

**PCGK: Pressure Case Gamma**  
**PCDC: Pressure Case Directional**



**1 : 600 / 1 : 240**

[illegible]

## WELL INFORMATION

<b>MWD Run Number</b>	200	300	400	500	
<b>Date run completed</b>	24-May-14	24-May-14	29-May-14	03-Jun-14	
<b>Rig Bit Number</b>	2	3	4	5	
<b>Bit Size (in)</b>	8.750	8.750	6.125	6.125	
<b>Tool Nominal OD (in)</b>	6.750	6.750	4.750	4.750	
<b>Log Start Depth (MD, ft)</b>	626.00	5,460.00	6,506.00	12,384.00	
<b>Log End Depth (MD, ft)</b>	5,460.00	6,506.00	12,384.00	15,548.00	
<b>Drill or Wipe</b>	Drill	Drill	Drill	Drill	
<b>Drill/Wipe Start Date and Time</b>	23-May-14 12:45	24-May-14 07:30	26-May-14 04:00	30-May-14 07:00	
<b>Drill/Wipe End Date and Time</b>	23-May-14 22:45	24-May-14 18:10	29-May-14 13:00	02-Jun-14 22:30	
<b>Min Inc (deg) @ Depth (MD, ft)</b>	0.15 @ 1,366.00	1.87 @ 5,432.00	86.98 @ 11,729.00	86.98 @ 12,795.00	
<b>Max Inc (deg) @ Depth (MD, ft)</b>	10.79 @ 2,779.00	85.68 @ 6,452.00	94.22 @ 7,309.00	91.91 @ 13,459.00	
<b>Bit TFA(in2) / Bit Type</b>	0.74 / PDC	0.98 / PDC	0.86 / PDC	0.86 / PDC	
<b>Flow Rate (gpm)</b>	593.66	580.57	300.00	265.27	
<b>Max AV (fpm) / CV (fpm) @ MWD</b>	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A	
<b>Fluid Type</b>	Polymer	Polymer	Polymer	Polymer	
<b>Density (ppg) / Viscosity (spqt)</b>	9.00 / 32.00	10.20 / 43.00	10.25 / 26.00	10.20 / 37.00	
<b>Filtrate CL (ppm)</b>	200.00	200.00	200.00	200.00	
<b>pH / Fluid Loss (mptm)</b>	8.30 / 0	8.20 / 0	9.00 / 8	9.20 / 0	
<b>PV (cP) / YP (lbf2)</b>	7 / 2.00	10 / 9.00	13 / 9.00	14 / 10.00	
<b>% Solids / % Sand</b>	2 / .1	10.1 / .1	9.30 / 0.10	9.20 / 0.10	
<b>% Oil / Oil:Water Ratio</b>	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A	
<b>Rm @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	
<b>Rmf @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	
<b>Rmc @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	
<b>Max Tool Temp (deg F) @ 100 ft</b>	127.50 / ROM	122.00 / ROM	201.00 / ROM	200.70 / ROM	

Max Tool Temp (degF) / Source	137.50 / PCM	162.80 / PCM	221.80 / PCM	238.70 / PCM	
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	
Lead MWD Engineer	Paul Kock	Paul Kock	Paul Kock	Paul Kock	
Customer Representative	Dave Nielsen	Dave Nielsen	Dave Nielsen	Dave Nielsen	

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM	PCM	PCM	
Software Version	5.84	5.84	5.84	5.84	
Sub Serial Number	11404264	11404264	11672158	11672158	
Insert Serial Number	11399998	11399998	11055839	11399998	
Date and Time Initialized	23-May-14 03:29	23-May-14 03:29	24-May-14 21:05	29-May-14 18:51	
Date and Time Read	25-May-14 00:39	01-Jan-70 00:00	30-May-14 00:08	03-Jun-14 10:47	
ECMB SW Version	N/A	N/A	N/A	N/A	

### Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	54.24	52.31	53.74	53.22	
Software Version	6.21	6.21	6.21	6.21	
Sub Serial Number	11404264	11404264	11672158	11672158	
Sonde Serial Number	11297583	11297583	10993472	11297583	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	46.18	3.60	165.22	41.68	

### Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG	PCG	
Distance From Bit (ft)	49.14	47.21	48.64	48.12	
Recorded Sample Period (sec)	15	15	15	10	
Software Version	8.15	8.15	8.15	8.15	
Sub Serial Number	11404264	11404264	11672158	11672158	
Insert/Sonde Serial Number	11681029	11681029	11293394	11681029	

## REMARKS

1. All depths are calibrated to the driller's pipe tally and are measured from the rig drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
  - ROPA: Average Rate of Penetration is real time data.
  - PGRC: Smooth Pressure Case Gamma Ray Borehole corrected is recorded data.
4. The following smoothing parameters have been applied to the data:
  - 2" (1:600) log - 1 ft. interval, 3 ft. coercion distance, 5 ft. gap fill.
  - 5" (1:240) log for ROP - 0.5 ft. interval, 1.2 ft. coercion distance, 3 ft. gap fill.
  - 5" (1:240) log for Gamma Ray - 0.5 ft. interval, 0.6 ft. coercion distance, 3 ft. gap fill.
5. INSITE version 8.0.20
6. Gamma presented inside casing/cement from 6459 ft. MD to 6506 ft. MD.

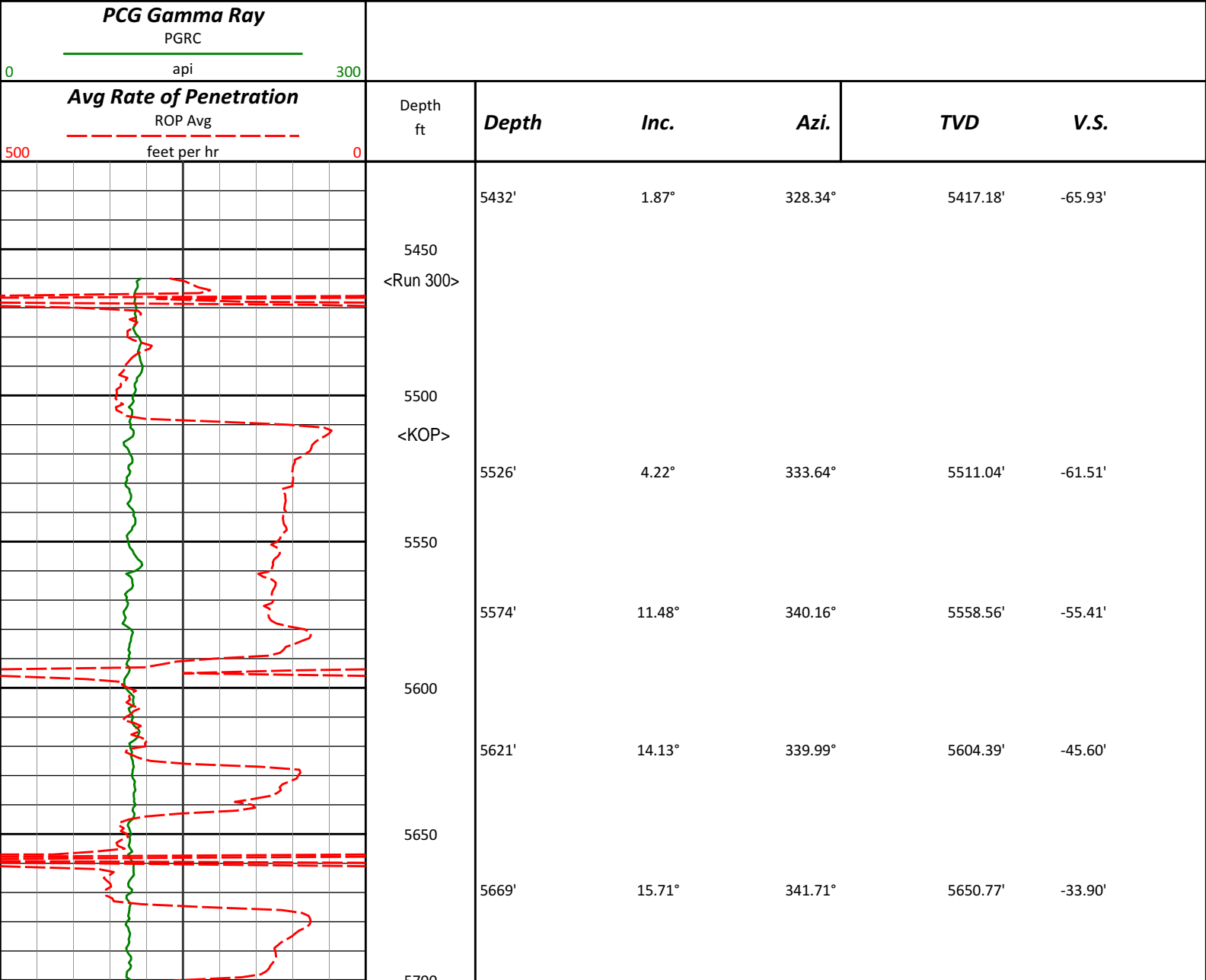
WARRANTY

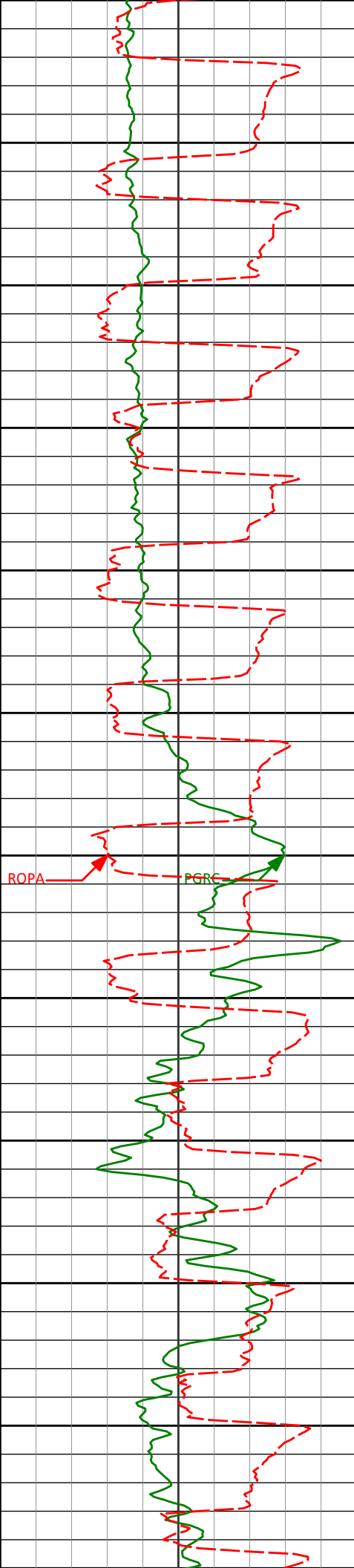
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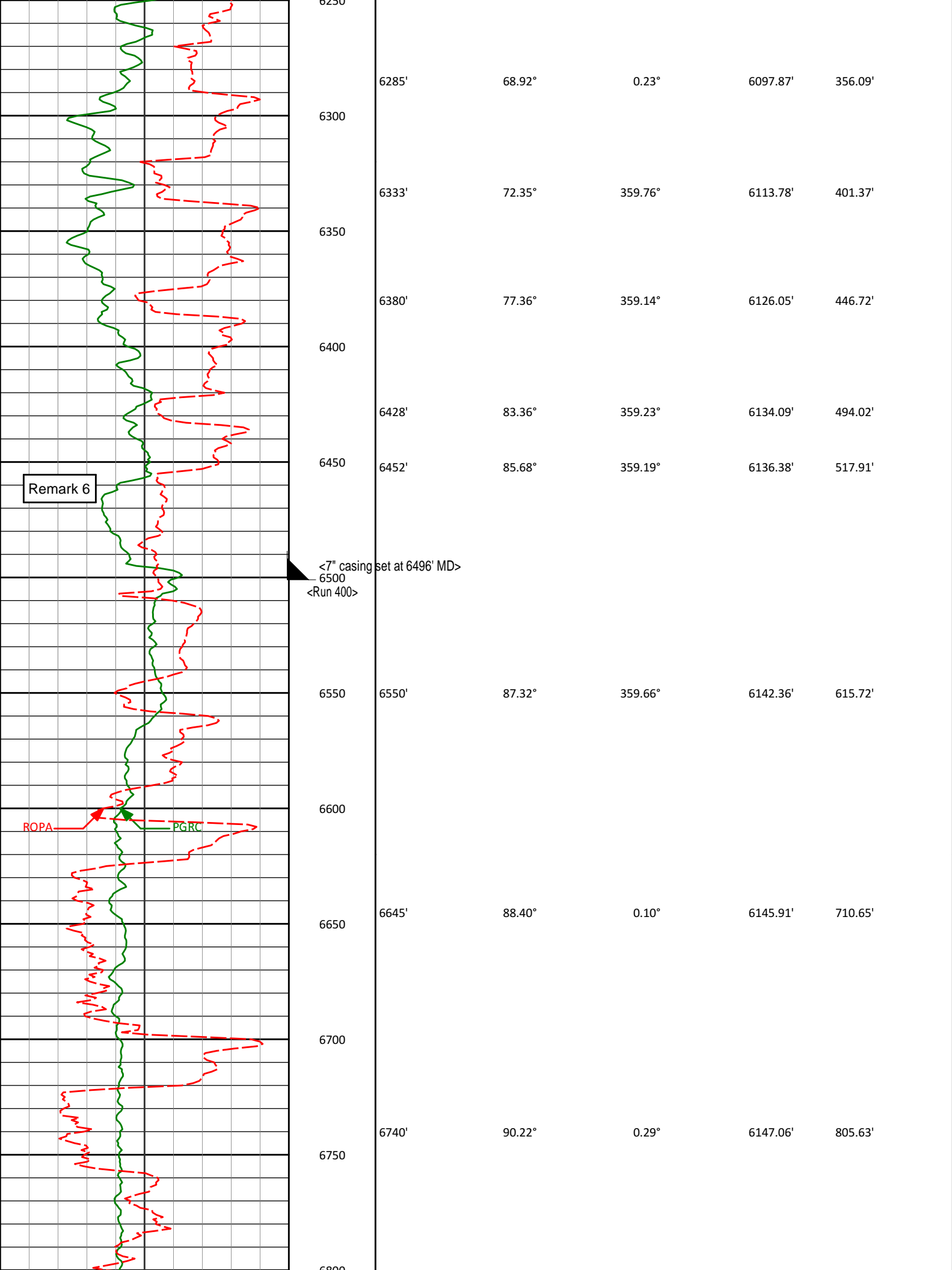
MD Main Log 1:600

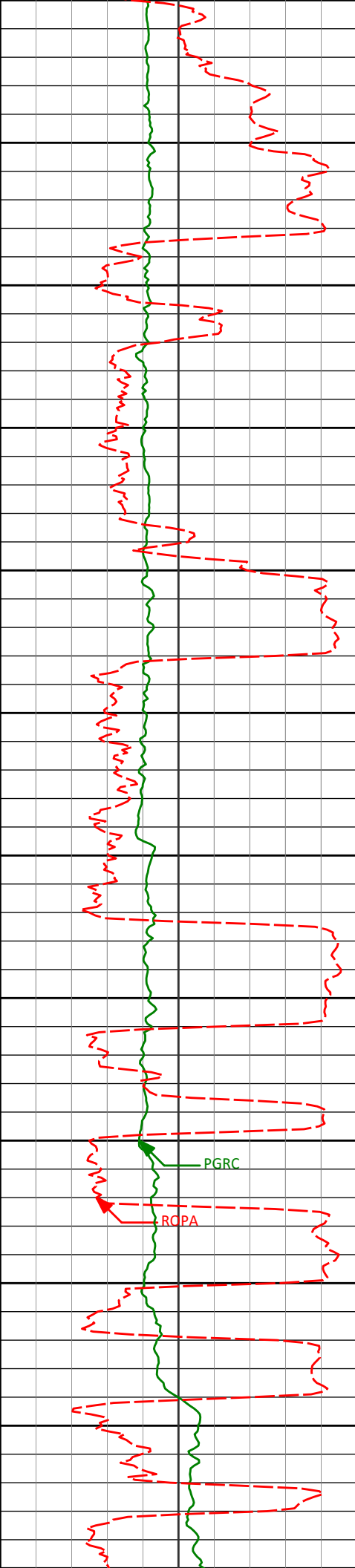
Noble Energy  
Trisha LC29-74HNB  
H&P 273  
T9N, R59W





5700					
	5716'	18.84°	348.38°	5695.65'	-20.40'
5750					
	5764'	23.43°	355.28°	5740.42'	-3.27'
5800					
	5811'	27.25°	356.06°	5782.89'	16.80'
5850					
	5859'	30.15°	357.85°	5824.99'	39.82'
5900					
	5906'	33.75°	0.61°	5864.86'	64.68'
5950					
	5954'	37.91°	3.38°	5903.77'	92.74'
6000					
	6001'	43.07°	2.54°	5939.50'	123.20'
6050					
	6049'	48.50°	1.35°	5972.96'	157.56'
6100					
	6096'	51.53°	1.30°	6003.16'	193.55'
6150					
	6144'	54.38°	1.05°	6032.08'	231.84'
6200					
	6190'	59.51°	0.72°	6057.16'	270.38'
6250					
	6238'	65.03°	359.94°	6079.49'	312.84'





6800  
6835'  
6850  
6900  
6930'  
6950  
7000  
7025'  
7050  
7100  
7119'  
7150  
7200  
7214'  
7250  
7300  
7309'  
7350

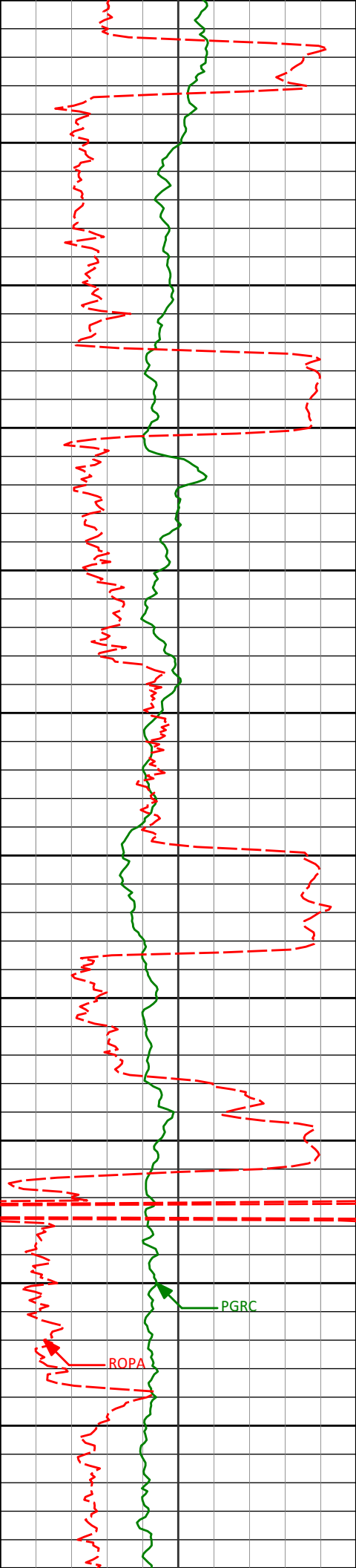
6835'  
6930'  
7025'  
7119'  
7214'  
7309'

89.45°  
91.14°  
91.51°  
88.24°  
91.08°  
94.22°

1.18°  
359.96°  
358.12°  
353.91°  
353.36°  
356.15°

6147.33'  
6146.84'  
6144.64'  
6144.85'  
6145.41'  
6141.02'

900.61'  
995.59'  
1090.56'  
1184.34'  
1278.81'  
1373.34'



7350  
7400  
7450  
7500  
7550  
7600  
7650  
7700  
7750  
7800  
7850  
7900

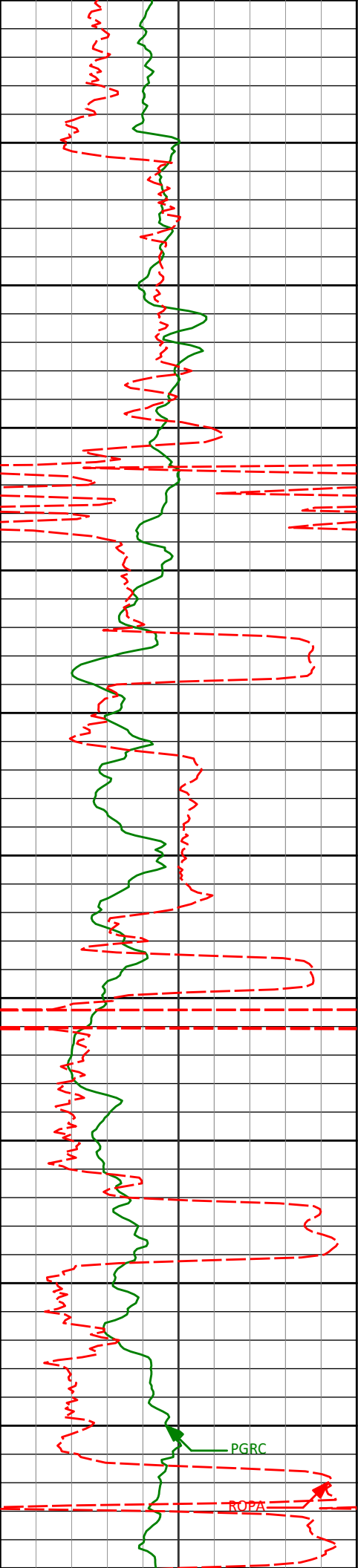
7403'  
7498'  
7593'  
7687'  
7782'  
7877'

90.80°  
91.60°  
92.31°  
89.66°  
90.89°  
91.48°

356.93°  
358.36°  
357.39°  
359.05°  
0.62°  
1.75°

6136.90'  
6134.91'  
6131.67'  
6130.06'  
6129.60'  
6127.64'

1467.10'  
1562.02'  
1656.92'  
1750.86'  
1845.86'  
1940.80'



7900  
7950  
8000  
8050  
8100  
8150  
8200  
8250  
8300  
8350  
8400  
8450

7972'  
8067'  
8162'  
8256'  
8351'  
8446'

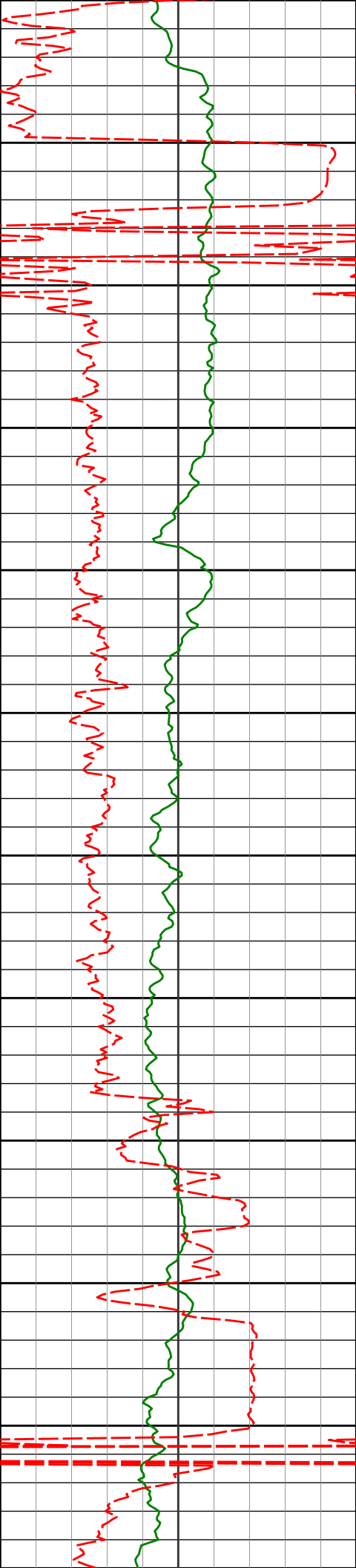
91.26°  
92.25°  
88.12°  
87.57°  
87.60°  
88.74°

3.89°  
3.15°  
2.04°  
1.26°  
0.39°  
1.11°

6125.36'  
6122.45'  
6122.15'  
6125.68'  
6129.69'  
6132.72'

2035.62'  
2130.35'  
2225.21'  
2319.08'  
2413.97'  
2508.90'





8450  
8500  
8550  
8600  
8650  
8700  
8750  
8800  
8850  
8900  
8950  
9000

8541'

90.28°

359.38°

6133.53'

2603.89'

8636'

90.59°

359.16°

6132.81'

2698.88'

8730'

90.25°

358.30°

6132.12'

2792.87'

8825'

91.20°

357.88°

6130.92'

2887.83'

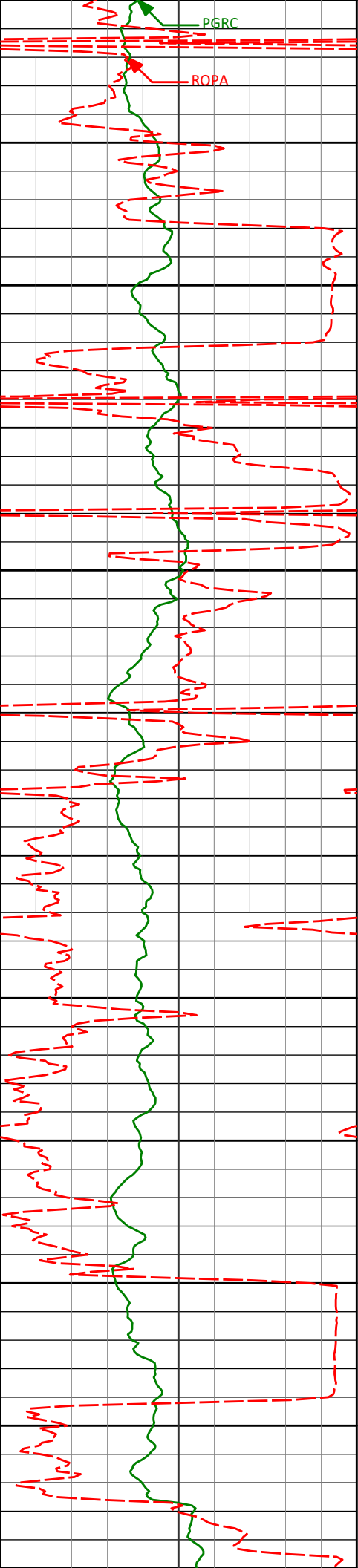
8920'

91.20°

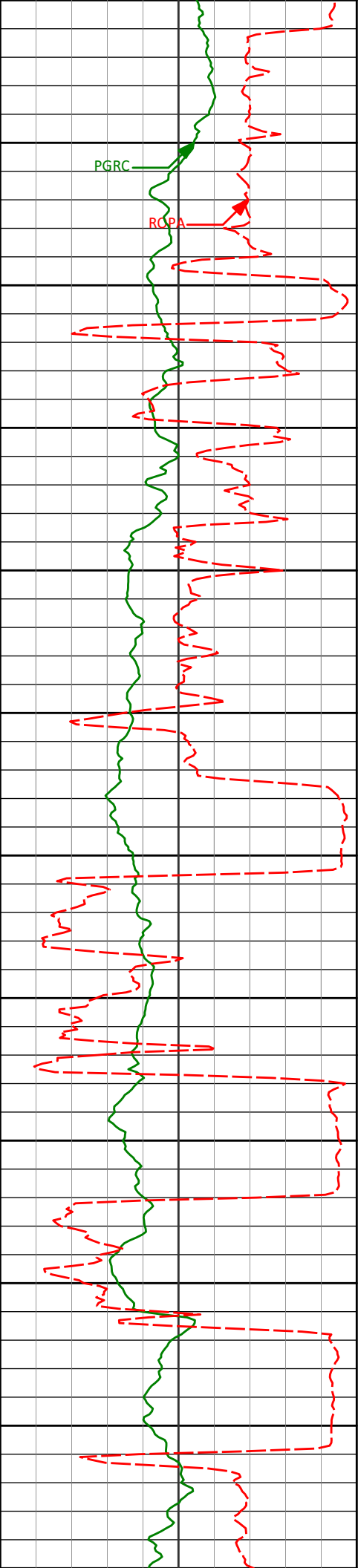
357.56°

6128.93'

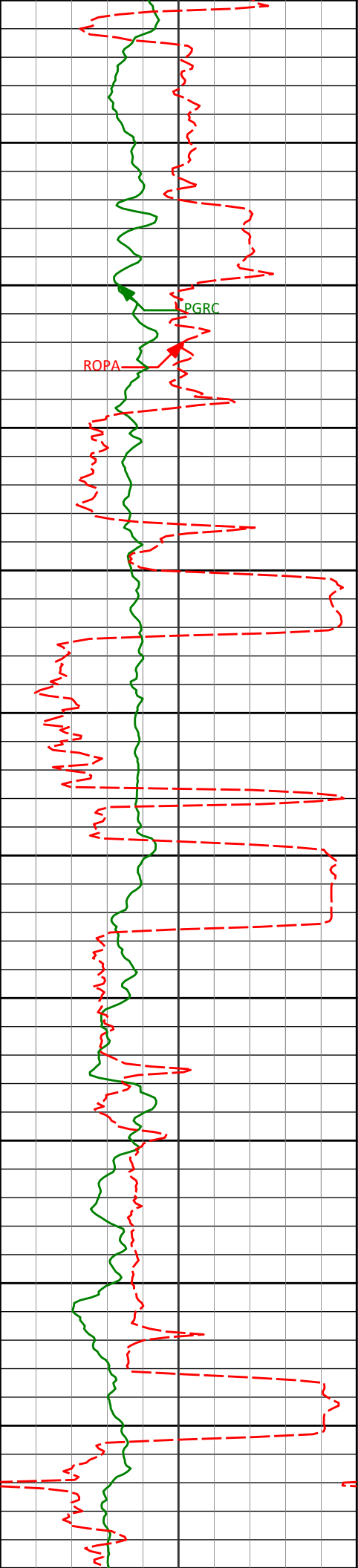
2982.75'



9000				
9015'	9015'	89.51°	355.00°	6128.34' 3077.58'
9050				
9100	9110'	89.91°	356.68°	6128.82' 3172.36'
9150				
9200	9205'	91.08°	359.63°	6128.00' 3267.32'
9250				
9300	9300'	91.26°	359.18°	6126.06' 3362.30'
9350				
9400	9395'	87.38°	356.50°	6127.19' 3457.22'
9450				
9500	9489'	90.52°	358.60°	6128.91' 3551.12'
9550				

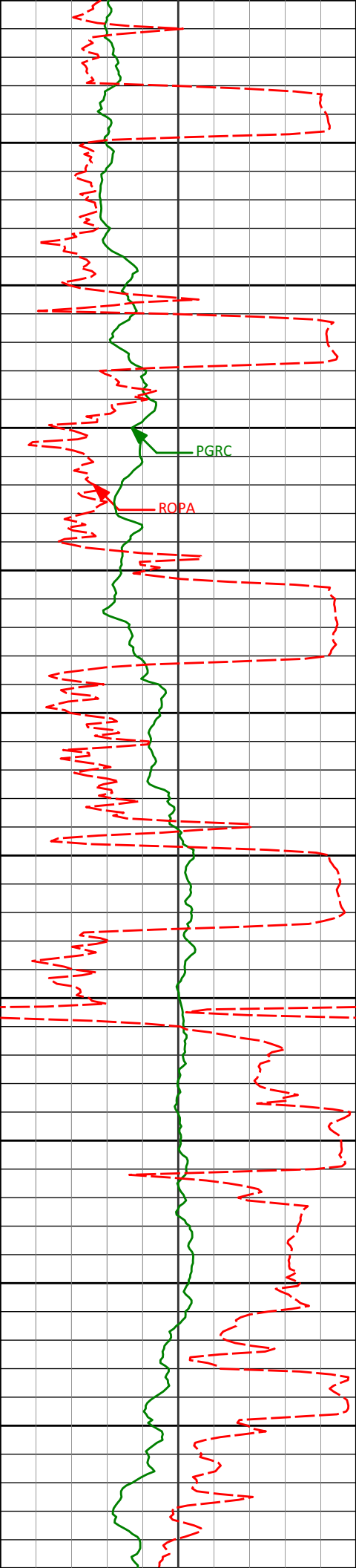


9550				
9584'	91.36°	358.57°	6127.35'	3646.09'
9600				
9650				
9677'	92.49°	359.31°	6124.23'	3739.03'
9700				
9750				
9770'	90.34°	355.52°	6121.93'	3831.91'
9800				
9850				
9863'	89.94°	356.27°	6121.71'	3924.71'
9900				
9950				
9956'	90.18°	357.95°	6121.61'	4017.62'
10000				
10050	10049'	90.03°	1.58°	6121.44'
10100				

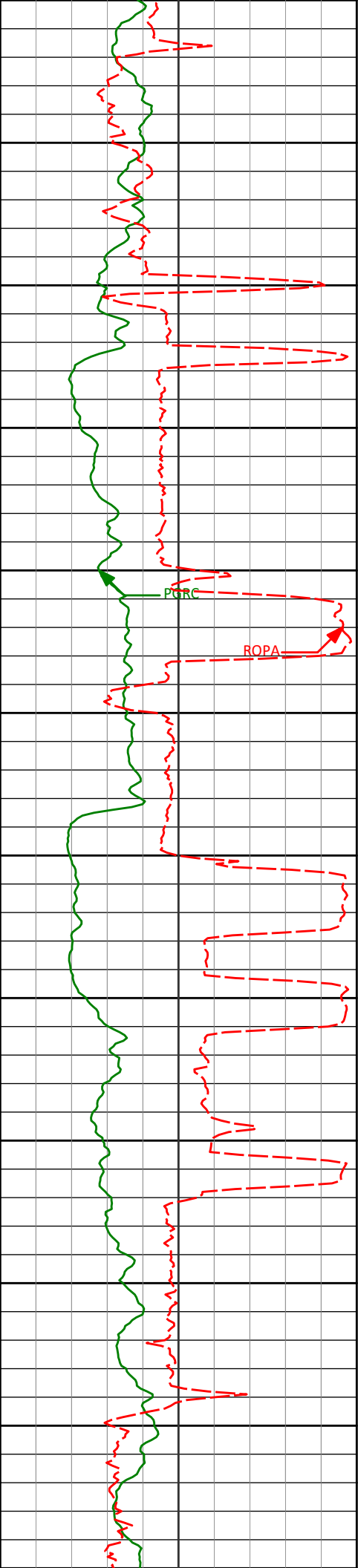


10100  
10150  
10200  
10250  
10300  
10350  
10400  
10450  
10500  
10550  
10600  
10650

10141'	90.37°	1.55°	6121.12'	4202.55'
10234'	91.48°	1.83°	6119.61'	4295.48'
10327'	88.09°	359.73°	6119.96'	4388.44'
10420'	91.17°	3.37°	6120.56'	4481.36'
10512'	91.48°	2.13°	6118.44'	4573.19'
10605'	90.37°	2.68°	6116.94'	4666.07'

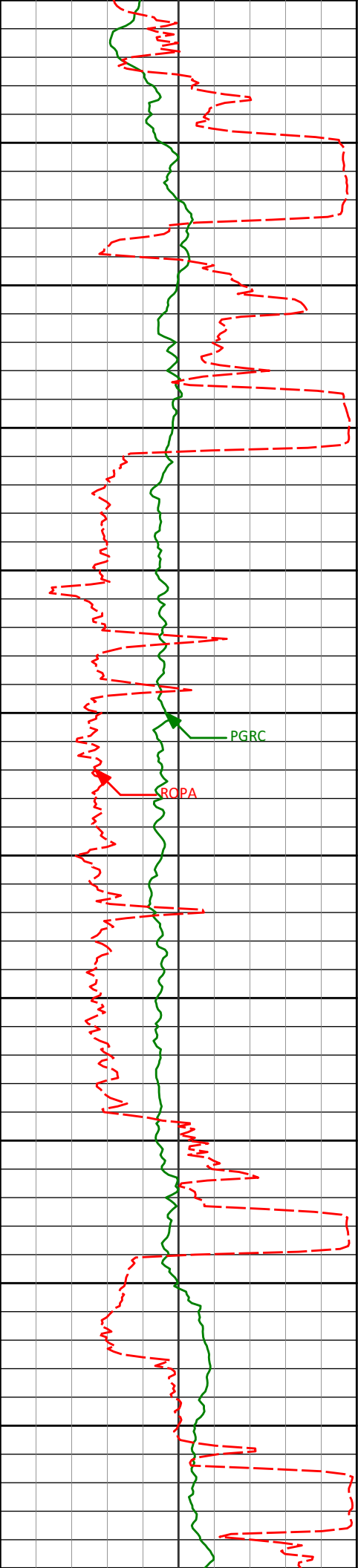


10650					
10700	10698'	87.81°	356.90°	6118.41'	4759.01'
10750					
10800	10791'	87.32°	357.97°	6122.37'	4851.86'
10850					
10900	10883'	88.37°	358.90°	6125.82'	4943.77'
10950					
11000	10976'	89.91°	359.75°	6127.22'	5036.75'
11050					
11100	11069'	91.05°	358.38°	6126.44'	5129.74'
11150					
11200	11162'	92.03°	358.81°	6123.94'	5222.69'



11200  
11250  
11300  
11350  
11400  
11450  
11500  
11550  
11600  
11650  
11700  
11750

11255'	92.09°	358.48°	6120.60'	5315.62'
11350'	92.25°	357.23°	6117.00'	5410.50'
11445'	91.63°	358.12°	6113.79'	5505.39'
11539'	89.91°	359.69°	6112.52'	5599.37'
11634'	87.66°	359.49°	6114.54'	5694.34'
11729'	86.98°	359.04°	6118.98'	5789.24'



11750  
11800  
11850  
11900  
11950  
12000  
12050  
12100  
12150  
12200  
12250  
12300

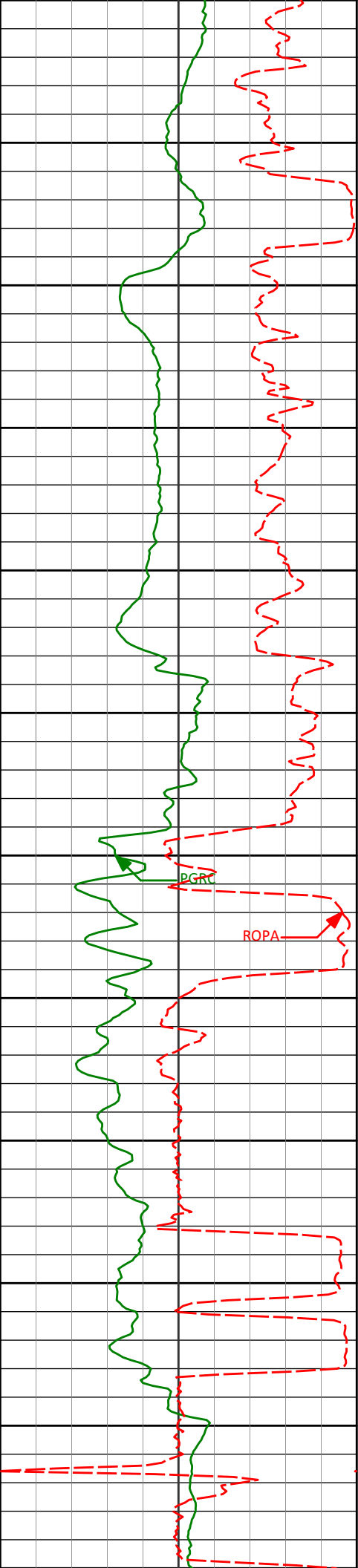
11824'  
11919'  
12013'  
12108'  
12203'  
12298'

87.97°  
91.57°  
90.43°  
91.02°  
88.21°  
88.06°

358.91°  
0.57°  
358.45°  
356.37°  
355.50°  
355.96°

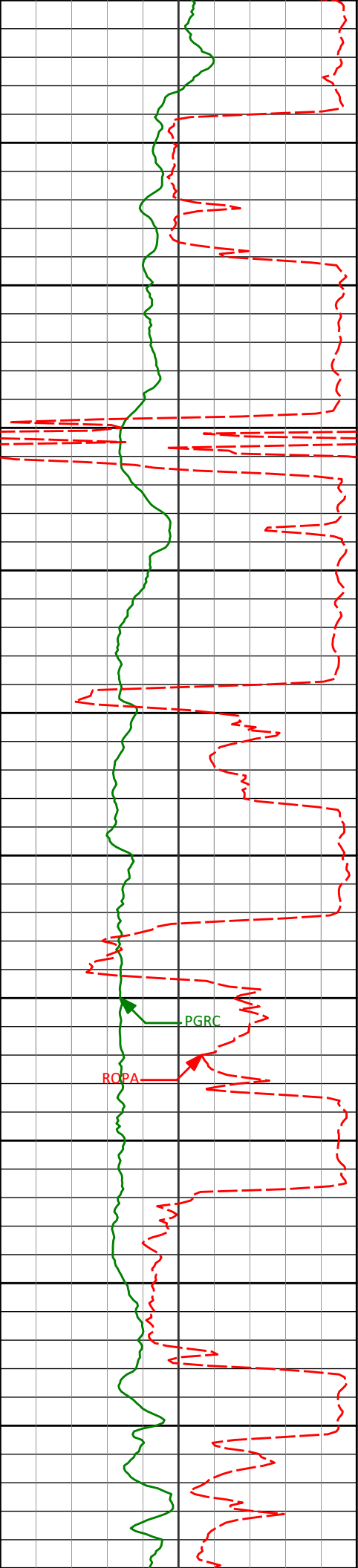
6123.16'  
6123.55'  
6121.90'  
6120.70'  
6121.34'  
6124.43'

5884.14'  
5979.12'  
6073.09'  
6168.01'  
6262.80'  
6357.53'



12300					
12350					
<Run 500>					
12400	12416'	89.97°	358.89°	6126.32'	6475.41'
12450					
12500	12511'	88.92°	357.80°	6127.24'	6570.38'
12550					
12600	12606'	88.15°	357.98°	6129.67'	6665.30'
12650					
12700	12700'	87.35°	357.74°	6133.36'	6759.19'
12750					
12800	12795'	86.98°	358.64°	6138.05'	6854.04'
12850					





12850  
12900  
12950  
13000  
13050  
13100  
13150  
13200  
13250  
13300  
13350  
13400

12890'

87.07°

358.51°

6142.99'

6948.90'

12985'

88.09°

358.99°

6147.00'

7043.80'

13080'

89.88°

0.25°

6148.68'

7138.78'

13175'

91.11°

1.52°

6147.86'

7233.75'

13270'

90.93°

0.98°

6146.17'

7328.69'

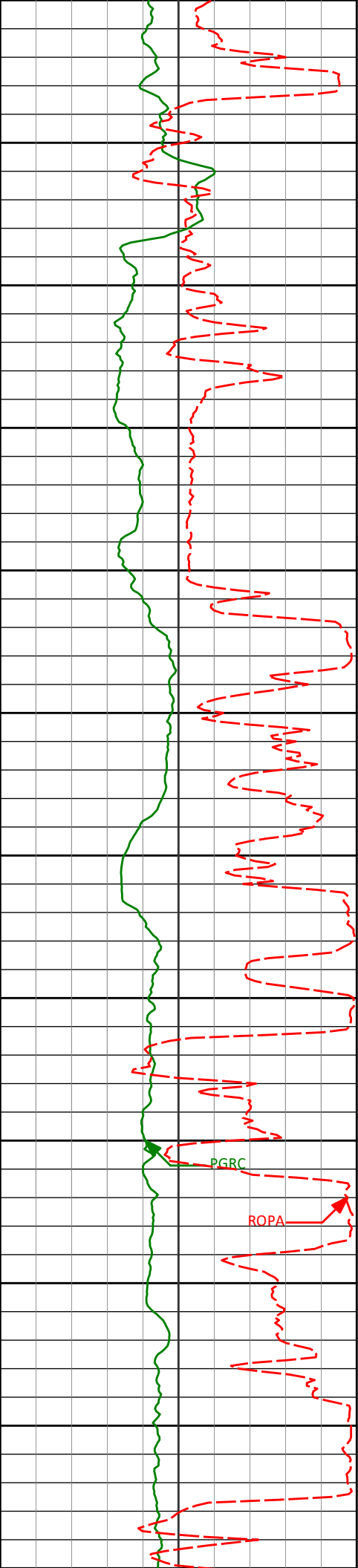
13365'

91.63°

1.85°

6144.05'

7423.62'



13400

13450

13500

13550

13600

13650

13700

13750

13800

13850

13900

13950

13459'

91.91°

2.05°

6141.14'

7517.50'

13554'

91.79°

2.36°

6138.08'

7612.35'

13649'

90.46°

1.87°

6136.21'

7707.24'

13744'

90.25°

0.85°

6135.62'

7802.20'

13839'

89.91°

0.12°

6135.49'

7897.19'

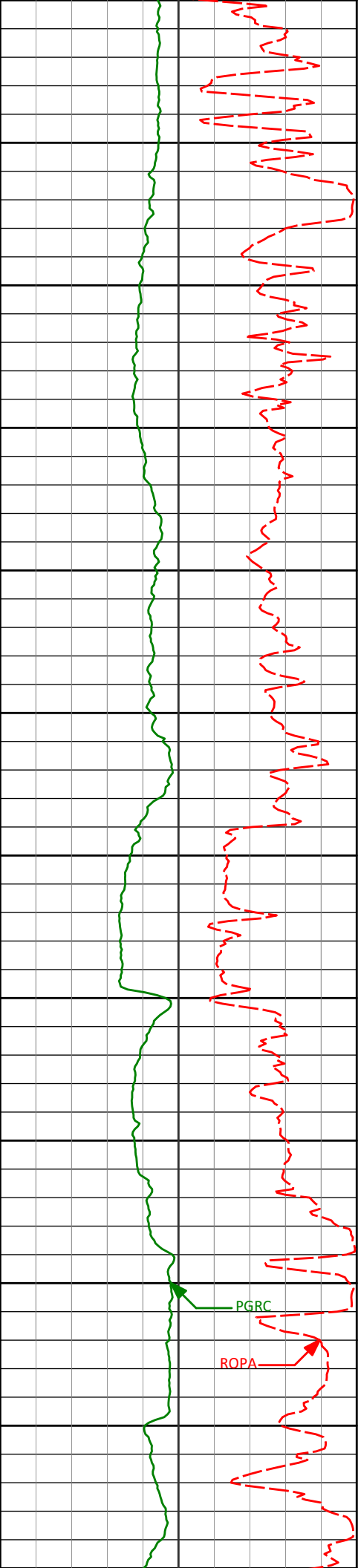
13933'

90.15°

358.30°

6135.44'

7991.18'



13950  
14000  
14050  
14100  
14150  
14200  
14250  
14300  
14350  
14400  
14450  
14500

14028'

90.15°

357.25°

6135.19'

8086.13'

14123'

90.06°

357.18°

6135.02'

8181.04'

14218'

90.09°

357.16°

6134.89'

8275.96'

14313'

89.78°

356.59°

6135.00'

8370.85'

14408'

89.41°

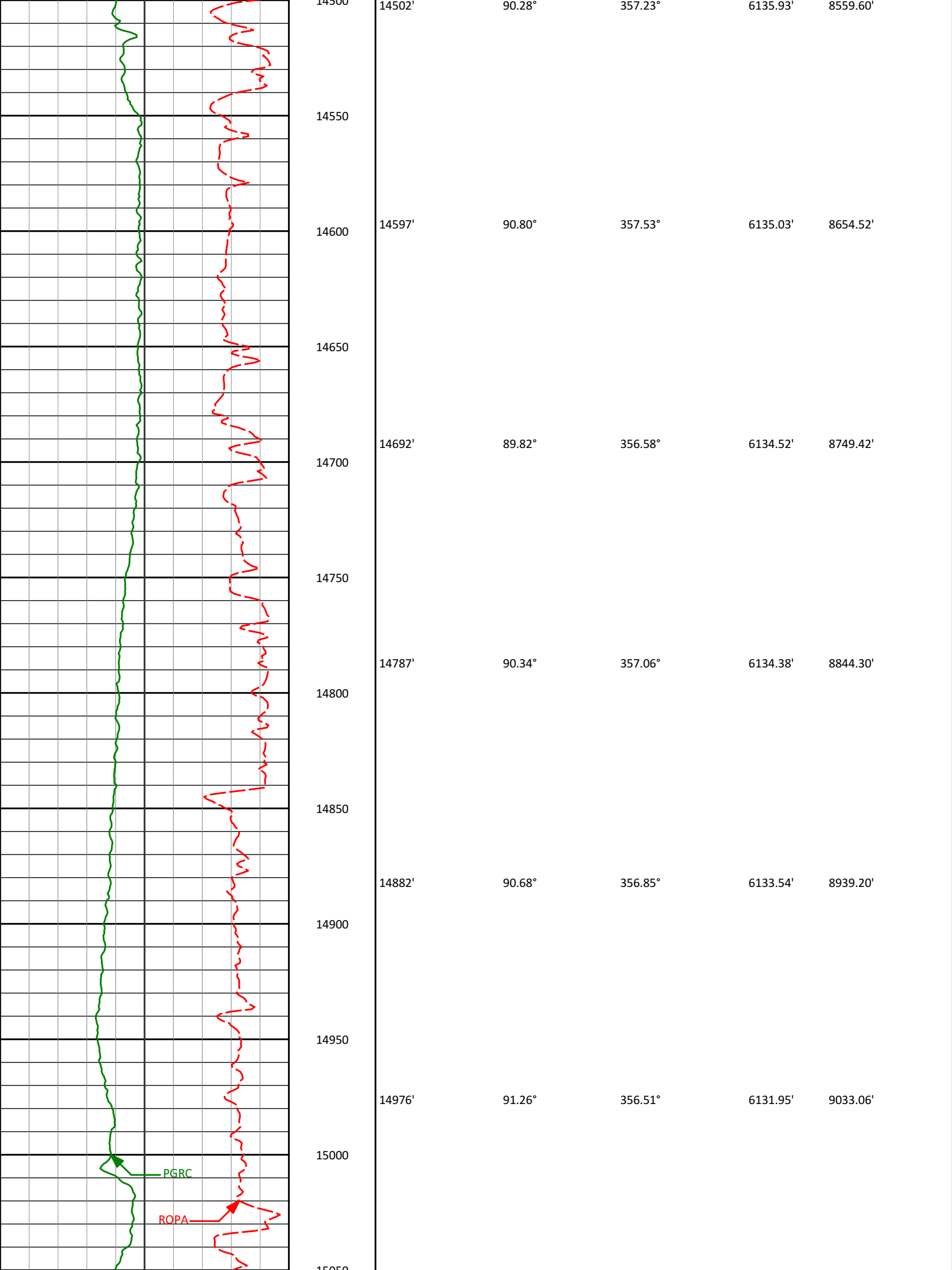
356.52°

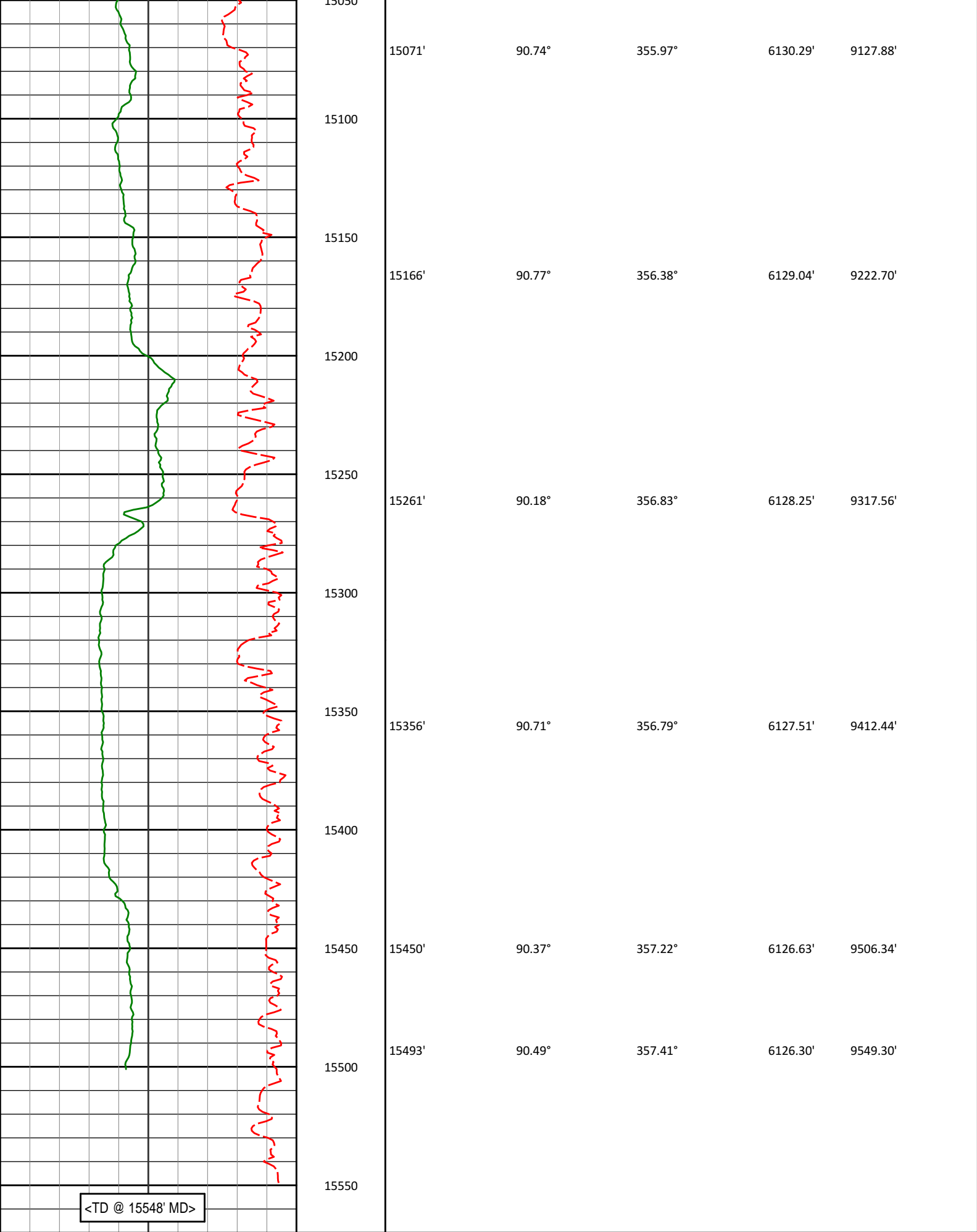
6135.67'

8465.71'

PGRC

ROPA



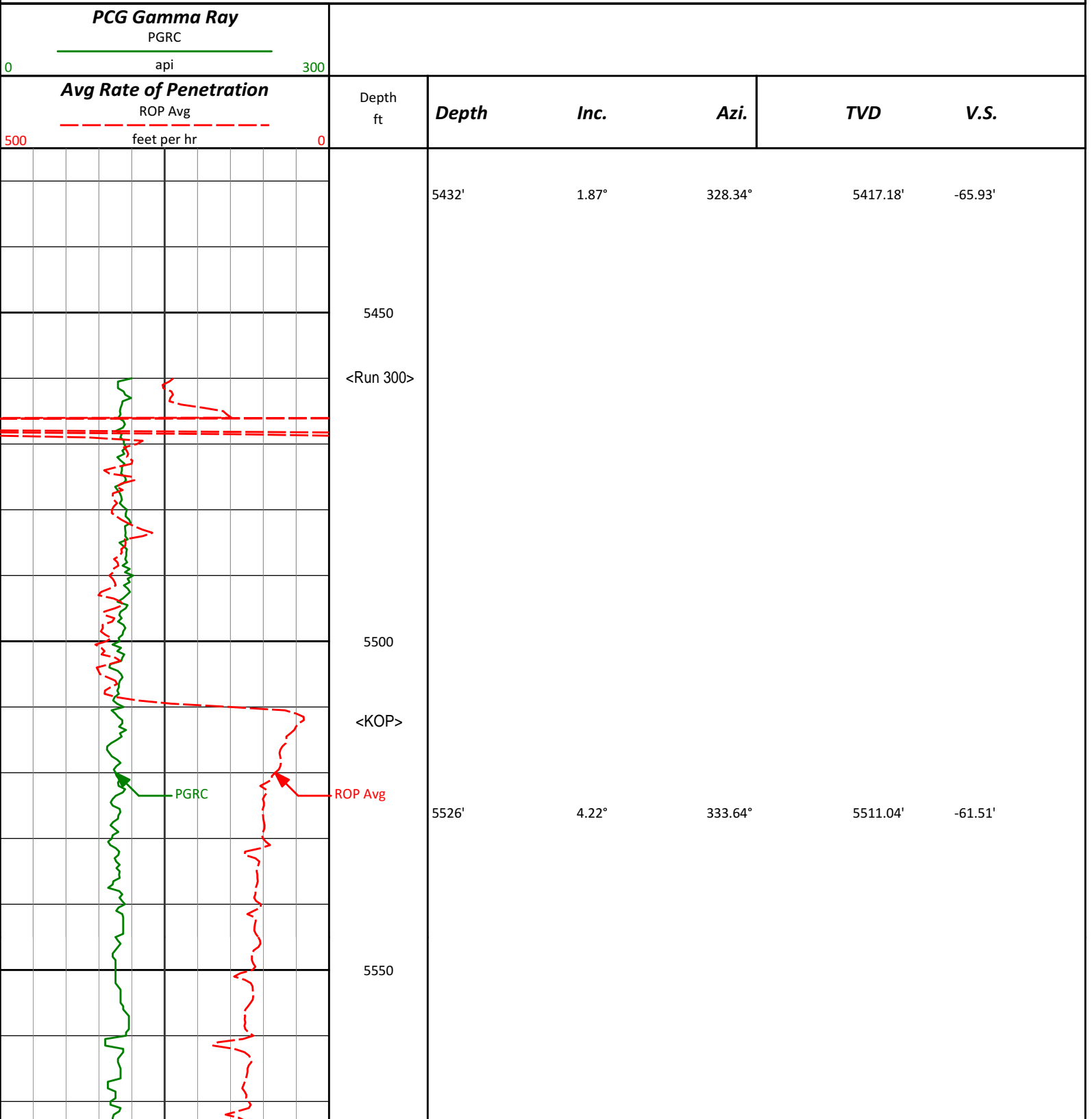


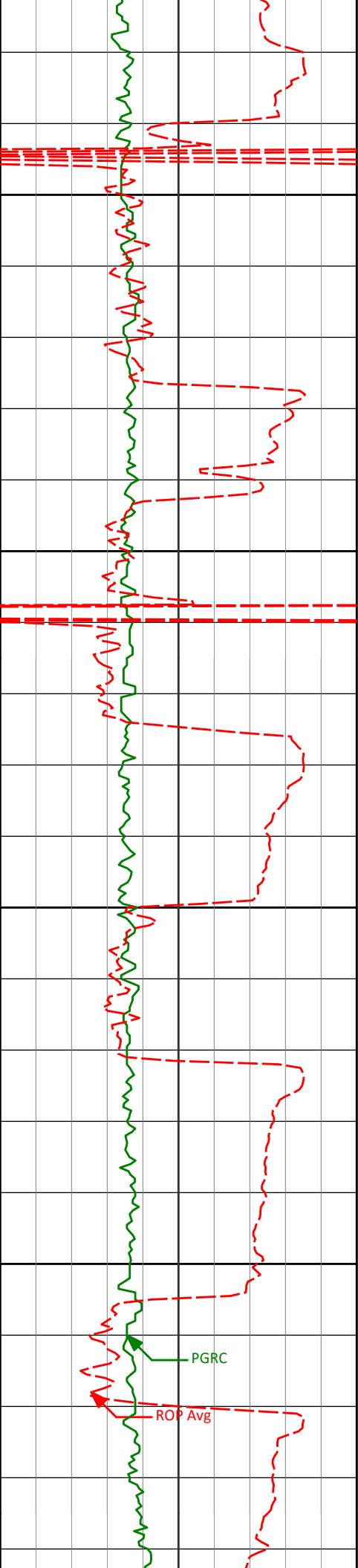
15071'	90.74°	355.97°	6130.29'	9127.88'
15166'	90.77°	356.38°	6129.04'	9222.70'
15261'	90.18°	356.83°	6128.25'	9317.56'
15356'	90.71°	356.79°	6127.51'	9412.44'
15450'	90.37°	357.22°	6126.63'	9506.34'
15493'	90.49°	357.41°	6126.30'	9549.30'

Avg Rate of Penetration		Depth	Inc.	Azi.	TVD	V.S.
ROP Avg		ft				
500	0					
feet per hr						

**HALLIBURTON**  
**Sperry Drilling Services**  
MD Detail Log 1:240

Noble Energy  
Trisha LC29-74HNB  
H&P 273  
T9N, R59W





5600

5650

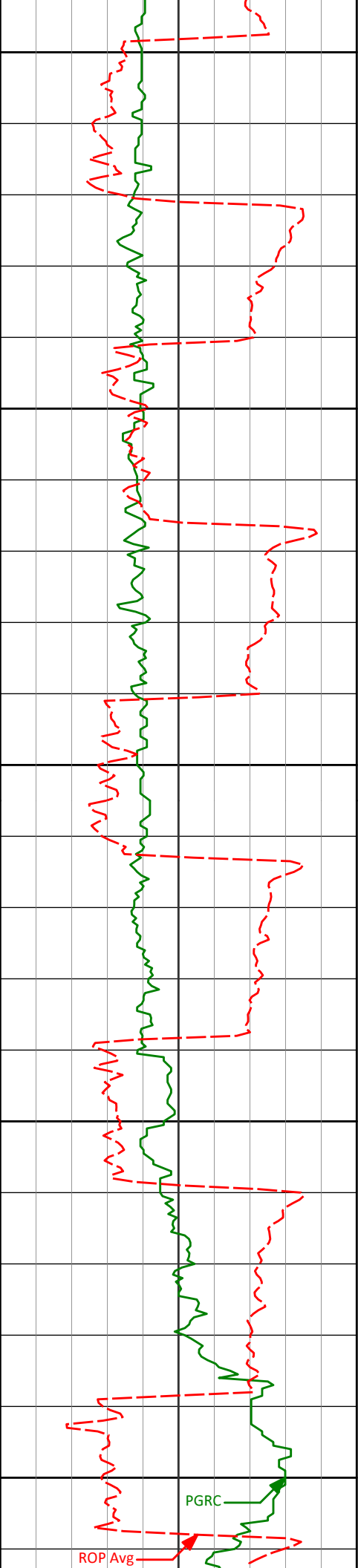
5700

5750

PGRC

ROP Avg

5574'	11.48°	340.16°	5558.56'	-55.41'
5621'	14.13°	339.99°	5604.39'	-45.60'
5669'	15.71°	341.71°	5650.77'	-33.90'
5716'	18.84°	348.38°	5695.65'	-20.40'
5764'	23.43°	355.28°	5740.42'	-3.27'



5800

5811'

27.25°

356.06°

5782.89'

16.80'

5850

5859'

30.15°

357.85°

5824.99'

39.82'

5900

5906'

33.75°

0.61°

5864.86'

64.68'

5950

5954'

37.91°

3.38°

5903.77'

92.74'

6000

6001'

43.07°

2.54°

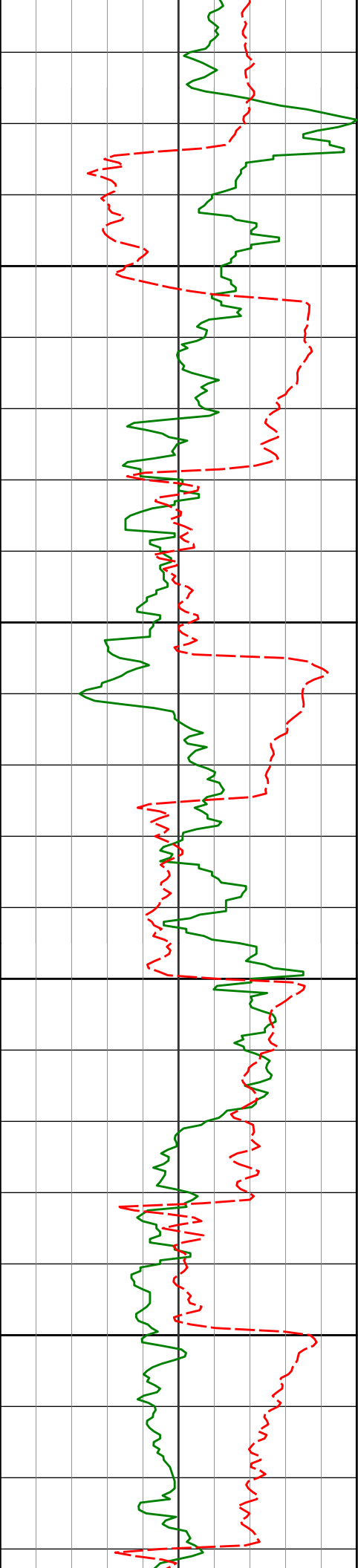
5939.50'

123.20'

PGRC

ROP Avg





6050

6049'

48.50°

1.35°

5972.96'

157.56'

6100

6096'

51.53°

1.30°

6003.16'

193.55'

6150

6144'

54.38°

1.05°

6032.08'

231.84'

6200

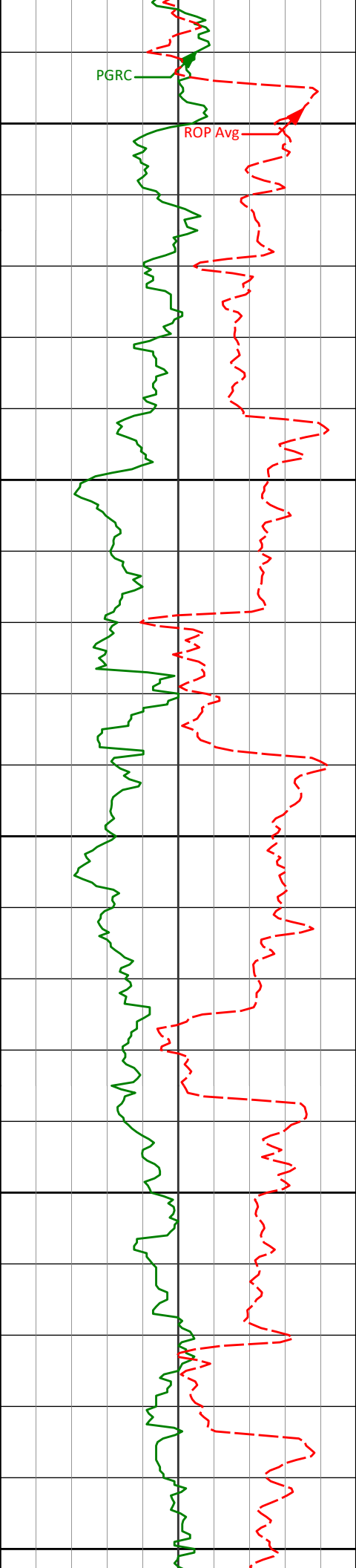
6190'

59.51°

0.72°

6057.16'

270.38'



6238'	65.03°	359.94°	6079.49'	312.84'
6250				
6285'	68.92°	0.23°	6097.87'	356.09'
6300				
6333'	72.35°	359.76°	6113.78'	401.37'
6350				
6380'	77.36°	359.14°	6126.05'	446.72'
6400				
6428'	83.36°	359.23°	6134.09'	494.02'
6450				
6452'	85.68°	359.19°	6136.38'	517.91'

Remark 6

PGRC

ROP Avg

<7" casing set at 6496' MD>

6500

<Run 400>

6550

6550'

87.32°

359.66°

6142.36'

615.72'

6600

6645'

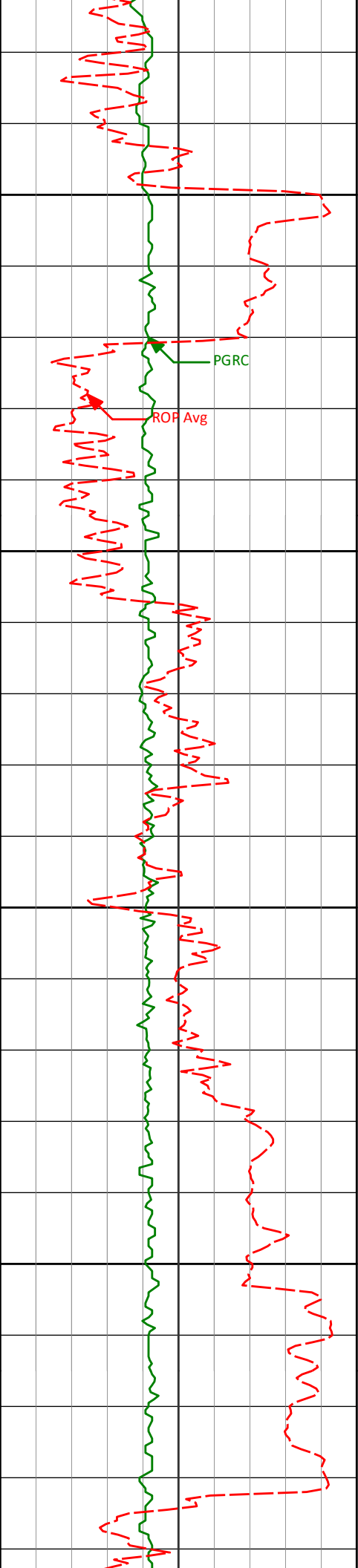
88.40°

0.10°

6145.91'

710.65'

6650



6700

6750

6800

6850

6740'

6835'

90.22°

89.45°

0.29°

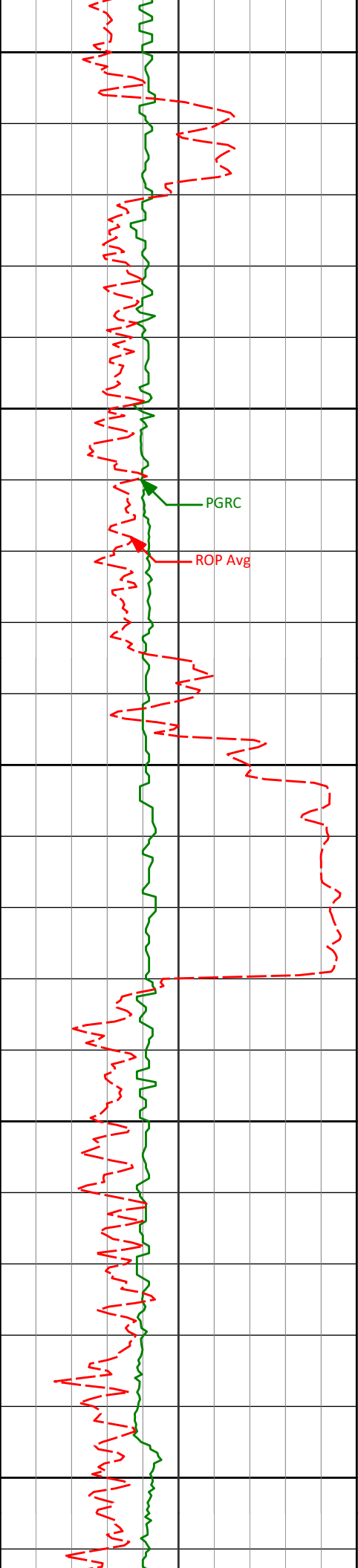
1.18°

6147.06'

6147.33'

805.63'

900.61'



6900

6930'

91.14°

359.96°

6146.84'

995.59'

6950

PGRC

ROP Avg

7000

7025'

91.51°

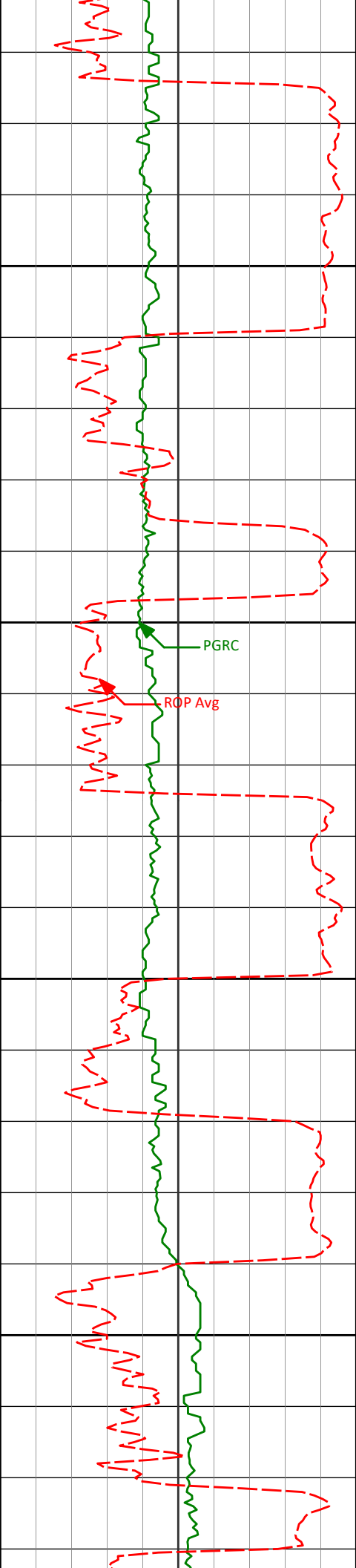
358.12°

6144.64'

1090.56'

7050

7100



7119'

88.24°

353.91°

6144.85'

1184.34'

7150

7200

7214'

91.08°

353.36°

6145.41'

1278.81'

7250

7300

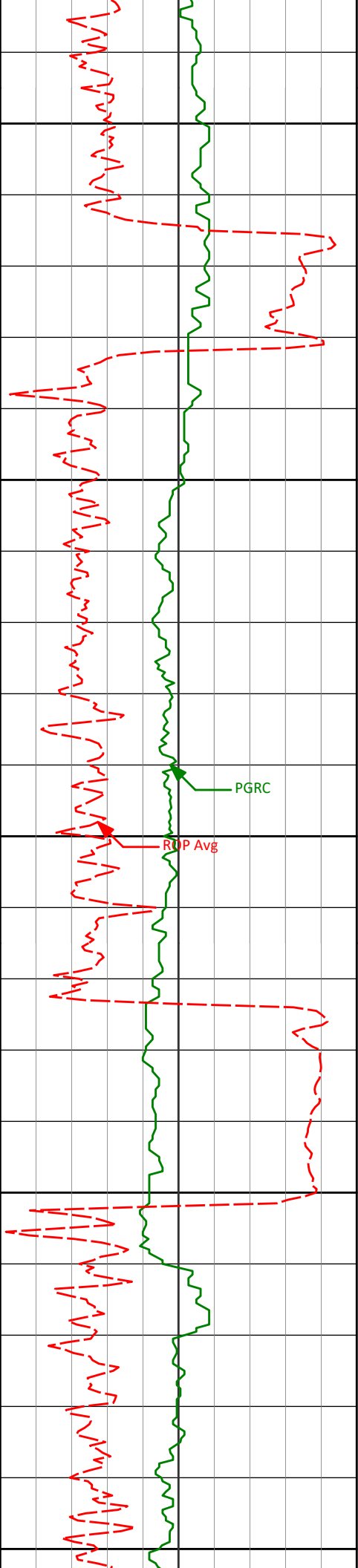
7309'

94.22°

356.15°

6141.02'

1373.34'



7350

7400

7450

7500

7550

7403'

90.80°

356.93°

6136.90'

1467.10'

RTP Avg

PGRC

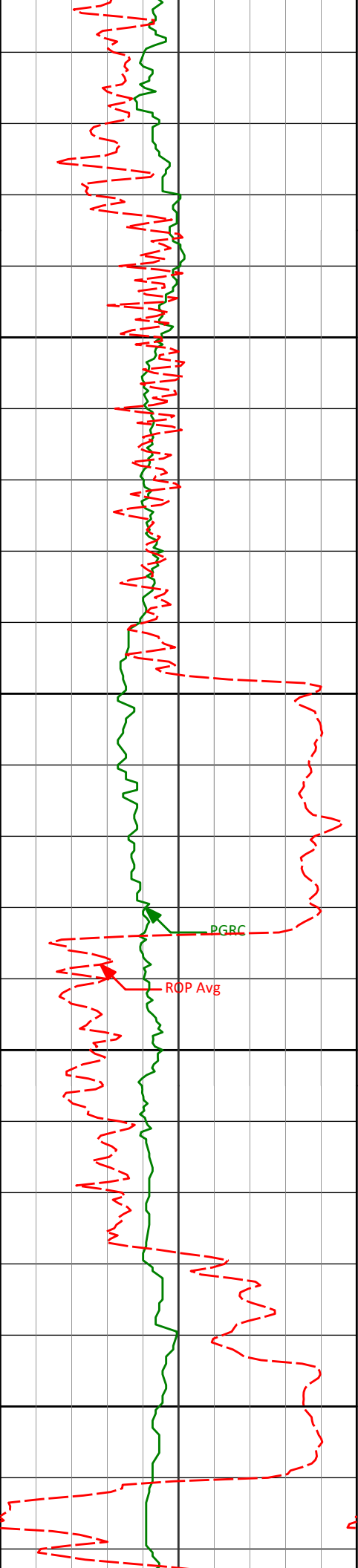
7498'

91.60°

358.36°

6134.91'

1562.02'



7593'

92.31°

357.39°

6131.67'

1656.92'

7600

7650

7687'

89.66°

359.05°

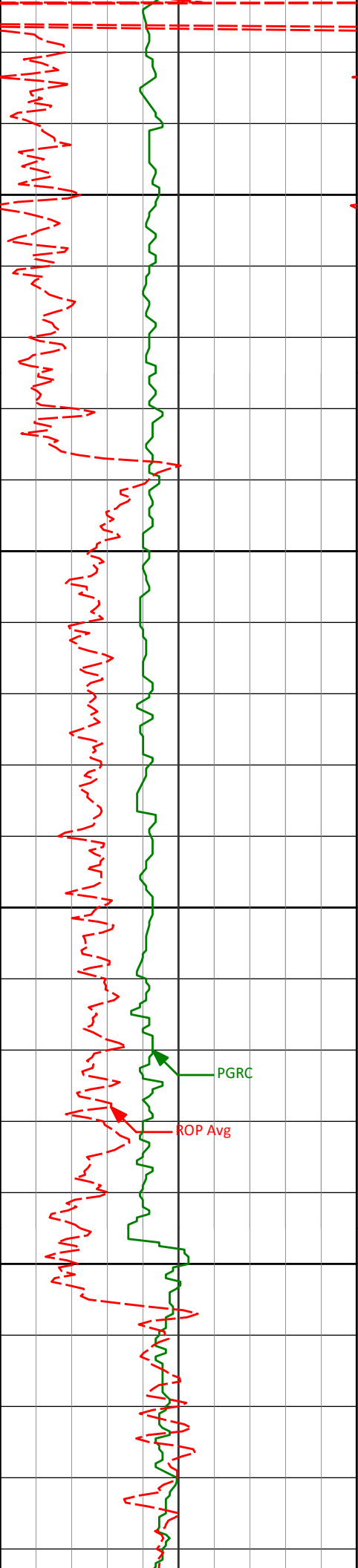
6130.06'

1750.86'

7700

7750





7782'

90.89°

0.62°

6129.60'

1845.86'

7800

7850

7877'

91.48°

1.75°

6127.64'

1940.80'

7900

PGRC

ROP Avg

7950

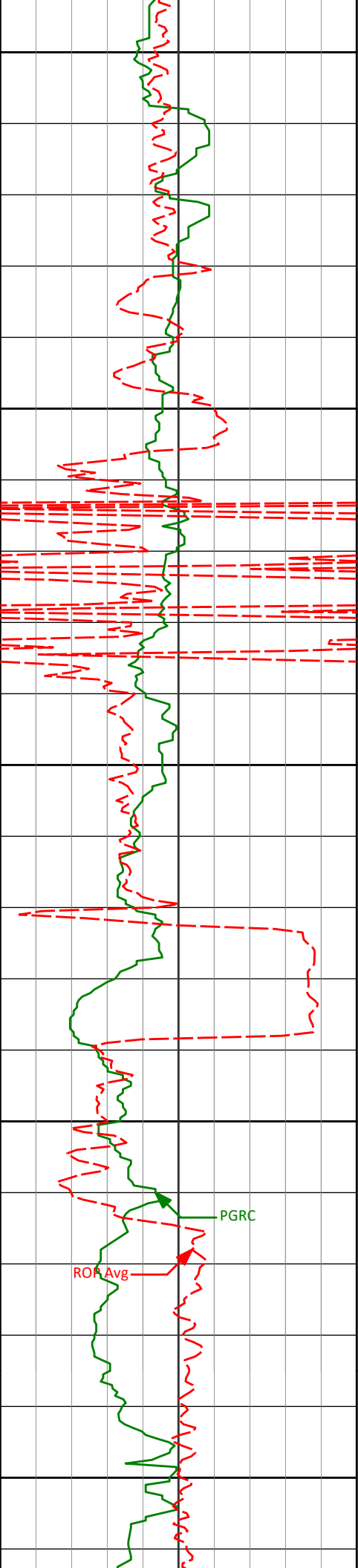
7972'

91.26°

3.89°

6125.36'

2035.62'



8000

8050

8100

8150

8200

8067'

92.25°

3.15°

6122.45'

2130.35'

8162'

88.12°

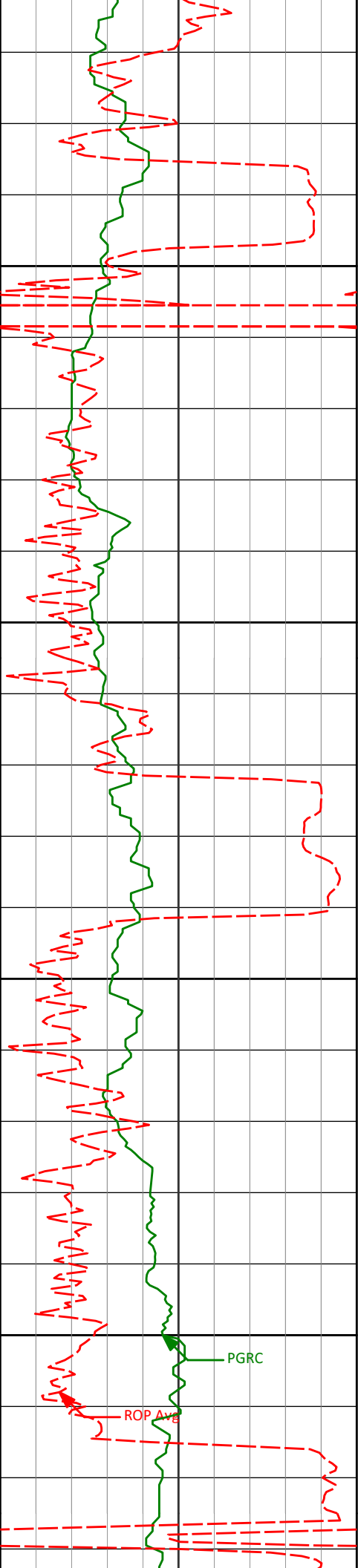
2.04°

6122.15'

2225.21'

PGRC

ROP Avg



8250

8256'

87.57°

1.26°

6125.68'

2319.08'

8300

8350

8351'

87.60°

0.39°

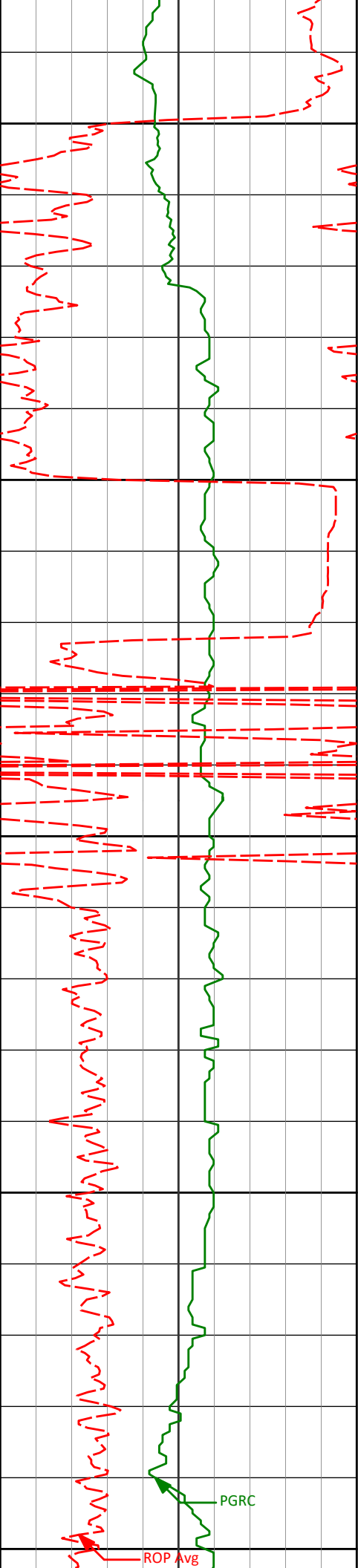
6129.69'

2413.97'

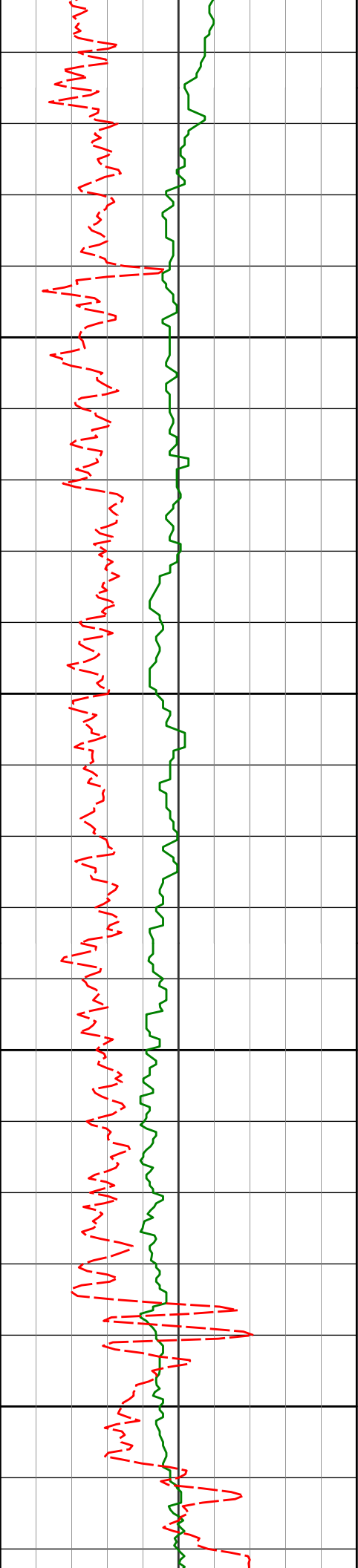
8400

PGRC

ROP Avg



8446'	88.74°	1.11°	6132.72'	2508.90'
8450				
8500				
8541'	90.28°	359.38°	6133.53'	2603.89'
8550				
8600				
8636'	90.59°	359.16°	6132.81'	2698.88'
8650				



8700

8730'

90.25°

358.30°

6132.12'

2792.87'

8750

8800

8825'

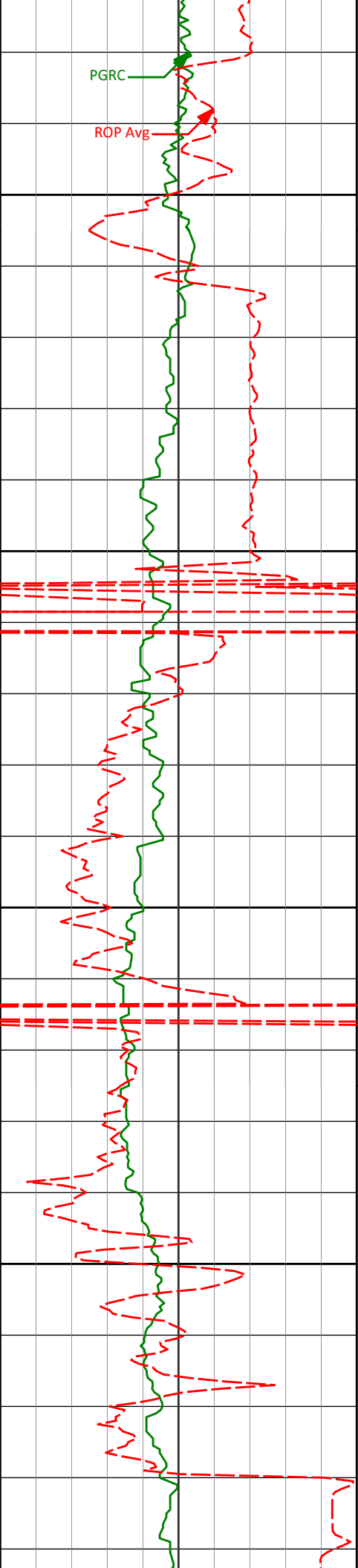
91.20°

357.88°

6130.92'

2887.83'

8850



PGRC

ROP Avg

8900

8950

9000

9050

8920'

91.20°

357.56°

6128.93'

2982.75'

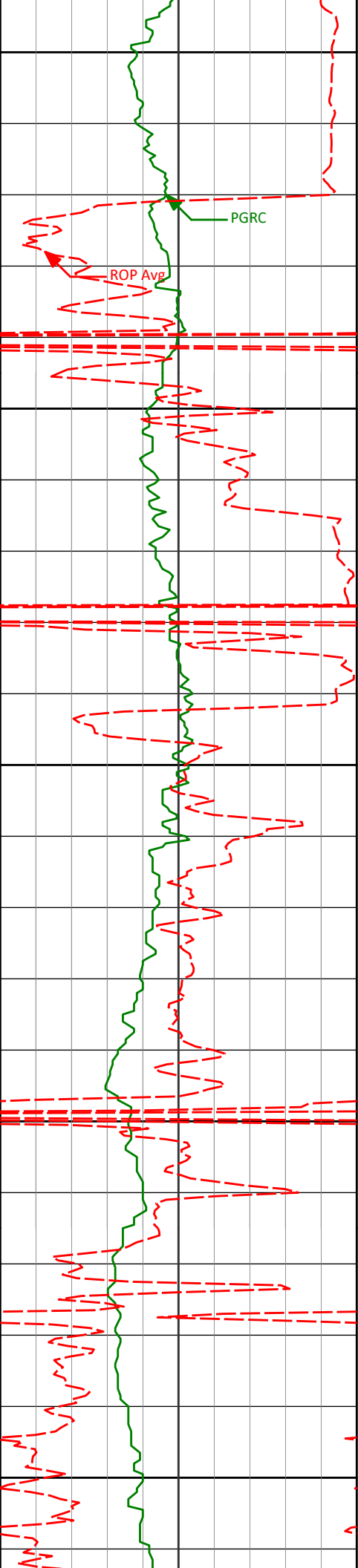
9015'

89.51°

355.00°

6128.34'

3077.58'



9100

9110'

89.91°

356.68°

6128.82'

3172.36'

PGRC

ROP Avg

9150

9200

9205'

91.08°

359.63°

6128.00'

3267.32'

9250

9300

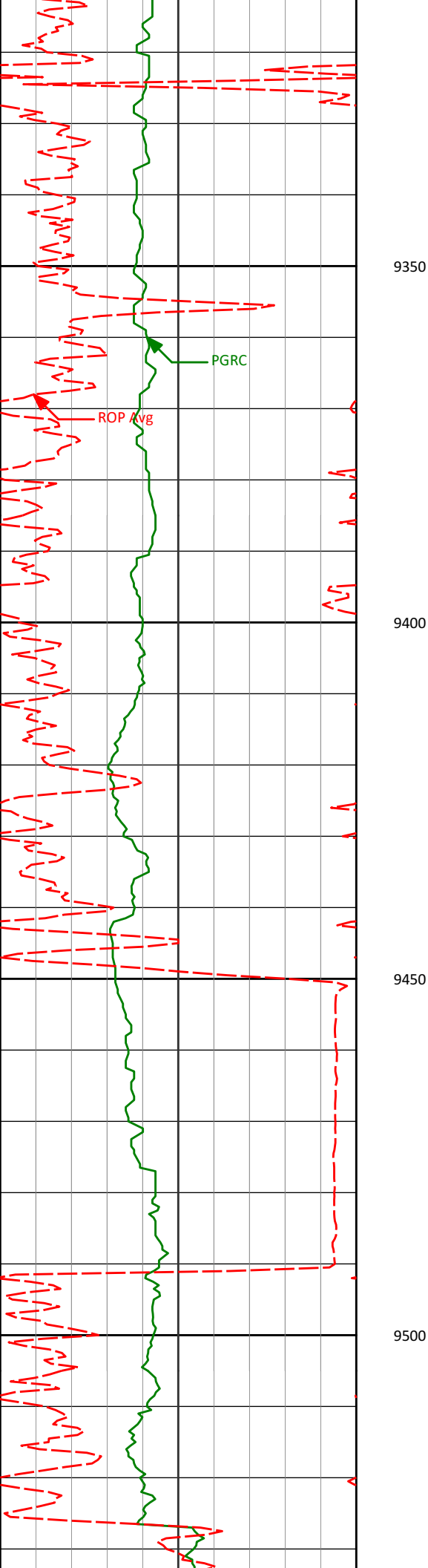
9300'

91.26°

359.18°

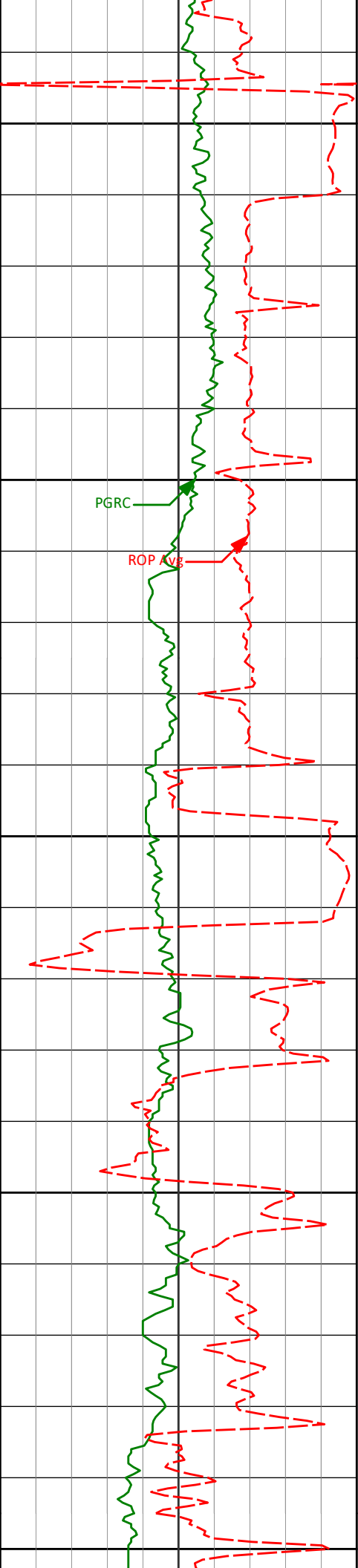
6126.06'

3362.30'



9395'	87.38°	356.50°	6127.19'	3457.22'
9489'	90.52°	358.60°	6128.91'	3551.12'





9550

9584'

91.36°

358.57°

6127.35'

3646.09'

9600

9650

9677'

92.49°

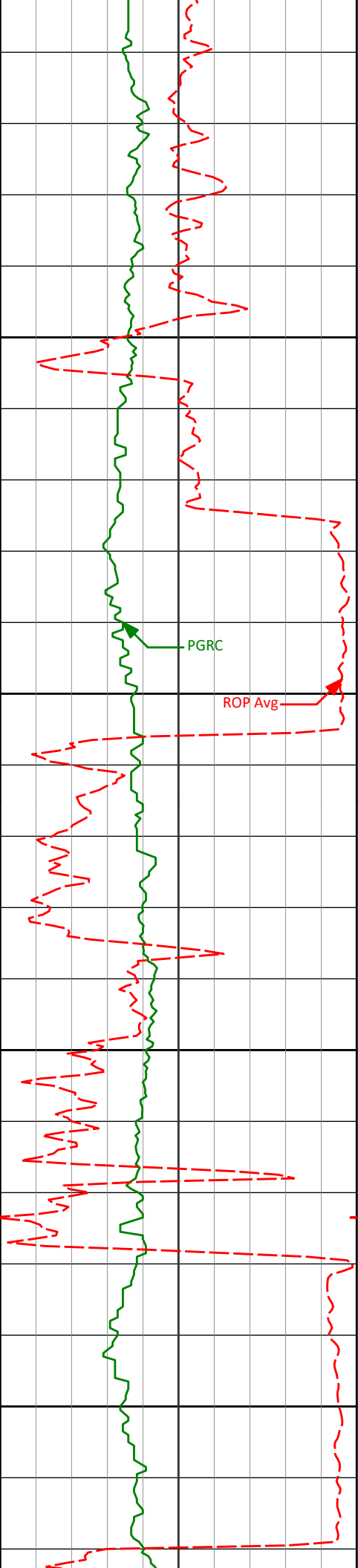
359.31°

6124.23'

3739.03'

9700

9750



9800

9850

9900

9950

9770'

90.34°

355.52°

6121.93'

3831.91'

9863'

89.94°

356.27°

6121.71'

3924.71'

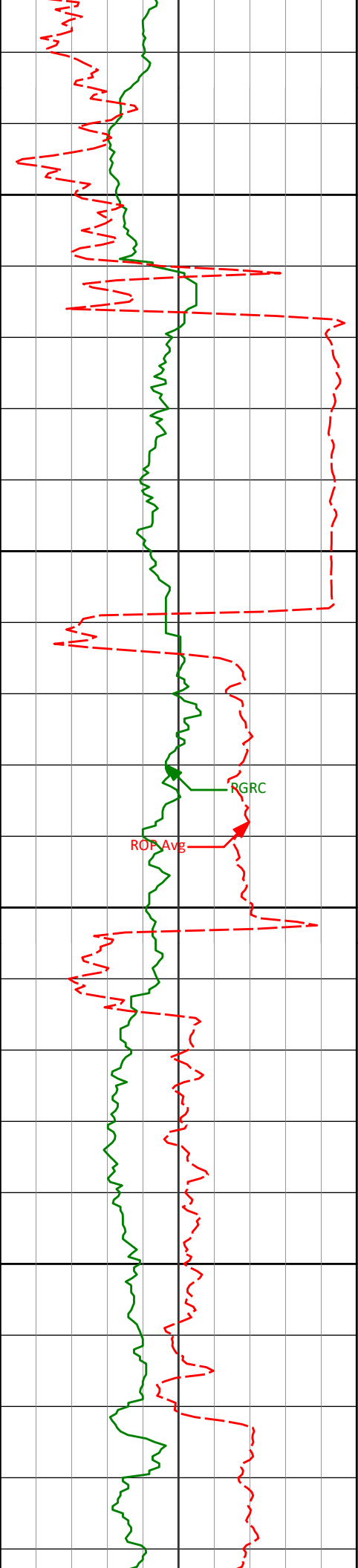
9956'

90.18°

357.95°

6121.61'

4017.62'



10000

10050

10100

10150

10049'

90.03°

1.58°

6121.44'

4110.60'

10141'

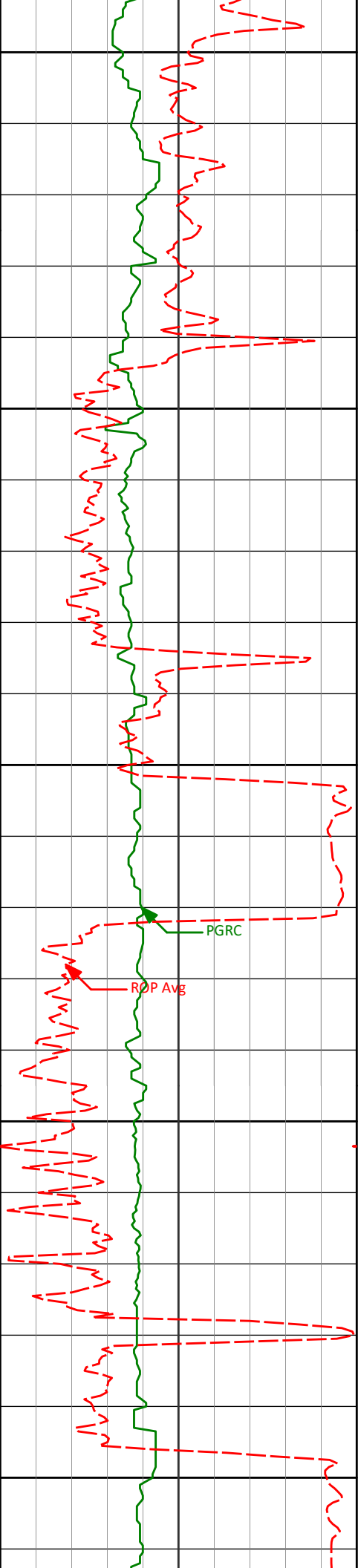
90.37°

1.55°

6121.12'

4202.55'

RGRC  
ROP Avg



10200

10234'

91.48°

1.83°

6119.61'

4295.48'

10250

10300

10327'

88.09°

359.73°

6119.96'

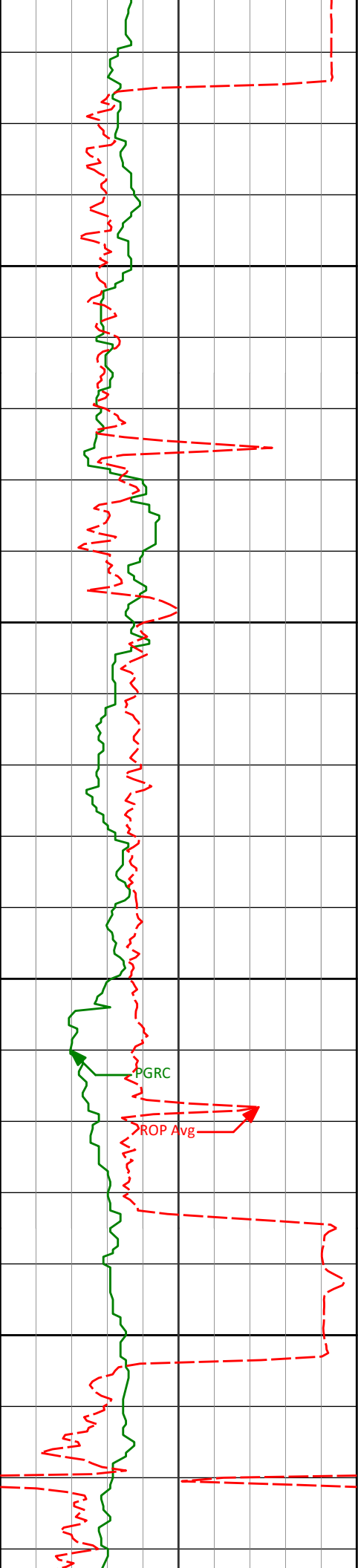
4388.44'

10350

10400

PGRC

ROP Avg



10420'

91.17°

3.37°

6120.56'

4481.36'

10450

10500

10512'

91.48°

2.13°

6118.44'

4573.19'

10550

PGRC

ROP Avg

10600

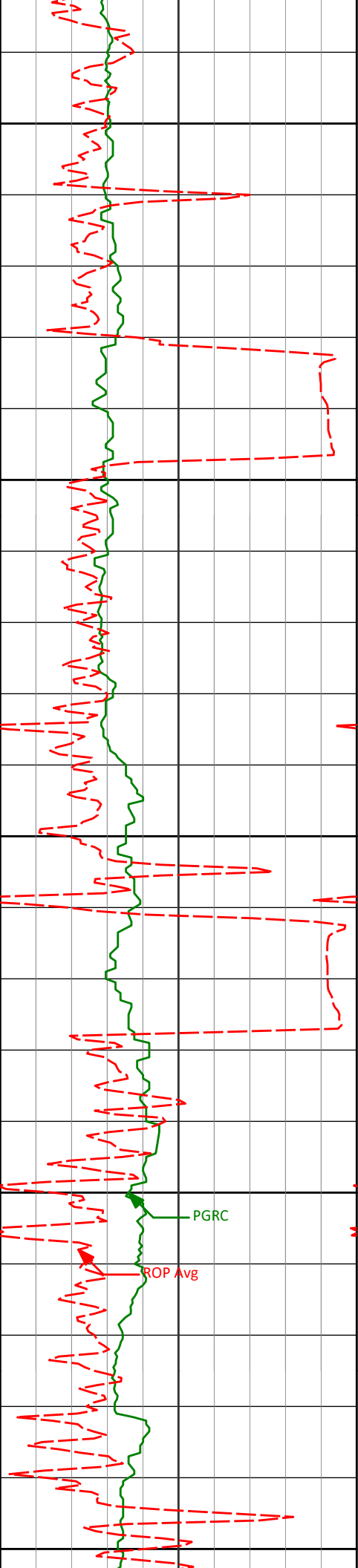
10605'

90.37°

2.68°

6116.94'

4666.07'



10650

10700

10750

10800

10850

10698'

87.81°

356.90°

6118.41'

4759.01'

10791'

87.32°

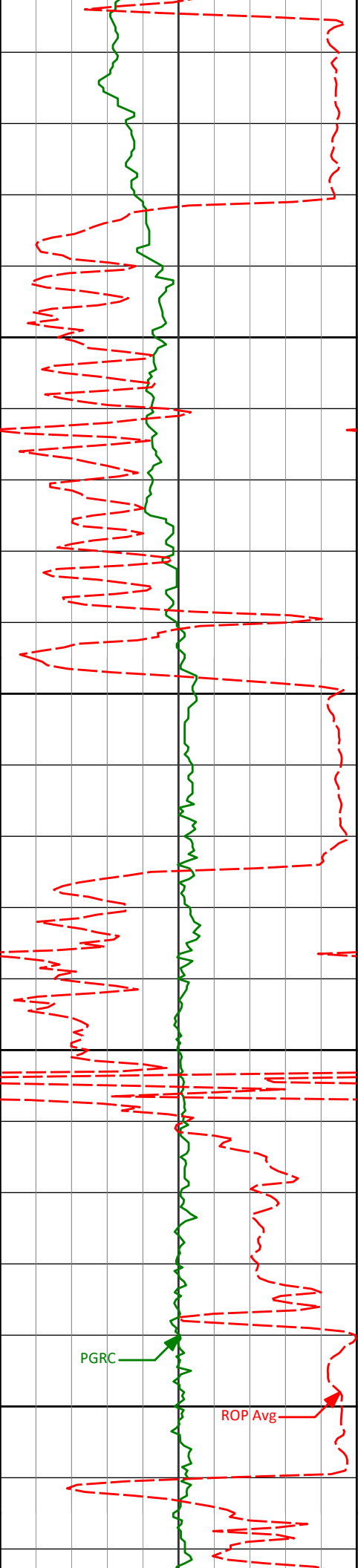
357.97°

6122.37'

4851.86'

PGRC

ROP Avg



10883'

88.37°

358.90°

6125.82'

4943.77'

10900

10950

10976'

89.91°

359.75°

6127.22'

5036.75'

11000

11050

11069'

91.05°

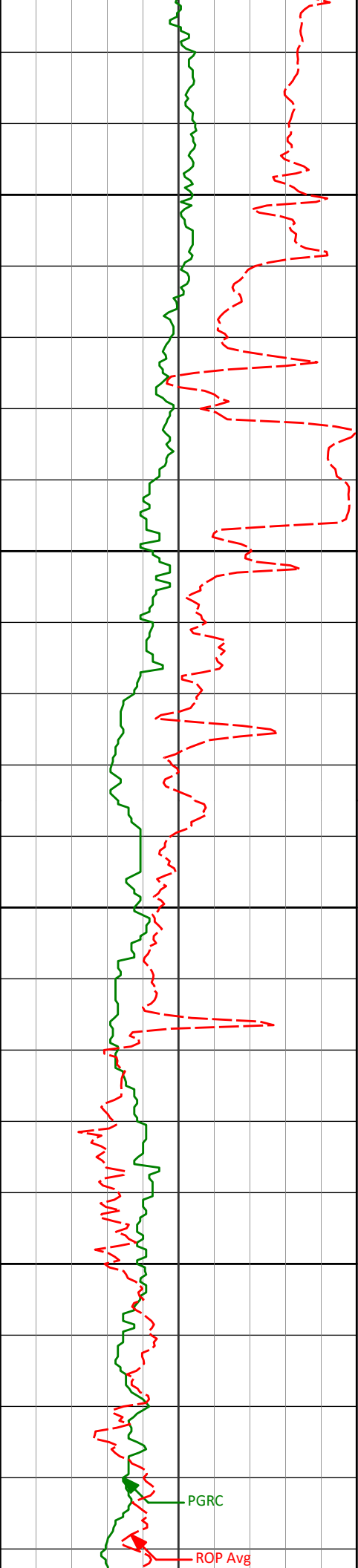
358.38°

6126.44'

5129.74'

PGRC

ROP Avg



11100

11150

11200

11250

11162'

92.03°

358.81°

6123.94'

5222.69'

11255'

92.09°

358.48°

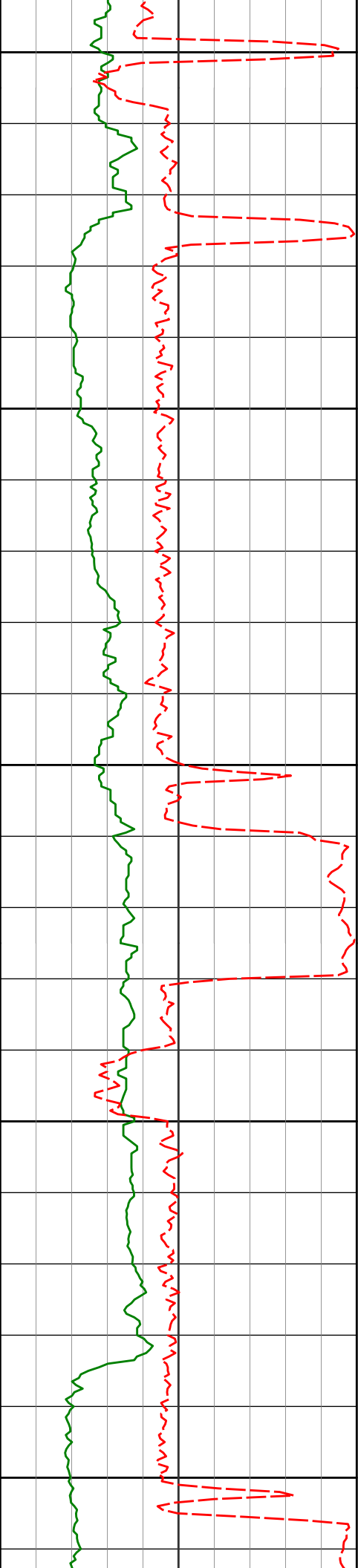
6120.60'

5315.62'

PGRC

ROP Avg





11300

11350

11400

11450

11500

11350'

92.25°

357.23°

6117.00'

5410.50'

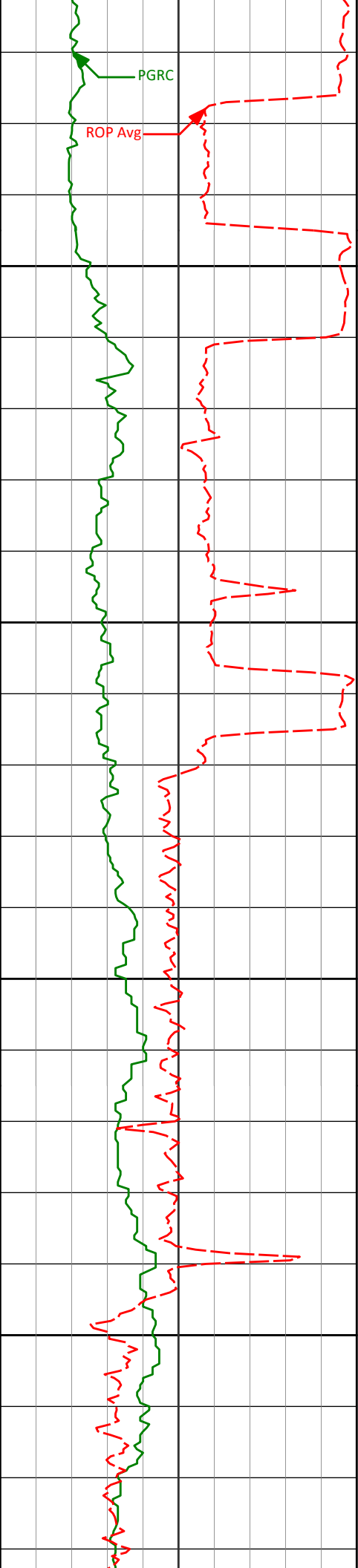
11445'

91.63°

358.12°

6113.79'

5505.39'



11539'	89.91°	359.69°	6112.52'	5599.37'
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11550

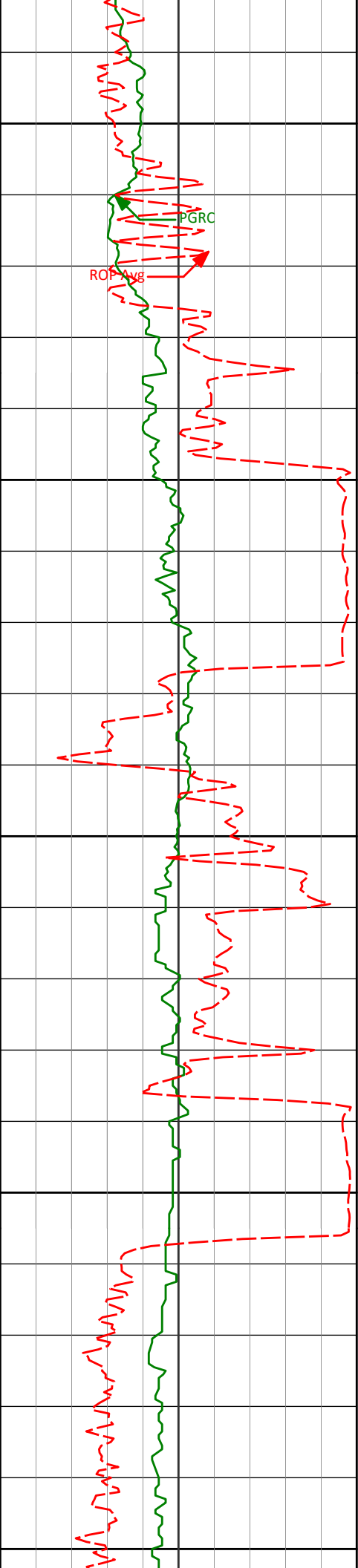
11600

11634'	87.66°	359.49°	6114.54'	5694.34'
--------	--------	---------	----------	----------

11650

11700

11729'	86.98°	359.04°	6118.98'	5789.24'
--------	--------	---------	----------	----------



11750

PGRC

ROP Avg

11800

11824'

87.97°

358.91°

6123.16'

5884.14'

11850

11900

11919'

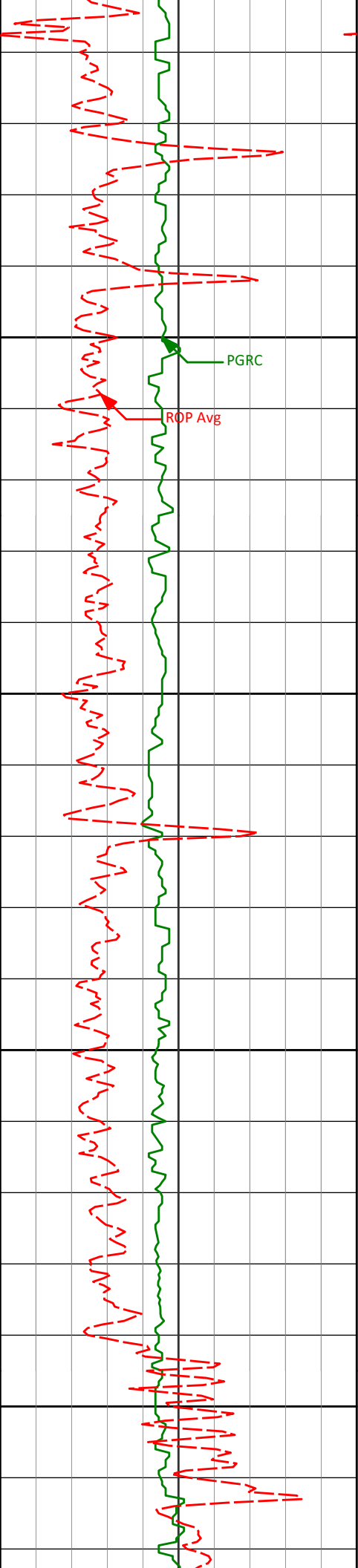
91.57°

0.57°

6123.55'

5979.12'

11950



12000

12050

12100

12150

12013'

90.43°

358.45°

6121.90'

6073.09'

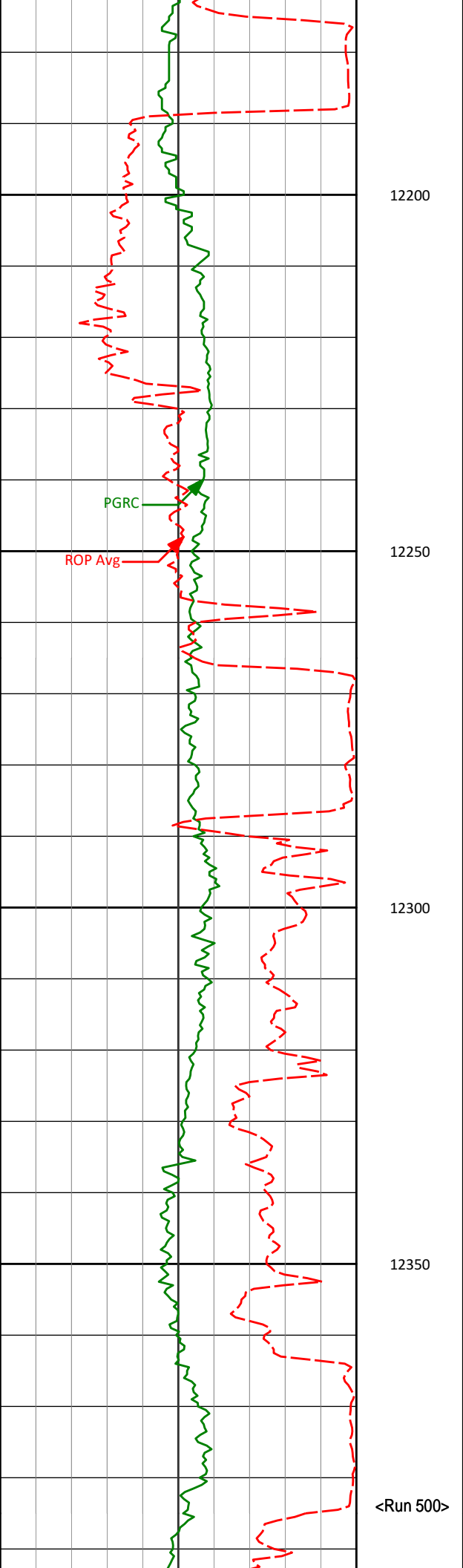
12108'

91.02°

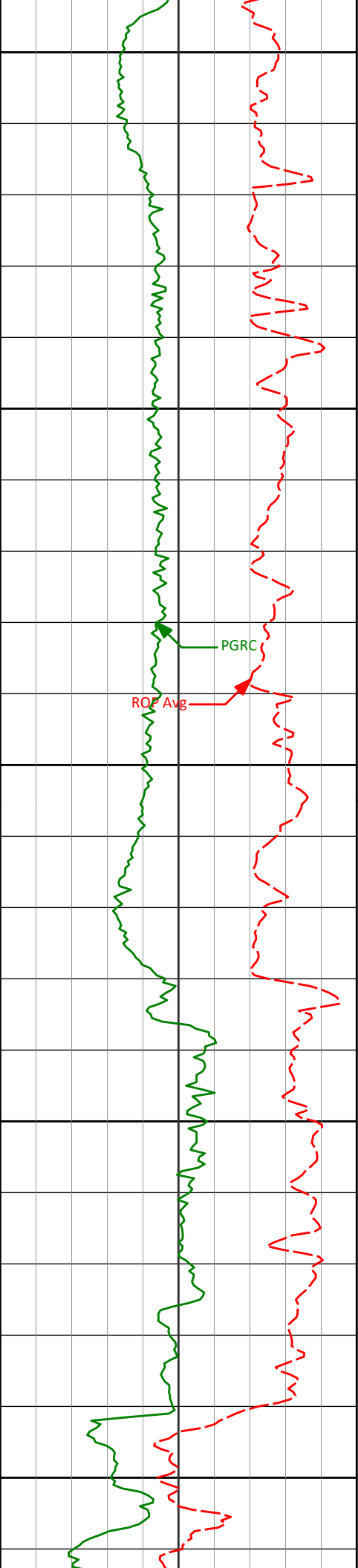
356.37°

6120.70'

6168.01'



12200	12203'	88.21°	355.50°	6121.34'	6262.80'
12250					
12300	12298'	88.06°	355.96°	6124.43'	6357.53'
12350					
<Run 500>					



12400

12416'

89.97°

358.89°

6126.32'

6475.41'

12450

12500

12511'

88.92°

357.80°

6127.24'

6570.38'

12550

12600

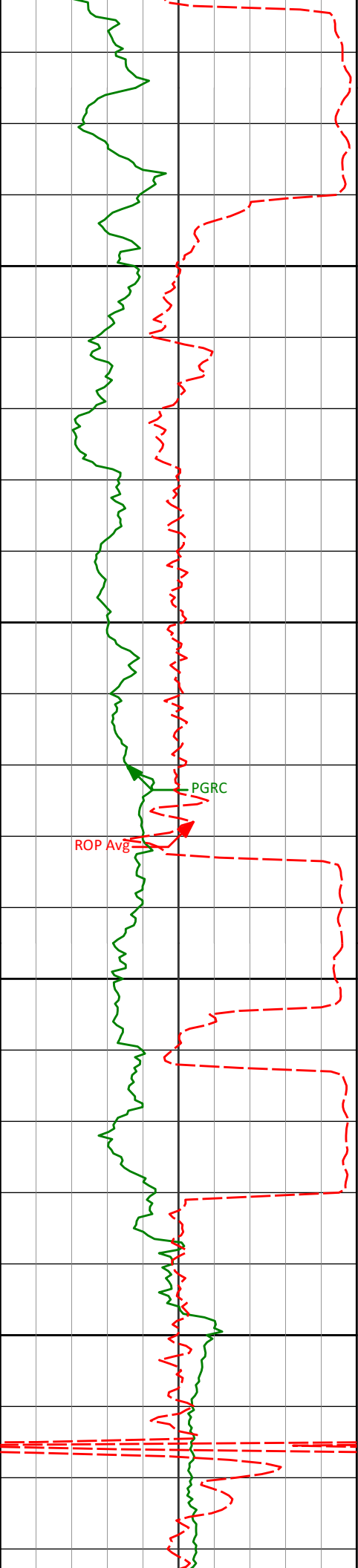
12606'

88.15°

357.98°

6129.67'

6665.30'



12650

12700

12750

12800

12700'

87.35°

357.74°

6133.36'

6759.19'

12795'

86.98°

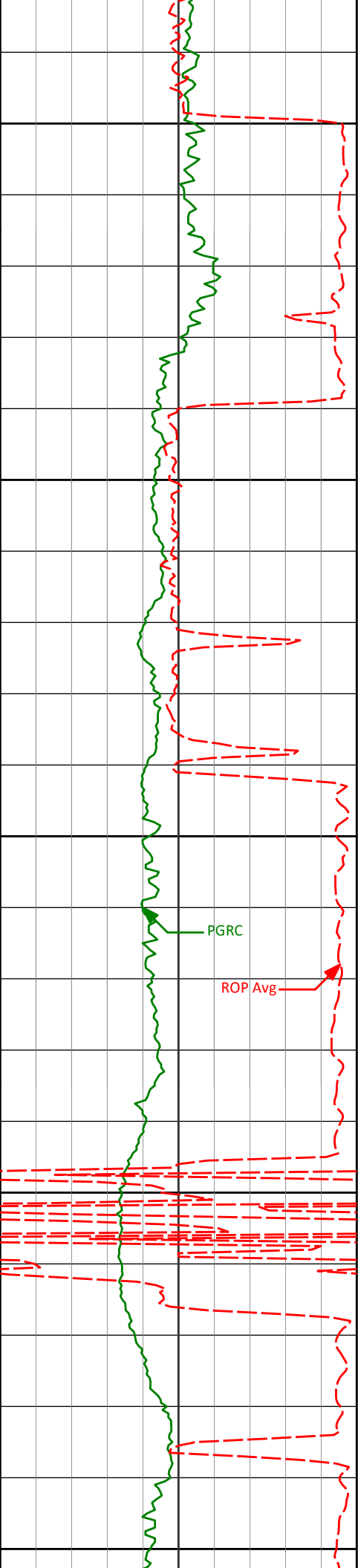
358.64°

6138.05'

6854.04'

ROP Avg

PGRC



12850

12890'

87.07°

358.51°

6142.99'

6948.90'

12900

12950

PGRC

ROP Avg

12985'

88.09°

358.99°

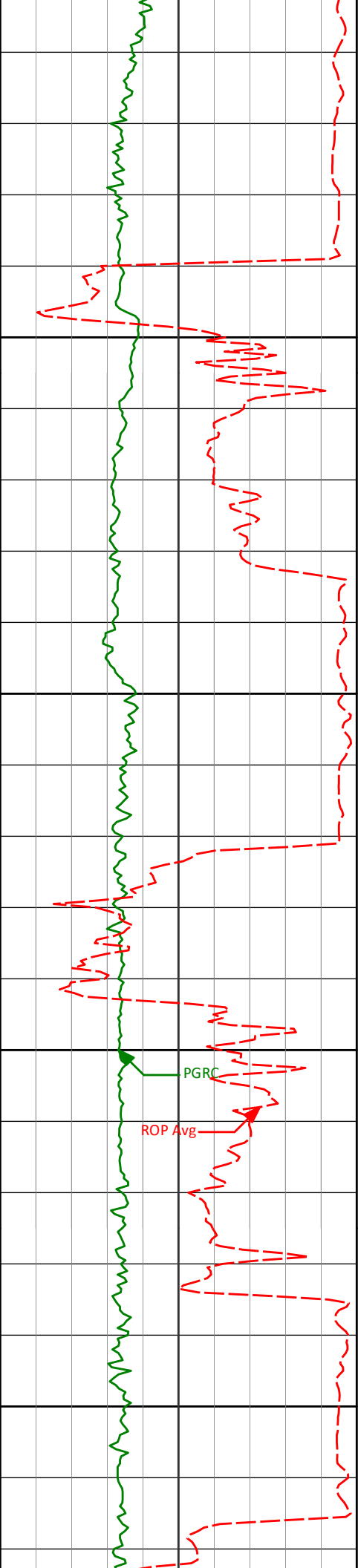
6147.00'

7043.80'

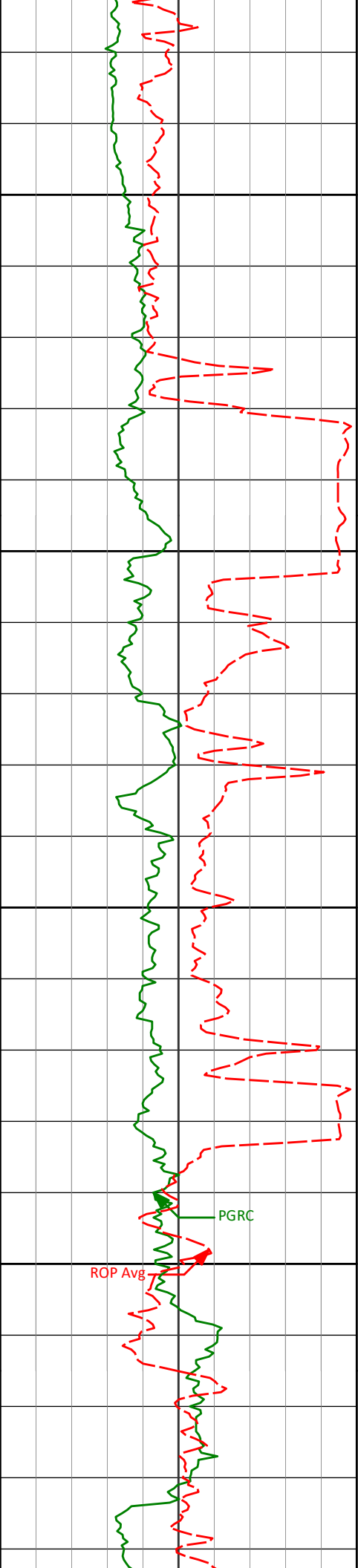
13000

13050





	13080'	89.88°	0.25°	6148.68'	7138.78'
13100					
13150					
	13175'	91.11°	1.52°	6147.86'	7233.75'
13200					
13250					
	13270'	90.93°	0.98°	6146.17'	7328.69'



13300

13350

13400

13450

13365'

13459'

91.63°

91.91°

1.85°

2.05°

6144.05'

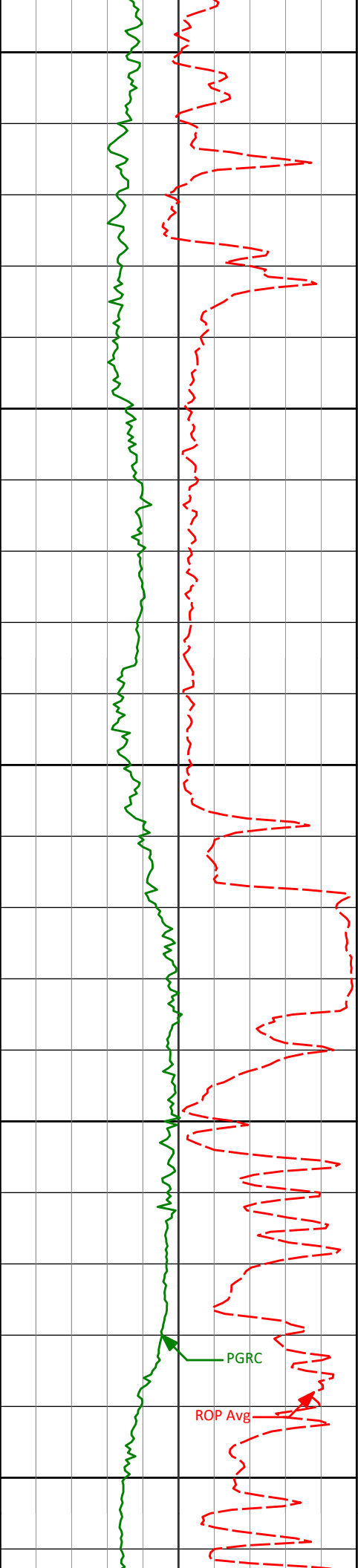
6141.14'

7423.62'

7517.50'

PGRC

ROP Avg



13500

13550

13600

13650

13700

13554'

91.79°

2.36°

6138.08'

7612.35'

13649'

90.46°

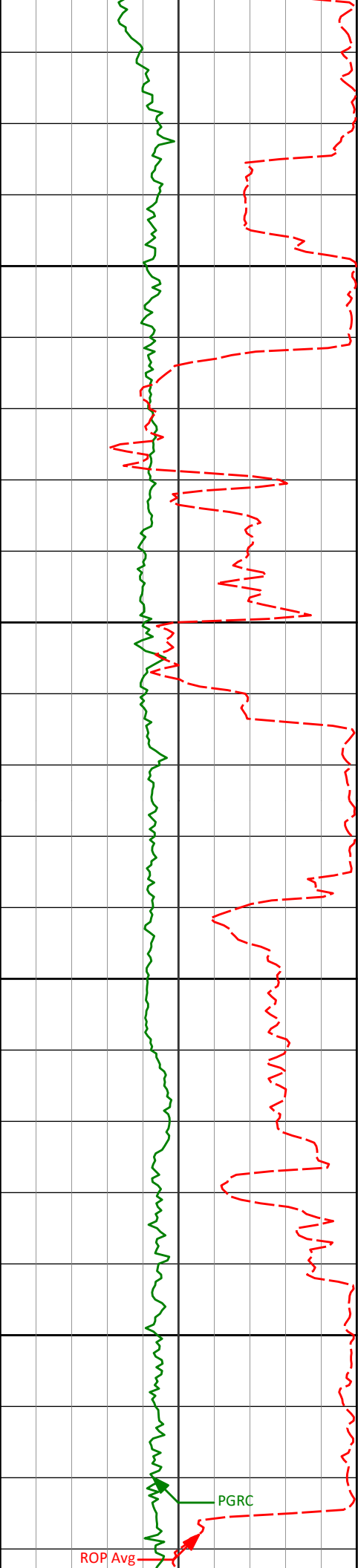
1.87°

6136.21'

7707.24'

PGRC

ROP Avg



13750

13800

13850

13900

13744'

90.25°

0.85°

6135.62'

7802.20'

13839'

89.91°

0.12°

6135.49'

7897.19'

13932'

89.15°

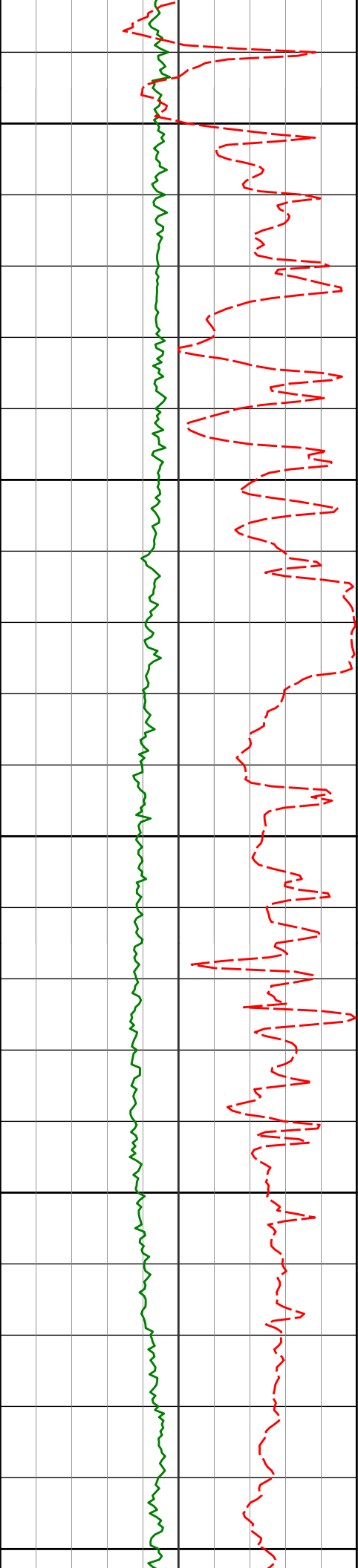
252.22°

6135.44'

7897.12'

ROP Avg

PGRC



13950

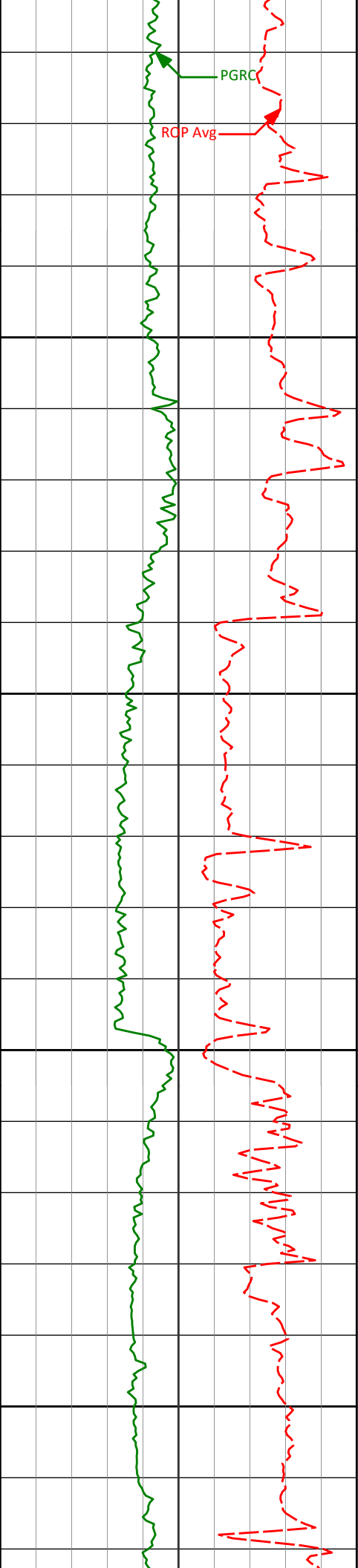
14000

14050

14100

14150

13933'	90.15°	358.30°	6135.44'	7991.18'
14028'	90.15°	357.25°	6135.19'	8086.13'
14123'	90.06°	357.18°	6135.02'	8181.04'



14200

14218'

90.09°

357.16°

6134.89'

8275.96'

14250

14300

14313'

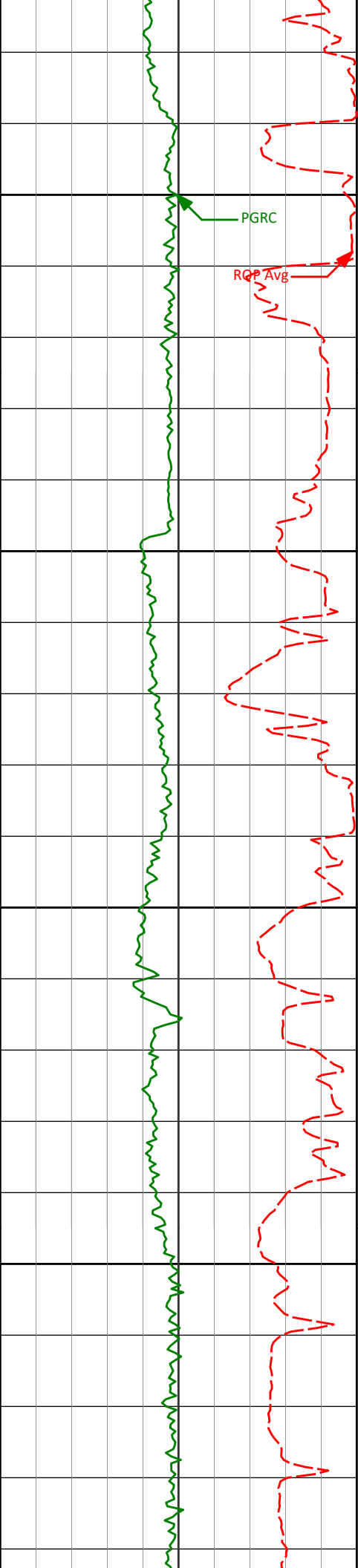
89.78°

356.59°

6135.00'

8370.85'

14350



14400

14450

14500

14550

14408'

14502'

89.41°

90.28°

356.52°

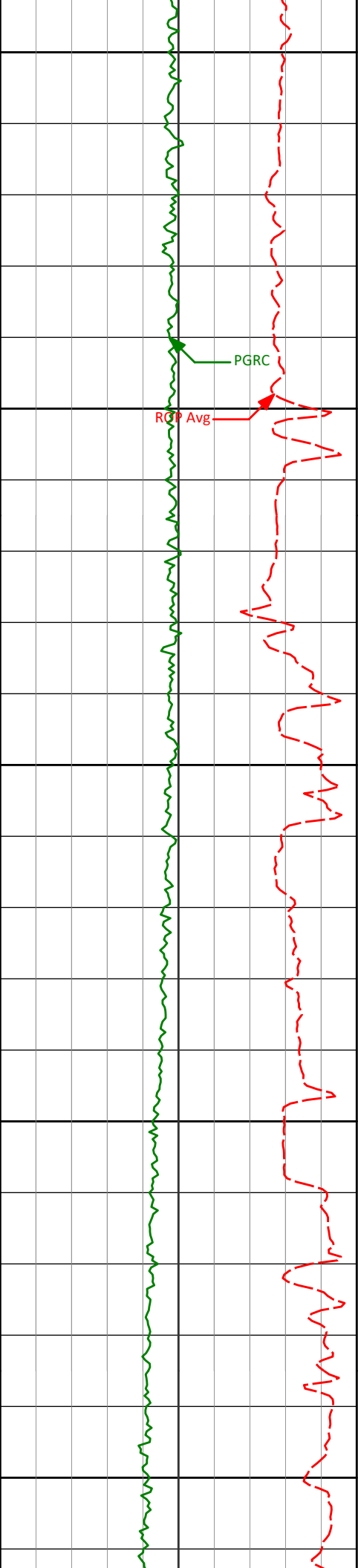
357.23°

6135.67'

6135.93'

8465.71'

8559.60'



14600

14650

14700

14750

14800

14597'

90.80°

357.53°

6135.03'

8654.52'

14692'

89.82°

356.58°

6134.52'

8749.42'

14787'

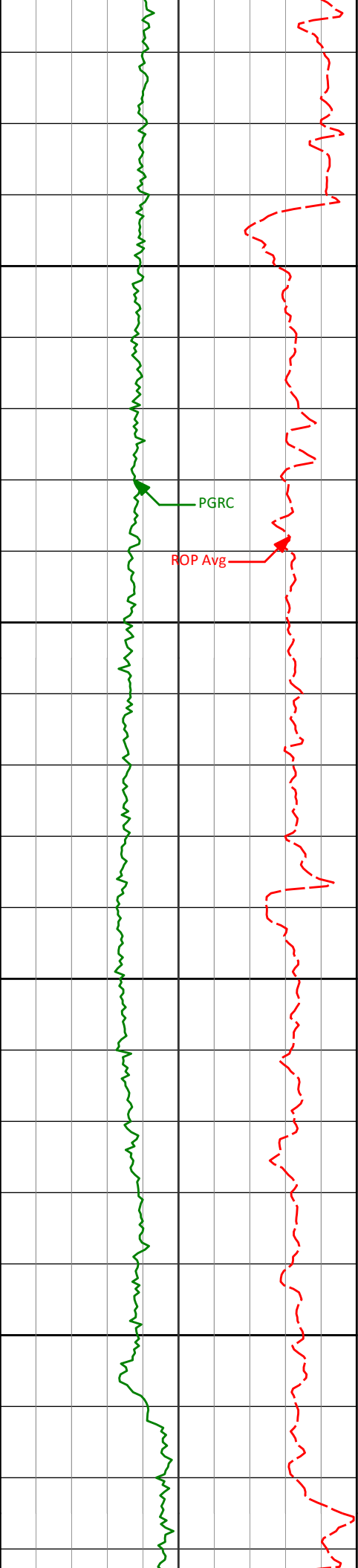
90.34°

357.06°

6134.38'

8844.30'





14850

14882'

90.68°

356.85°

6133.54'

8939.20'

14900

14950

14976'

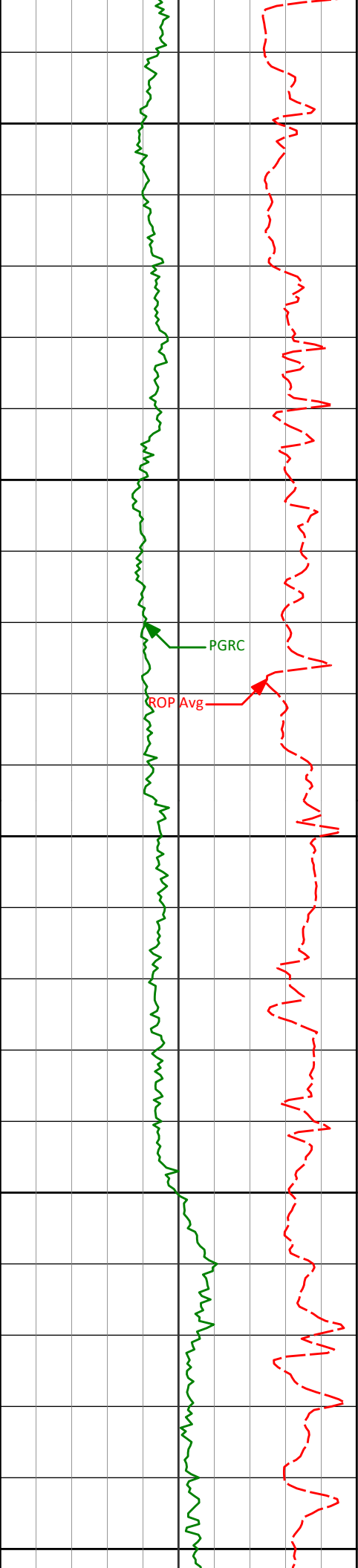
91.26°

356.51°

6131.95'

9033.06'

15000



15050

15071'

90.74°

355.97°

6130.29'

9127.88'

15100

PGRC

ROP Avg

15150

15166'

90.77°

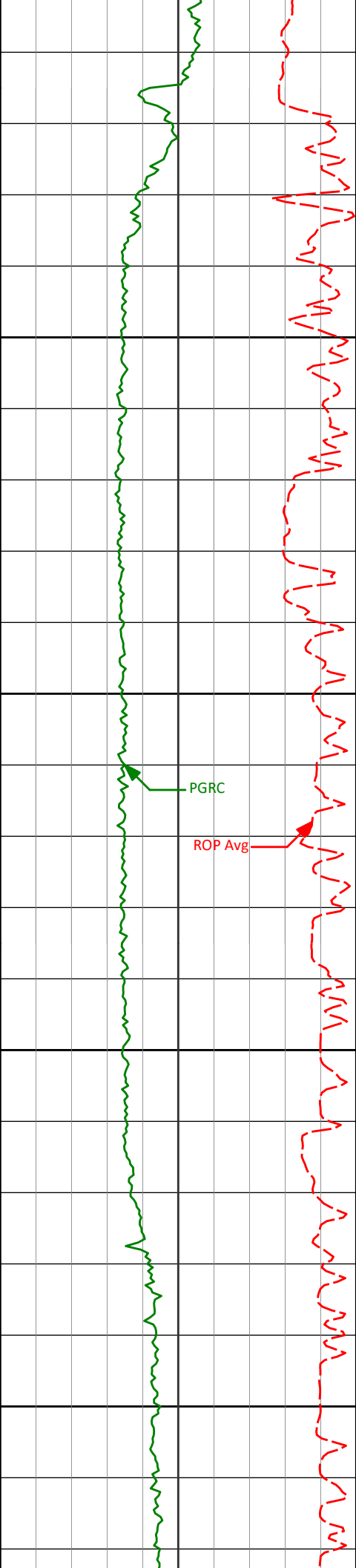
356.38°

6129.04'

9222.70'

15200

15250



15300

15350

15400

15450

15261'

15356'

15450'

90.18°

90.71°

90.37°

356.83°

356.79°

357.22°

6128.25'

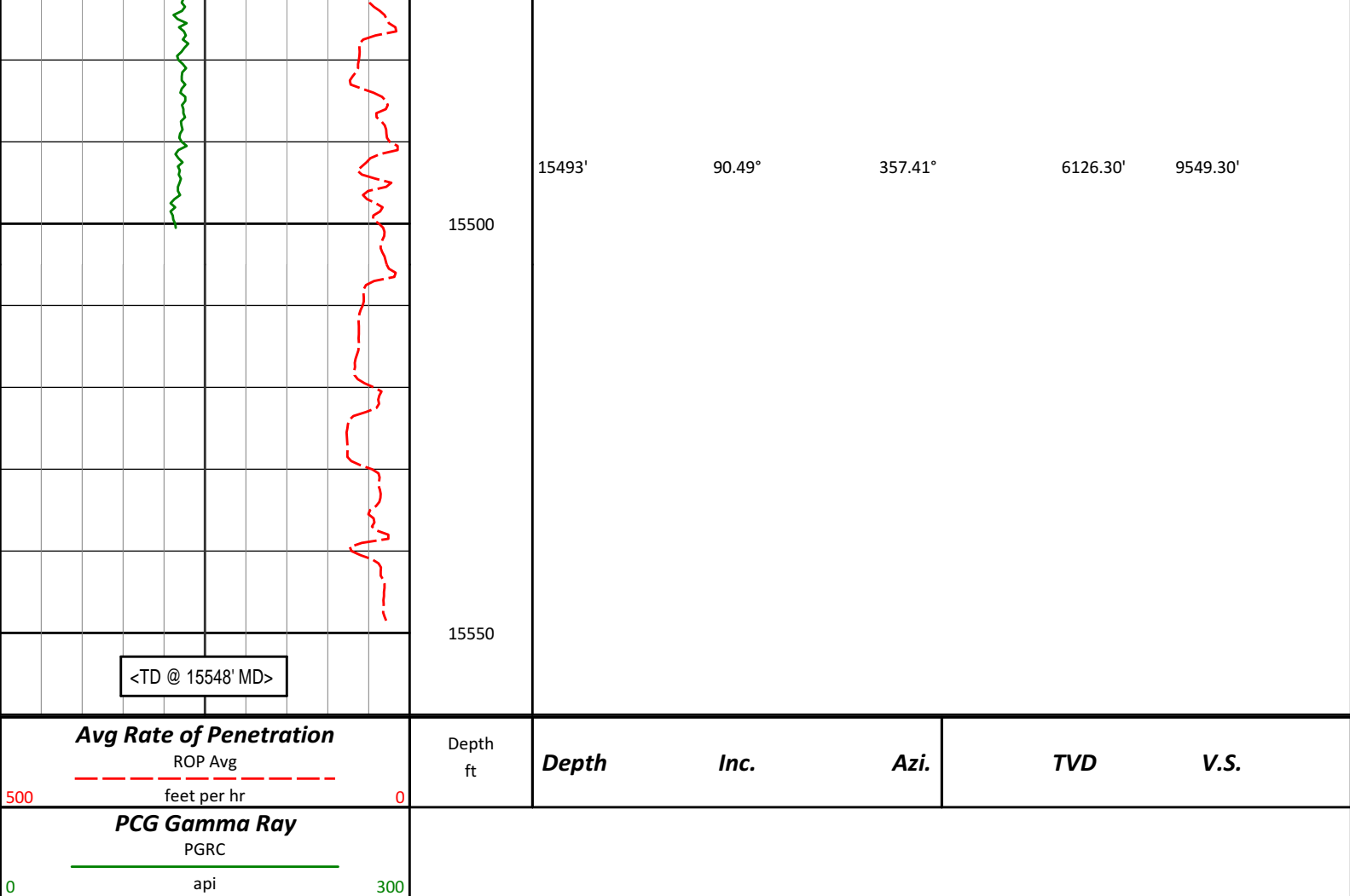
6127.51'

6126.63'

9317.56'

9412.44'

9506.34'



## HALLIBURTON

### DIRECTIONAL SURVEY REPORT

Noble Energy  
Trisha LC29-74HNB  
Wattenberg  
Weld Colorado  
USA

CA-XX-0901287195

Surveys are IFR1 and MSA corrected.

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
350.00	0.60	209.14	349.99	1.60 S	0.89 W	-1.59	0.17
600.00	0.20	317.14	599.99	2.42 S	1.83 W	-2.41	0.28
716.00	0.44	281.14	715.99	2.19 S	2.40 W	-2.17	0.26
809.00	0.38	266.55	808.98	2.14 S	3.06 W	-2.12	0.13
902.00	0.23	266.97	901.98	2.17 S	3.55 W	-2.14	0.16
1088.00	0.19	231.79	1087.98	2.38 S	4.17 W	-2.35	0.07
1180.00	0.21	145.79	1179.98	2.61 S	4.19 W	-2.58	0.30
1366.00	0.15	122.93	1365.98	3.03 S	3.80 W	-3.00	0.05
1459.00	0.40	92.48	1458.98	3.11 S	3.37 W	-3.08	0.30
1551.00	0.37	85.03	1550.98	3.09 S	2.75 W	-3.08	0.06
1644.00	0.22	122.68	1643.98	3.16 S	2.31 W	-3.15	0.26
1737.00	0.19	98.57	1736.98	3.28 S	2.00 W	-3.27	0.10
1831.00	2.47	134.71	1830.94	4.73 S	0.41 W	-4.73	2.47
1926.00	4.21	137.56	1925.78	8.75 S	3.40 E	-8.77	1.84
2021.00	4.72	121.55	2020.50	13.37 S	9.08 E	-13.42	1.41
2115.00	6.25	125.53	2114.06	18.36 S	16.54 E	-18.47	1.68

2210.00	7.66	126.51	2208.36	25.14 S	25.84 E	-25.30	1.49
2305.00	8.91	118.64	2302.37	32.43 S	37.39 E	-32.67	1.77
2399.00	7.91	115.71	2395.36	38.72 S	49.61 E	-39.04	1.16
2494.00	9.80	120.89	2489.22	45.71 S	62.43 E	-46.11	2.16
2589.00	10.68	117.81	2582.71	53.97 S	77.16 E	-54.47	1.09
2684.00	10.68	118.21	2676.06	62.24 S	92.70 E	-62.83	0.08
2779.00	10.79	116.31	2769.40	70.34 S	108.43 E	-71.04	0.39
2873.00	9.17	115.02	2861.98	77.41 S	123.11 E	-78.20	1.74
2968.00	7.59	114.18	2955.96	83.18 S	135.69 E	-84.05	1.67
3063.00	5.37	118.07	3050.35	87.84 S	145.34 E	-88.78	2.38
3158.00	4.65	126.35	3144.99	92.22 S	152.36 E	-93.20	1.07
3253.00	4.07	131.24	3239.71	96.72 S	158.00 E	-97.74	0.72
3348.00	2.53	127.85	3334.55	100.23 S	162.19 E	-101.28	1.63
3442.00	1.66	108.69	3428.49	101.94 S	165.12 E	-103.00	1.18
3537.00	2.04	109.46	3523.44	102.94 S	168.02 E	-104.03	0.40
3632.00	2.32	108.66	3618.37	104.12 S	171.43 E	-105.23	0.30
3727.00	2.48	110.73	3713.29	105.47 S	175.18 E	-106.59	0.19
3822.00	0.87	90.20	3808.24	106.20 S	177.82 E	-107.34	1.78
3917.00	1.25	295.07	3903.24	105.76 S	177.60 E	-106.90	2.18
4011.00	1.23	304.84	3997.21	104.75 S	175.84 E	-105.88	0.23
4106.00	1.75	291.90	4092.18	103.62 S	173.66 E	-104.74	0.65
4201.00	2.16	279.63	4187.13	102.78 S	170.55 E	-103.88	0.61
4296.00	2.19	284.63	4282.06	102.03 S	167.03 E	-103.10	0.20
4391.00	2.15	294.48	4376.99	100.83 S	163.65 E	-101.88	0.39
4486.00	2.06	308.04	4471.93	99.04 S	160.69 E	-100.07	0.53
4581.00	2.47	332.93	4566.85	96.16 S	158.41 E	-97.18	1.11
4676.00	2.82	344.08	4661.75	92.09 S	156.84 E	-93.10	0.65
4770.00	3.27	4.19	4755.62	87.20 S	156.40 E	-88.20	1.22
4865.00	2.26	358.11	4850.51	82.62 S	156.53 E	-83.63	1.11
4960.00	1.80	348.31	4945.45	79.29 S	156.17 E	-80.30	0.60
5055.00	2.19	340.20	5040.40	76.12 S	155.25 E	-77.12	0.51
5150.00	1.95	338.58	5135.33	72.91 S	154.05 E	-73.90	0.26
5245.00	1.86	329.27	5230.28	70.08 S	152.67 E	-71.06	0.34
5339.00	1.81	329.45	5324.23	67.49 S	151.14 E	-68.46	0.05
5404.00	1.90	323.79	5389.20	65.73 S	149.98 E	-66.70	0.31
5432.00	1.87	328.34	5417.18	64.97 S	149.46 E	-65.93	0.54
5526.00	4.22	333.64	5511.04	60.57 S	147.12 E	-61.51	2.52
5574.00	11.48	340.16	5558.56	54.48 S	144.71 E	-55.41	15.21
5621.00	14.13	339.99	5604.39	44.69 S	141.16 E	-45.60	5.64
5669.00	15.71	341.71	5650.77	33.01 S	137.12 E	-33.90	3.42
5716.00	18.84	348.38	5695.65	19.53 S	133.59 E	-20.40	7.87
5764.00	23.43	355.28	5740.42	2.42 S	131.24 E	-3.27	10.86
5811.00	27.25	356.06	5782.89	17.63 N	129.73 E	16.80	8.16
5859.00	30.15	357.85	5824.99	40.65 N	128.53 E	39.82	6.30
5906.00	33.75	0.61	5864.86	65.51 N	128.22 E	64.68	8.26
5954.00	37.91	3.38	5903.77	93.58 N	129.23 E	92.74	9.30
6001.00	43.07	2.54	5939.50	124.04 N	130.80 E	123.20	11.04
6049.00	48.50	1.35	5972.96	158.41 N	131.95 E	157.56	11.45
6096.00	51.53	1.30	6003.16	194.41 N	132.78 E	193.55	6.45
6144.00	54.38	1.05	6032.08	232.71 N	133.57 E	231.84	5.95
6190.00	59.51	0.72	6057.16	271.25 N	134.16 E	270.38	11.17
6238.00	65.03	359.94	6079.49	313.72 N	134.39 E	312.84	11.59
6285.00	68.92	0.23	6097.87	356.96 N	134.46 E	356.09	8.30
6333.00	72.35	359.76	6113.78	402.24 N	134.45 E	401.37	7.21
6380.00	77.36	359.14	6126.05	447.59 N	134.02 E	446.72	10.74
6428.00	83.36	359.23	6134.09	494.89 N	133.34 E	494.02	12.50
6452.00	85.68	359.19	6136.38	518.78 N	133.01 E	517.91	9.67
6550.00	87.32	359.66	6142.36	616.58 N	132.03 E	615.72	1.74
6645.00	88.40	0.10	6145.91	711.52 N	131.83 E	710.65	1.23
6740.00	90.22	0.29	6147.06	806.50 N	132.16 E	805.63	1.93
6835.00	89.45	1.18	6147.33	901.49 N	133.38 E	900.61	1.24
6930.00	91.14	359.96	6146.84	996.48 N	134.32 E	995.59	2.19
7025.00	91.51	358.12	6144.64	1091.44 N	132.73 E	1090.56	1.98
7119.00	88.24	353.91	6144.85	1185.18 N	126.20 E	1184.34	5.67
7214.00	91.08	353.36	6145.41	1279.58 N	115.67 E	1278.81	3.05
7309.00	94.22	356.15	6141.02	1374.06 N	106.99 E	1373.34	4.42
7403.00	90.80	356.93	6136.90	1467.79 N	101.33 E	1467.10	3.73
7498.00	91.60	358.36	6134.91	1562.68 N	97.42 E	1562.02	1.72
7593.00	92.31	357.39	6131.67	1657.56 N	93.90 E	1656.92	1.26
7687.00	89.66	359.05	6130.06	1751.49 N	90.99 E	1750.86	3.33
7782.00	90.89	0.62	6129.60	1846.48 N	90.71 E	1845.86	2.10
7877.00	91.48	1.75	6127.64	1941.44 N	92.68 E	1940.80	1.24

7877.00	91.48	1.75	6121.84	1941.44 N	92.88 E	1940.80	1.34
7972.00	91.26	3.89	6125.36	2036.29 N	97.35 E	2035.62	2.26
8067.00	92.25	3.15	6122.45	2131.07 N	103.18 E	2130.35	1.30
8162.00	88.12	2.04	6122.15	2225.95 N	107.48 E	2225.21	4.50
8256.00	87.57	1.26	6125.68	2319.84 N	110.18 E	2319.08	1.01
8351.00	87.60	0.39	6129.69	2414.74 N	111.55 E	2413.97	0.92
8446.00	88.74	1.11	6132.72	2509.69 N	112.79 E	2508.90	1.42
8541.00	90.28	359.38	6133.53	2604.67 N	113.20 E	2603.89	2.44
8636.00	90.59	359.16	6132.81	2699.66 N	111.99 E	2698.88	0.40
8730.00	90.25	358.30	6132.12	2793.64 N	109.90 E	2792.87	0.98
8825.00	91.20	357.88	6130.92	2888.58 N	106.74 E	2887.83	1.09
8920.00	91.20	357.56	6128.93	2983.48 N	102.96 E	2982.75	0.34
9015.00	89.51	355.00	6128.34	3078.27 N	96.80 E	3077.58	3.23
9110.00	89.91	356.68	6128.82	3173.01 N	89.91 E	3172.36	1.82
9205.00	91.08	359.63	6128.00	3267.95 N	86.85 E	3267.32	3.34
9300.00	91.26	359.18	6126.06	3362.92 N	85.86 E	3362.30	0.51
9395.00	87.38	356.50	6127.19	3457.82 N	82.28 E	3457.22	4.96
9489.00	90.52	358.60	6128.91	3551.70 N	78.27 E	3551.12	4.02
9584.00	91.36	358.57	6127.35	3646.66 N	75.92 E	3646.09	0.88
9677.00	92.49	359.31	6124.23	3739.59 N	74.20 E	3739.03	1.45
9770.00	90.34	355.52	6121.93	3832.44 N	70.01 E	3831.91	4.68
9863.00	89.94	356.27	6121.71	3925.20 N	63.35 E	3924.71	0.91
9956.00	90.18	357.95	6121.61	4018.08 N	58.66 E	4017.62	1.82
10049.00	90.03	1.58	6121.44	4111.06 N	58.28 E	4110.60	3.91
10141.00	90.37	1.55	6121.12	4203.03 N	60.79 E	4202.55	0.37
10234.00	91.48	1.83	6119.61	4295.98 N	63.53 E	4295.48	1.23
10327.00	88.09	359.73	6119.96	4388.95 N	64.80 E	4388.44	4.29
10420.00	91.17	3.37	6120.56	4481.88 N	67.32 E	4481.36	5.13
10512.00	91.48	2.13	6118.44	4573.75 N	71.73 E	4573.19	1.39
10605.00	90.37	2.68	6116.94	4666.66 N	75.63 E	4666.07	1.33
10698.00	87.81	356.90	6118.41	4759.60 N	75.29 E	4759.01	6.80
10791.00	87.32	357.97	6122.37	4852.42 N	71.13 E	4851.86	1.26
10883.00	88.37	358.90	6125.82	4944.32 N	68.62 E	4943.77	1.52
10976.00	89.91	359.75	6127.22	5037.30 N	67.53 E	5036.75	1.89
11069.00	91.05	358.38	6126.44	5130.28 N	66.01 E	5129.74	1.92
11162.00	92.03	358.81	6123.94	5223.21 N	63.73 E	5222.69	1.15
11255.00	92.09	358.48	6120.60	5316.13 N	61.53 E	5315.62	0.36
11350.00	92.25	357.23	6117.00	5410.99 N	57.98 E	5410.50	1.33
11445.00	91.63	358.12	6113.79	5505.86 N	54.13 E	5505.39	1.14
11539.00	89.91	359.69	6112.52	5599.82 N	52.33 E	5599.37	2.48
11634.00	87.66	359.49	6114.54	5694.79 N	51.65 E	5694.34	2.38
11729.00	86.98	359.04	6118.98	5789.68 N	50.43 E	5789.24	0.86
11824.00	87.97	358.91	6123.16	5884.57 N	48.74 E	5884.14	1.05
11919.00	91.57	0.57	6123.55	5979.55 N	48.31 E	5979.12	4.17
12013.00	90.43	358.45	6121.90	6073.53 N	47.50 E	6073.09	2.56
12108.00	91.02	356.37	6120.70	6168.42 N	43.21 E	6168.01	2.28
12203.00	88.21	355.50	6121.34	6263.17 N	36.48 E	6262.80	3.10
12298.00	88.06	355.96	6124.43	6357.85 N	29.41 E	6357.53	0.51
12369.00	89.35	357.79	6126.04	6428.72 N	25.54 E	6428.42	3.15
12416.00	89.97	358.89	6126.32	6475.70 N	24.18 E	6475.41	2.69
12511.00	88.92	357.80	6127.24	6570.66 N	21.43 E	6570.38	1.59
12606.00	88.15	357.98	6129.67	6665.56 N	17.94 E	6665.30	0.83
12700.00	87.35	357.74	6133.36	6759.42 N	14.43 E	6759.19	0.89
12795.00	86.98	358.64	6138.05	6854.26 N	11.43 E	6854.04	1.02
12890.00	87.07	358.51	6142.99	6949.10 N	9.07 E	6948.90	0.17
12985.00	88.09	358.99	6147.00	7043.99 N	7.00 E	7043.80	1.19
13080.00	89.88	0.25	6148.68	7138.97 N	6.37 E	7138.78	2.30
13175.00	91.11	1.52	6147.86	7233.95 N	7.84 E	7233.75	1.86
13270.00	90.93	0.98	6146.17	7328.91 N	9.91 E	7328.69	0.60
13365.00	91.63	1.85	6144.05	7423.86 N	12.26 E	7423.62	1.18
13459.00	91.91	2.05	6141.14	7517.76 N	15.45 E	7517.50	0.37
13554.00	91.79	2.36	6138.08	7612.64 N	19.11 E	7612.35	0.35
13649.00	90.46	1.87	6136.21	7707.55 N	22.61 E	7707.24	1.49
13744.00	90.25	0.85	6135.62	7802.52 N	24.87 E	7802.20	1.10
13839.00	89.91	0.12	6135.49	7897.52 N	25.67 E	7897.19	0.85
13933.00	90.15	358.30	6135.44	7991.50 N	24.37 E	7991.18	1.95
14028.00	90.15	357.25	6135.19	8086.43 N	20.69 E	8086.13	1.11
14123.00	90.06	357.18	6135.02	8181.32 N	16.07 E	8181.04	0.12
14218.00	90.09	357.16	6134.89	8276.20 N	11.38 E	8275.96	0.04
14313.00	89.78	356.59	6135.00	8371.06 N	6.20 E	8370.85	0.68
14408.00	89.41	356.52	6135.67	8465.89 N	0.49 E	8465.71	0.40
14502.00	90.28	357.23	6135.93	8559.74 N	4.63 W	8559.60	1.19

14597.00	90.80	357.53	6135.03	8654.64 N	8.97 W	8654.52	0.63
14692.00	89.82	356.58	6134.52	8749.51 N	13.86 W	8749.42	1.44
14787.00	90.34	357.06	6134.38	8844.36 N	19.13 W	8844.30	0.74
14882.00	90.68	356.85	6133.54	8939.23 N	24.17 W	8939.20	0.42
14976.00	91.26	356.51	6131.95	9033.05 N	29.61 W	9033.06	0.72
15071.00	90.74	355.97	6130.29	9127.84 N	35.84 W	9127.88	0.79
15166.00	90.77	356.38	6129.04	9222.62 N	42.18 W	9222.70	0.43
15261.00	90.18	356.83	6128.25	9317.44 N	47.81 W	9317.56	0.78
15356.00	90.71	356.79	6127.51	9412.29 N	53.09 W	9412.44	0.56
15450.00	90.37	357.22	6126.63	9506.16 N	58.00 W	9506.34	0.58
15493.00	90.49	357.41	6126.30	9549.11 N	60.02 W	9549.30	0.52
15548.00	90.49	357.41	6125.83	9604.05 N	62.50 W	9604.26	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 359.63 DEGREES (GRID)  
A TOTAL CORRECTION OF 7.16 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 15548.00 FEET  
IS 9604.26 FEET ALONG 359.63 DEGREES (GRID)**

**Surface surveys at 350 ft and 600 ft have had azimuths corrected to grid north, but were not taken by Halliburton.**

**Final survey is a projection from 15493 MD to TD at 15548' MD.**