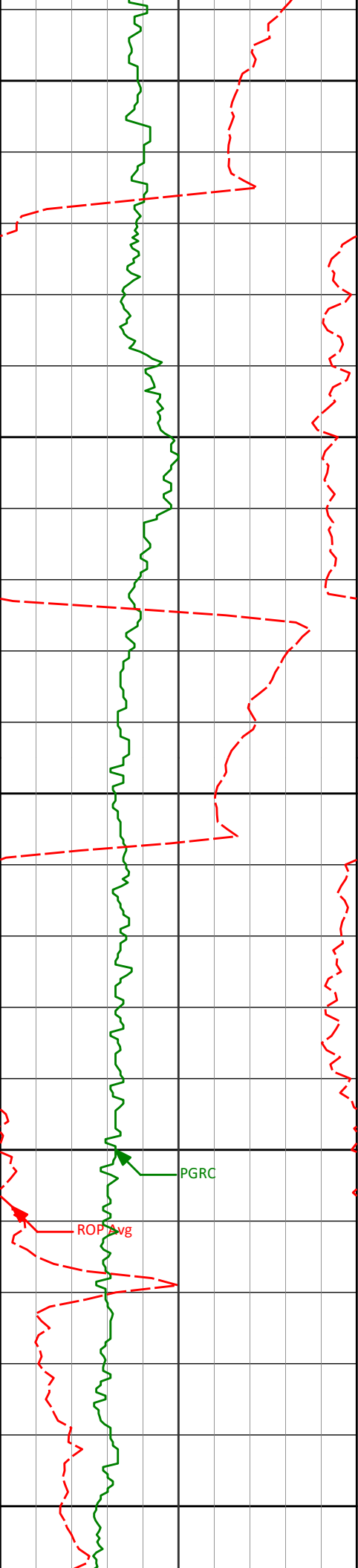
9370'

90.06°

359.59°

6762.23'

3385.33'



9450

9462'

91.29°

0.76°

6761.15'

3477.31'

9500

9550

9554'

91.33°

1.94°

6759.05'

3569.28'

9600

PGRC

ROP Avg

9650

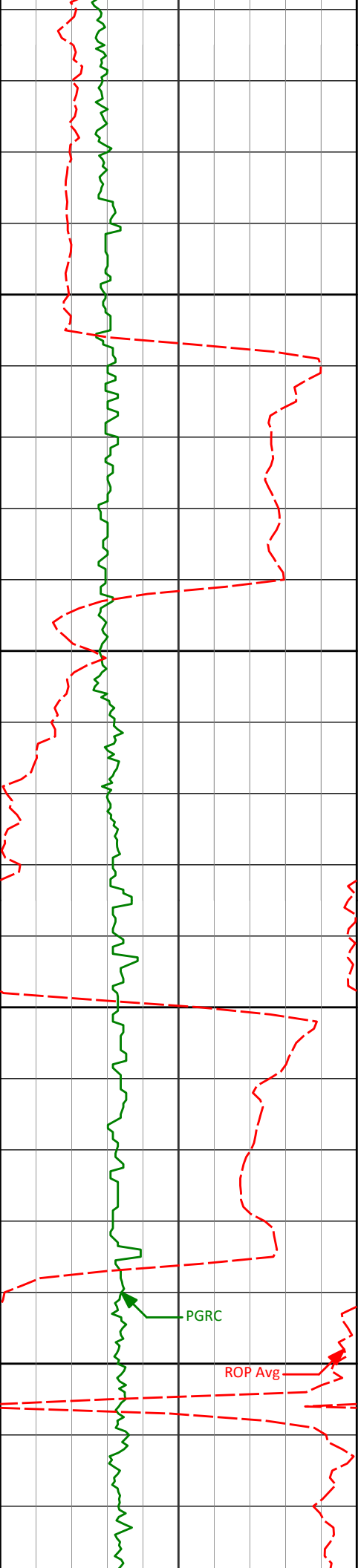
9648'

89.94°

359.76°

6758.01'

3663.27'



9700

9750

9800

9850

9741'

88.49°

358.98°

6759.28'

3756.23'

9834'

88.77°

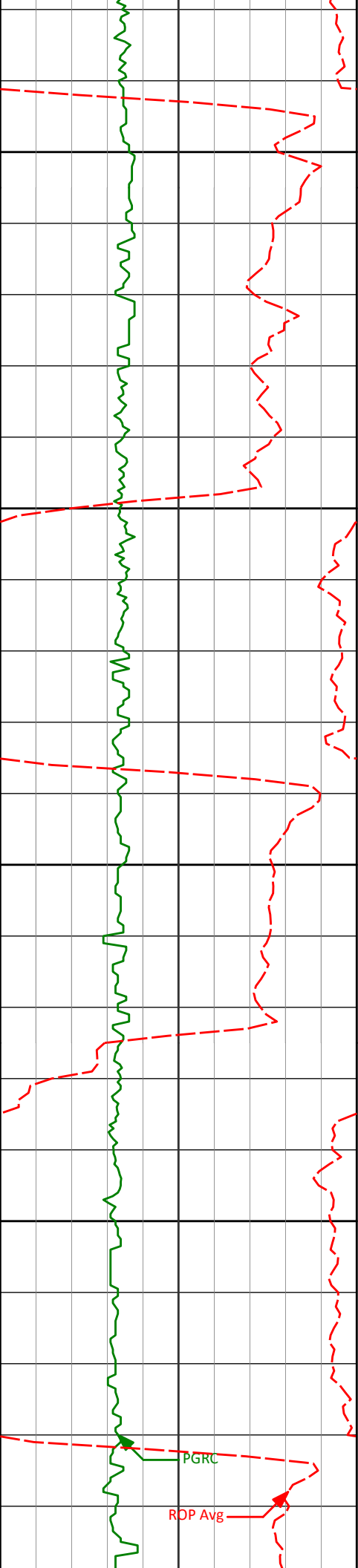
358.48°

6761.50'

3849.15'

PGRC

ROP Avg



9900

9927'

89.57°

359.61°

6762.85'

3942.11'

9950

10000

10022'

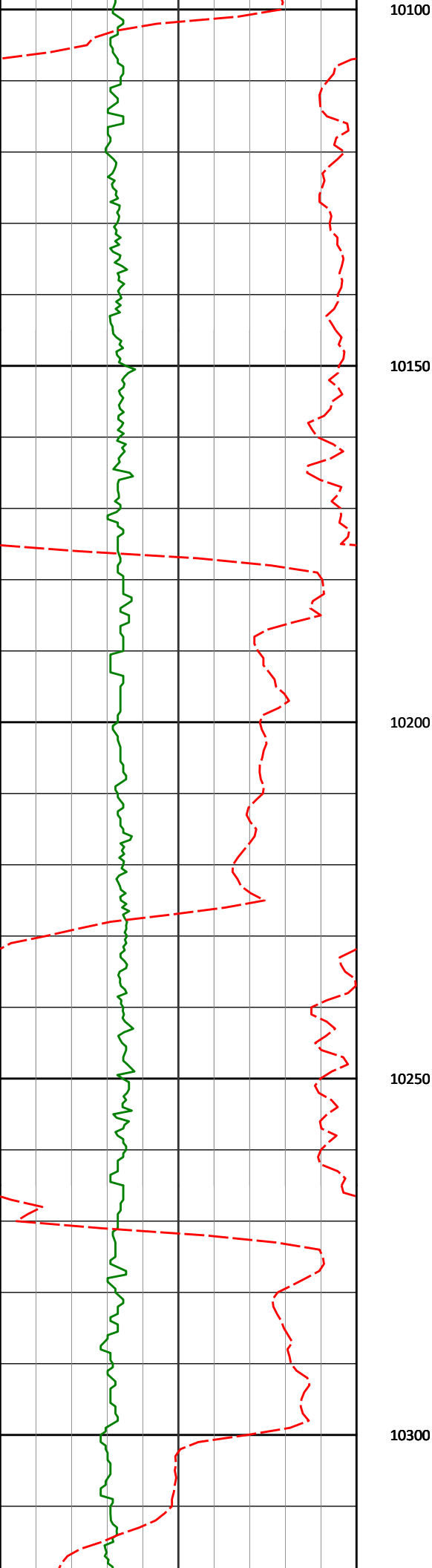
90.68°

0.81°

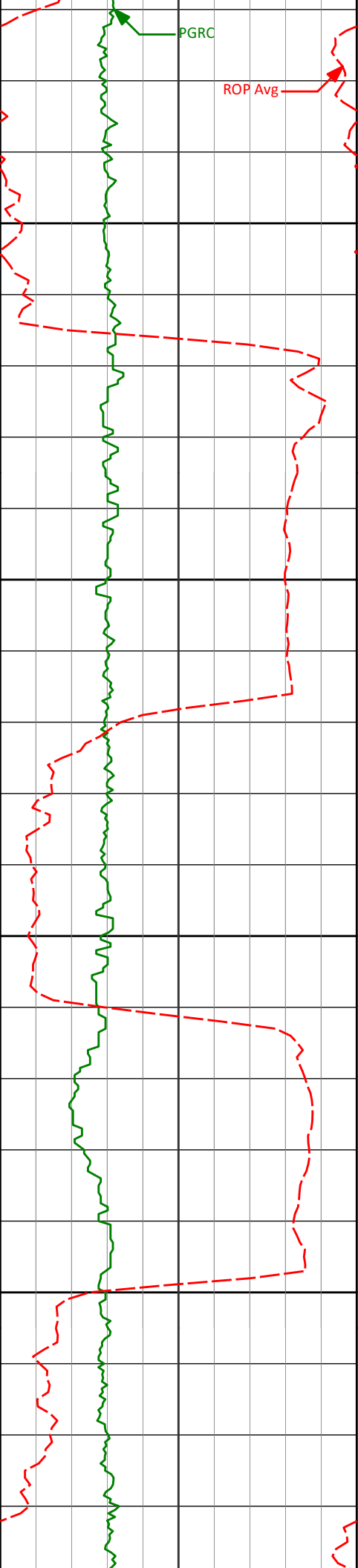
6762.64'

4037.10'

10050



10100				
10117'	89.29°	359.79°	6762.67'	4132.09'
10150				
10200				
10211'	90.12°	0.49°	6763.15'	4226.09'
10250				
10300				
10306'	90.52°	0.43°	6762.62'	4321.09'



10350

10400

10450

10500

10401'

90.59°

359.30°

6761.70'

4416.07'

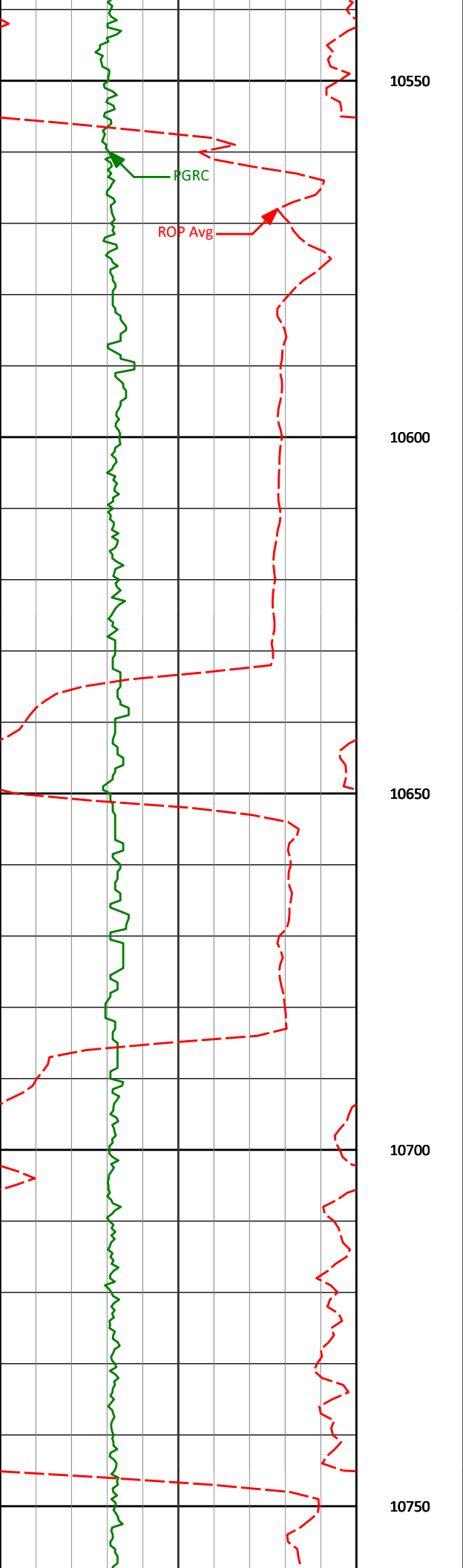
10496'

89.26°

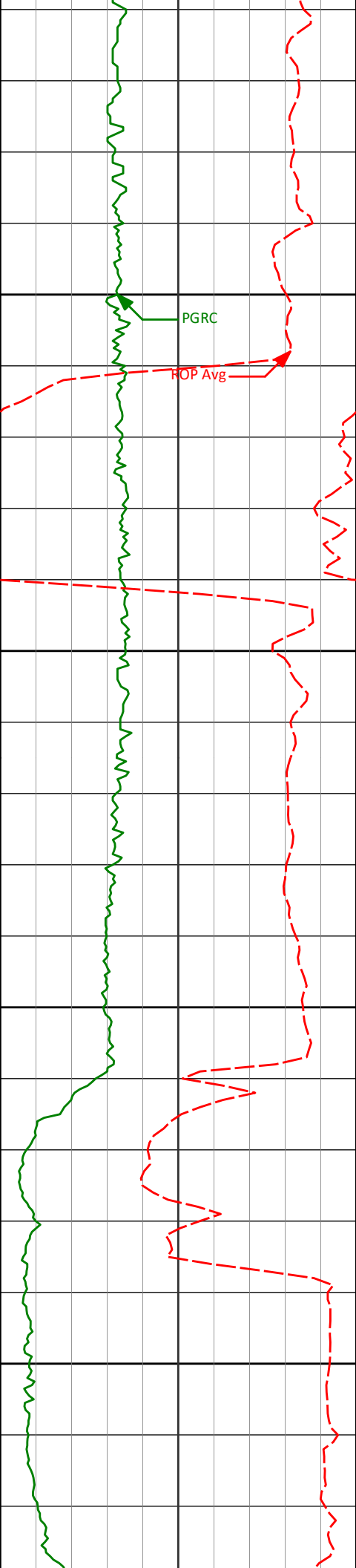
357.73°

6761.83'

4511.00'



10591'	87.69°	357.43°	6764.35'	4605.83'
10686'	89.20°	359.61°	6766.93'	4700.72'



10781'

89.48°

359.39°

6768.03'

4795.70'

10800

PGRC

ROP Avg

10850

10876'

91.30°

0.59°

6767.38'

4890.68'

10900

10950

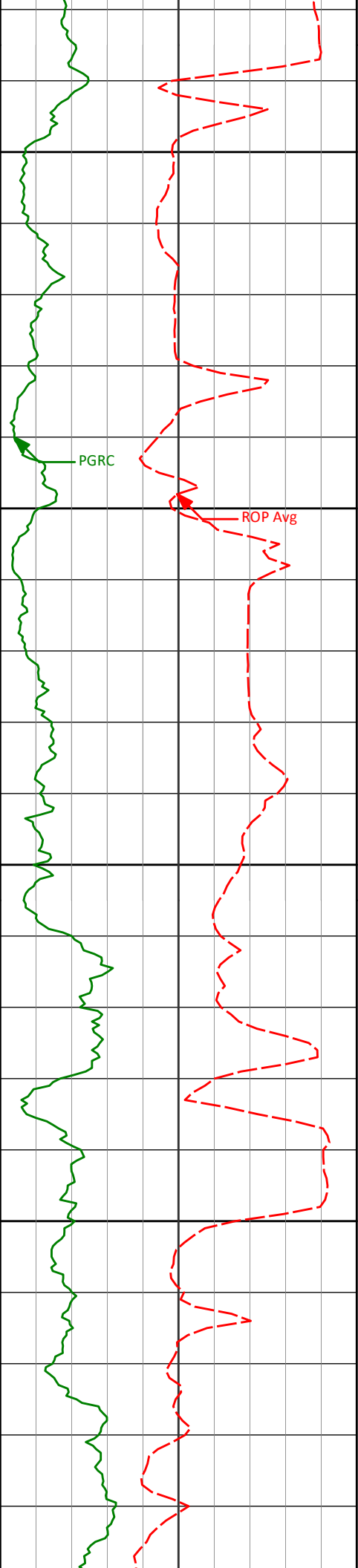
10971'

92.47°

3.30°

6764.25'

4985.59'



11000

11050

11100

11150

11066'

92.87°

2.84°

6759.83'

5080.41'

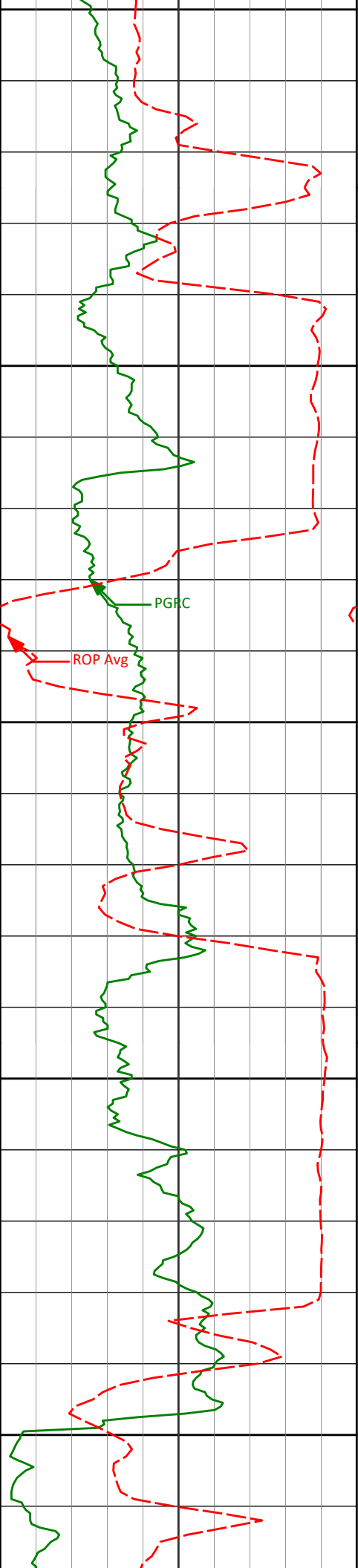
11160'

93.02°

0.79°

6755.00'

5174.26'



11200

11250

11300

11350

11400

11255'

92.40°

1.13°

6750.51'

5269.15'

11350'

91.79°

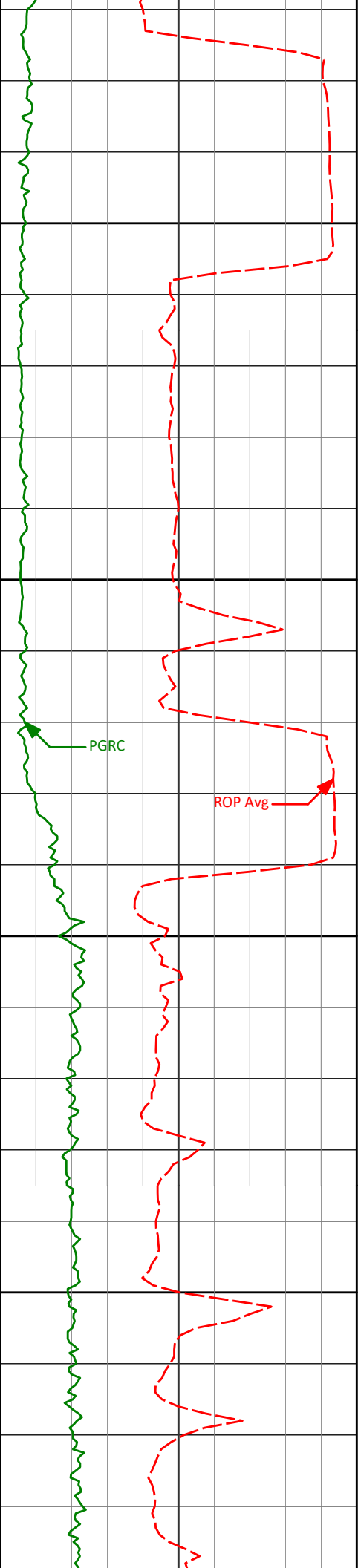
0.80°

6747.04'

5364.08'

PGRC

ROP Avg



11450

11500

11550

11600

11445'

89.41°

0.73°

6746.04'

5459.07'

11540'

88.40°

1.83°

6747.86'

5554.04'

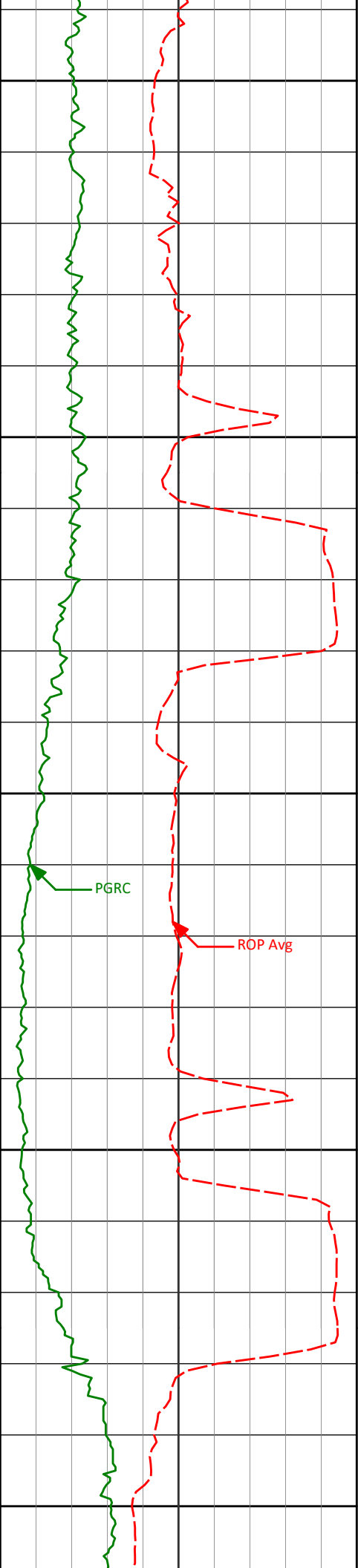
11635'

91.05°

2.41°

6748.31'

5649.00'



11650

11700

11750

11800

11850

11729'

85.03°

0.19°

6751.53'

5742.89'

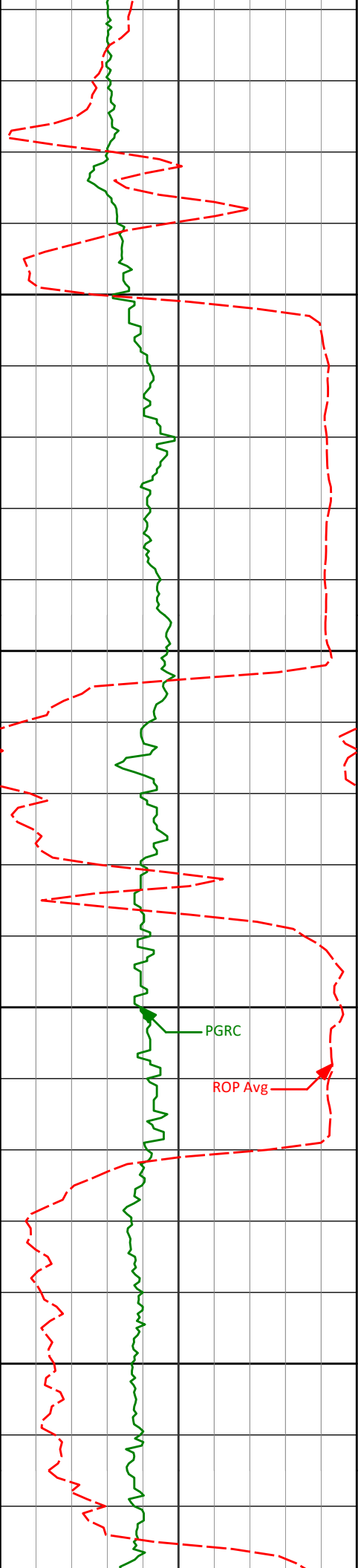
11824'

85.74°

359.33°

6759.17'

5837.57'



11900

11950

12000

12050

11919'

85.18°

358.39°

6766.69'

5932.23'

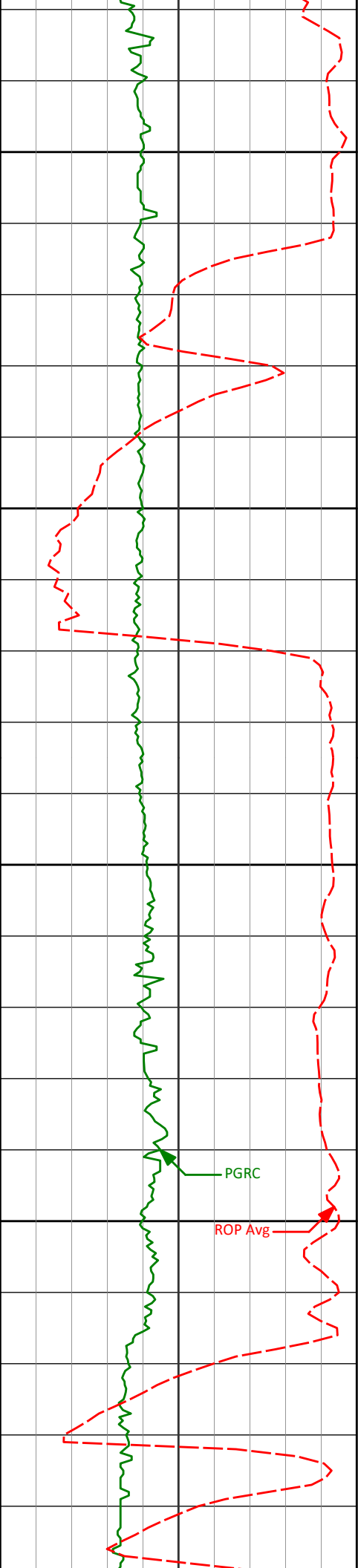
12014'

87.07°

357.92°

6773.11'

6026.92'



12100

12109'

88.12°

357.92°

6777.10'

6121.72'

12150

12200

12204'

89.44°

358.57°

6779.12'

6216.62'

PGRC

ROP Avg

12250

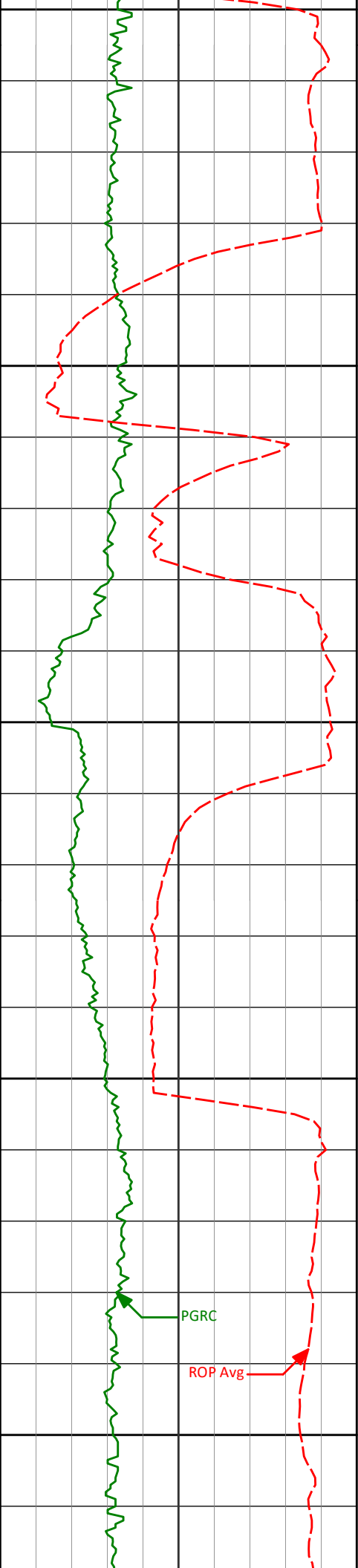
12298'

91.54°

357.98°

6778.31'

6310.53'



12300

12350

12400

12450

12500

12393'

90.37°

357.68°

6776.73'

6405.40'

12488'

87.78°

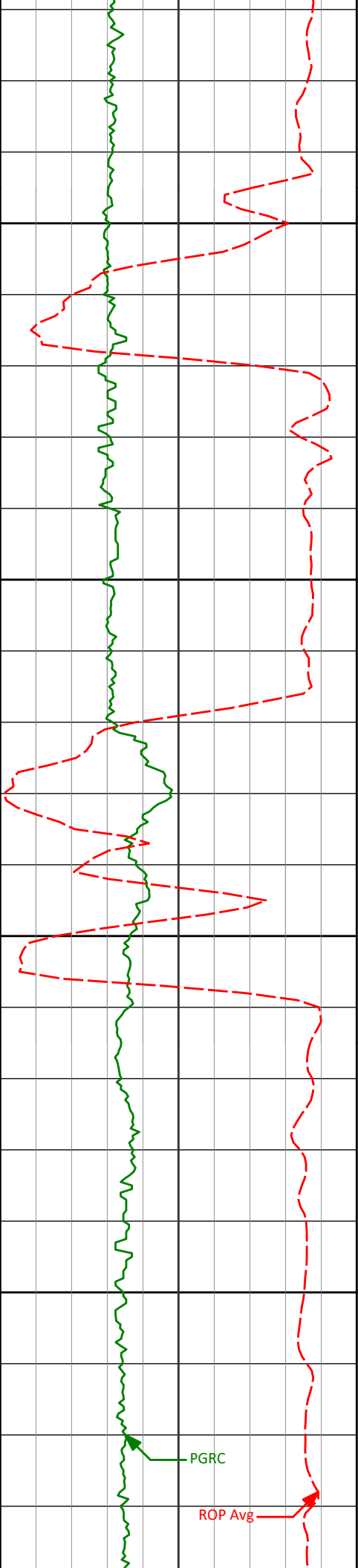
357.09°

6778.26'

6500.22'

PGRC

ROP Avg



12550

12600

12650

12700

12583'

88.61°

357.47°

6781.26'

6595.01'

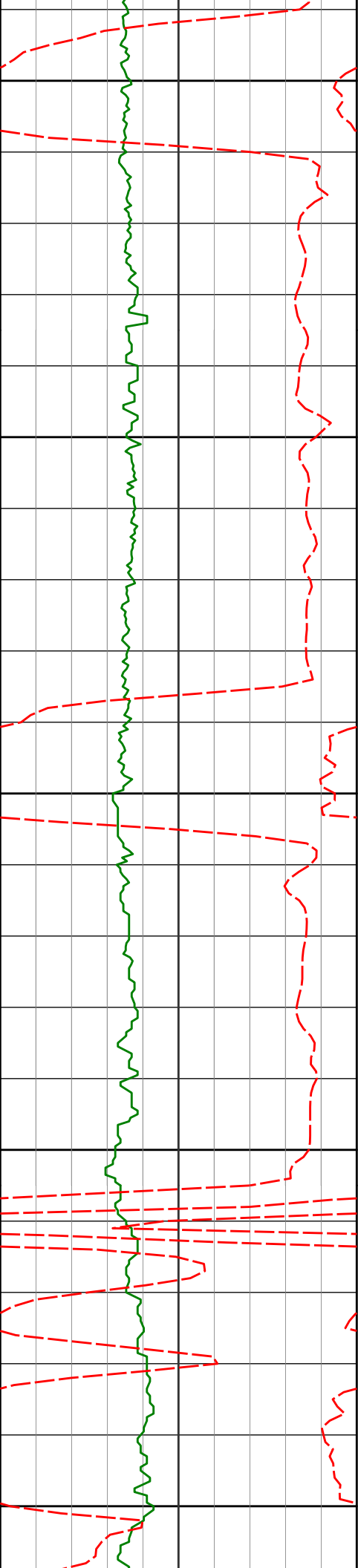
12678'

87.81°

359.25°

6784.22'

6689.89'



12750

12773'

89.72°

2.12°

6786.27'

6784.85'

12800

12850

12867'

91.26°

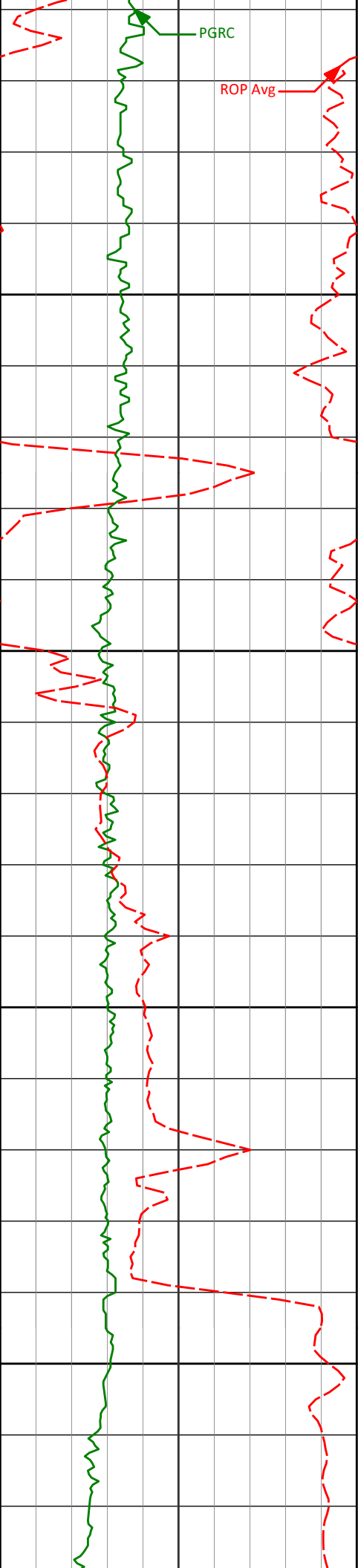
4.72°

6785.47'

6878.73'

12900

12950



12962'

91.79°

5.57°

6782.94'

6973.40'

13000

13050

13100

13150

13057'

90.92°

3.70°

6780.69'

7068.13'

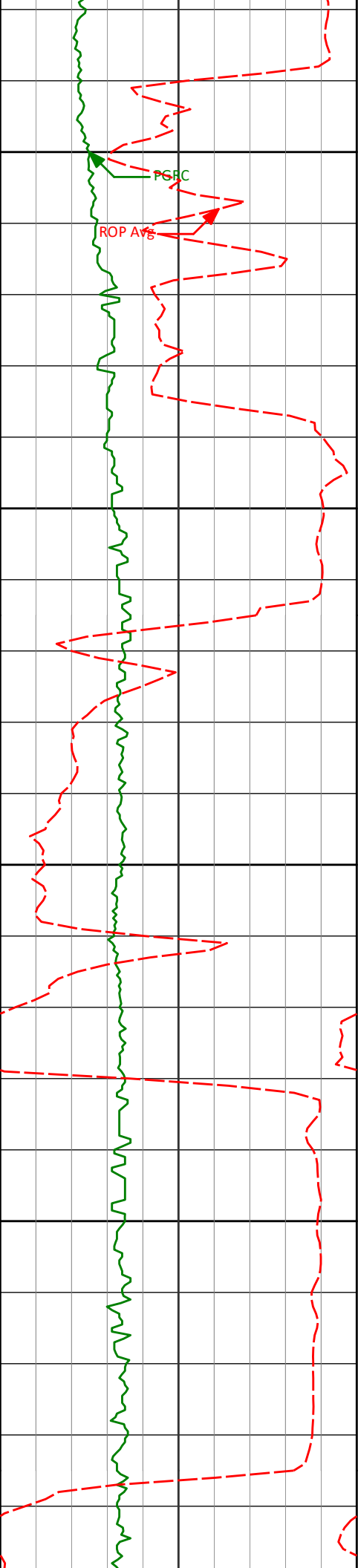
13152'

89.57°

1.37°

6780.29'

7163.07'



13200

<Run 400>

13250

13300

13350

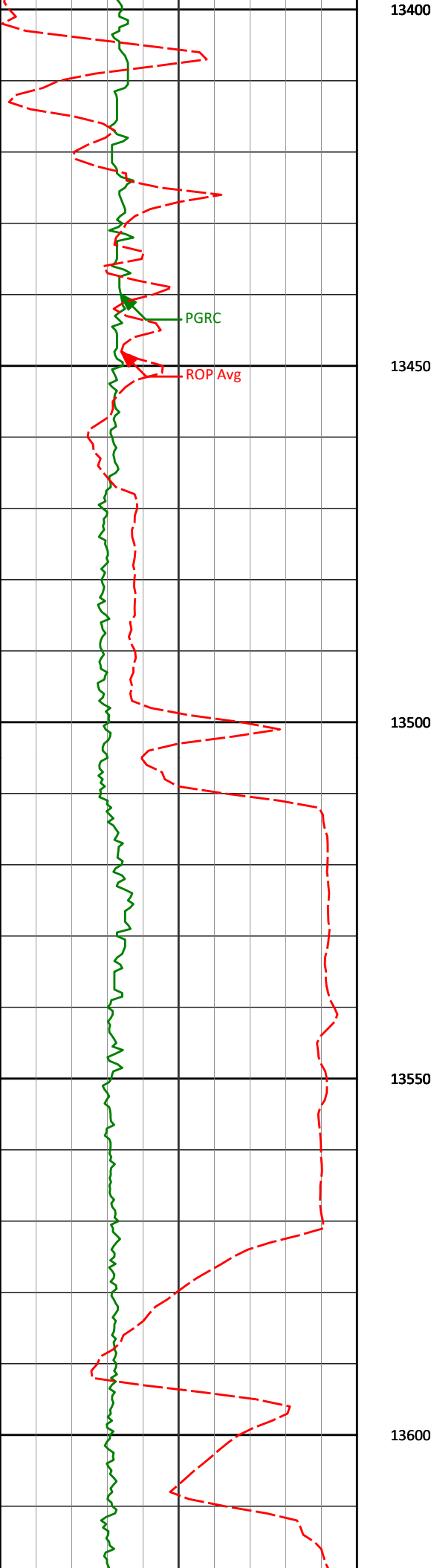
13247'

87.90°

2.00°

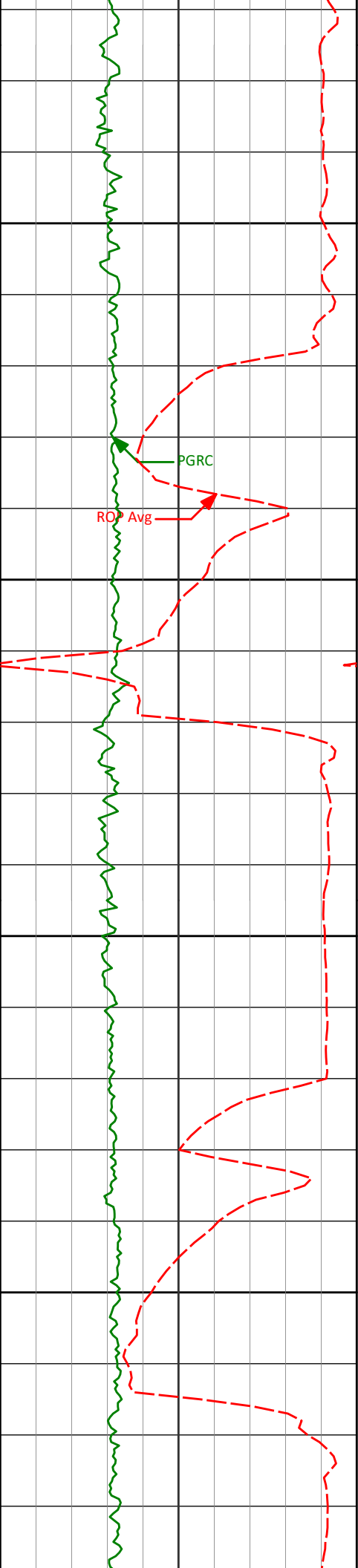
6782.38'

7258.03'



13437' 90.71° 356.73° 6785.69' 7447.90'

13532' 88.30° 356.82° 6786.51' 7542.67'



13627'

90.68°

359.62°

6787.36'

7637.56'

13650

13700

13722'

89.91°

0.45°

6786.87'

7732.55'

13750

13800

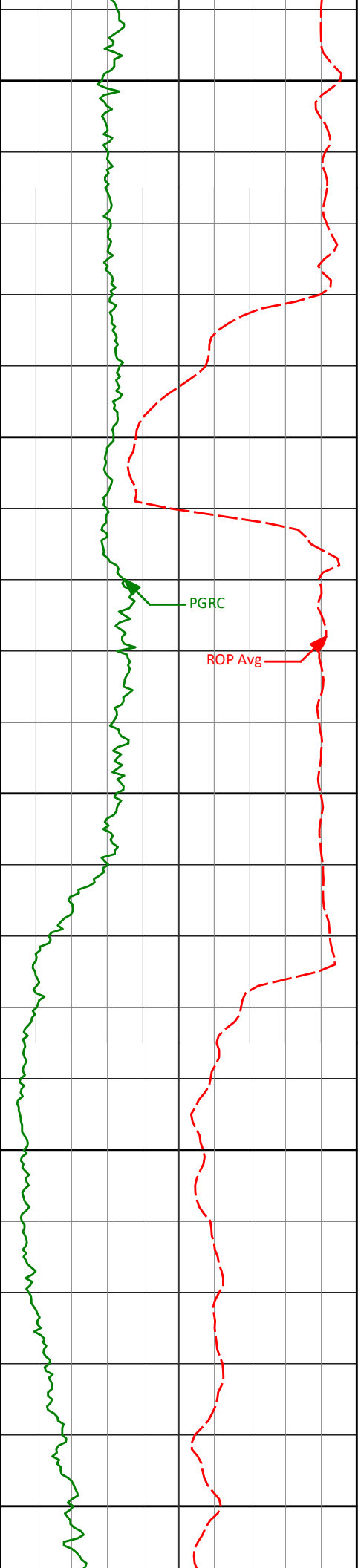
13817'

88.83°

1.62°

6787.91'

7827.54'



13850

13900

13950

14000

14050

13912'

90.55°

3.23°

6788.43'

7922.49'

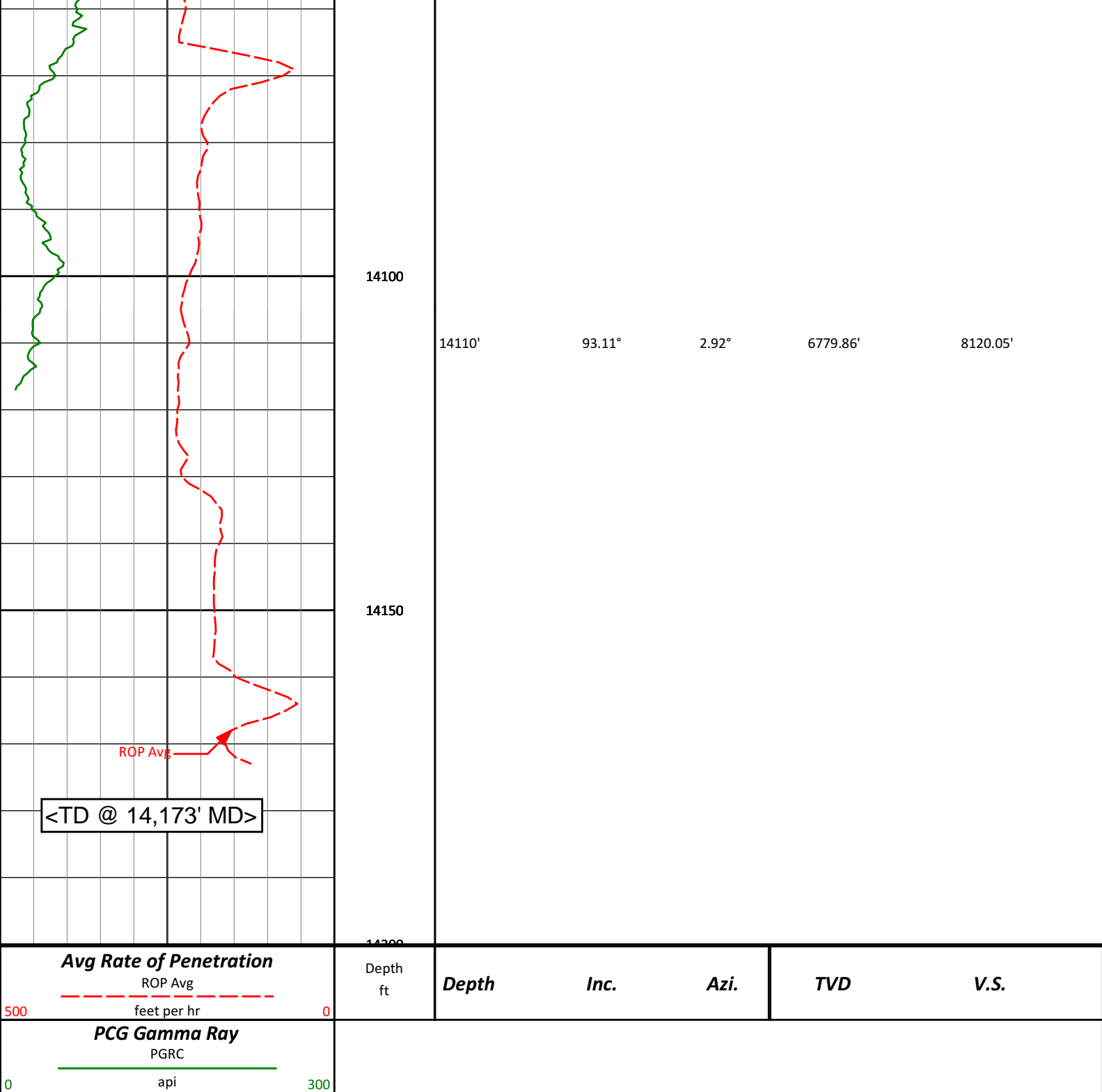
14007'

93.08°

3.66°

6785.42'

8017.31'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

**Noble Energy
Jenkins B11-79-1HCM
Wattenberg
Weld Colorado
USA
CA-XX-0900343457**

Surface surveys at 250 ft, 550 ft and 722 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Last survey is a projection from 14110 ft MD to TD at 14173 ft MD.

Measured	Vertical	Vertical
Depth	Depth	Depth

Depth (feet)	Inclination (degrees)	Direction (degrees)	Depth (feet)	Latitude (feet)	Departure (feet)	Section (feet)	Dogleg (deg/100ft)
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
250.00	0.70	110.10	249.99	0.52 S	1.43 E	-0.51	0.28
550.00	0.30	153.00	549.98	1.85 S	3.51 E	-1.82	0.17
722.00	0.40	146.10	721.98	2.75 S	4.05 E	-2.71	0.06
809.00	0.40	171.46	808.98	3.31 S	4.27 E	-3.26	0.20
1085.00	0.37	157.65	1084.97	5.08 S	4.75 E	-5.03	0.04
1178.00	0.83	106.19	1177.97	5.55 S	5.51 E	-5.49	0.72
1270.00	0.98	39.92	1269.96	5.13 S	6.65 E	-5.06	1.08
1457.00	1.01	41.74	1456.93	2.68 S	8.78 E	-2.58	0.02
1552.00	1.36	24.62	1551.91	1.03 S	9.80 E	-0.92	0.52
1646.00	1.26	22.54	1645.88	0.94 N	10.66 E	1.06	0.12
1741.00	0.99	42.38	1740.87	2.51 N	11.62 E	2.64	0.49
1836.00	2.02	27.49	1835.83	4.61 N	12.94 E	4.75	1.15
1931.00	4.55	24.13	1930.67	9.53 N	15.26 E	9.70	2.67
2026.00	5.07	11.82	2025.34	17.08 N	17.66 E	17.27	1.21
2121.00	6.21	9.15	2119.88	26.26 N	19.34 E	26.47	1.23
2216.00	6.06	18.51	2214.33	36.09 N	21.74 E	36.33	1.06
2311.00	7.05	13.54	2308.71	46.51 N	24.70 E	46.79	1.20
2406.00	8.54	7.73	2402.83	59.17 N	27.02 E	59.47	1.77
2501.00	9.92	3.63	2496.60	74.33 N	28.48 E	74.64	1.61
2596.00	11.23	0.93	2589.99	91.74 N	29.15 E	92.06	1.47
2691.00	13.34	2.63	2682.81	111.94 N	29.80 E	112.27	2.25
2786.00	13.39	5.60	2775.23	133.84 N	31.38 E	134.18	0.72
2881.00	12.87	7.65	2867.75	155.27 N	33.86 E	155.64	0.73
2976.00	12.97	12.61	2960.35	176.16 N	37.60 E	176.57	1.17
3071.00	13.83	14.24	3052.76	197.57 N	42.72 E	198.04	0.99
3166.00	12.16	16.95	3145.33	218.15 N	48.43 E	218.68	1.87
3261.00	10.76	17.61	3238.43	236.18 N	54.03 E	236.76	1.48
3355.00	12.00	11.00	3330.58	254.13 N	58.55 E	254.77	1.91
3450.00	12.85	14.47	3423.36	274.06 N	63.07 E	274.74	1.19
3545.00	13.40	12.75	3515.88	295.02 N	68.14 E	295.77	0.71
3640.00	15.11	11.52	3607.95	317.89 N	73.04 E	318.69	1.83
3735.00	15.66	11.32	3699.55	342.60 N	78.03 E	343.45	0.58
3830.00	14.08	11.97	3791.36	366.48 N	82.95 E	367.38	1.67
3925.00	11.11	13.91	3884.06	386.67 N	87.55 E	387.62	3.16
4020.00	8.72	12.48	3977.64	402.59 N	91.30 E	403.58	2.53
4115.00	6.66	17.78	4071.78	414.87 N	94.54 E	415.90	2.29
4210.00	4.91	17.79	4166.29	423.98 N	97.47 E	425.05	1.84
4305.00	4.61	9.60	4260.97	431.62 N	99.35 E	432.70	0.78
4400.00	5.45	7.63	4355.60	439.86 N	100.58 E	440.95	0.90
4495.00	3.84	11.73	4450.29	447.44 N	101.83 E	448.55	1.73
4590.00	2.44	8.05	4545.14	452.56 N	102.76 E	453.68	1.49
4685.00	3.93	4.91	4639.99	457.81 N	103.32 E	458.93	1.58
4780.00	4.89	19.43	4734.71	464.87 N	104.94 E	466.01	1.54
4875.00	4.08	24.24	4829.42	471.77 N	107.68 E	472.94	0.94
4969.00	2.34	31.70	4923.27	476.45 N	110.06 E	477.65	1.90
5064.00	1.66	20.36	5018.21	479.39 N	111.56 E	480.61	0.82
5159.00	0.90	37.56	5113.19	481.27 N	112.49 E	482.50	0.89
5444.00	1.42	56.53	5398.13	484.99 N	116.80 E	486.27	0.22
5539.00	0.66	16.98	5493.11	486.17 N	117.94 E	487.45	1.06
5823.00	0.57	8.86	5777.10	489.13 N	118.64 E	490.42	0.04
6013.00	0.45	5.10	5967.09	490.80 N	118.85 E	492.10	0.07
6067.00	0.65	352.21	6021.09	491.32 N	118.83 E	492.62	0.43
6200.00	10.00	356.95	6153.37	503.62 N	118.11 E	504.91	7.03
6248.00	14.60	359.01	6200.25	513.84 N	117.78 E	515.12	9.63
6295.00	18.50	357.66	6245.30	527.22 N	117.38 E	528.50	8.34
6343.00	22.32	356.45	6290.28	543.93 N	116.50 E	545.20	8.01
6390.00	26.55	356.18	6333.06	563.33 N	115.25 E	564.58	9.00
6438.00	31.26	358.33	6375.07	586.49 N	114.17 E	587.73	10.05
6484.00	33.92	0.52	6413.82	611.26 N	113.94 E	612.50	6.32
6532.00	36.06	359.60	6453.14	638.79 N	113.96 E	640.02	4.59
6579.00	39.33	0.41	6490.33	667.52 N	113.97 E	668.75	7.04
6627.00	43.06	359.96	6526.44	699.13 N	114.07 E	700.36	7.80
6674.00	47.55	359.97	6559.49	732.53 N	114.05 E	733.76	9.55
6722.00	51.32	359.51	6590.70	768.99 N	113.88 E	770.21	7.89
6769.00	55.42	358.58	6618.73	806.69 N	113.24 E	807.91	8.87
6817.00	60.30	357.45	6644.26	847.30 N	111.82 E	848.49	10.36
6864.00	64.83	357.84	6665.91	888.97 N	110.11 E	890.14	9.67
6912.00	70.63	358.39	6684.10	933.34 N	108.66 E	934.50	12.13
6959.00	74.44	358.72	6698.24	978.45 N	107.53 E	979.22	8.27

6959.00	74.41	358.73	6698.21	978.15 N	107.53 E	979.29	8.07
7007.00	78.02	358.40	6709.65	1024.74 N	106.36 E	1025.87	7.55
7054.00	79.65	359.21	6718.75	1070.84 N	105.40 E	1071.95	3.86
7072.00	81.64	359.00	6721.67	1088.60 N	105.13 E	1089.71	11.12
7158.00	86.65	358.84	6730.44	1174.11 N	103.51 E	1175.19	5.83
7221.00	87.44	358.25	6733.69	1237.00 N	101.91 E	1238.07	1.56
7316.00	89.20	358.18	6736.48	1331.91 N	98.96 E	1332.94	1.85
7411.00	87.59	358.08	6739.14	1426.82 N	95.86 E	1427.80	1.70
7506.00	88.24	357.87	6742.59	1521.70 N	92.50 E	1522.64	0.72
7600.00	87.90	357.62	6745.76	1615.57 N	88.81 E	1616.46	0.45
7695.00	88.21	358.04	6748.98	1710.45 N	85.21 E	1711.30	0.55
7790.00	88.27	357.50	6751.90	1805.33 N	81.52 E	1806.13	0.57
7885.00	89.72	359.17	6753.57	1900.27 N	78.76 E	1901.03	2.33
7980.00	91.11	359.88	6752.88	1995.26 N	77.97 E	1996.01	1.64
8075.00	87.41	359.87	6754.11	2090.24 N	77.76 E	2090.98	3.89
8168.00	87.84	359.79	6757.96	2183.16 N	77.49 E	2183.89	0.47
8261.00	90.77	0.88	6759.09	2276.14 N	78.03 E	2276.87	3.36
8354.00	91.85	359.23	6756.96	2369.11 N	78.12 E	2369.83	2.12
8447.00	91.67	0.57	6754.10	2462.06 N	77.96 E	2462.78	1.45
8539.00	91.64	1.25	6751.45	2554.01 N	79.42 E	2554.74	0.74
8631.00	90.28	0.46	6749.91	2645.99 N	80.79 E	2646.72	1.71
8724.00	89.01	359.40	6750.48	2738.98 N	80.68 E	2739.71	1.78
8816.00	90.52	0.95	6750.86	2830.98 N	80.96 E	2831.70	2.35
8908.00	90.12	359.15	6750.35	2922.97 N	81.04 E	2923.69	2.00
9001.00	89.26	358.82	6750.85	3015.95 N	79.39 E	3016.65	0.99
9094.00	88.46	359.15	6752.70	3108.92 N	77.74 E	3109.59	0.93
9186.00	86.45	358.90	6756.78	3200.81 N	76.18 E	3201.46	2.20
9277.00	88.33	0.38	6760.93	3291.71 N	75.61 E	3292.35	2.63
9370.00	90.06	359.59	6762.23	3384.69 N	75.59 E	3385.33	2.04
9462.00	91.29	0.76	6761.15	3476.68 N	75.87 E	3477.31	1.85
9554.00	91.33	1.94	6759.05	3568.63 N	78.03 E	3569.28	1.28
9648.00	89.94	359.76	6758.01	3662.61 N	79.43 E	3663.27	2.75
9741.00	88.49	358.98	6759.28	3755.59 N	78.40 E	3756.23	1.77
9834.00	88.77	358.48	6761.50	3848.54 N	76.34 E	3849.15	0.62
9927.00	89.57	359.61	6762.85	3941.52 N	74.79 E	3942.11	1.49
10022.00	90.68	0.81	6762.64	4036.51 N	75.14 E	4037.10	1.72
10117.00	89.29	359.79	6762.67	4131.51 N	75.64 E	4132.09	1.81
10211.00	90.12	0.49	6763.15	4225.50 N	75.87 E	4226.09	1.16
10306.00	90.52	0.43	6762.62	4320.50 N	76.63 E	4321.09	0.43
10401.00	90.59	359.30	6761.70	4415.49 N	76.41 E	4416.07	1.19
10496.00	89.26	357.73	6761.83	4510.46 N	73.95 E	4511.00	2.17
10591.00	87.69	357.43	6764.35	4605.34 N	69.94 E	4605.83	1.68
10686.00	89.20	359.61	6766.93	4700.26 N	67.48 E	4700.72	2.79
10781.00	89.48	359.39	6768.03	4795.25 N	66.66 E	4795.70	0.37
10876.00	91.30	0.59	6767.38	4890.24 N	66.64 E	4890.68	2.29
10971.00	92.47	3.30	6764.25	4985.13 N	69.86 E	4985.59	3.11
11066.00	92.87	2.84	6759.83	5079.89 N	74.94 E	5080.41	0.64
11160.00	93.02	0.79	6755.00	5173.71 N	77.92 E	5174.26	2.18
11255.00	92.40	1.13	6750.51	5268.59 N	79.51 E	5269.15	0.74
11350.00	91.79	0.80	6747.04	5363.51 N	81.10 E	5364.08	0.73
11445.00	89.41	0.73	6746.04	5458.49 N	82.37 E	5459.07	2.51
11540.00	88.40	1.83	6747.86	5553.45 N	84.49 E	5554.04	1.57
11635.00	91.05	2.41	6748.31	5648.37 N	88.01 E	5649.00	2.86
11729.00	85.03	0.19	6751.53	5742.24 N	90.14 E	5742.89	6.82
11824.00	85.74	359.33	6759.17	5836.93 N	89.74 E	5837.57	1.17
11919.00	85.18	358.39	6766.69	5931.62 N	87.86 E	5932.23	1.15
12014.00	87.07	357.92	6773.11	6026.34 N	84.81 E	6026.92	2.05
12109.00	88.12	357.92	6777.10	6121.20 N	81.36 E	6121.72	1.11
12204.00	89.44	358.57	6779.12	6216.13 N	78.45 E	6216.62	1.55
12298.00	91.54	357.98	6778.31	6310.08 N	75.63 E	6310.53	2.32
12393.00	90.37	357.68	6776.73	6404.99 N	72.03 E	6405.40	1.27
12488.00	87.78	357.09	6778.26	6499.87 N	67.70 E	6500.22	2.80
12583.00	88.61	357.47	6781.26	6594.72 N	63.19 E	6595.01	0.96
12678.00	87.81	359.25	6784.22	6689.63 N	60.47 E	6689.89	2.05
12773.00	89.72	2.12	6786.27	6784.59 N	61.61 E	6784.85	3.63
12867.00	91.26	4.72	6785.47	6878.40 N	67.21 E	6878.73	3.21
12962.00	91.79	5.57	6782.94	6972.99 N	75.73 E	6973.40	1.05
13057.00	90.92	3.70	6780.69	7067.64 N	83.40 E	7068.13	2.17
13152.00	89.57	1.37	6780.29	7162.54 N	87.61 E	7163.07	2.83
13247.00	87.90	2.05	6782.38	7257.47 N	90.44 E	7258.03	1.90
13342.00	88.70	0.86	6785.20	7352.40 N	92.85 E	7352.98	1.51

13437.00	90.71	356.69	6785.69	7447.35 N	90.82 E	7447.90	4.87
13532.00	88.30	356.78	6786.51	7542.18 N	85.41 E	7542.67	2.54
13627.00	90.68	359.60	6787.36	7637.12 N	82.41 E	7637.56	3.88
13722.00	89.91	0.46	6786.87	7732.11 N	82.46 E	7732.55	1.22
13817.00	88.83	1.64	6787.91	7827.09 N	84.20 E	7827.54	1.68

13912.00	90.55	3.24	6788.43	7921.99 N	88.24 E	7922.49	2.47
14007.00	93.08	3.70	6785.42	8016.76 N	93.99 E	8017.31	2.71
14110.00	93.11	2.94	6779.86	8119.44 N	99.95 E	8120.05	0.74
14173.00	93.11	2.94	6776.44	8182.27 N	103.17 E	8182.91	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 0.64 DEGREES (GRID)
A TOTAL CORRECTION OF 7.90 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 14173.00 FEET
IS 8182.92 FEET ALONG 0.72 DEGREES (GRID)**

Date Printed:08 June 2013