

PCGK - Pressure Case Gamma

1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	12-Jan-14	20-Jan-14			
Rig Bit Number	0100	0200			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	1,088.00	7,964.00			
Log End Depth (MD, ft)	7,964.00	16,708.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	10-Jan-14 08:30	13-Jan-14 12:58			
Drill/Wipe End Date and Time	12-Jan-14 10:30	19-Jan-14 17:17			
Min Inc (deg) @ Depth (MD, ft)	0.19 @ 4,008.00	88.03 @ 8,549.00			
Max Inc (deg) @ Depth (MD, ft)	87.19 @ 7,916.00	93.08 @ 9,233.00			
Bit TFA(in2) / Bit Type	1.49 / N/A	1.53 / N/A			
Flow Rate (gpm)	624.55	279.07			
Max AV (fpm) / CV (fpm) @ MWD	420.5 / N/A	N/A / N/A			
Fluid Type	Native/Spud Mud	Mineral Oil Bas			
Density (ppg) / Viscosity (spqt)	10.10 / 55.00	9.00 / 58.00			
Filtrate CL (ppm)	2,200.00	N/A			
pH / Fluid Loss (mptm)	8.50 / 5	N/A / N/A			
PV (cP) / YP (lbf2)	13 / 14.00	16 / 10.00			
% Solids / % Sand	9.00 / 0.10	9.50 / N/A			
% Oil / Oil:Water Ratio	2.00 / N/A	58.50 / 65:35			
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Max Tool Temp (in F) / S	477.04 / FCM	622.2 / FCM			

Max Tool Temp (degF) / Source	177.64 / PCM	230.3 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ 177.64	N/A @ 412.20			
Lead MWD Engineer	Clay Wass	Caleb Jones			
Customer Representative	Jack Sanders	Jack Sanders			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.76	5.76			
Sub Serial Number	11342274	12334785			
Insert Serial Number	11680802	11680770			
Date and Time Initialized	09-Jan-14 18:08	13-Jan-14 14:14			
Date and Time Read	13-Jan-14 11:47	20-Jan-14 16:22			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	45.64	43.43			
Software Version	6.21	6.21			
Sub Serial Number	11342274	12334785			
Sonde Serial Number	11833253	11638590			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	158.04	303.16			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	50.84	48.43			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11342274	12334785			
Insert/Sonde Serial Number	11293272	12071268			

REMARKS

1. Depths are Measured Depths, referenced to Driller's pipe tally, and measure from the rig floor.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annular velocities are calculated using the Power Law model for water based fluids and the Bingham Plastic model for oil based fluids.
4. All data presented is recorded unless otherwise specified.
5. The following smoothing parameters have been applied to the data:

PGRC (Corrected Gamma Ray):

Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft
Gap Fill: 3.0 ft

ROPA (Average Rate of Penetration):

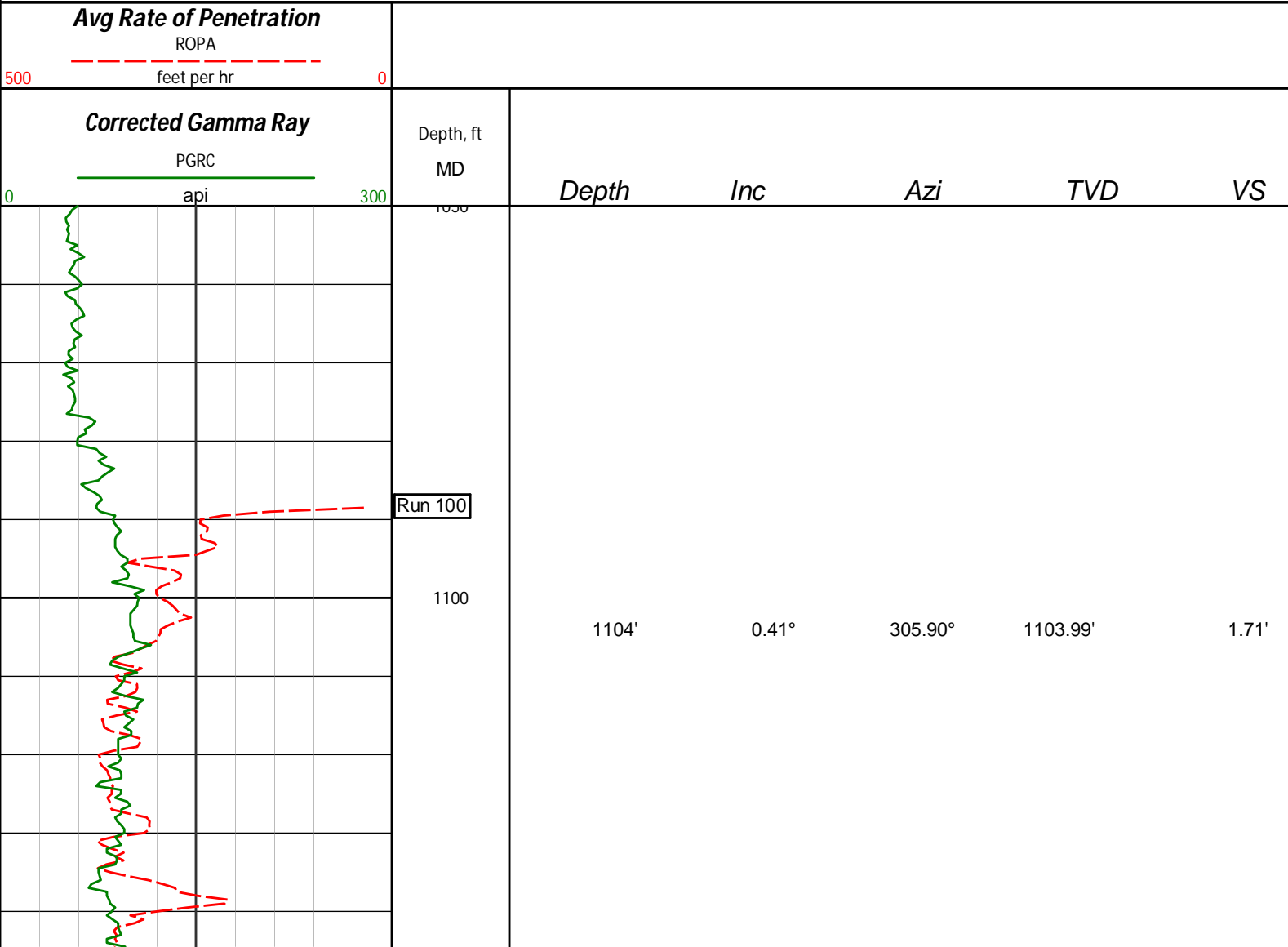
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft
Gap Fill: 3.0 ft

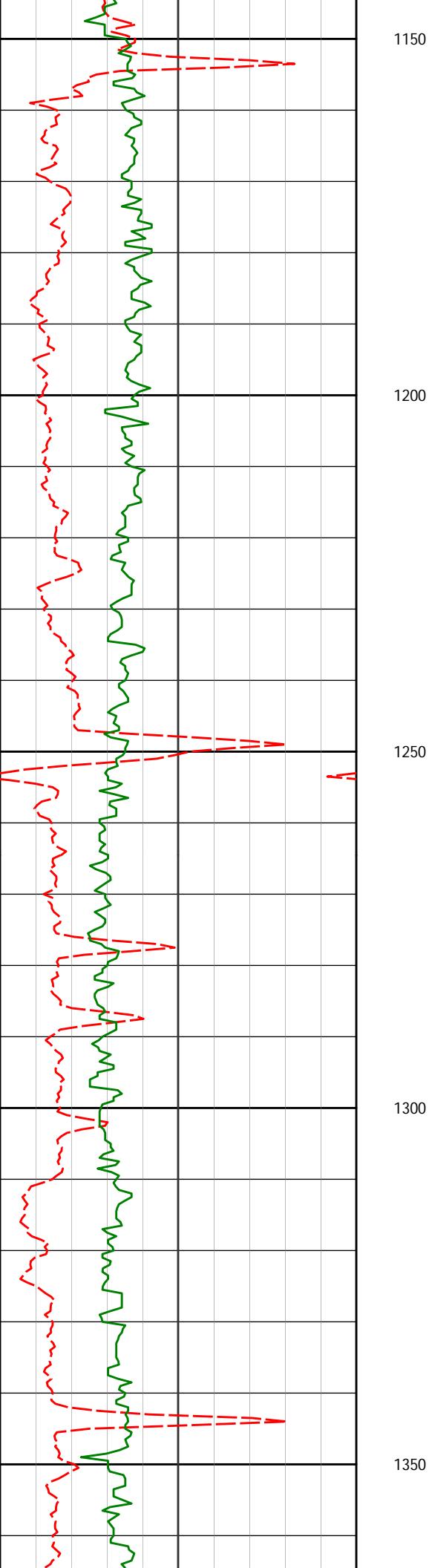
WARRANTY

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HALLIBURTON
Sperry Drilling Services
MD Detail Log 1:240

Anadarko Petroleum Company
Grenemyer 13N-3HZ
Xtreme 22
Weld County, CO





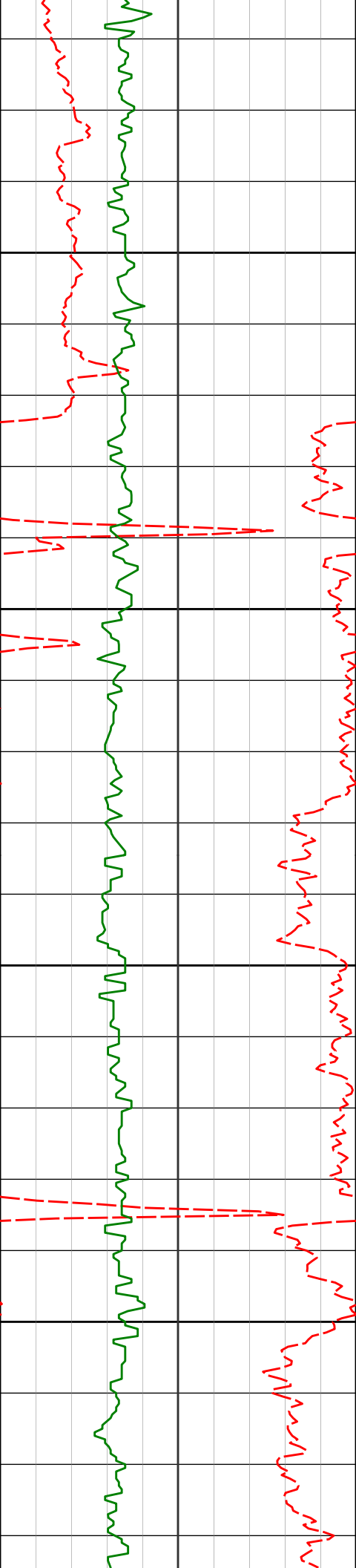
1294'

0.42°

345.48°

1293.98'

0.64'



1400

1450

1500

1550

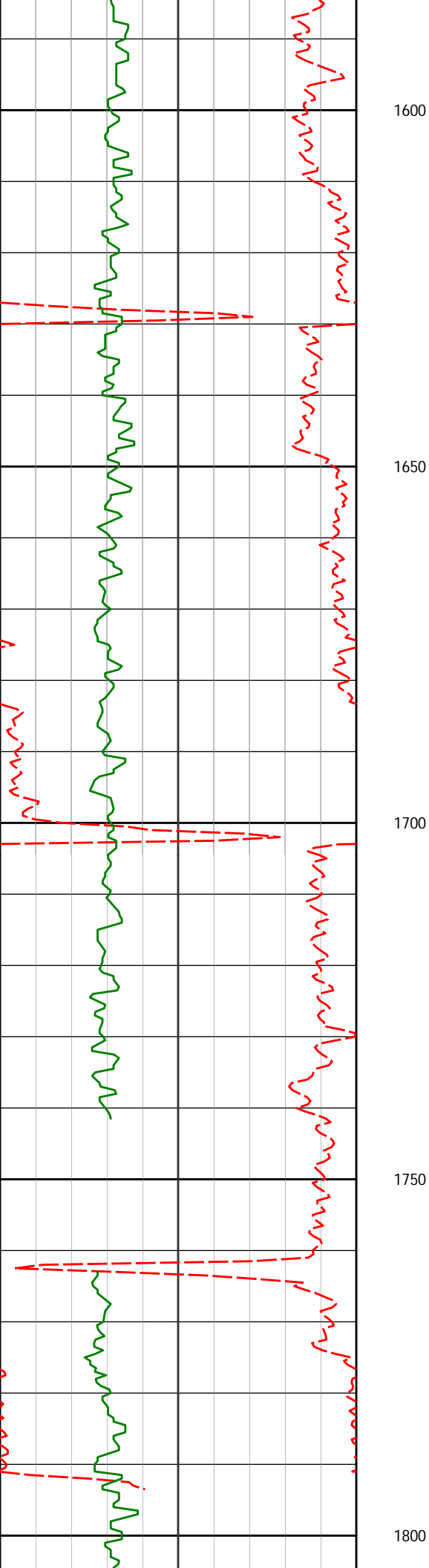
1484'

0.57°

0.35°

1483.98'

-0.98'



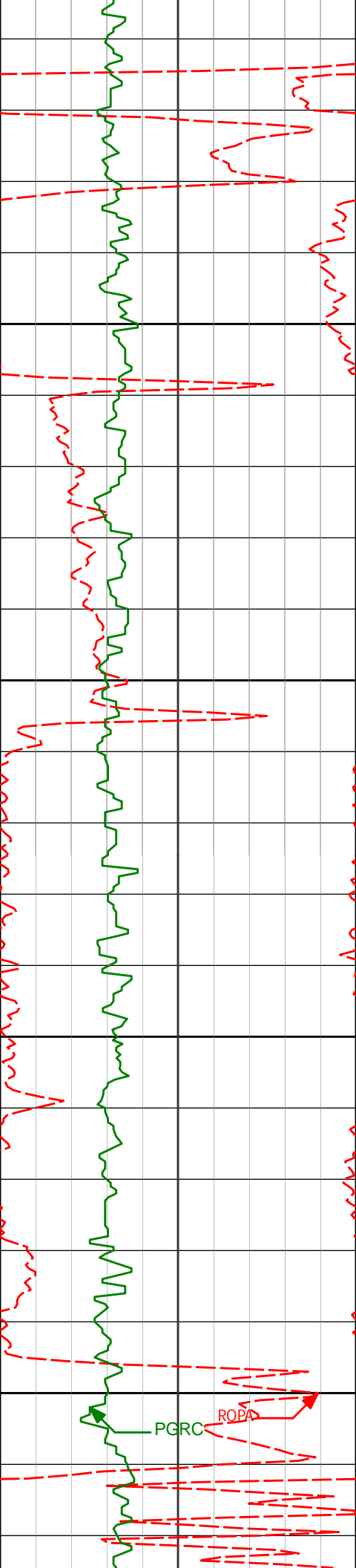
1673'

1.07°

357.68°

1672.96'

-3.69'



1850

1900

1950

2000

1855'

1.27°

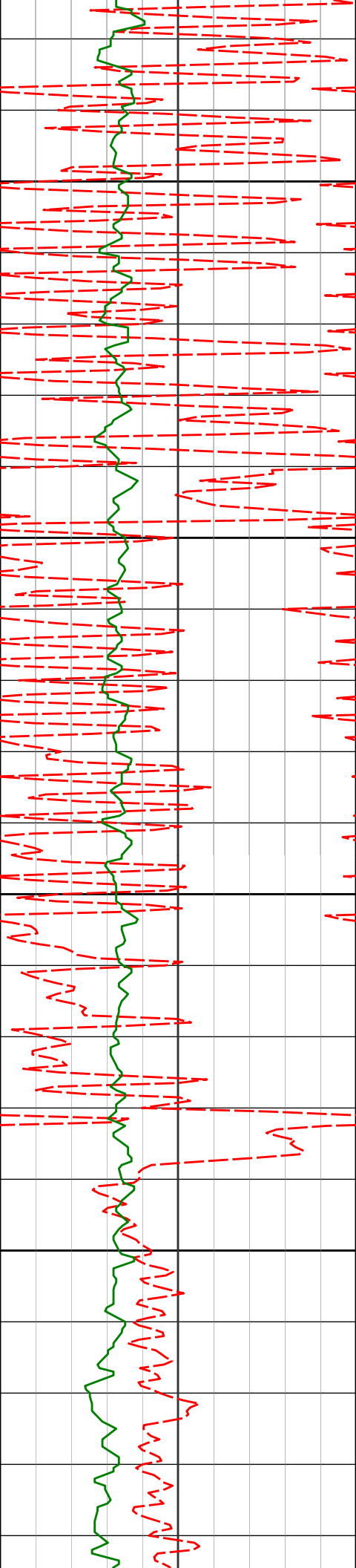
295.34°

1854.92'

-6.25'

PGRC

ROPA



2050

2100

2150

2200

2039'

0.62°

41.14°

2038.91'

-7.87'

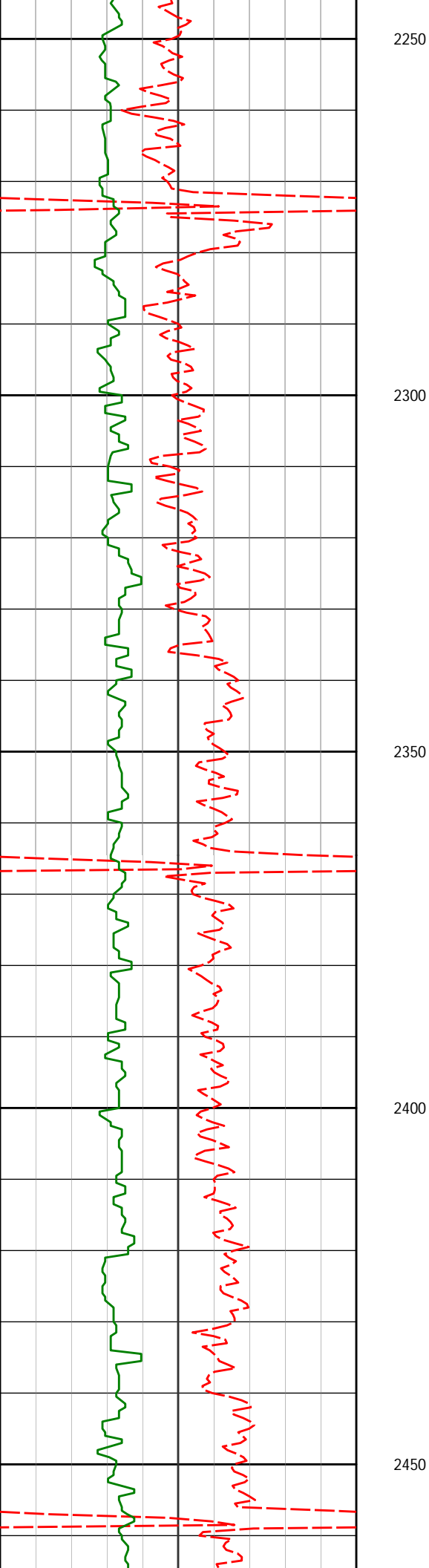
2222'

0.53°

22.33°

2221.90'

-9.40'



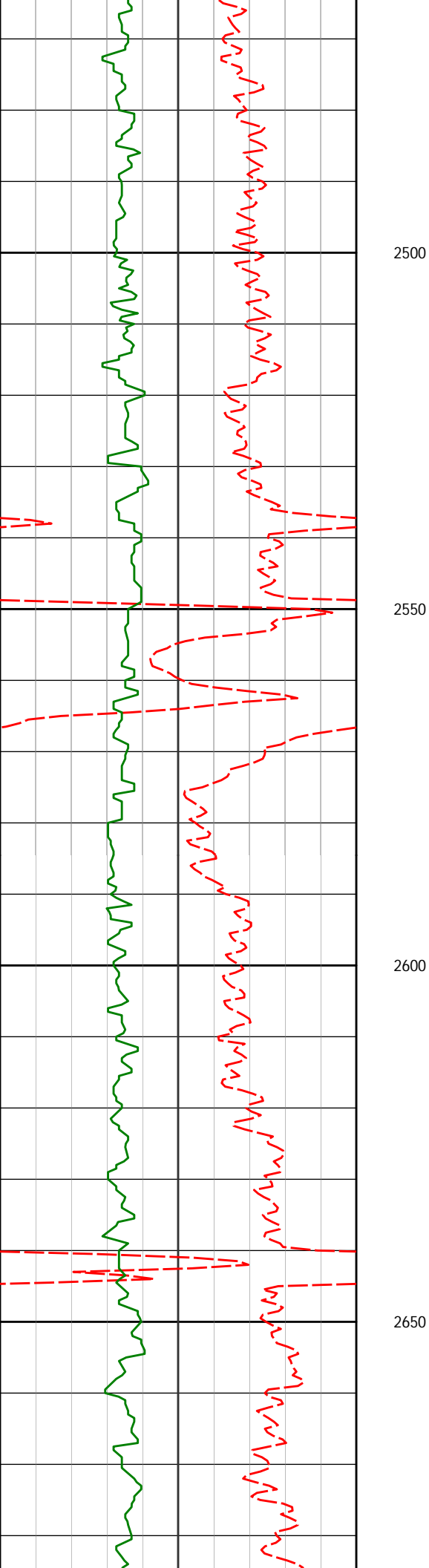
2406'

0.61°

39.31°

2405.89'

-10.94'



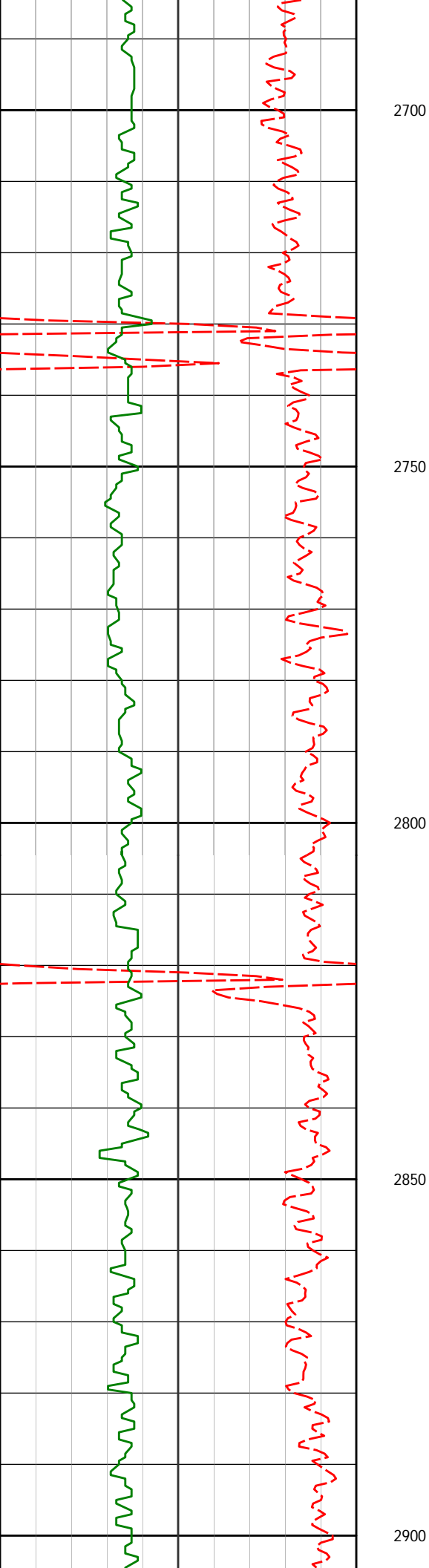
2587'

0.34°

240.82°

2586.89'

-11.43'



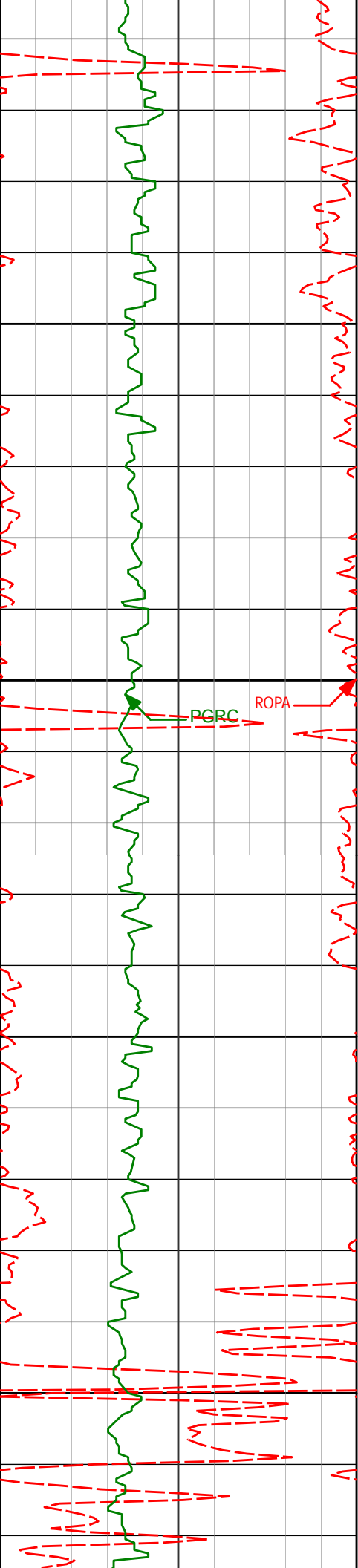
2769'

1.13°

251.40°

2768.87'

-10.59'



2950

2952'

1.38°

238.78°

2951.83'

-8.87'

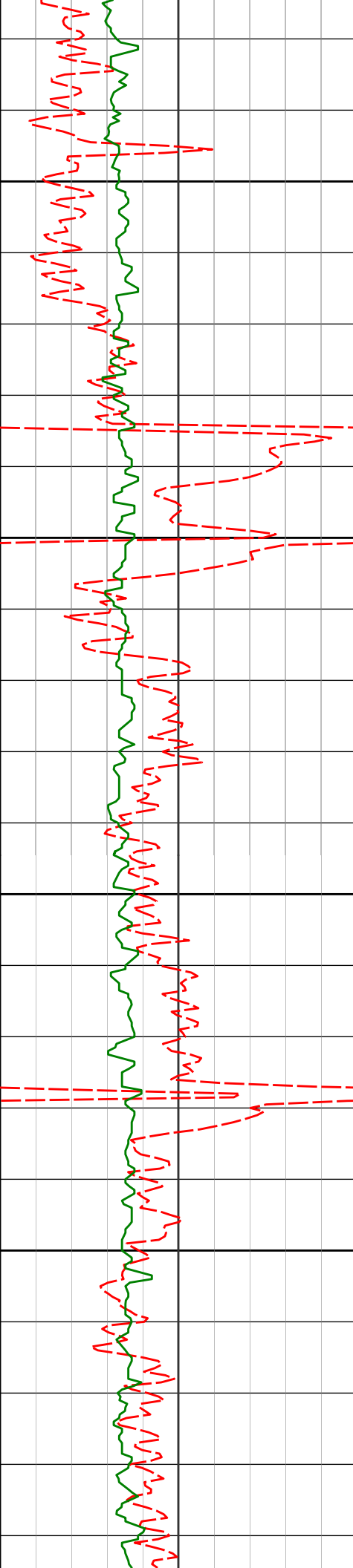
3000

PGRC

ROPA

3050

3100



3150

3200

3250

3300

3135'

2.04°

248.02°

3134.75'

-6.51'

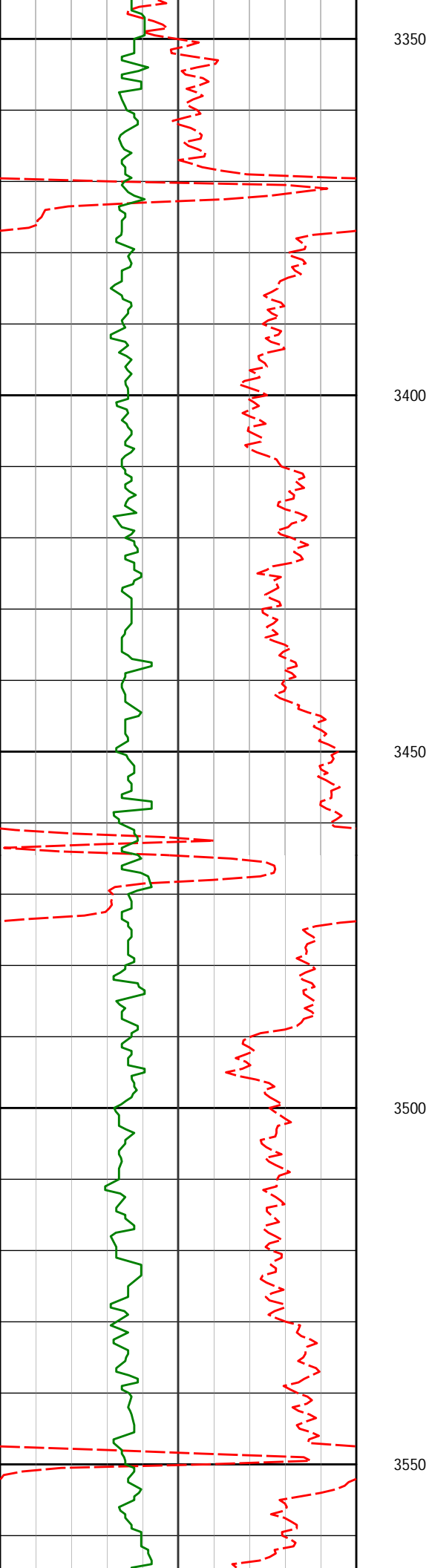
3318'

0.60°

265.40°

3317.69'

-5.22'



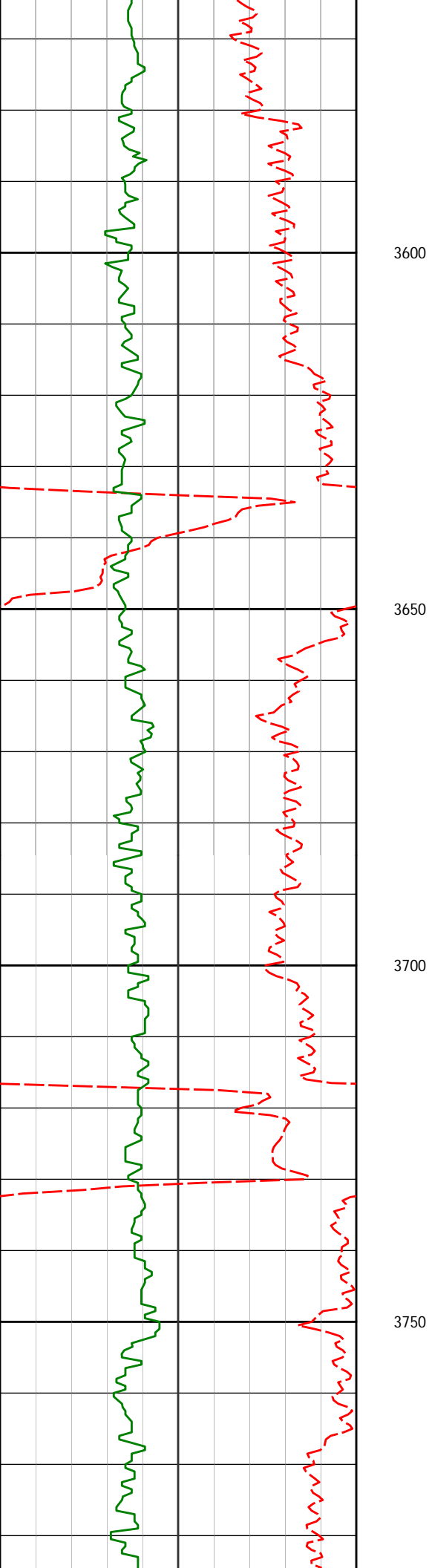
3495'

1.01°

252.40°

3494.67'

-4.67'



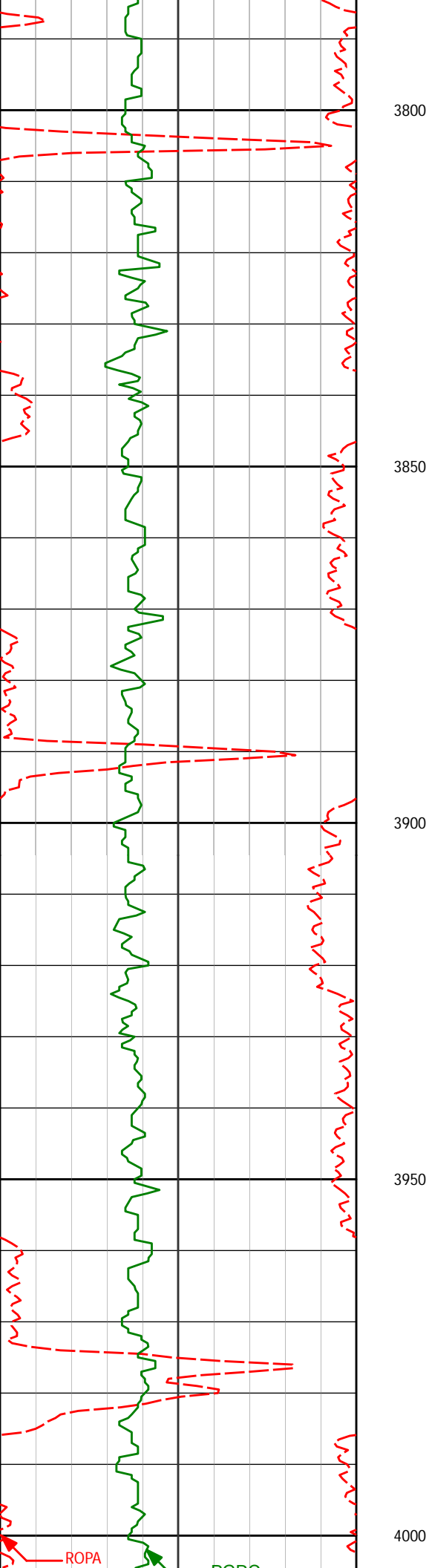
3666'

1.58°

256.51°

3665.63'

-3.66'



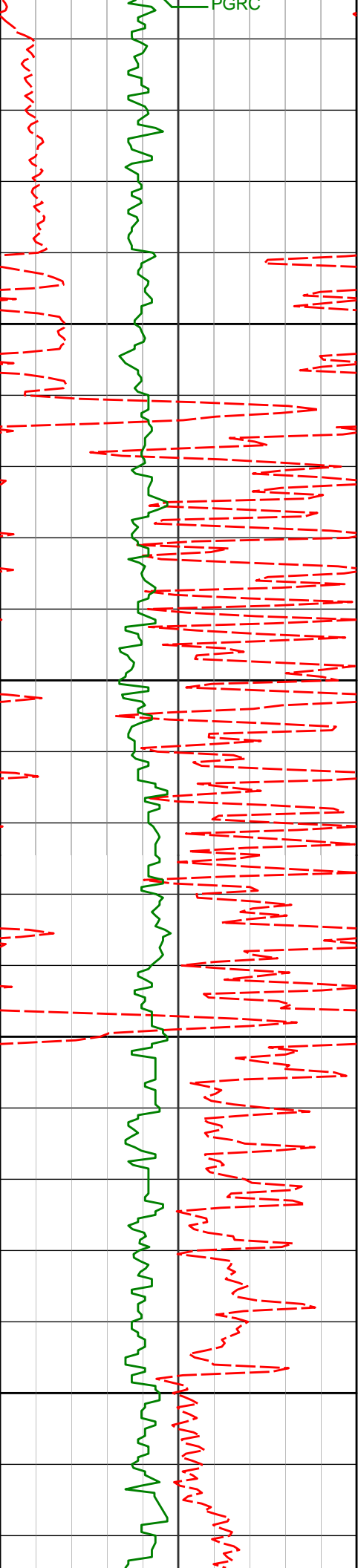
3837'

0.48°

238.57°

3836.60'

-2.74'



4008'

0.19°

316.97°

4007.60'

-2.57'

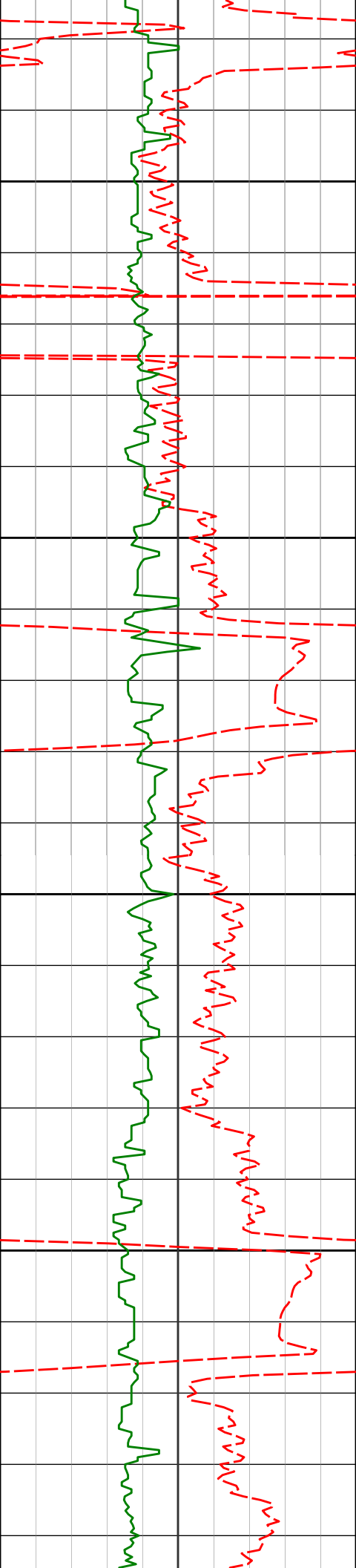
4179'

0.64°

236.75°

4178.59'

-2.26'



4250

4300

4350

4400

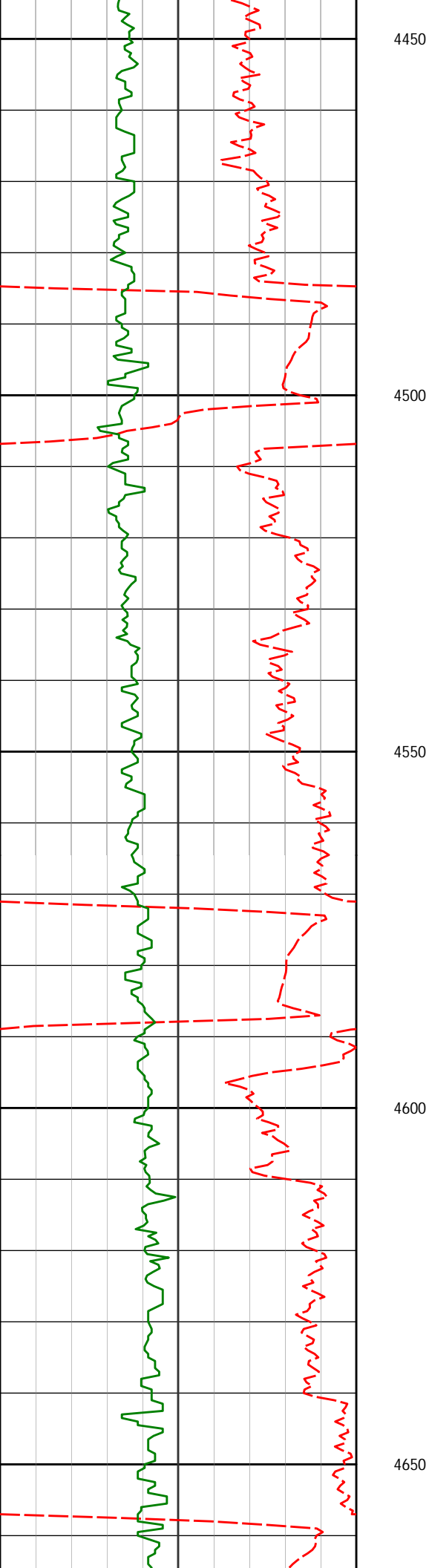
4350'

1.59°

268.31°

4349.56'

-1.66'



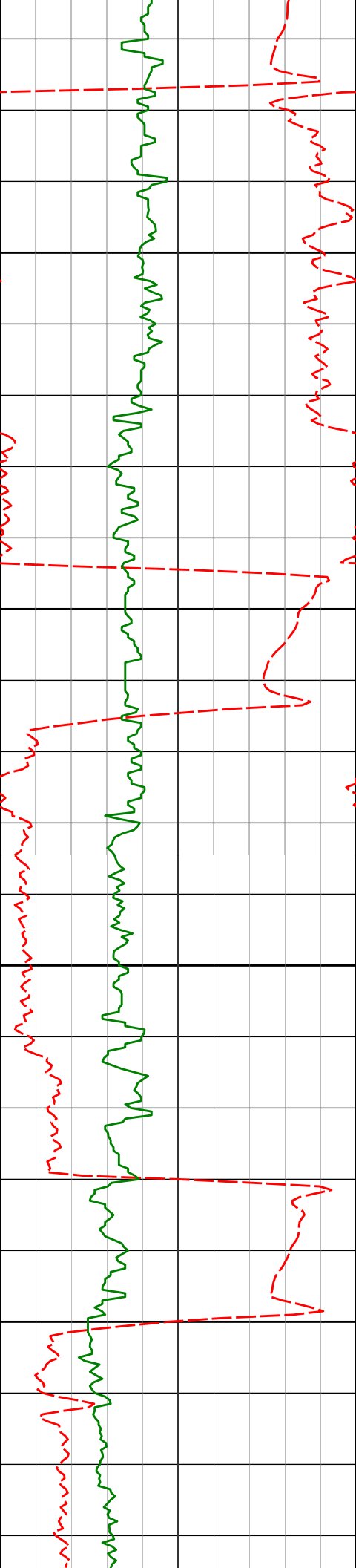
4521'

5.05°

279.44°

4520.25'

-2.83'



4700

4750

4800

4850

4692'

6.90°

272.86°

4690.31'

-4.58'

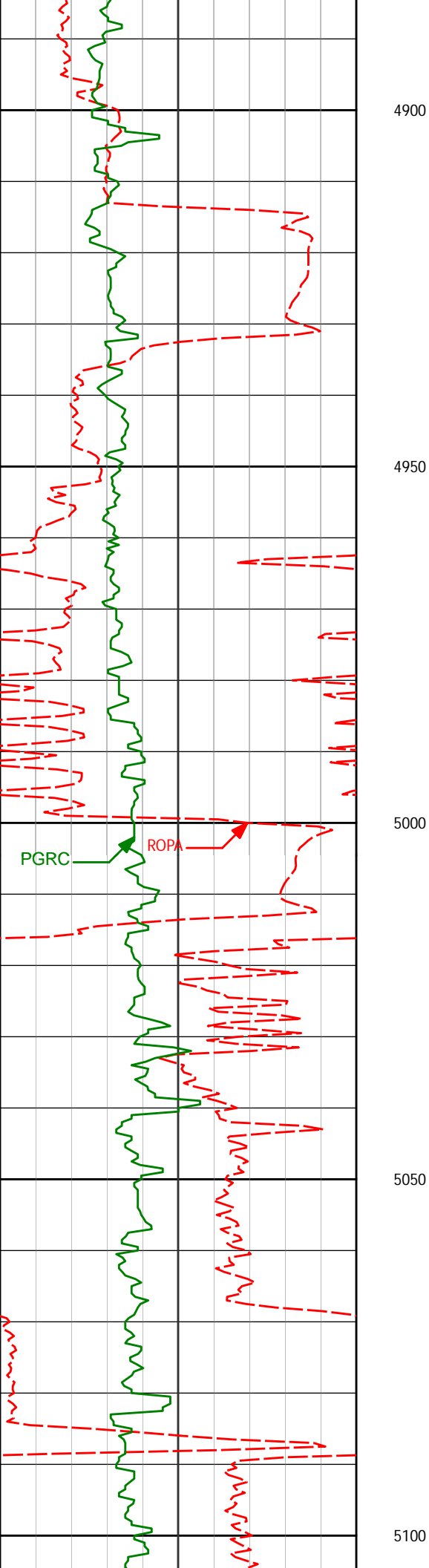
4863'

9.31°

275.25°

4859.59'

-6.35'



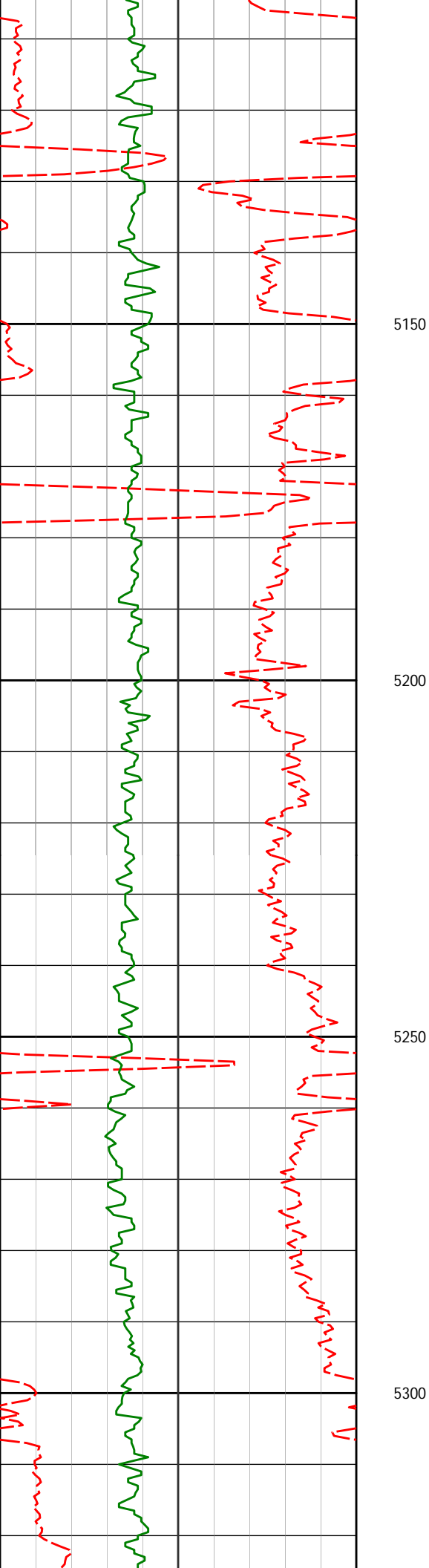
5034'

12.08°

272.31°

5027.61'

-8.34'



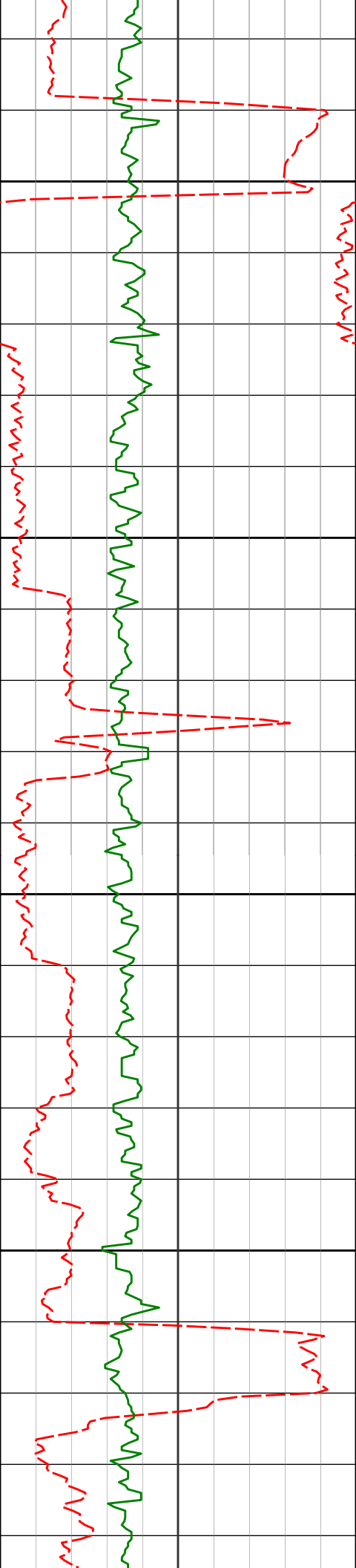
5206'

11.13°

273.08°

5196.09'

-9.96'



5350

5377'

10.51°

272.60°

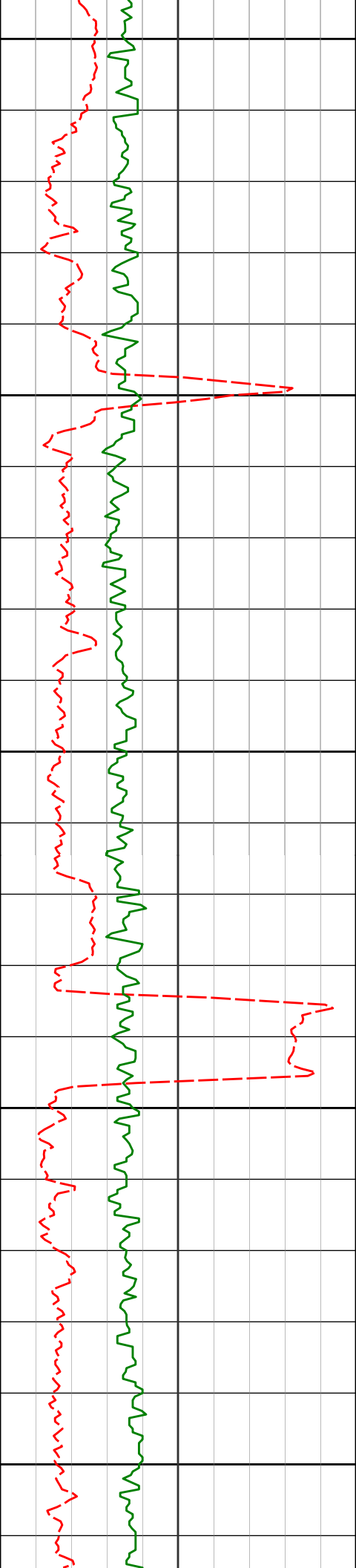
5364.05'

-11.55'

5400

5450

5500



5550

5600

5650

5700

5750

5548'

10.26°

270.57°

5532.25'

-12.41'

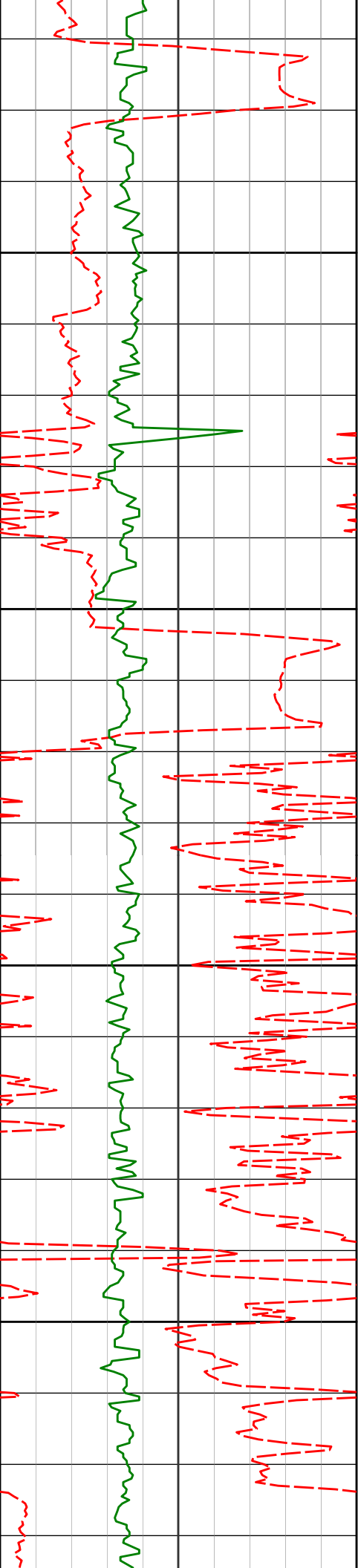
5720'

9.76°

268.16°

5701.63'

-12.10'



5800

5850

5900

5950

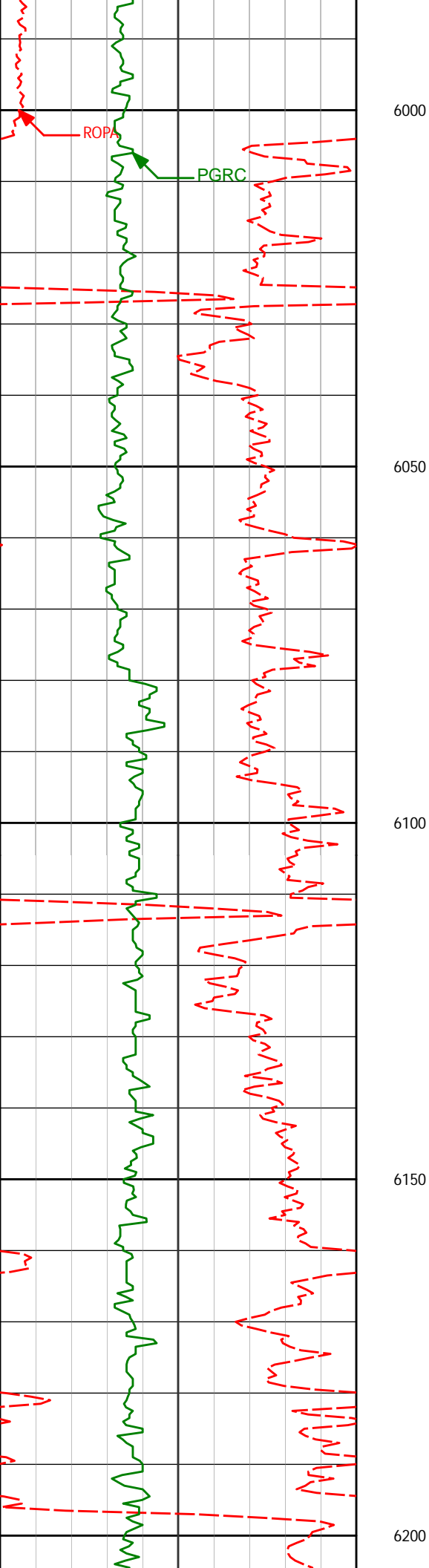
5891'

10.54°

268.18°

5869.95'

-11.13'



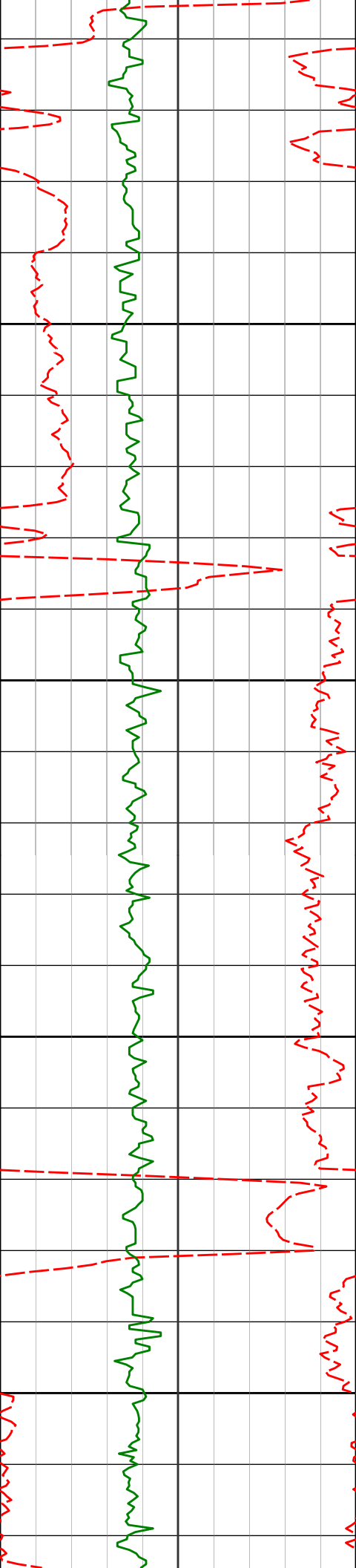
6062'

9.01°

268.83°

6038.47'

-10.36'



6250

6300

6350

6400

6234'

5.98°

268.53°

6208.98'

-9.86'

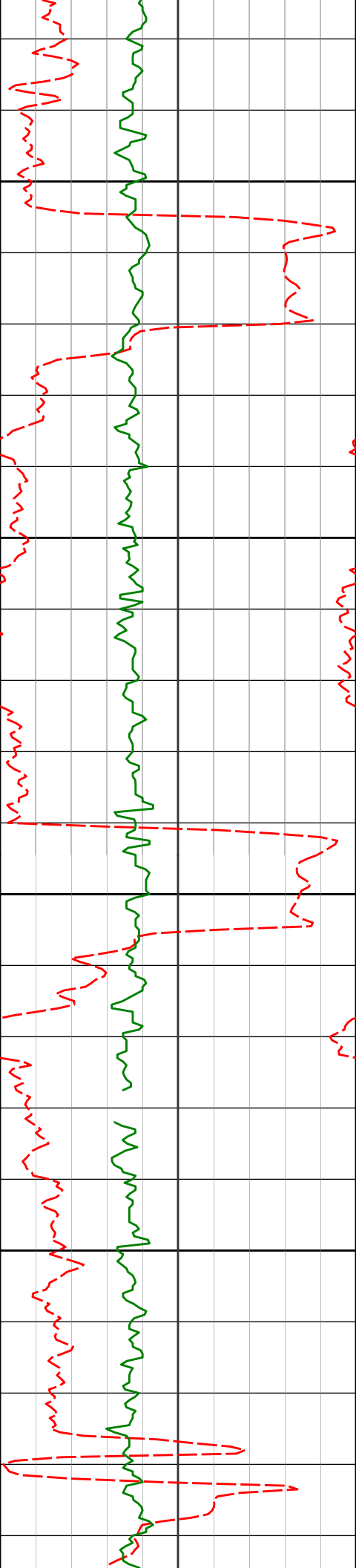
6405'

3.45°

270.46°

6379.38'

-9.67'



6450

6500

6550

6600

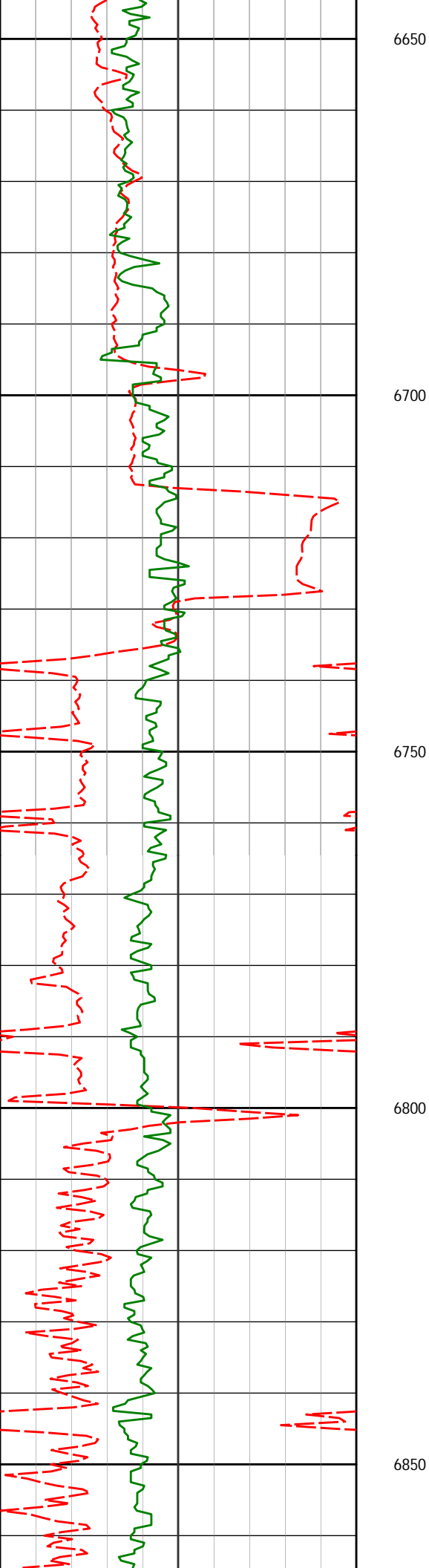
6576'

0.98°

269.08°

6550.24'

-9.69'



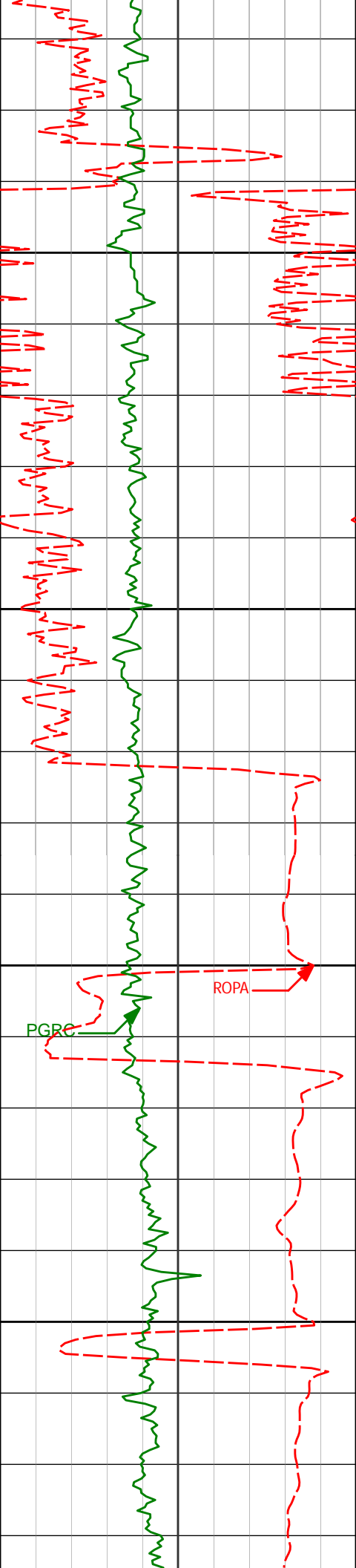
6747'

0.68°

104.05°

6721.24'

-9.42'



6900

6919'

0.40°

89.45°

6893.23'

-9.18'

6950

6961'

1.05°

149.99°

6935.23'

-8.85'

7000

7004'

3.30°

167.73°

6978.19'

-7.30'

7050

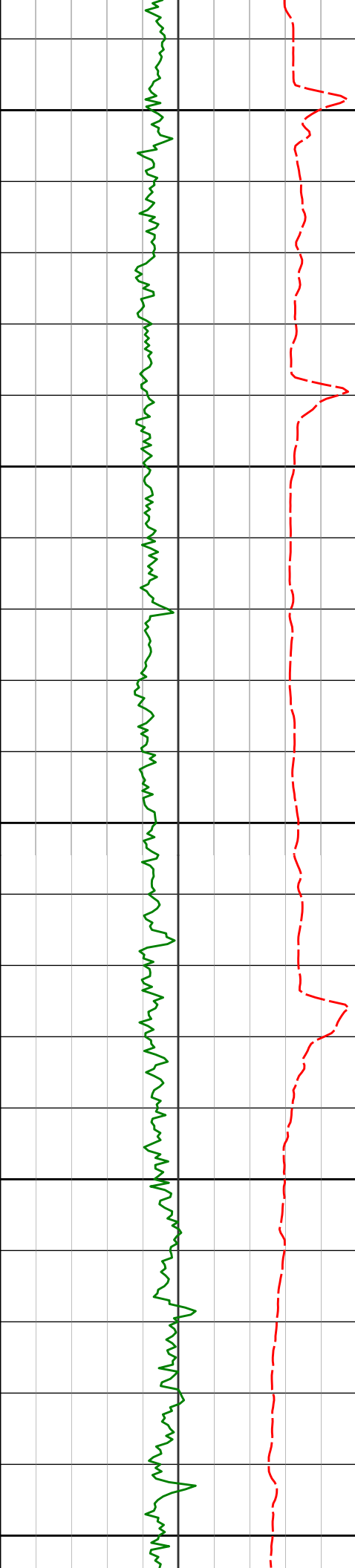
7047'

6.20°

175.81°

7021.04'

-3.77'



7100

7150

7200

7250

7300

7090'

9.70°

177.24°

7063.62'

2.17'

7133'

13.72°

174.42°

7105.72'

10.86'

7176'

17.26°

174.77°

7147.15'

22.29'

7218'

21.22°

174.69°

7186.80'

36.07'

7261'

24.82°

176.85°

7226.37'

52.84'

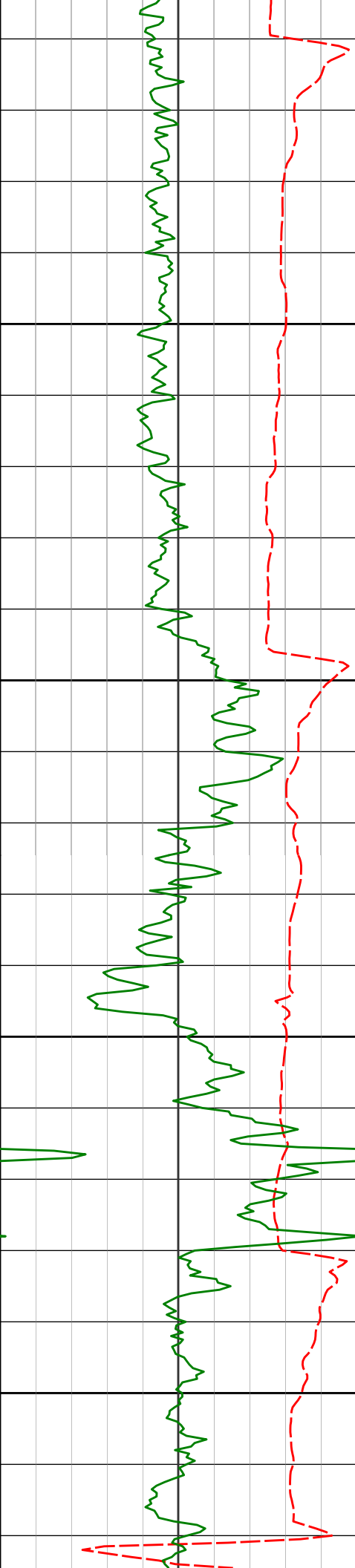
7303'

29.31°

178.82°

7263.76'

71.93'



7350

7400

7450

7500

7346'

33.33°

178.86°

7300.48'

94.27'

7389'

38.32°

179.90°

7335.34'

119.43'

7432'

42.69°

179.90°

7368.02'

147.35'

7475'

48.21°

179.73°

7398.18'

177.98'

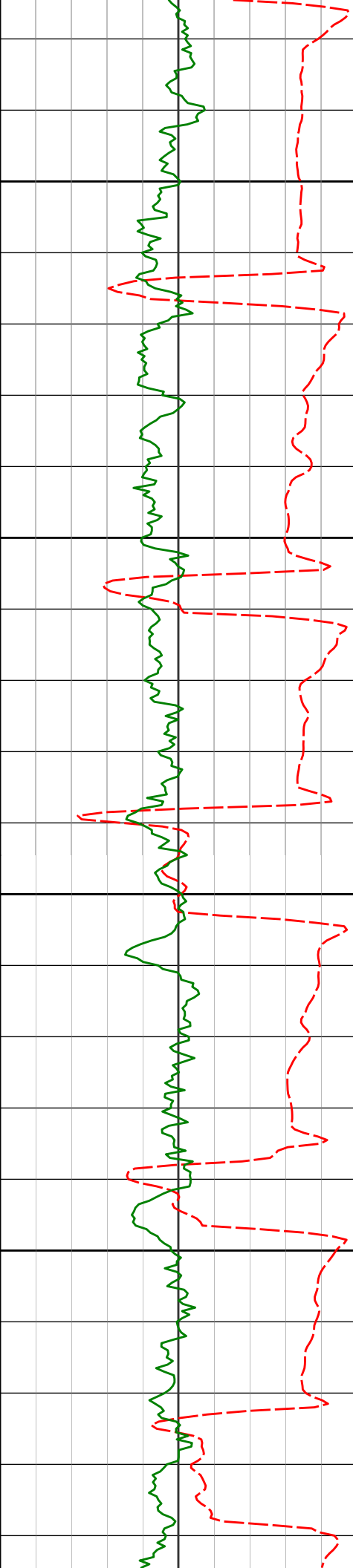
7518'

52.77°

179.75°

7425.53'

211.15'



7550

7561'

57.53°

179.64°

7450.09'

246.43'

7600

7604'

61.61°

179.83°

7471.87'

283.50'

7650

7647'

64.51°

179.93°

7491.35'

321.83'

7700

7690'

68.64°

180.47°

7508.44'

361.27'

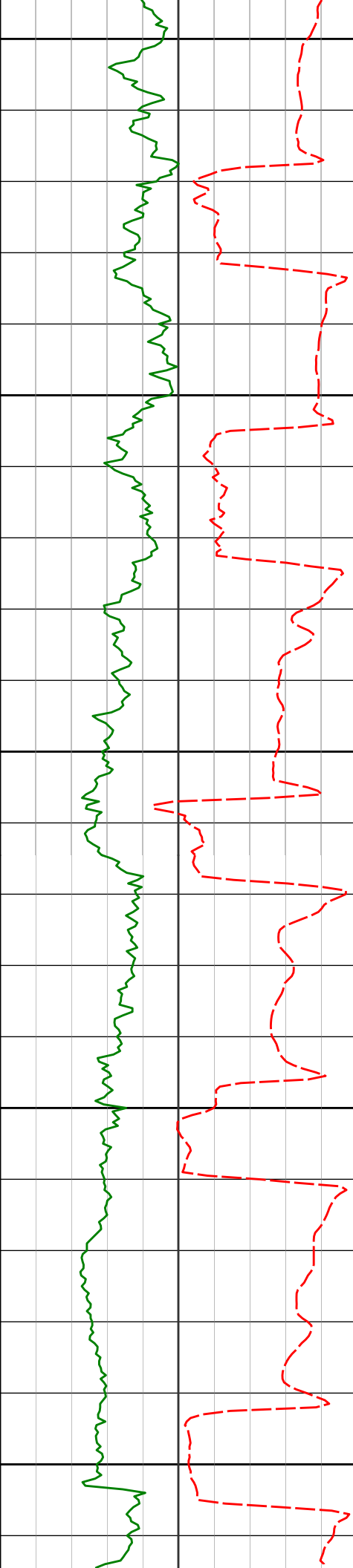
7732'

71.76°

181.23°

7522.66'

400.78'



7750

7775'

75.10°

181.52°

7534.93'

441.98'

7800

7818'

77.99°

181.14°

7544.93'

483.78'

7850

7861'

81.96°

181.25°

7552.41'

526.11'

7900

7916'

87.19°

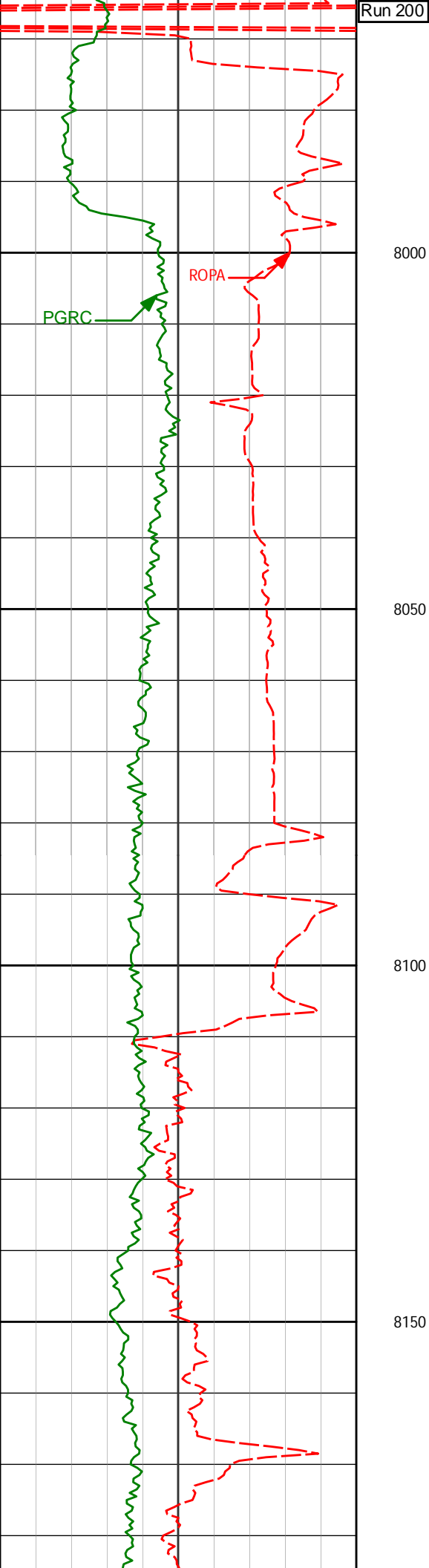
181.29°

7557.61'

580.83'

7950

TD Curve @ 7964' MD



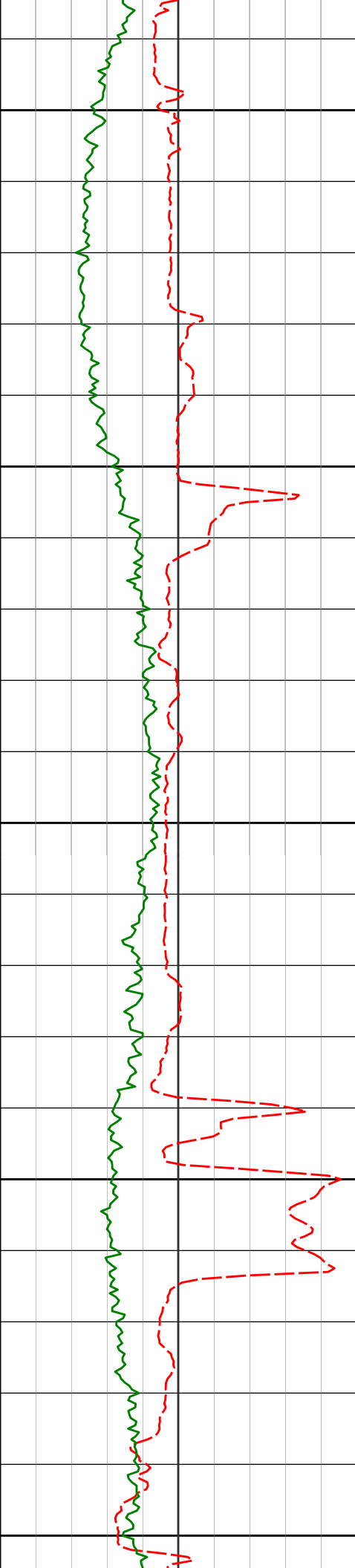
8035'

88.61°

180.87°

7561.97'

699.72'



8200

8206'

90.62°

179.42°

7563.12'

870.71'

8250

8300

8350

8377'

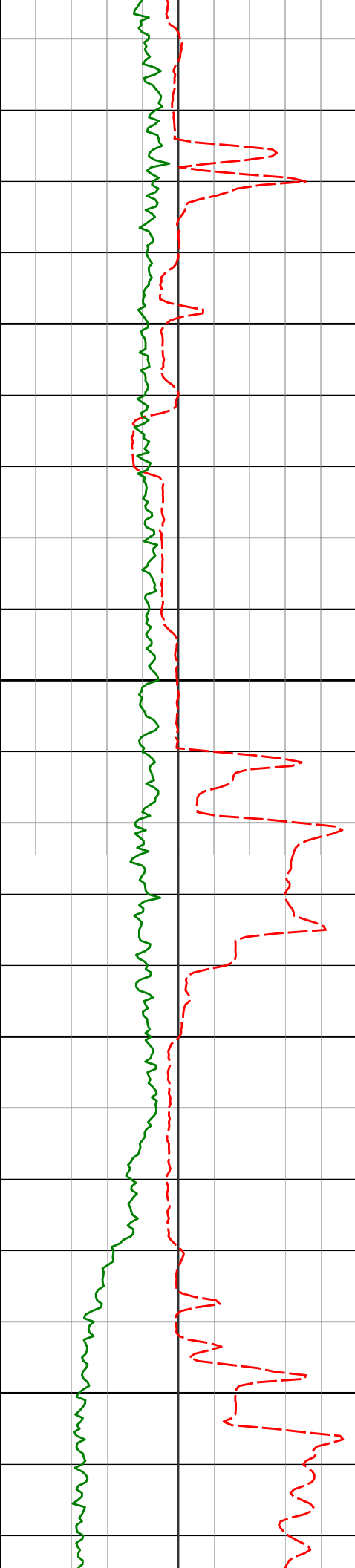
90.59°

177.92°

7561.32'

1041.65'

8400



8450

8500

8550

8600

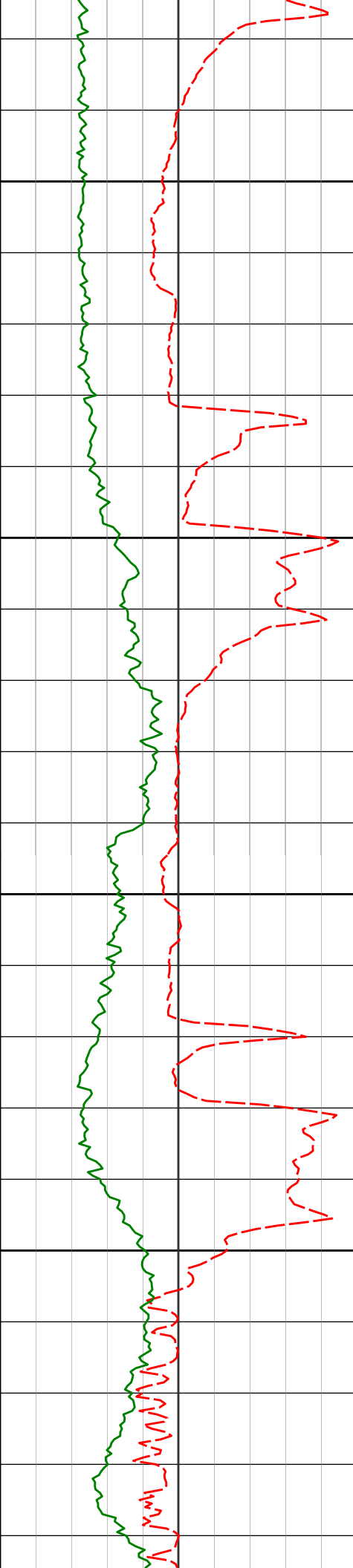
8549'

88.03°

177.16°

7563.39'

1213.46'



8650

8700

8750

8800

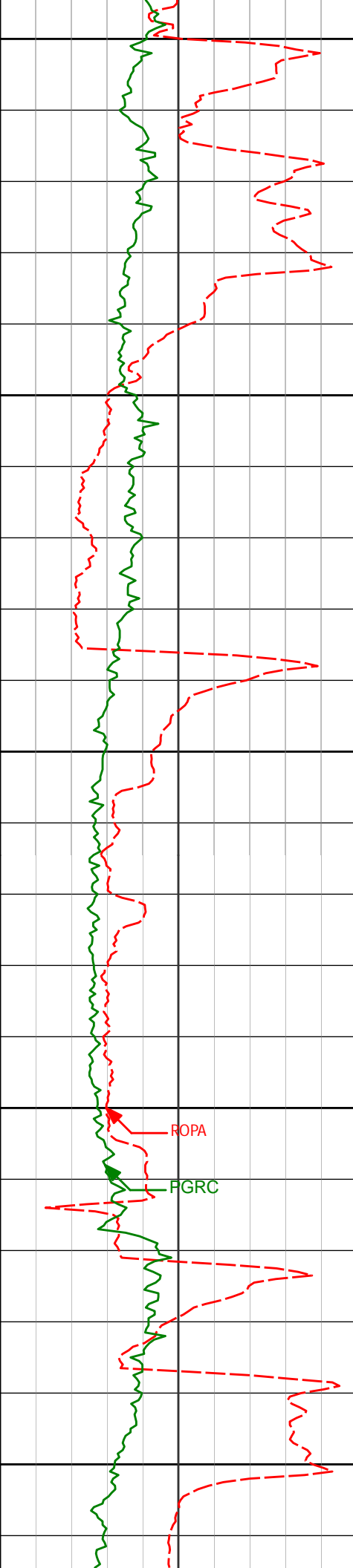
8720'

90.95°

179.36°

7564.91'

1384.34'



8850

8891'

91.41°

182.22°

7561.39'

1555.27'

8900

8950

9000

ROPA

PGRC

9050

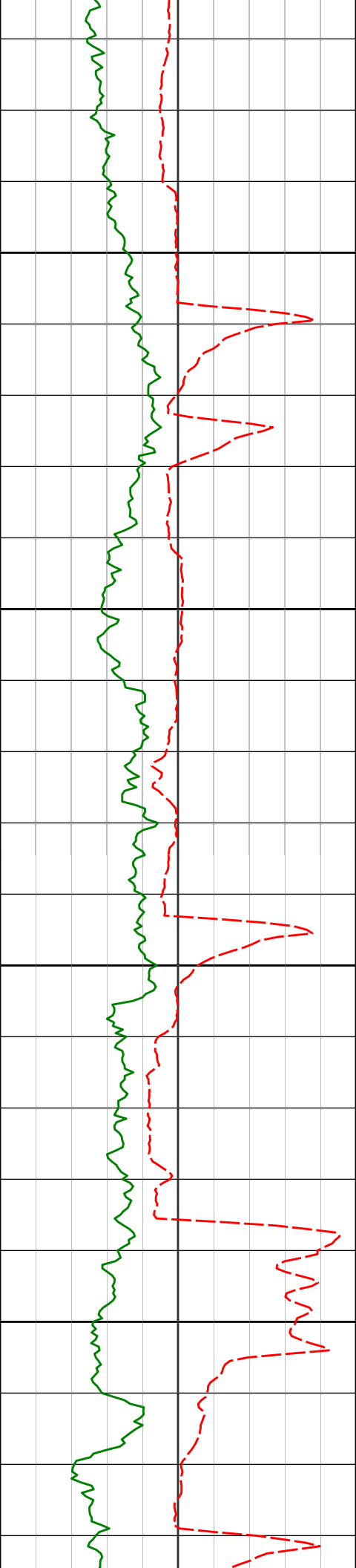
9062'

89.91°

182.34°

7559.42'

1726.12'



9100

9150

9200

9250

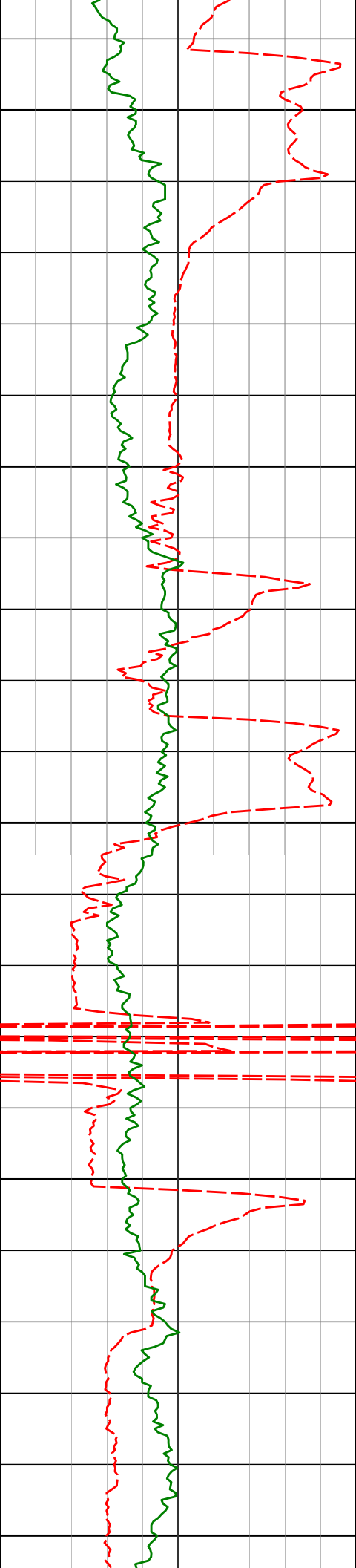
9233'

93.08°

182.78°

7554.96'

1896.87'



9300

9350

9400

9450

9500

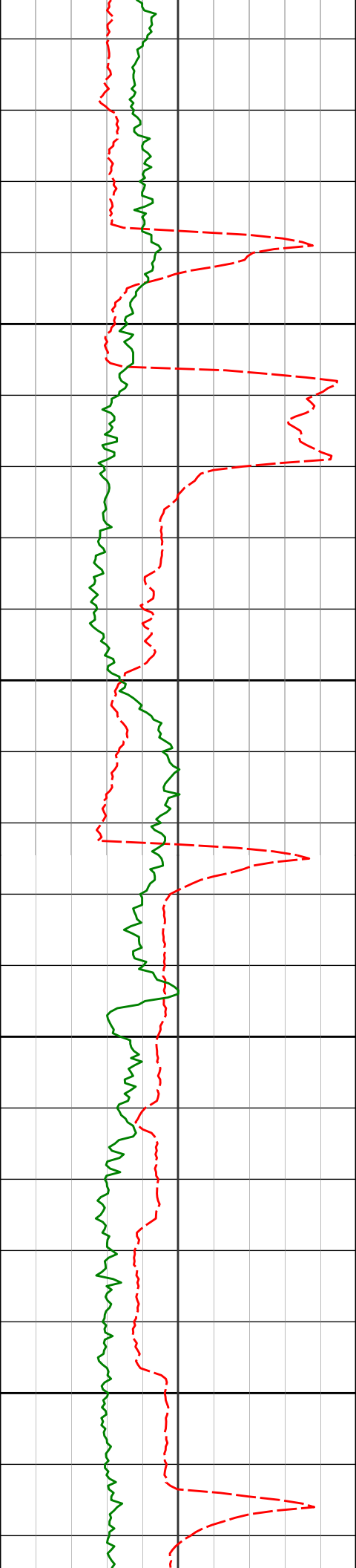
9405'

89.57~

180.98~

7550.98'

2068.70'



9550

9575'

88.67°

179.91°

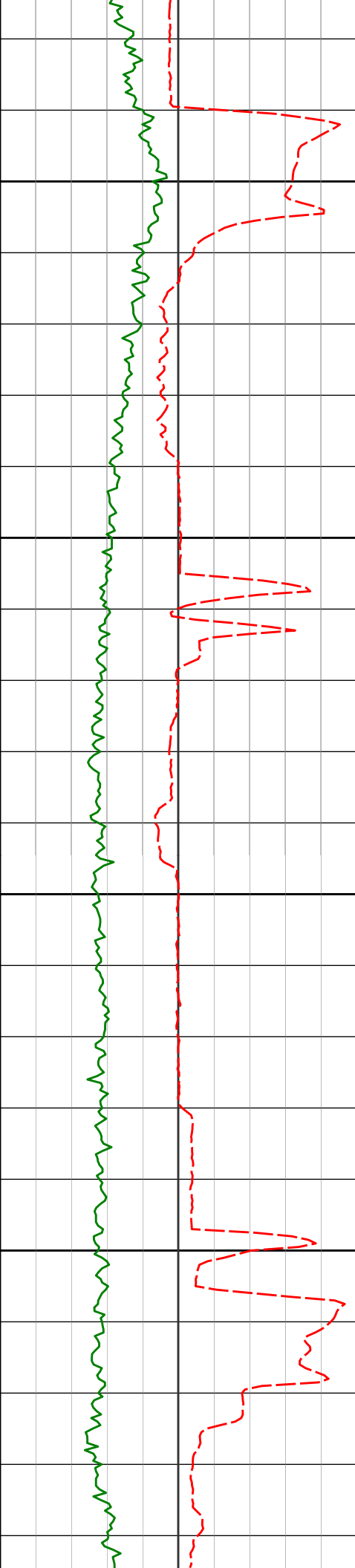
7553.59'

2238.67'

9600

9650

9700



9750

9758'

89.60°

179.62°

7556.35'

2421.64'

9800

9850

9900

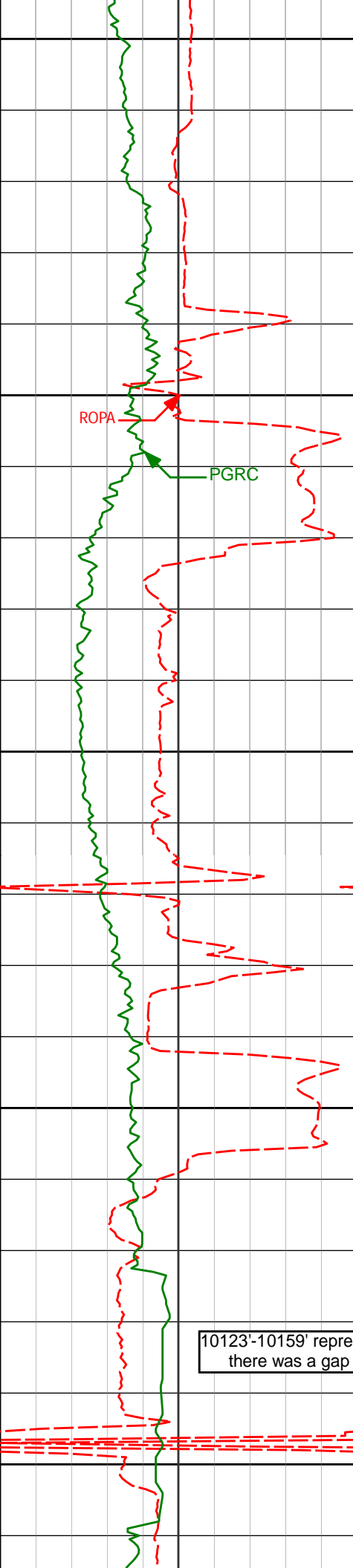
9941'

88.49°

177.58°

7559.40'

2604.55'



9950

10000

10050

10100

10125'

90.12°

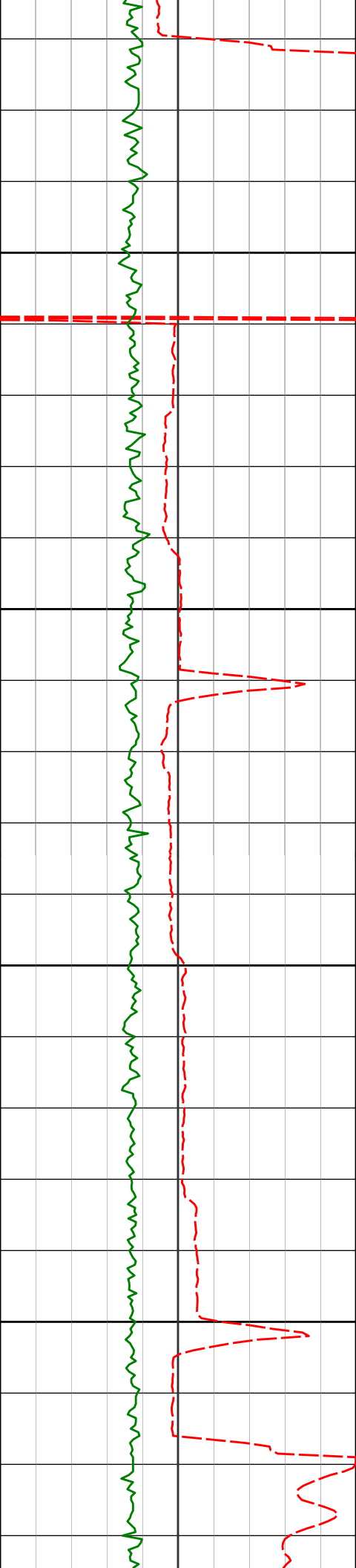
178.98°

7561.64'

2788.44'

10123'-10159' represents uncorrected RT Gamma data,
there was a gap in recorded data for this interval.

10150



10200

10250

10300

10350

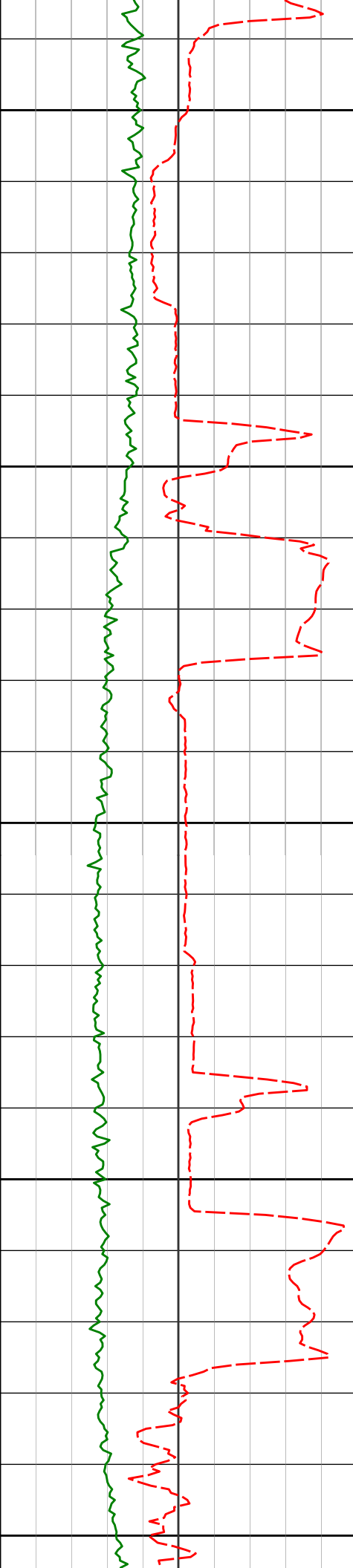
10308'

90.25°

176.57°

7561.04'

2971.29'



10400

10450

10500

10550

10600

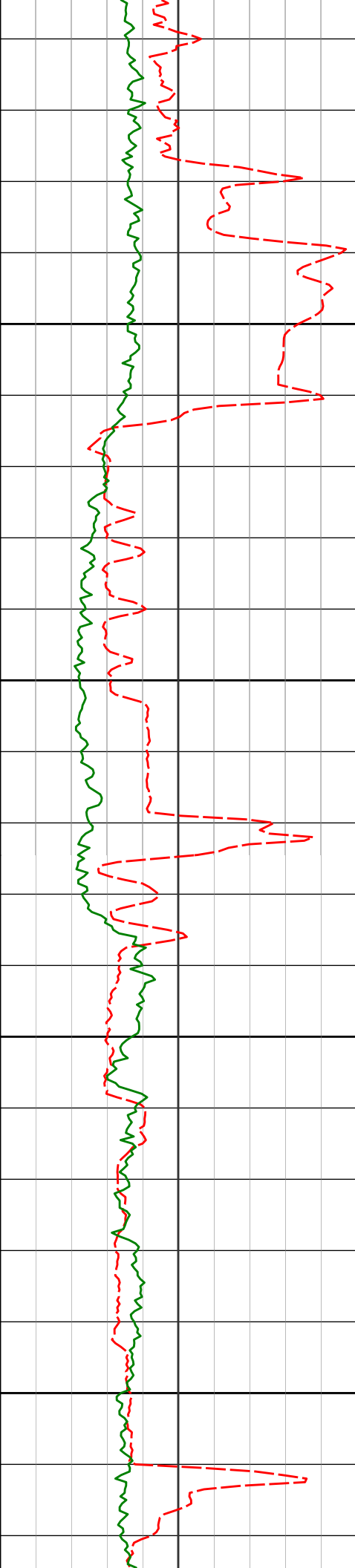
10491'

90.25°

179.34°

7560.25'

3154.16'



10650

10700

10750

10800

10673'

90.00°

180.12°

7559.85'

3336.15'



10850

10900

10950

11000

10855'

89.72°

179.75°

7560.29'

3518.15'

ROPA

FGRC

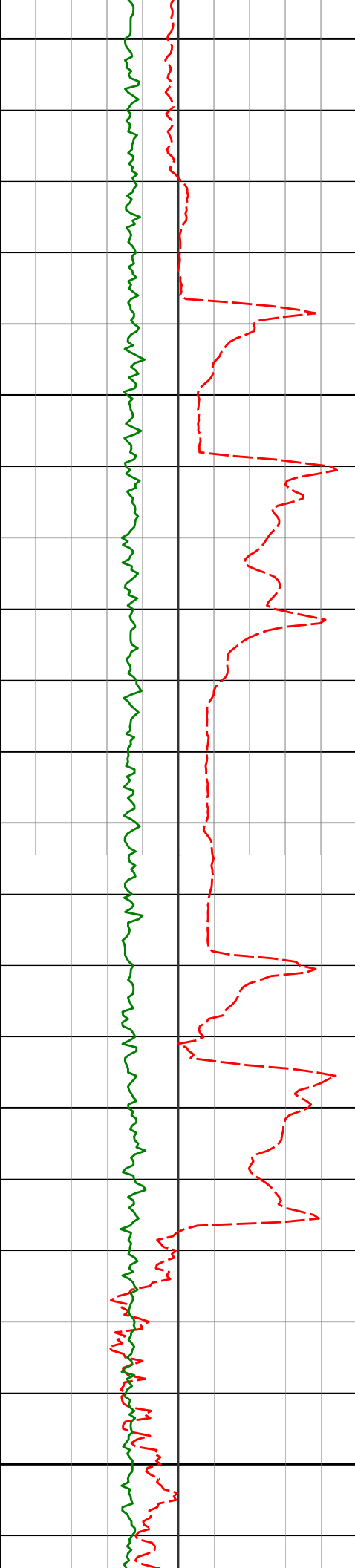
11038'

89.85°

180.41°

7560.98'

3701.15'



11050

11100

11150

11200

11250

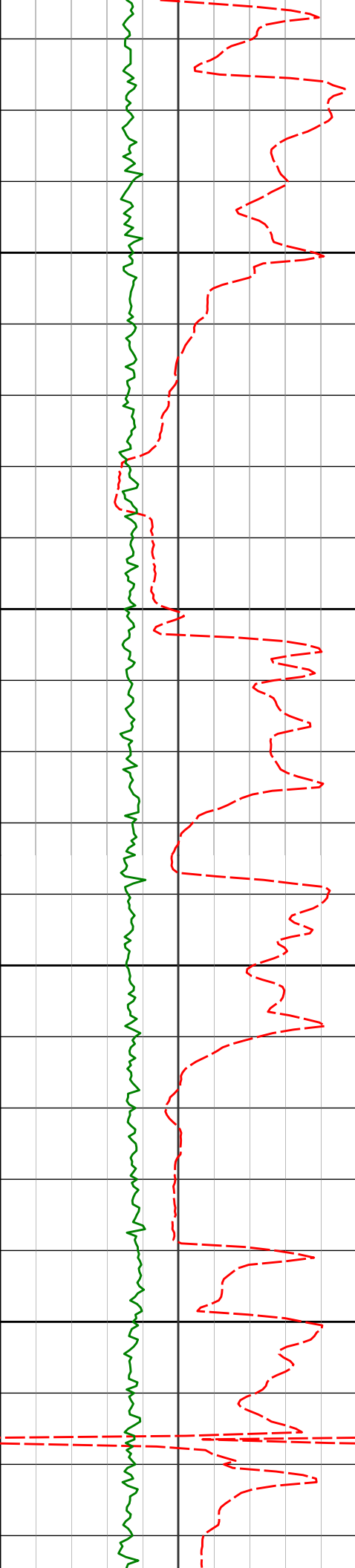
11215'

90.12°

178.27°

7561.03'

3878.13'



11300

11350

11400

11450

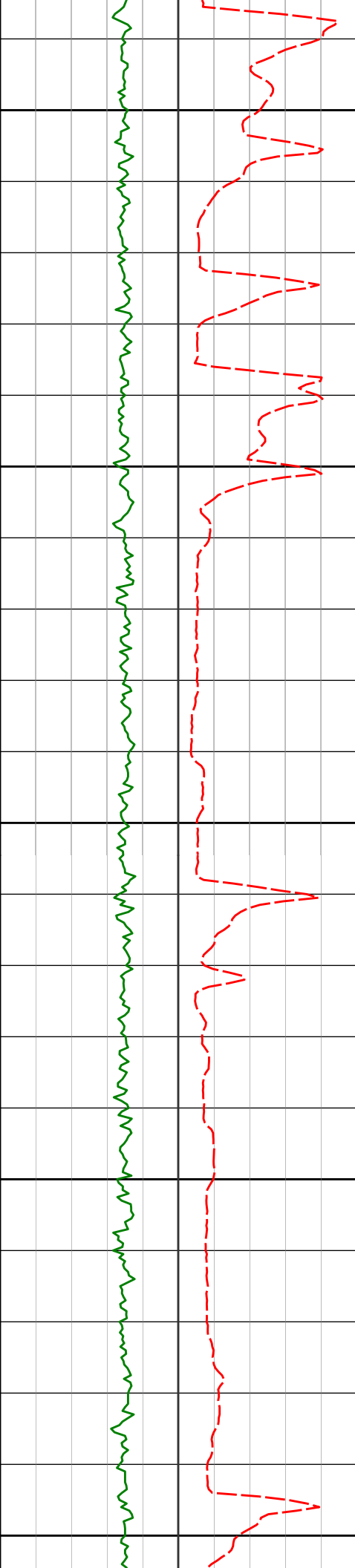
11386'

90.62°

179.55°

7559.92'

4049.09'



11500

11550

11600

11650

11700

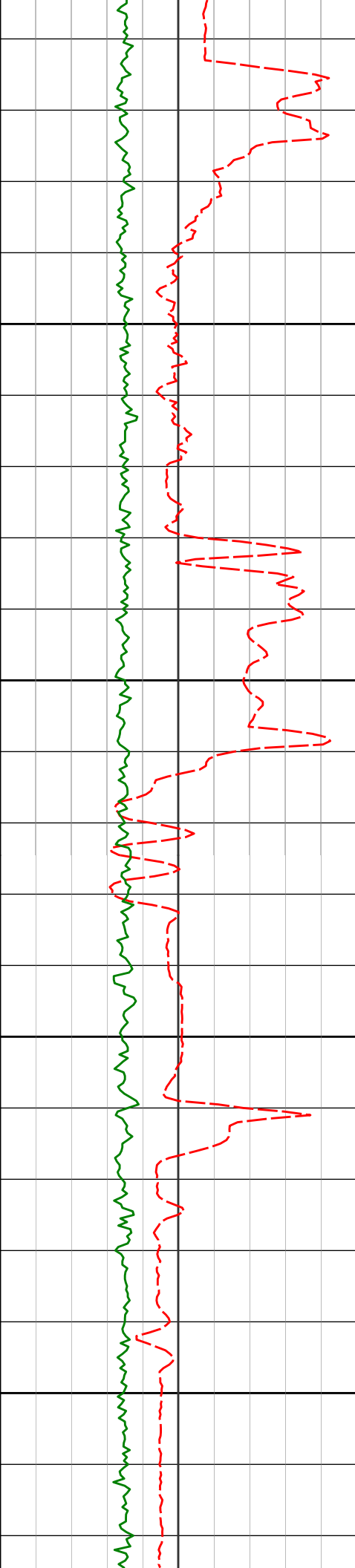
11557'

89.29°

183.80°

7560.06'

4219.97'



11750

11800

11850

11900

11729'

90.06°

183.71°

7561.03'

4391.60'

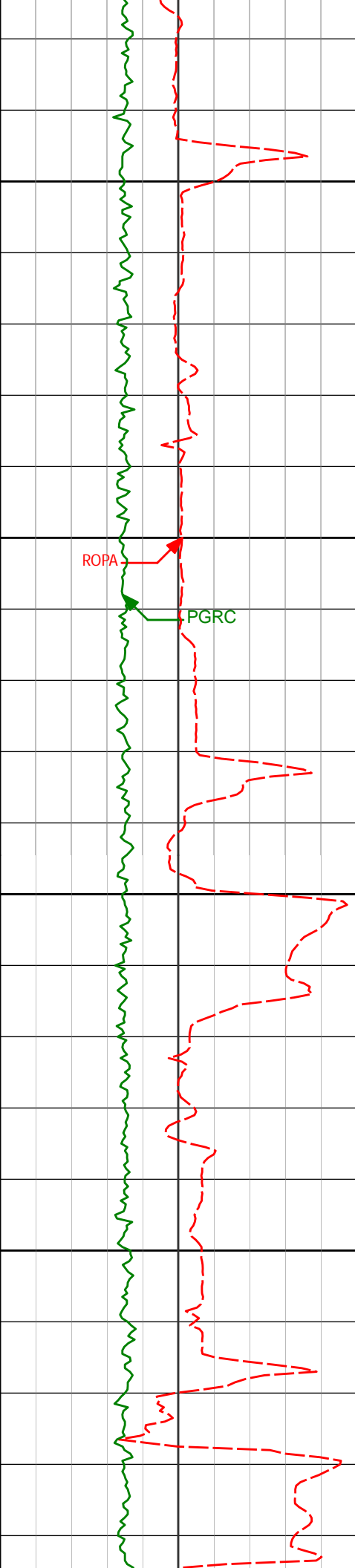
11900'

90.46°

180.81°

7560.26'

4562.44'



11950

12000

12050

12100

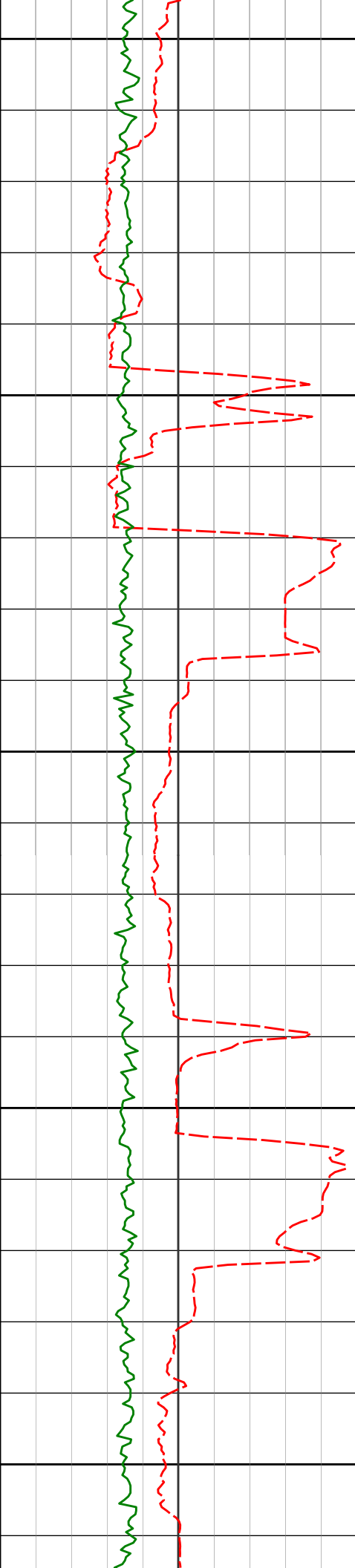
12071'

89.57°

180.13°

7560.21'

4733.44'



12150

12200

12250

12300

12350

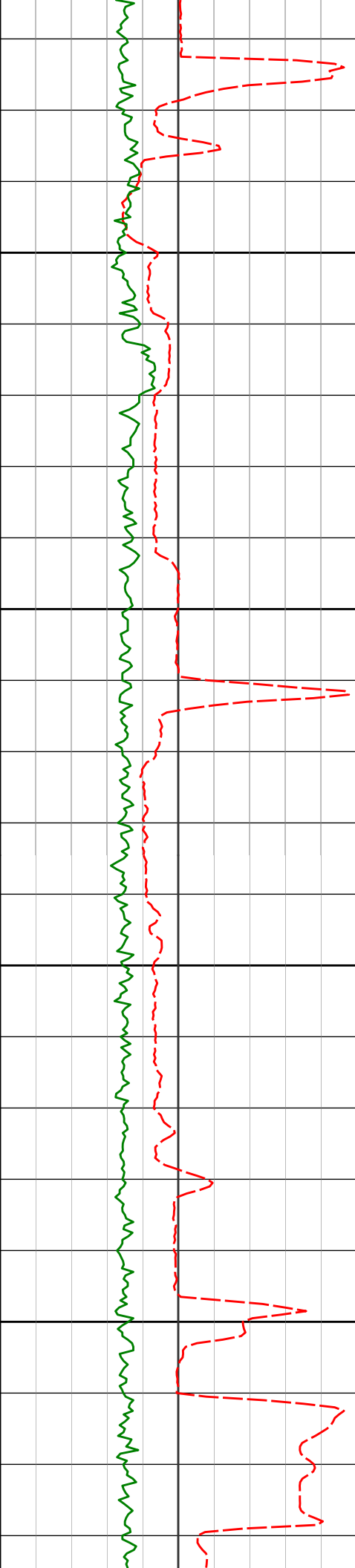
12243'

89.51°

181.09°

7561.59'

4905.42'



12400

12450

12500

12550

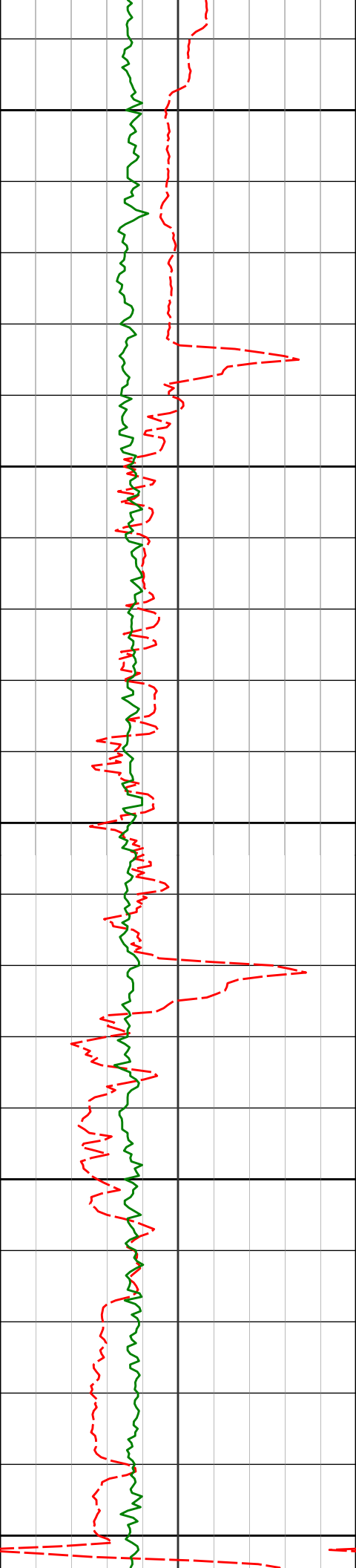
12414'

90.62°

179.84°

7561.40'

5076.41'



12600

12650

12700

12750

12800

12757'

89.85°

178.98°

7559.41'

5419.39'

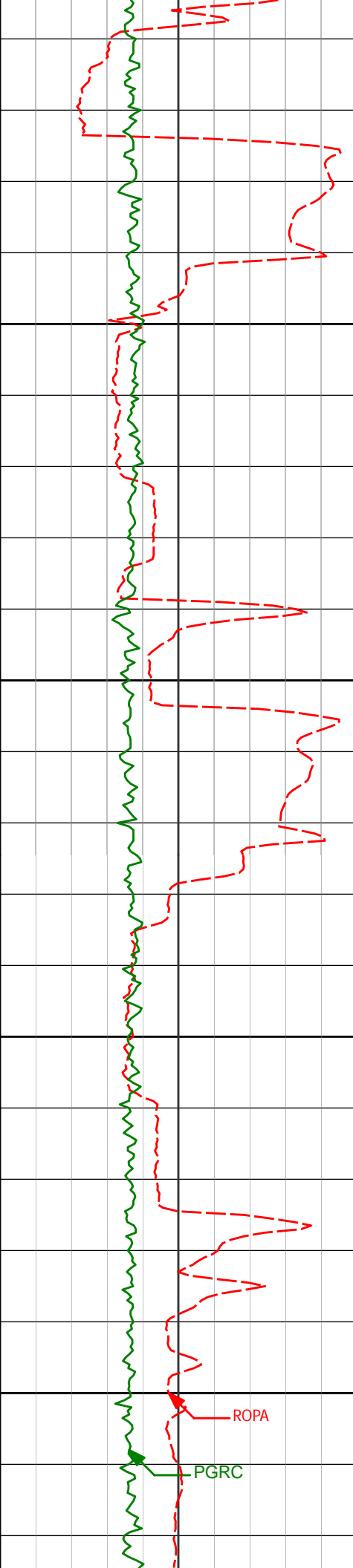
12585

90.43°

180.54°

7559.83

5247.40



12850

12900

12950

13000

ROPA

- PGRC

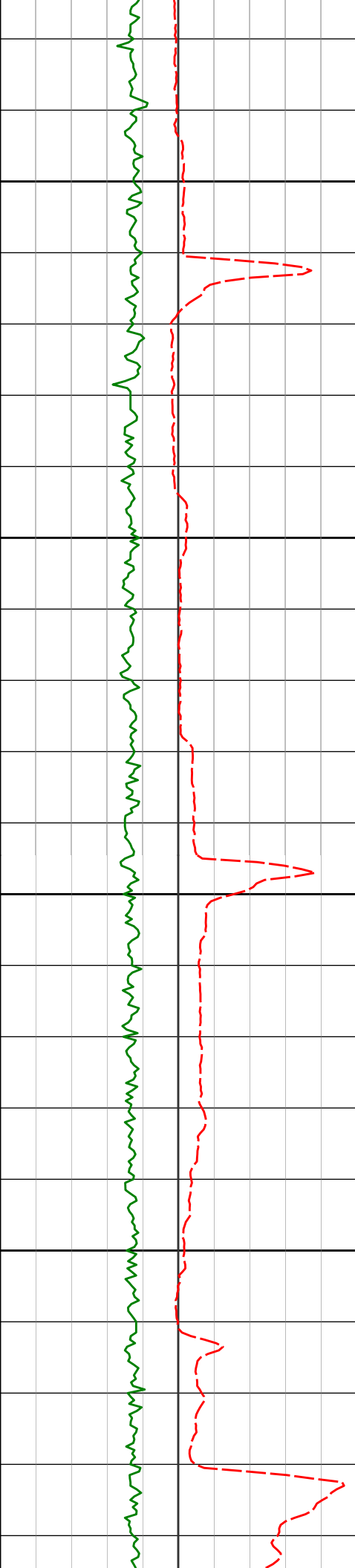
12928'

89.23°

179.99°

7560.78'

5590.37'



13050

13100

13150

13200

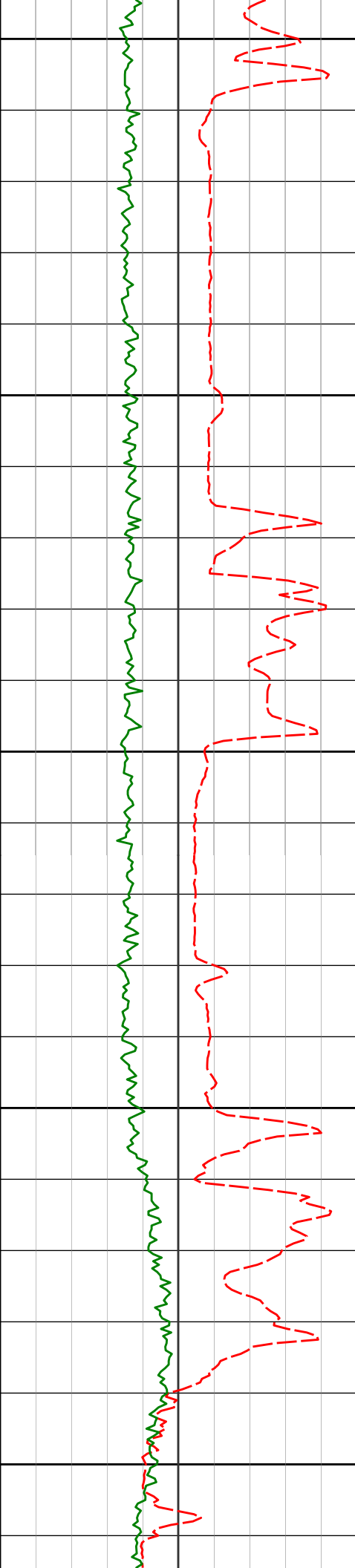
13099'

89.97°

179.80°

7561.98'

5761.37'



13250

13271'

89.26°

179.13°

7563.13'

5933.35'

13300

13350

13400

13442'

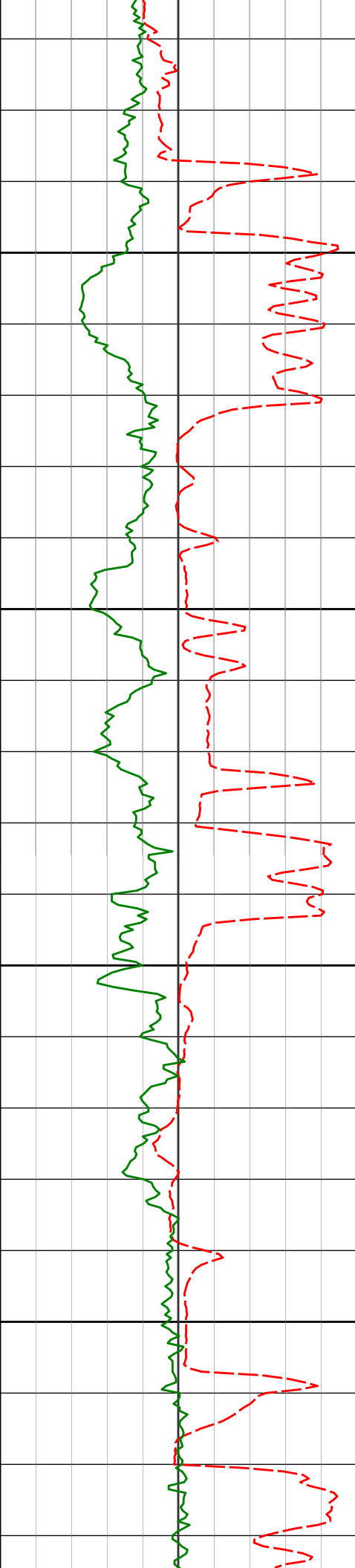
90.59°

179.51°

7563.36'

6104.34'

13450



13500

13550

13600

13650

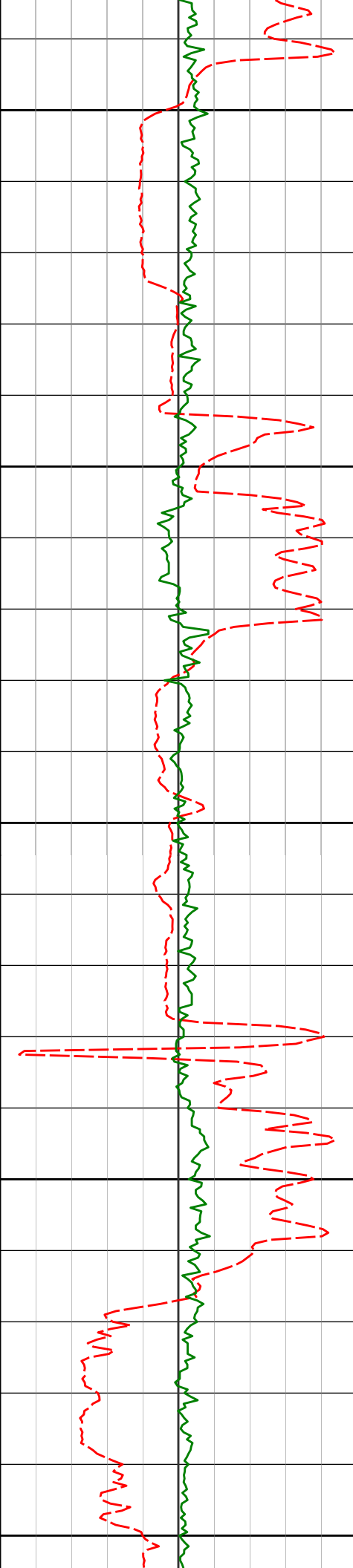
13613'

91.42°

180.50°

7560.36'

6275.31'



13700

13750

13800

13850

13900

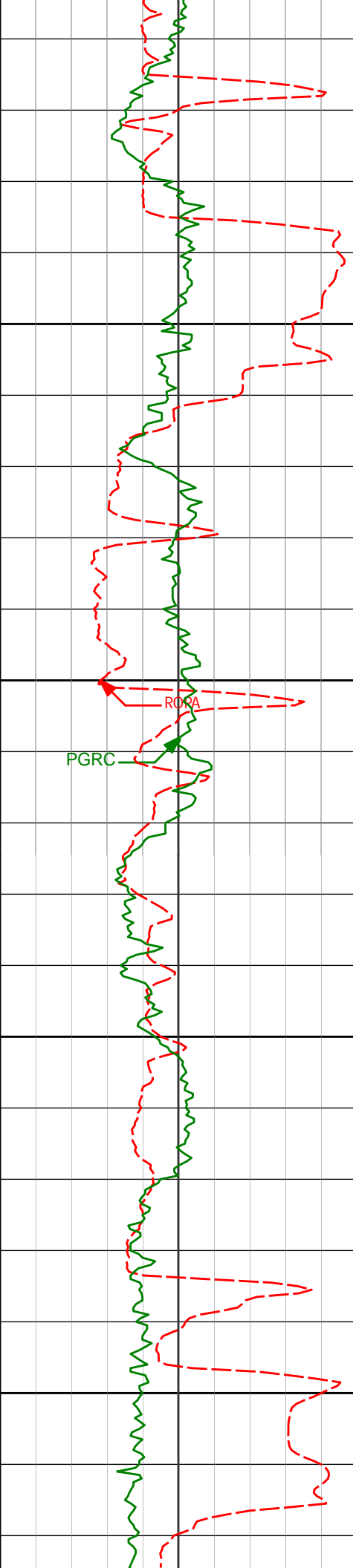
13785'

91.11°

179.89°

7556.56'

6447.26'



13950

13956'

89.13°

180.75°

7556.20'

6618.25'

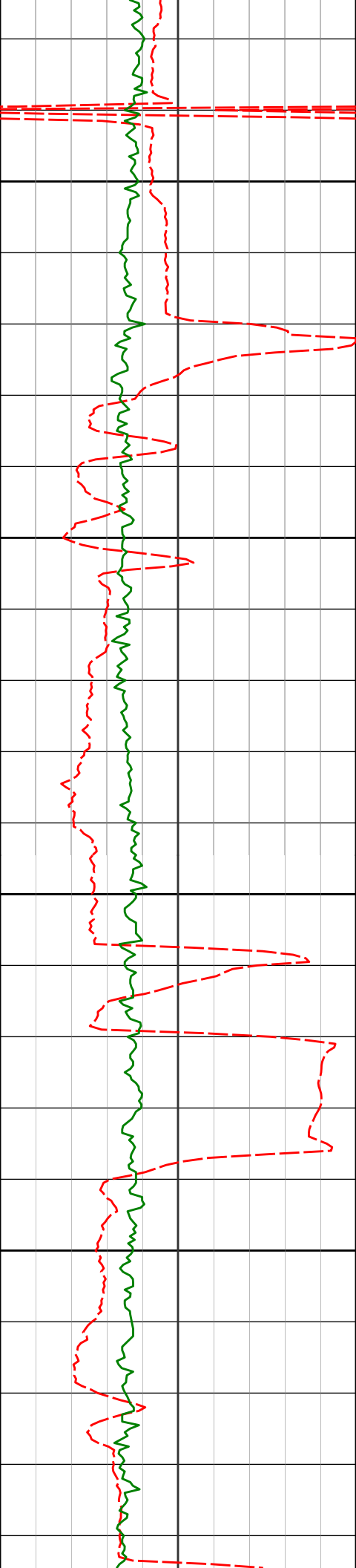
14000

PGRC

ROKA

14050

14100



14150

14200

14250

14300

14127'

88.80°

180.39°

7559.29'

6789.21'

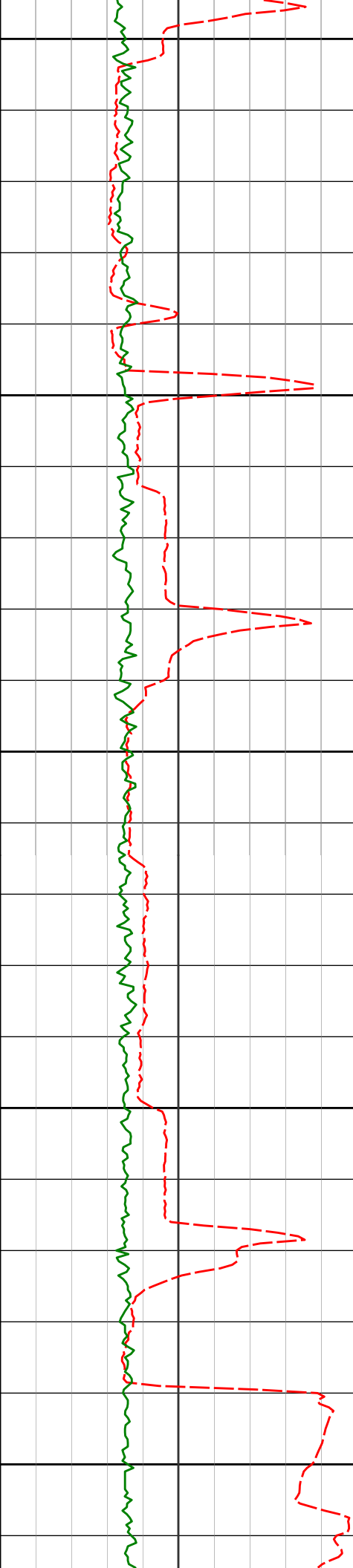
14299'

89.57°

178.25°

7561.74'

6961.17'



14350

14400

14450

14500

14550

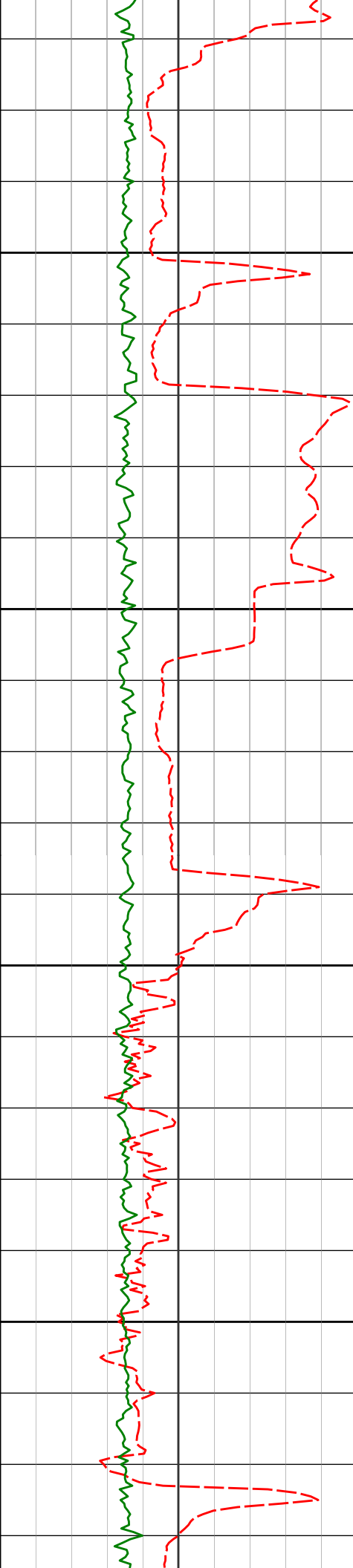
14470'

90.25°

178.08°

7562.01'

7132.08'



14600

14642'

89.20°

181.22°

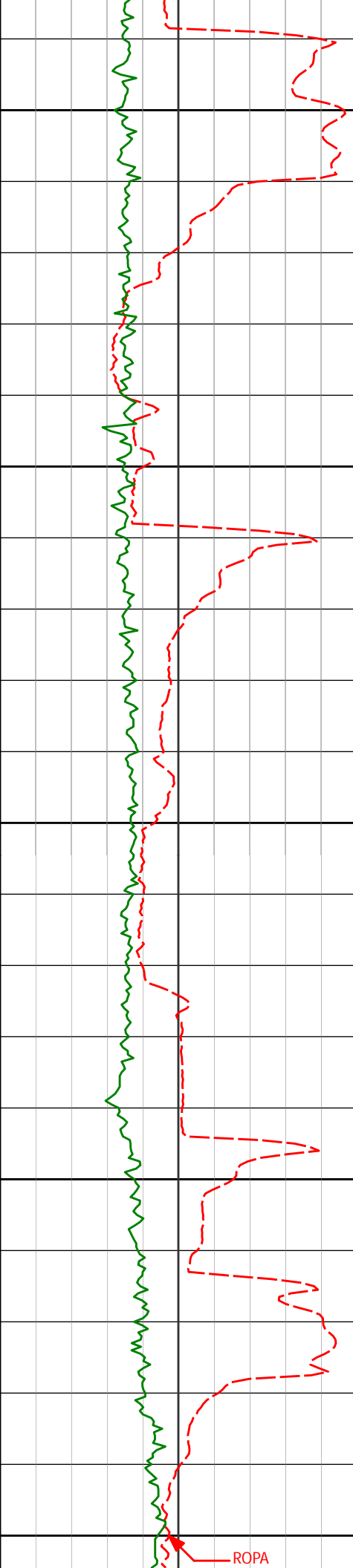
7562.83'

7304.06'

14650

14700

14750



14800

14850

14900

14950

15000

14813'

91.76°

181.50°

7561.40'

7474.99'

14984'

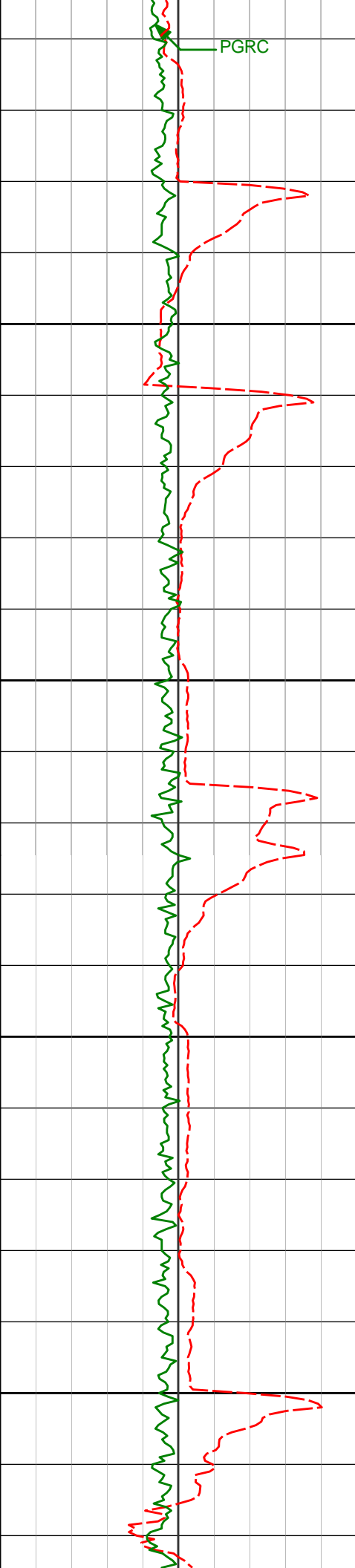
90.46°

180.67°

7558.09'

7645.92'

ROPA



15050

15100

15150

15200

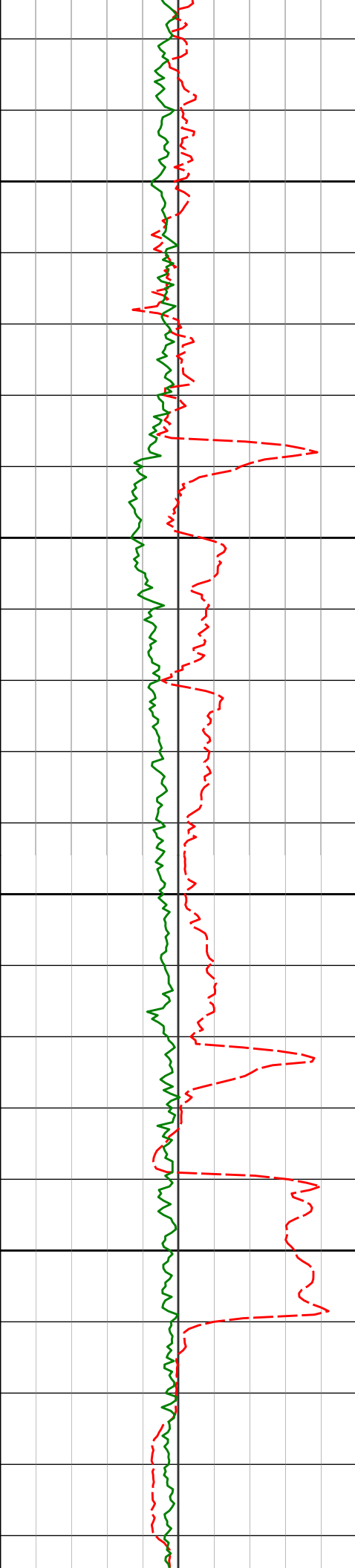
15155'

89.57°

179.12°

7558.04'

7816.91'



15250

15300

15350

15400

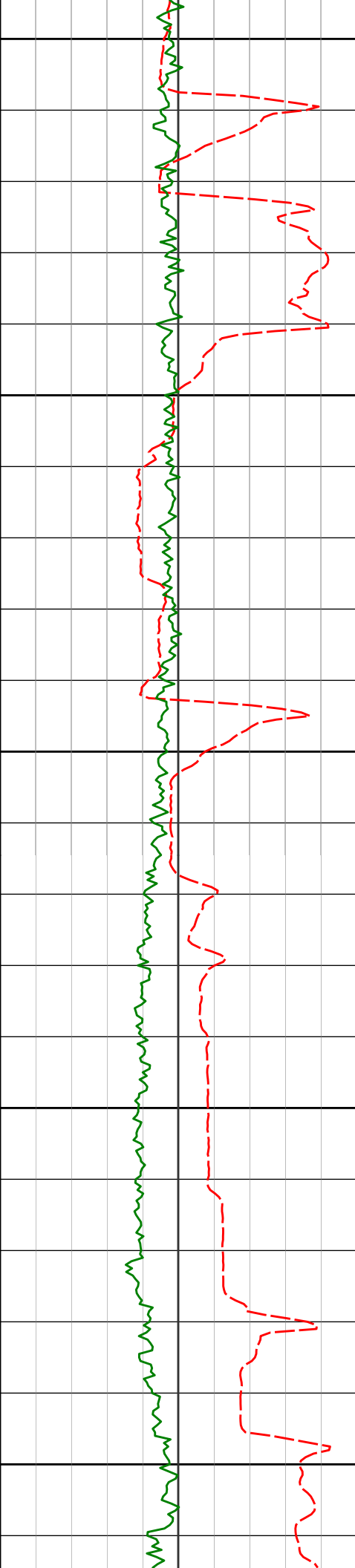
15326'

90.31°

178.36°

7558.22'

7987.87'



15450

15500

15550

15600

15650

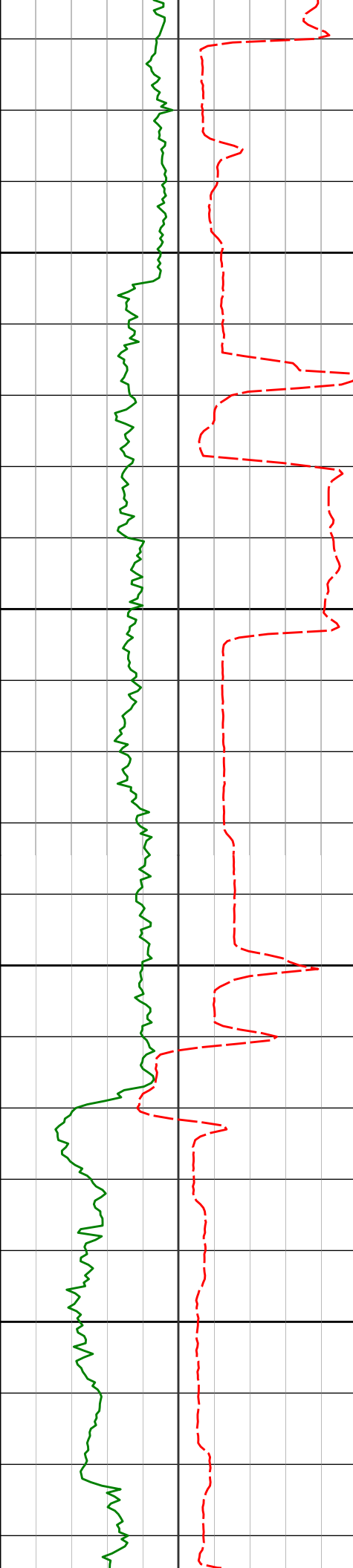
15498'

89.45°

179.64°

7558.58'

8159.84'



15700

15750

15800

15850

15669'

88.61°

179.67°

7561.48'

8330.81'

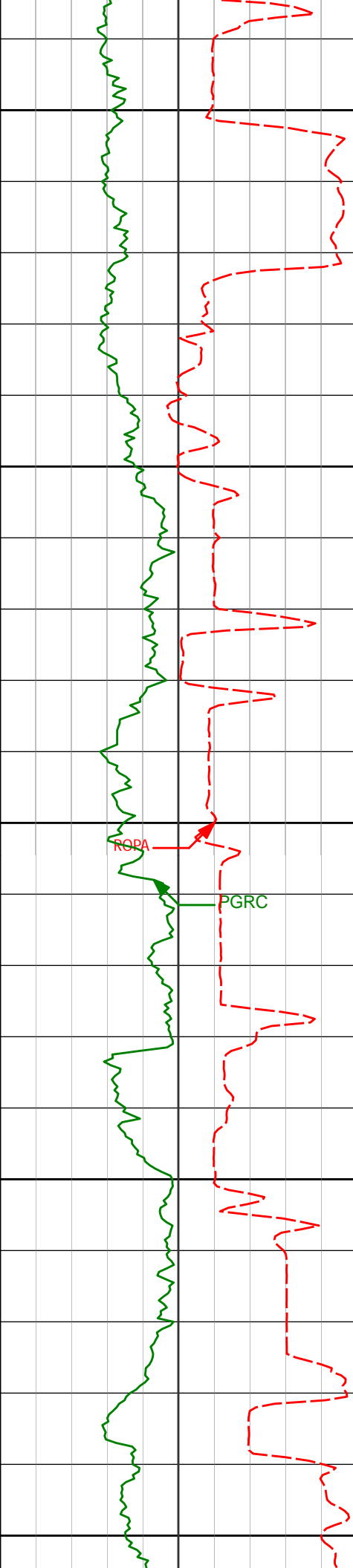
15840'

90.65°

178.51°

7562.58'

8501.77'



15900

15950

16000

16050

16100

ROPA

PGRC

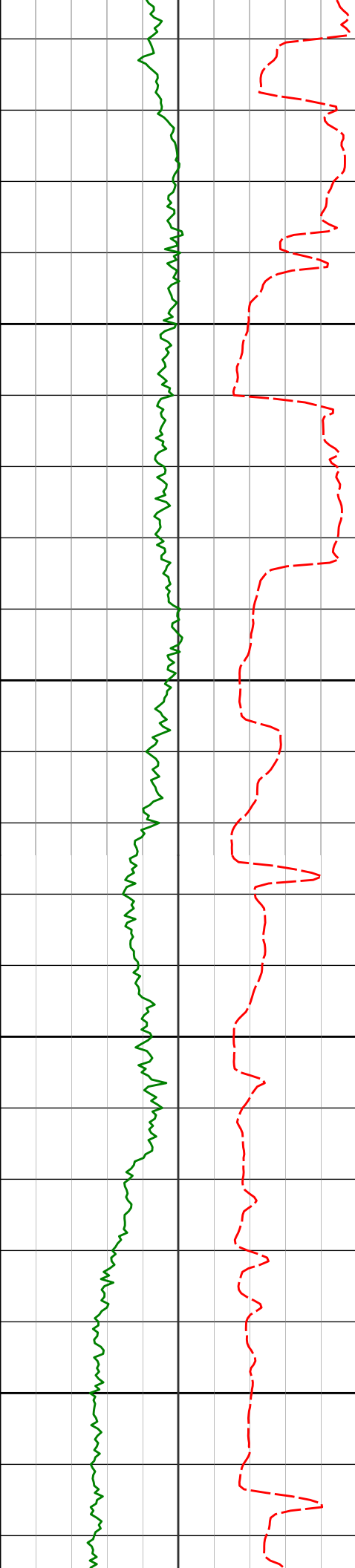
16012'

91.82°

179.31°

7558.88'

8673.70'



16150

16200

16250

16300

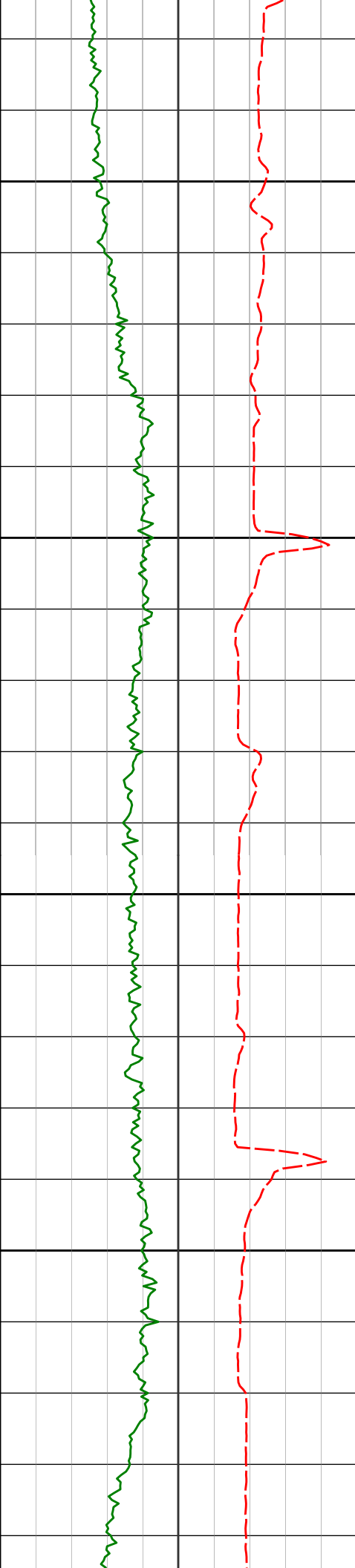
16183'

89.32°

180.50°

7557.17'

8844.67'



16350

16354'

89.20°

179.53°

7559.38'

9015.65'

16400

16450

16500

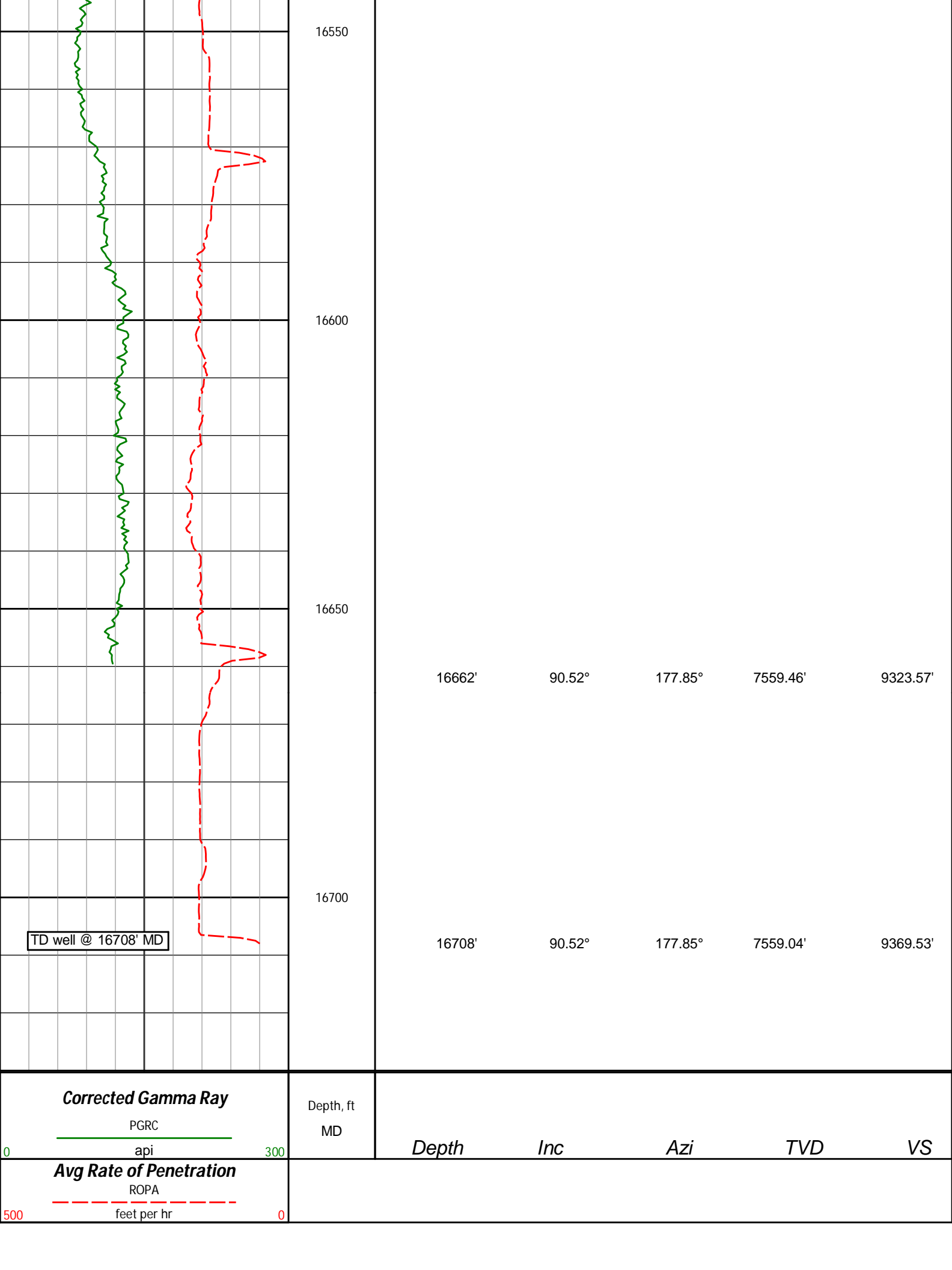
16526'

90.19°

178.77°

7560.30'

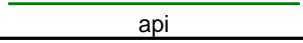
9187.63'



Corrected Gamma Ray

PGRC

api



feet per hr

Depth, ft

MD

Depth

Inc

Azi

TVD

VS

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp
Grenemyer 13N-3HZ
Wattenburg
Weld Colorado
USA
CA-XX-0900930446

<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
986.00	0.33	255.06	985.99	1.87 S	1.08 W	1.87	TIE-IN
1104.00	0.41	305.90	1103.99	1.71 S	1.75 W	1.71	0.28
1294.00	0.42	345.48	1293.98	0.64 S	2.48 W	0.64	0.15
1484.00	0.57	0.35	1483.98	0.98 N	2.64 W	-0.98	0.10
1673.00	1.07	357.68	1672.96	3.69 N	2.71 W	-3.69	0.27
1855.00	1.27	295.34	1854.92	6.25 N	4.60 W	-6.25	0.67
2039.00	0.62	41.14	2038.91	7.87 N	5.79 W	-7.87	0.85
2222.00	0.53	22.33	2221.90	9.40 N	4.82 W	-9.40	0.11
2406.00	0.61	39.31	2405.89	10.94 N	3.87 W	-10.94	0.10
2587.00	0.34	240.82	2586.89	11.43 N	3.73 W	-11.43	0.52
2769.00	1.13	251.40	2768.87	10.59 N	5.90 W	-10.59	0.44
2952.00	1.38	238.78	2951.83	8.87 N	9.50 W	-8.87	0.20
3135.00	2.04	248.02	3134.75	6.51 N	14.40 W	-6.51	0.39
3318.00	0.60	265.40	3317.69	5.22 N	18.38 W	-5.22	0.81
3495.00	1.01	252.40	3494.67	4.67 N	20.79 W	-4.67	0.25
3666.00	1.58	256.51	3665.63	3.66 N	24.52 W	-3.66	0.34
3837.00	0.48	238.57	3836.60	2.74 N	27.42 W	-2.74	0.66
4008.00	0.19	316.97	4007.60	2.57 N	28.23 W	-2.57	0.28
4179.00	0.64	236.75	4178.59	2.26 N	29.22 W	-2.26	0.37
4350.00	1.59	268.31	4349.56	1.66 N	32.39 W	-1.66	0.64
4521.00	5.05	279.44	4520.25	2.83 N	42.19 W	-2.83	2.05
4692.00	6.90	272.86	4690.31	4.58 N	59.87 W	-4.58	1.15
4863.00	9.31	275.25	4859.59	6.35 N	83.91 W	-6.35	1.42
5034.00	12.08	272.31	5027.61	8.34 N	115.57 W	-8.34	1.65
5206.00	11.13	273.08	5196.09	9.96 N	150.13 W	-9.96	0.56
5377.00	10.51	272.60	5364.05	11.55 N	182.19 W	-11.55	0.37
5548.00	10.26	270.57	5532.25	12.41 N	213.00 W	-12.41	0.26
5720.00	9.76	268.16	5701.63	12.10 N	242.89 W	-12.10	0.38
5891.00	10.54	268.18	5869.95	11.13 N	273.01 W	-11.13	0.46
6062.00	9.01	268.83	6038.47	10.36 N	302.03 W	-10.36	0.90
6234.00	5.98	268.53	6208.98	9.86 N	324.45 W	-9.86	1.76
6405.00	3.45	270.46	6379.38	9.67 N	338.51 W	-9.67	1.48
6576.00	0.98	269.08	6550.24	9.69 N	345.11 W	-9.69	1.44
6747.00	0.68	104.05	6721.24	9.42 N	345.59 W	-9.42	0.96
6919.00	0.40	89.45	6893.23	9.18 N	344.00 W	-9.18	0.18
6961.00	1.05	149.99	6935.23	8.85 N	343.66 W	-8.85	2.19
7004.00	3.30	167.73	6978.19	7.30 N	343.20 W	-7.30	5.40
7047.00	6.20	175.81	7021.04	3.77 N	342.77 W	-3.77	6.90
7090.00	9.70	177.24	7063.62	2.17 S	342.43 W	2.17	8.15
7133.00	13.72	174.42	7105.72	10.86 S	341.75 W	10.86	9.44
7176.00	17.26	174.77	7147.15	22.30 S	340.68 W	22.29	8.24
7218.00	21.22	174.69	7186.80	36.07 S	339.41 W	36.07	9.43
7261.00	24.82	176.85	7226.37	52.84 S	338.19 W	52.84	8.60
7303.00	29.31	178.82	7263.76	71.93 S	337.49 W	71.93	10.90
7346.00	33.33	178.86	7300.48	94.27 S	337.04 W	94.27	9.35
7389.00	38.32	179.90	7335.34	119.43 S	336.78 W	119.43	11.69
7432.00	42.69	179.90	7368.02	147.35 S	336.73 W	147.35	10.16
7475.00	48.21	179.73	7398.18	177.98 S	336.63 W	177.98	12.84
7518.00	52.77	179.75	7425.53	211.15 S	336.48 W	211.15	10.60
7561.00	57.53	179.64	7450.09	246.43 S	336.29 W	246.43	11.07
7604.00	61.61	179.83	7471.87	283.50 S	336.12 W	283.50	9.50
7647.00	64.51	179.93	7491.35	321.83 S	336.04 W	321.83	6.75
7690.00	68.64	180.47	7508.44	361.27 S	336.18 W	361.27	9.67
7732.00	71.76	181.23	7522.66	400.78 S	336.77 W	400.78	7.62
7775.00	75.10	181.52	7534.93	441.98 S	337.76 W	441.98	7.79
7818.00	77.99	181.14	7544.93	483.78 S	338.73 W	483.78	6.78

7861.00	81.96	181.25	7552.41	526.11 S	339.61 W	526.11	9.24
7916.00	87.19	181.29	7557.61	580.83 S	340.83 W	580.83	9.51
8035.00	88.61	180.87	7561.97	699.72 S	343.07 W	699.72	1.24
8206.00	90.62	179.42	7563.12	870.71 S	343.50 W	870.71	1.45
8377.00	90.59	177.92	7561.32	1041.65 S	339.53 W	1041.65	0.88
8549.00	88.03	177.16	7563.39	1213.46 S	332.15 W	1213.46	1.55
8720.00	90.95	179.36	7564.91	1384.34 S	326.96 W	1384.34	2.14
8891.00	91.41	182.22	7561.39	1555.27 S	329.32 W	1555.27	1.69
9062.00	89.91	182.34	7559.42	1726.12 S	336.12 W	1726.12	0.88
9233.00	93.08	182.78	7554.96	1896.87 S	343.75 W	1896.87	1.87
9405.00	89.57	180.98	7550.98	2068.70 S	349.39 W	2068.70	2.29
9575.00	88.67	179.91	7553.59	2238.67 S	350.71 W	2238.67	0.82
9758.00	89.60	179.62	7556.35	2421.64 S	349.96 W	2421.64	0.53
9941.00	88.49	177.58	7559.40	2604.55 S	345.49 W	2604.55	1.27
10125.00	90.12	178.98	7561.64	2788.44 S	339.97 W	2788.44	1.17
10308.00	90.25	176.57	7561.04	2971.29 S	332.87 W	2971.29	1.32
10491.00	90.25	179.34	7560.25	3154.16 S	326.34 W	3154.16	1.51
10673.00	90.00	180.12	7559.85	3336.15 S	325.48 W	3336.15	0.45
10855.00	89.72	179.75	7560.29	3518.15 S	325.27 W	3518.15	0.25
11038.00	89.85	180.41	7560.98	3701.15 S	325.53 W	3701.15	0.37
11215.00	90.12	178.27	7561.03	3878.13 S	323.49 W	3878.13	1.22
11386.00	90.62	179.55	7559.92	4049.09 S	320.24 W	4049.09	0.80
11557.00	89.29	183.80	7560.06	4219.97 S	325.23 W	4219.97	2.60
11729.00	90.06	183.71	7561.03	4391.60 S	336.50 W	4391.60	0.45
11900.00	90.46	180.81	7560.26	4562.44 S	343.24 W	4562.44	1.71
12071.00	89.57	180.13	7560.21	4733.44 S	344.64 W	4733.44	0.65
12243.00	89.51	181.09	7561.59	4905.42 S	346.47 W	4905.42	0.56
12414.00	90.62	179.84	7561.40	5076.41 S	347.86 W	5076.41	0.98
12585.00	90.43	180.54	7559.83	5247.40 S	348.43 W	5247.40	0.42
12757.00	89.85	178.98	7559.41	5419.39 S	347.71 W	5419.39	0.97
12928.00	89.23	179.99	7560.78	5590.37 S	346.17 W	5590.37	0.69
13099.00	89.97	179.80	7561.98	5761.37 S	345.86 W	5761.37	0.45
13271.00	89.26	179.13	7563.13	5933.36 S	344.25 W	5933.35	0.57
13442.00	90.59	179.51	7563.36	6104.34 S	342.22 W	6104.34	0.81
13613.00	91.42	180.50	7560.36	6275.31 S	342.23 W	6275.31	0.76
13785.00	91.11	179.89	7556.56	6447.26 S	342.82 W	6447.26	0.40
13956.00	89.13	180.75	7556.20	6618.25 S	343.77 W	6618.25	1.26
14127.00	88.80	180.39	7559.29	6789.21 S	345.48 W	6789.21	0.29
14299.00	89.57	178.25	7561.74	6961.17 S	343.43 W	6961.17	1.32
14470.00	90.25	178.08	7562.01	7132.09 S	337.96 W	7132.08	0.41
14642.00	89.20	181.22	7562.83	7304.06 S	336.91 W	7304.06	1.92
14813.00	91.76	181.50	7561.40	7474.99 S	340.97 W	7474.99	1.51
14984.00	90.46	180.67	7558.09	7645.92 S	344.20 W	7645.92	0.90
15155.00	89.57	179.12	7558.04	7816.91 S	343.89 W	7816.91	1.05
15326.00	90.31	178.36	7558.22	7987.87 S	340.13 W	7987.87	0.62
15498.00	89.45	179.64	7558.58	8159.84 S	337.13 W	8159.84	0.90
15669.00	88.61	179.67	7561.48	8330.81 S	336.10 W	8330.81	0.49
15840.00	90.65	178.51	7562.58	8501.77 S	333.38 W	8501.77	1.37
16012.00	91.82	179.31	7558.88	8673.70 S	330.11 W	8673.70	0.82
16183.00	89.32	180.50	7557.17	8844.67 S	329.83 W	8844.67	1.62
16354.00	89.20	179.53	7559.38	9015.65 S	329.87 W	9015.65	0.57
16526.00	90.19	178.77	7560.30	9187.63 S	327.32 W	9187.63	0.73
16662.00	90.52	177.85	7559.46	9323.57 S	323.31 W	9323.57	0.72
16708.00	90.52	177.85	7559.04	9369.53 S	321.58 W	9369.53	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 180.00 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.59 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16708.00 FEET
IS 9375.05 FEET ALONG 181.97 DEGREES (TRUE)**

Directional Surveys Tied onto Gyros at 986' MD. Final survey is a projection to bit.