

Pressure Cased Gamma (PCGK)

1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	09-Nov-14	11-Nov-14	14-Nov-14		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	6.125	6.125		
Tool Nominal OD (in)	6.750	4.750	4.750		
Log Start Depth (MD, ft)	1,195.00	7,160.00	9,369.00		
Log End Depth (MD, ft)	7,160.00	9,369.00	12,678.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	07-Nov-14 18:20	10-Nov-14 18:40	12-Nov-14 06:00		
Drill/Wipe End Date and Time	09-Nov-14 08:20	11-Nov-14 15:35	13-Nov-14 16:20		
Min Inc (deg) @ Depth (MD, ft)	0.20 @ 5,902.00	86.55 @ 7,232.00	88.39 @ 12,621.00		
Max Inc (deg) @ Depth (MD, ft)	83.55 @ 7,160.00	92.43 @ 7,448.00	93.21 @ 10,249.00		
Bit TFA(in2) / Bit Type	0.91 /	0.65 /	0.75 /		
Flow Rate (gpm)	618.27	286.95	298.44		
Max AV (fpm) / CV (fpm) @ MWD	N/A	N/A	N/A		
Fluid Type	Polymer	Polymer	Polymer		
Density (ppg) / Viscosity (spcP)	9.75 / 40.00	9.43 / 41.00	9.57 / 39.00		
Filtrate CL (ppm)	1,400.00	1,300.00	1,100.00		
pH / API Filtrate (mpm)	8.90 / 9	9.00 / 7	8.90 / 8		
PV (cP) / YP (lbf/ft2)	10 / 8.00	9 / 8.00	9 / 8.00		
% Solids / % Sand	10.7 / 0.50	5.7 / 0.25	6.7 / 0.25		
% Oil / Oil:Water Ratio	N/A	0.00 / N/A	0.00 / N/A		
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Max Filter Cake Thickness (in)	1.75 @ 5,902.00	0.75 @ 7,232.00	0.8 @ 12,621.00		

Max Tool Temp (degF) / Source	177.64 / PCM	215.51 / PCM	234.12 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 177.64	N/A @ 215.51	N/A @ 234.12		
Lead MWD Engineer	Henry Schmeidler	Henry Schmeidler	Henry Schmeidler		
Customer Representative	Steve Record	Steve Record	Steve Record		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	11404298	12187589	12187589		
Insert Serial Number	11680742	11680742	11680802		
Date and Time Initialized	07-Nov-14 06:11	10-Nov-14 03:06	11-Nov-14 19:05		
Date and Time Read	09-Nov-14 15:18	11-Nov-14 22:01	14-Nov-14 13:08		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	56.29	58.04	53.54		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11404298	12187589	12187589		
Sonde Serial Number	11297515	11297515	11062039		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	234.83	110.98	248.54		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	51.19	52.94	48.44		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11404298	12187589	12187589		
Insert/Sonde Serial Number	11579787	11579787	11579792		

REMARKS

1. All depths are measured bit depths, referenced to the Driller's pipe tally and are measured from the Drill Floor, unless otherwise specified.

2. No depth corrections have been made for pipe stretch or compression.

3. All data presented is recorded data unless otherwise specified

4. 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

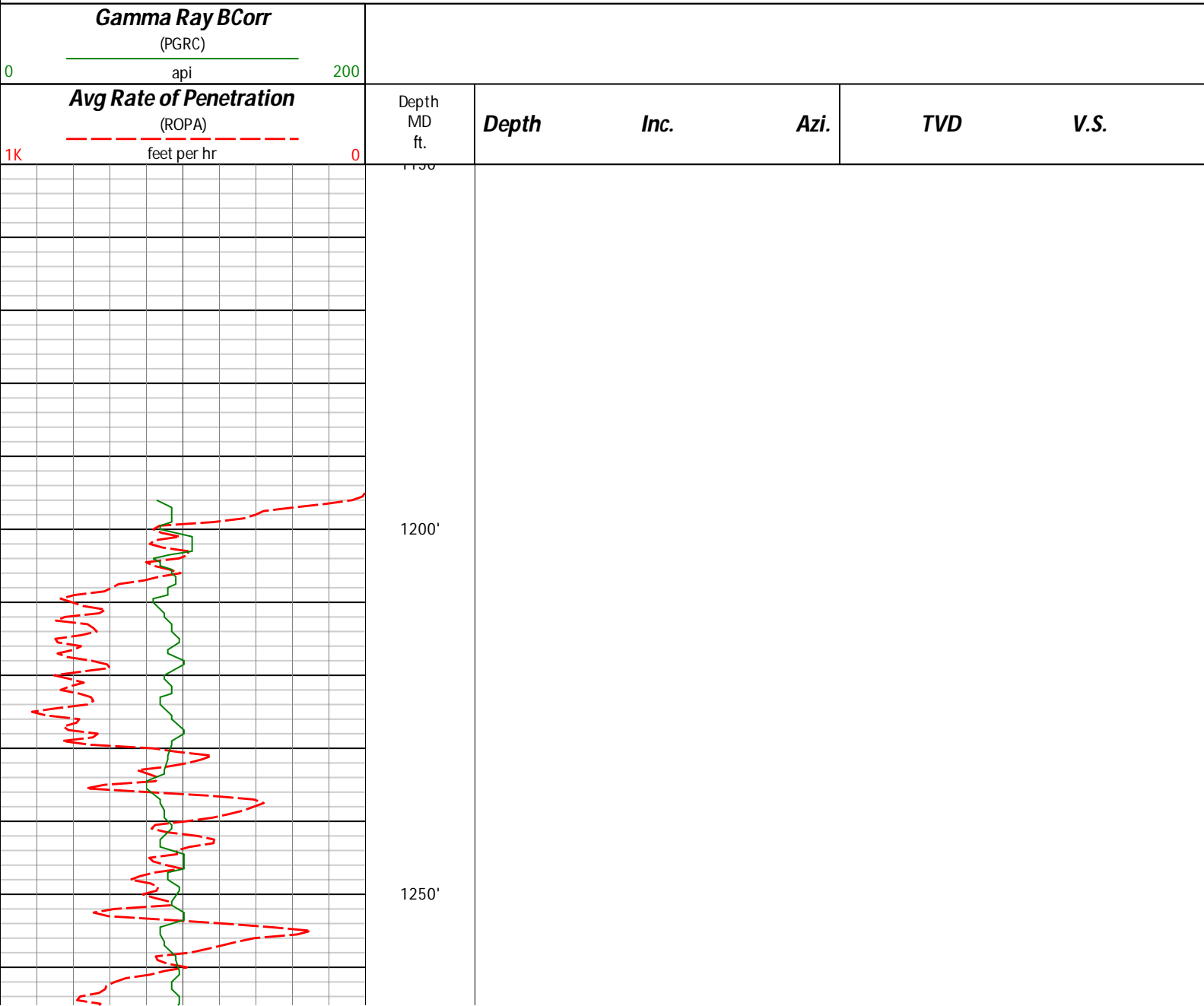
5. INSITE version 8.4.10-MLWD

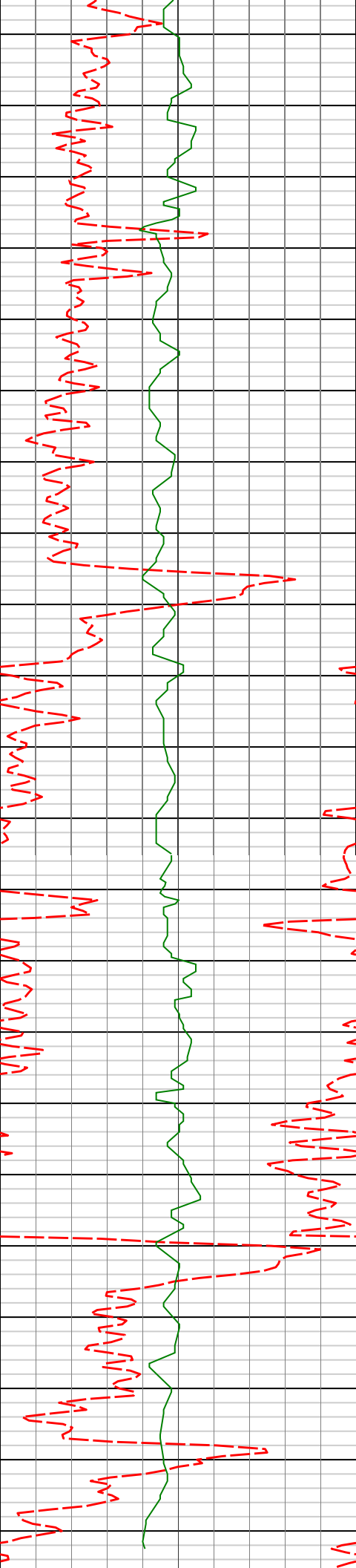
WARRANTY

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Sperry Drilling Services

MD Detail Log 1:240





1293'	0.81°	179.70°	1292.97'	-6.15'
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1300'

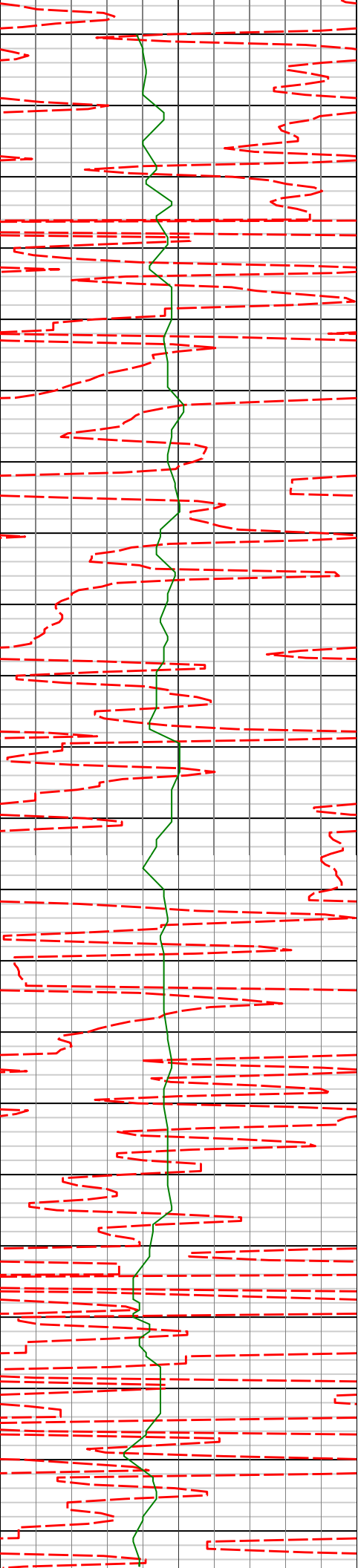
1350'

1386'	0.81°	174.42°	1385.96'	-7.46'
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1400'

1450'

1478'	0.81°	174.09°	1477.95'	-8.76'
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1500'

1550'

1570'

0.90°

170.35°

1569.94'

-10.12'

1600'

1650'

1663'

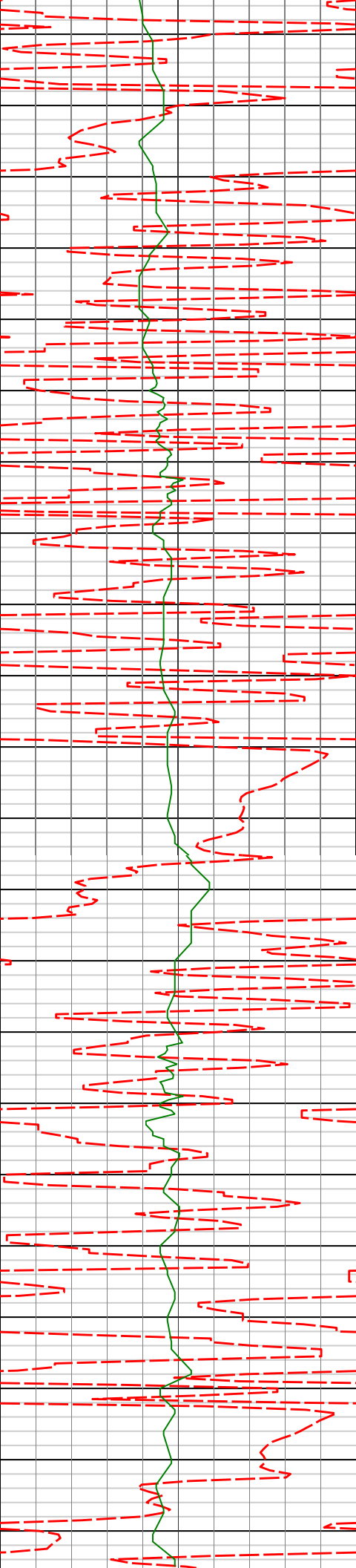
1.07°

162.38°

1662.93'

-11.67'

1700'



1750'

1800'

1850'

1900'

1755'

1.10°

163.81°

1754.91'

-13.34'

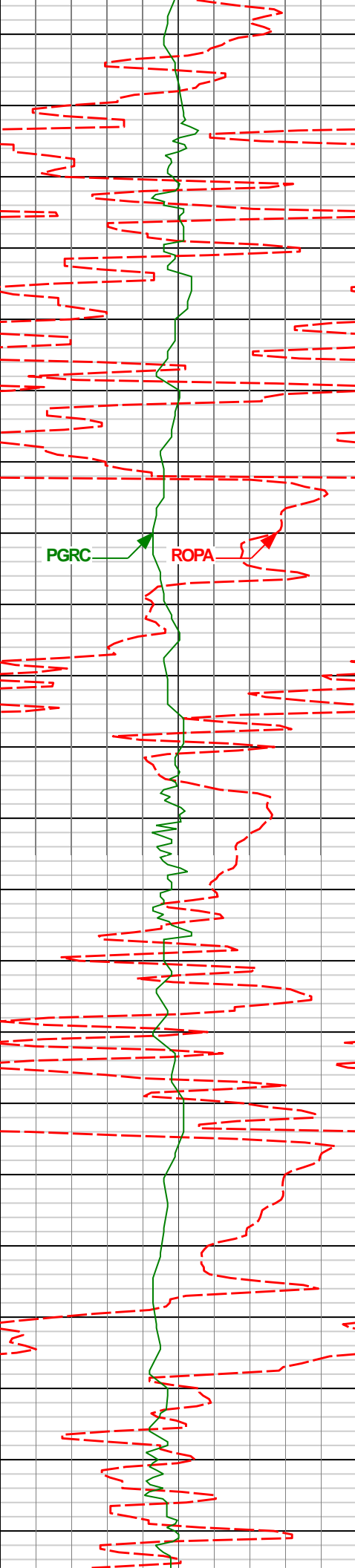
1847'

2.22°

89.32°

1846.88'

-14.19'



1950'

2000'

2050'

2100'

1938'

3.06°

55.90°

1937.79'

-12.84'

2031'

4.06°

36.23°

2030.61'

-8.82'

2123'

6.11°

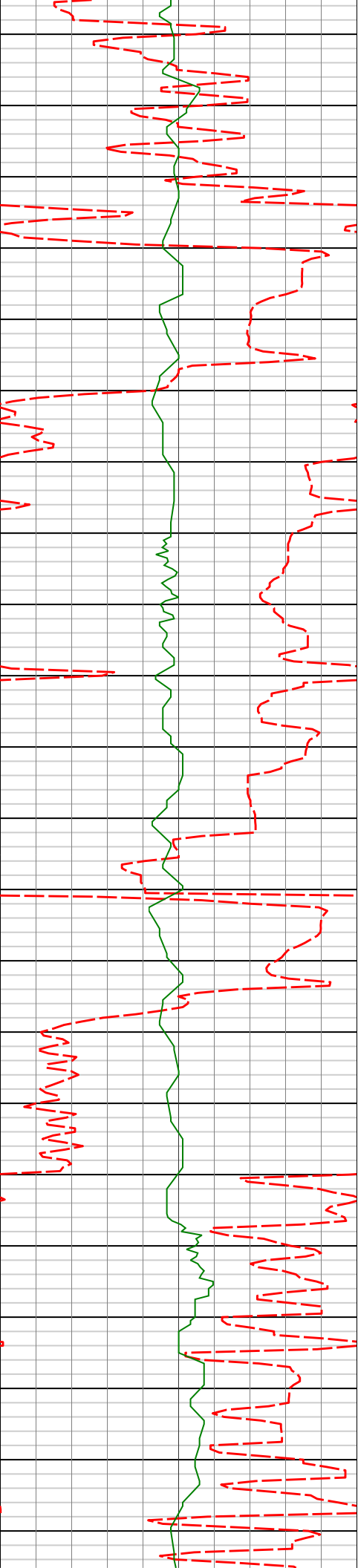
12.63°

2122.25'

-1.44'

PGRC

ROPA



2150'

2200'

2250'

2300'

2350'

2216'

7.89°

8.81°

2214.55'

9.68'

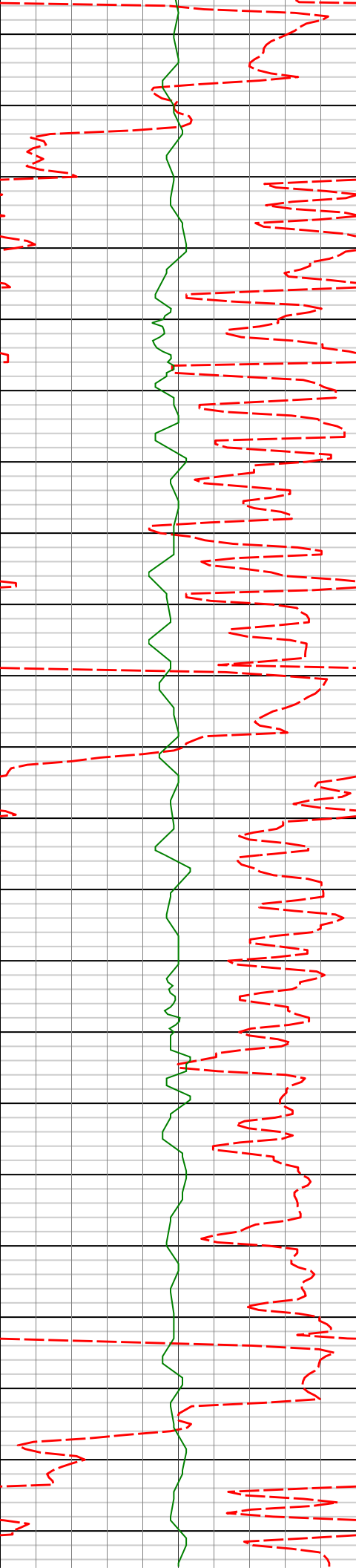
2309'

8.39°

1.76°

2306.62'

22.76'



2400'

2450'

2500'

2550'

2402'

8.87°

2.24°

2398.57'

36.70'

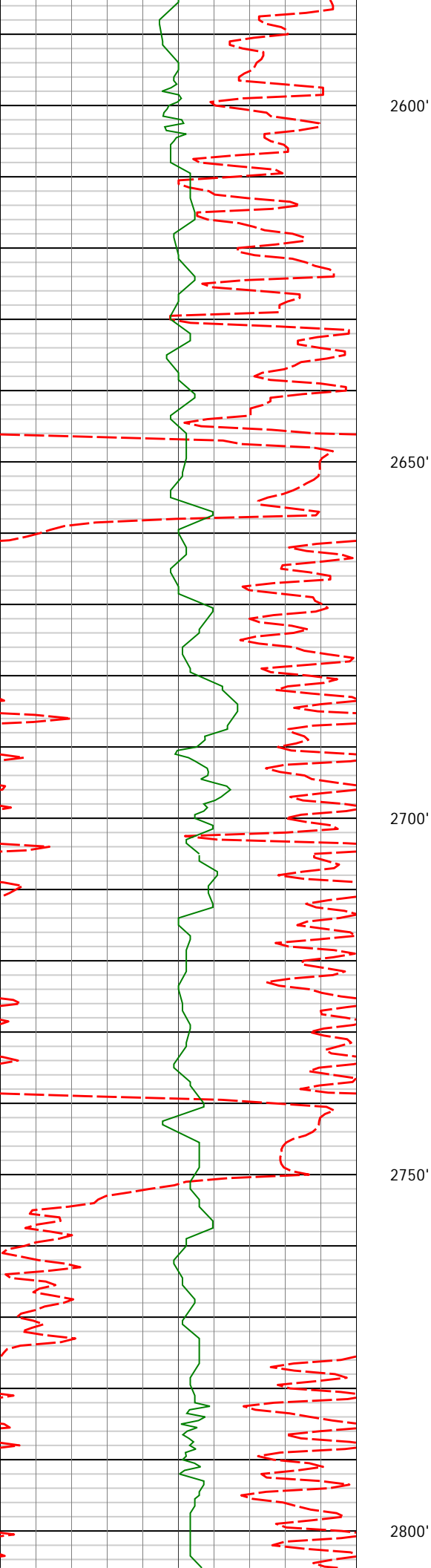
2495'

9.10°

5.42°

2490.43'

51.17'



2589'

8.78°

355.76°

2583.29'

65.73'

2681'

8.75°

356.50°

2674.21'

79.72'

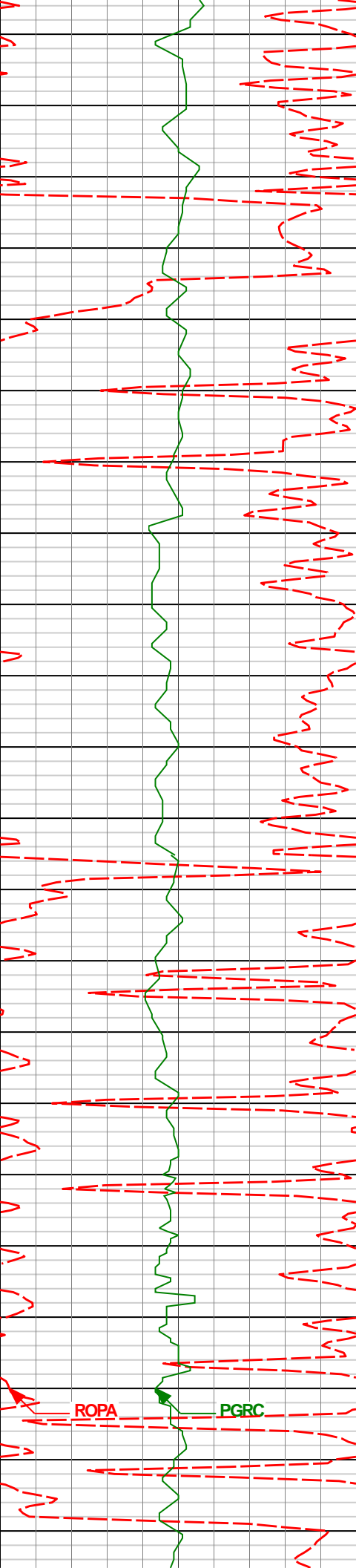
2773'

8.40°

1.27°

2765.19'

93.43'



2850'

2865'

9.20°

359.46°

2856.10'

107.50'

2900'

2950'

2960'

9.39°

357.34°

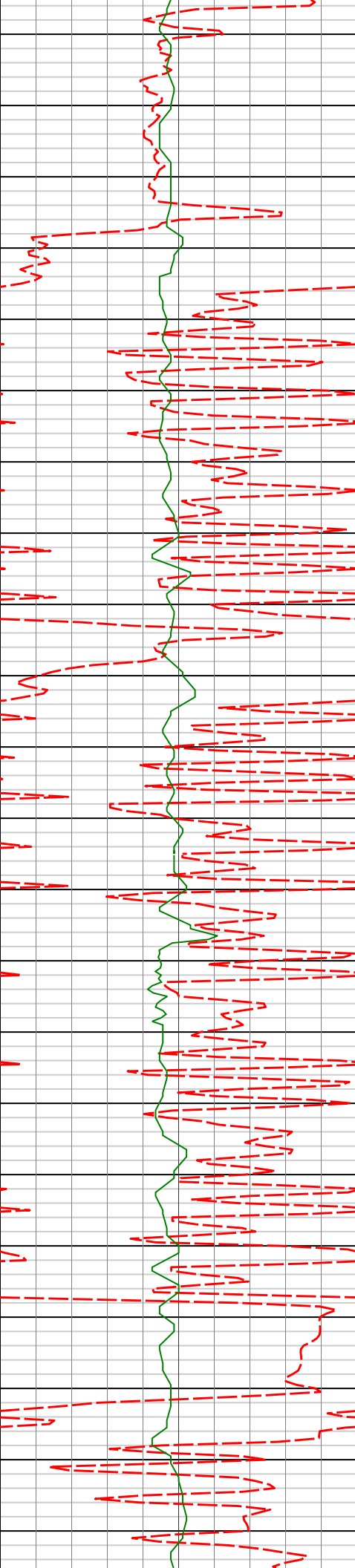
2949.86'

122.84'

3000'

ROPA

PGRC



3050'

3055'

9.26°

1.86°

3043.60'

138.22'

3100'

3150'

3150'

8.57°

358.56°

3137.45'

152.93'

3200'

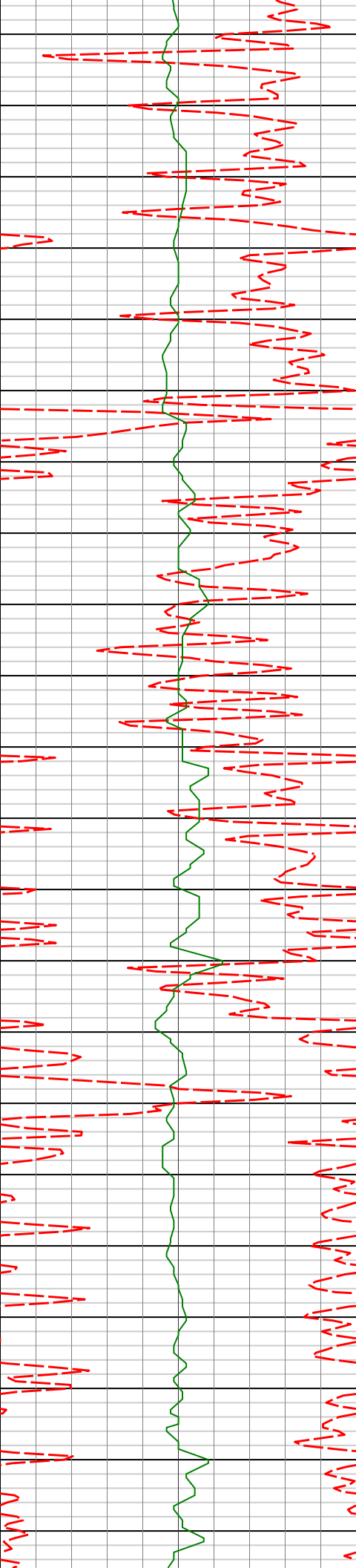
3245'

8.50°

5.91°

3231.30'

167.06'



3250'

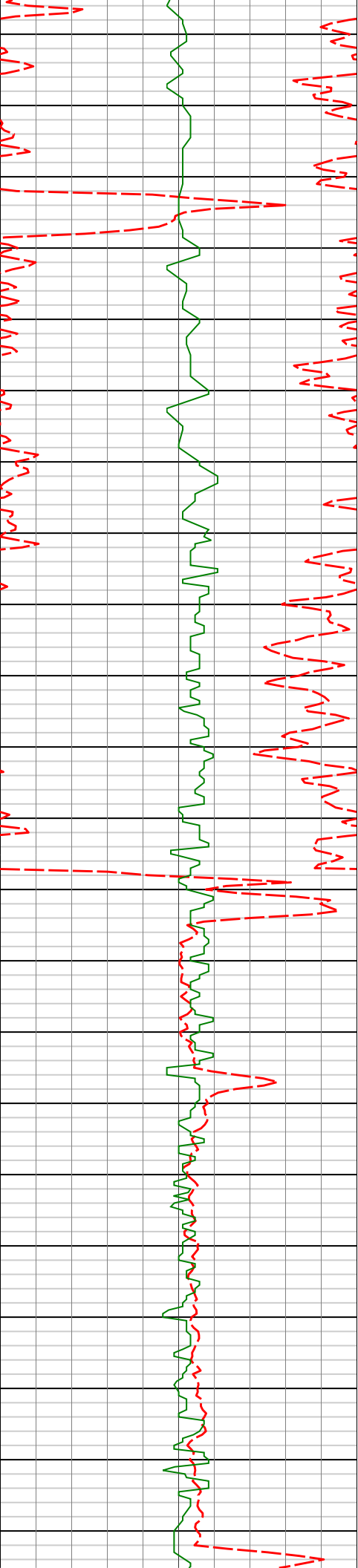
3300'

3350'

3400'

3450'

3245'	6.37°	3.91°	3231.37'	167.00'
3340'	7.28°	3.50°	3325.48'	180.12'
3435'	6.38°	359.91°	3419.81'	191.40'



3500'

3530'

5.33°

352.04°

3514.31'

201.05'

3550'

3600'

3624'

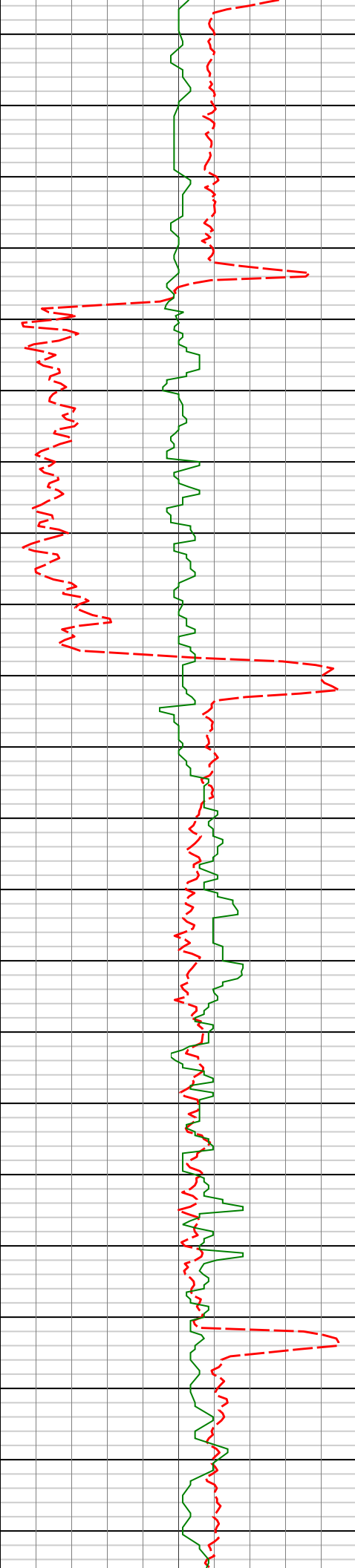
4.52°

344.44°

3607.97'

208.96'

3650'



3700'

3719'

3.46°

347.82°

3702.73'

215.38'

3750'

3800'

3814'

2.44°

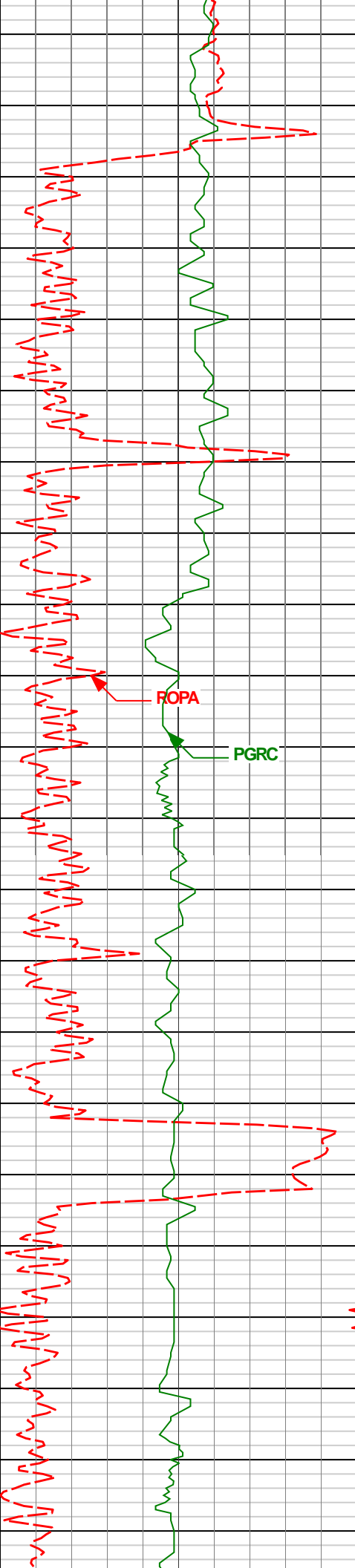
339.98°

3797.61'

220.09'

3850'

3900'



3950'

4000'

4050'

4100'

3909'

1.94°

329.32°

3892.54'

223.39'

4004'

1.60°

298.75°

3987.49'

225.43'

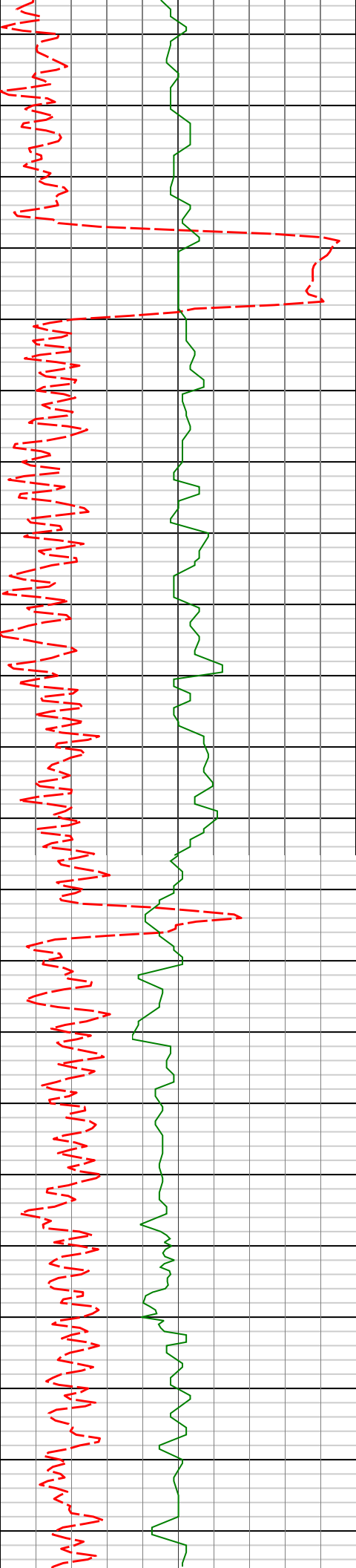
4099'

1.46°

320.55°

4082.46'

227.02'



4150'

4194'

0.52°

347.25°

4177.45'

228.38'

4200'

4250'

4289'

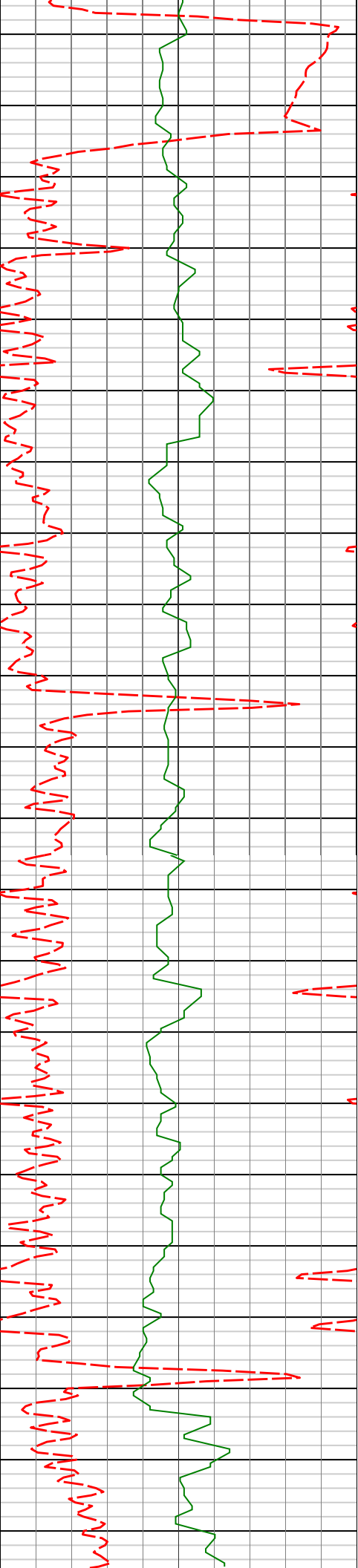
0.95°

259.97°

4272.44'

228.67'

4300'



4350'

4383'

0.99°

113.01°

4366.44'

228.22'

4400'

4450'

4478'

0.92°

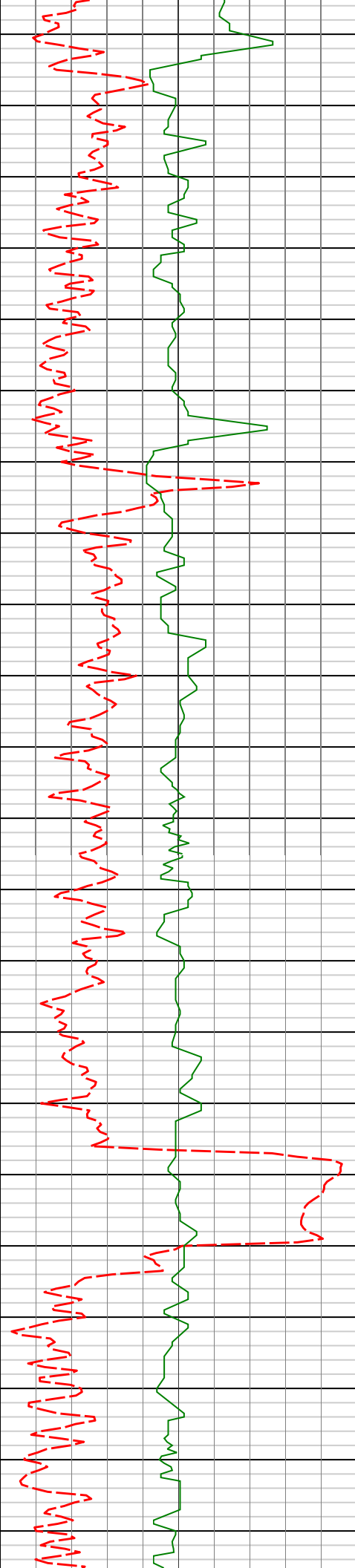
132.89°

4461.42'

227.37'

4500'

4550'



4573'

0.50°

162.08°

4556.42'

226.45'

4600'

4650'

4668'

0.88°

179.25°

4651.41'

225.32'

4700'

4750'

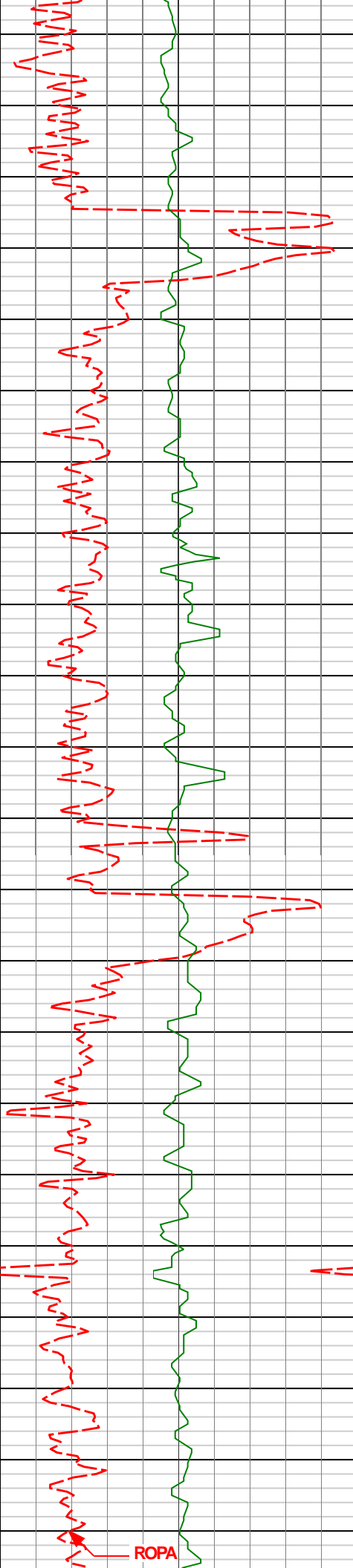
4763'

0.34°

139.69°

4746.40'

224.38'



4800'

4850'

4900'

4950'

5000'

4858'

0.31°

188.49°

4841.40'

223.91'

4953'

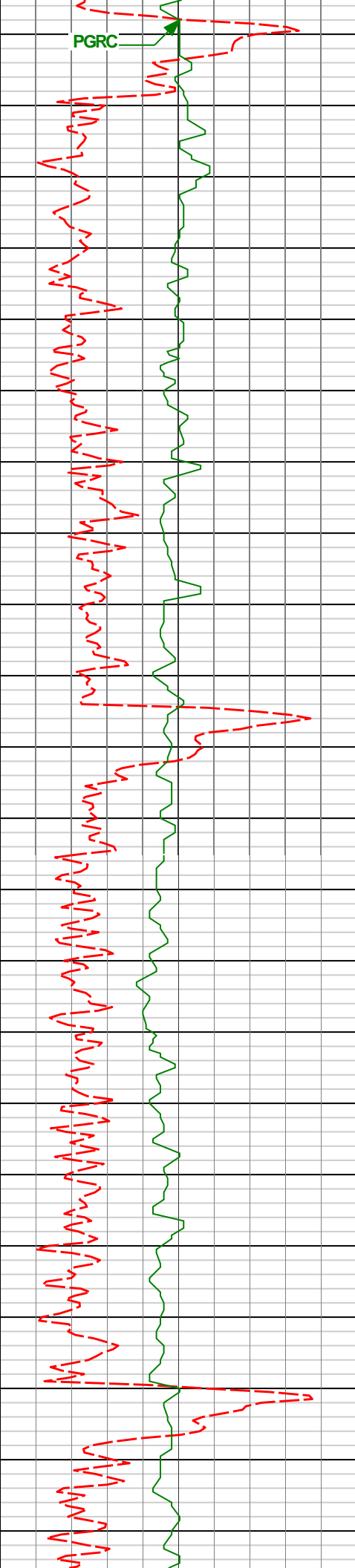
0.72°

190.54°

4936.40'

223.07'

ROPA



5050'

5100'

5150'

5200'

5048'

5143'

0.91°

0.84°

172.35°

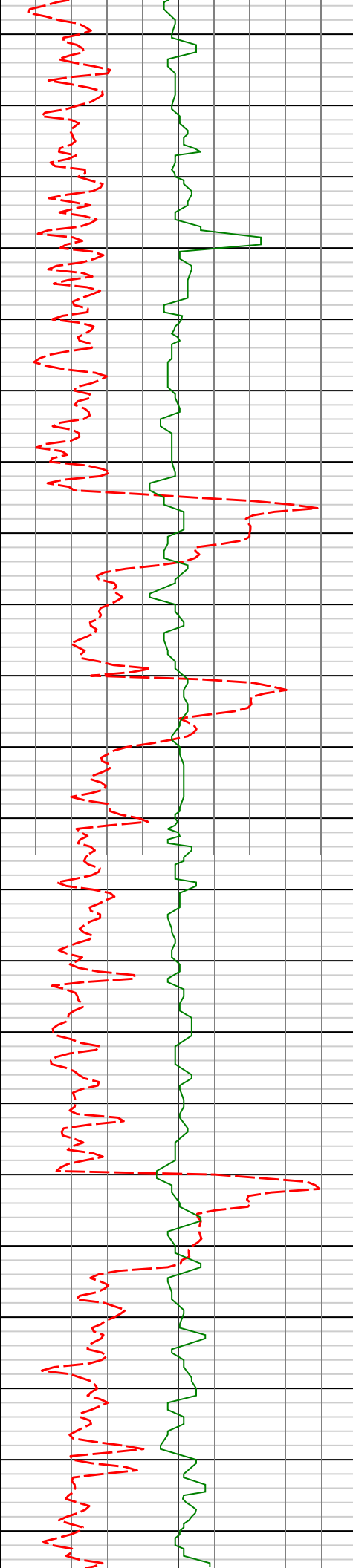
159.49°

5031.39'

5126.38'

221.73'

220.33'



5238'	0.61°	143.92°	5221.37'	219.26'
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5250'

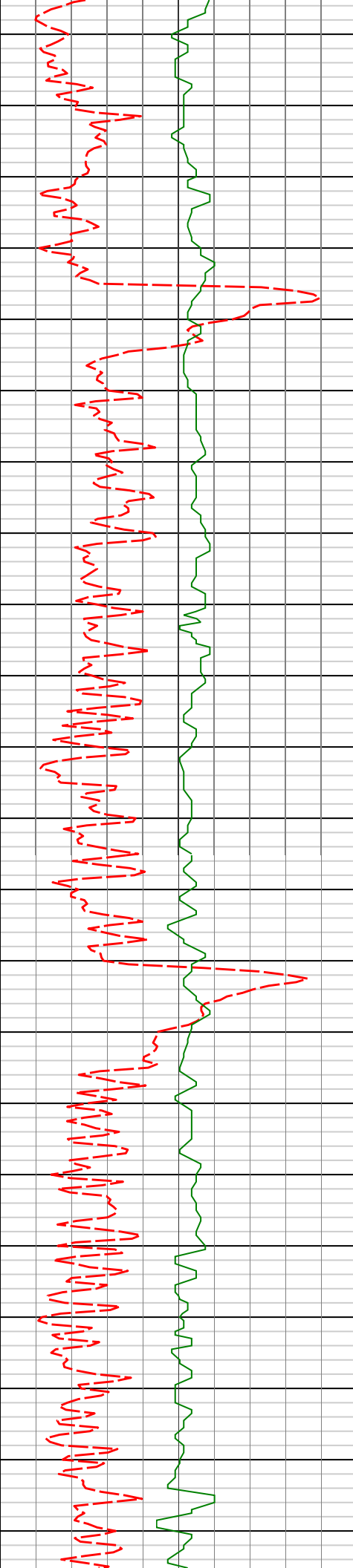
5300'

5333'	0.74°	95.65°	5316.36'	218.79'
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5350'

5400'

5428'	0.98°	96.54°	5411.35'	218.62'
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5450'

5500'

5550'

5600'

5650'

5522'

0.98°

103.79°

5505.34'

218.32'

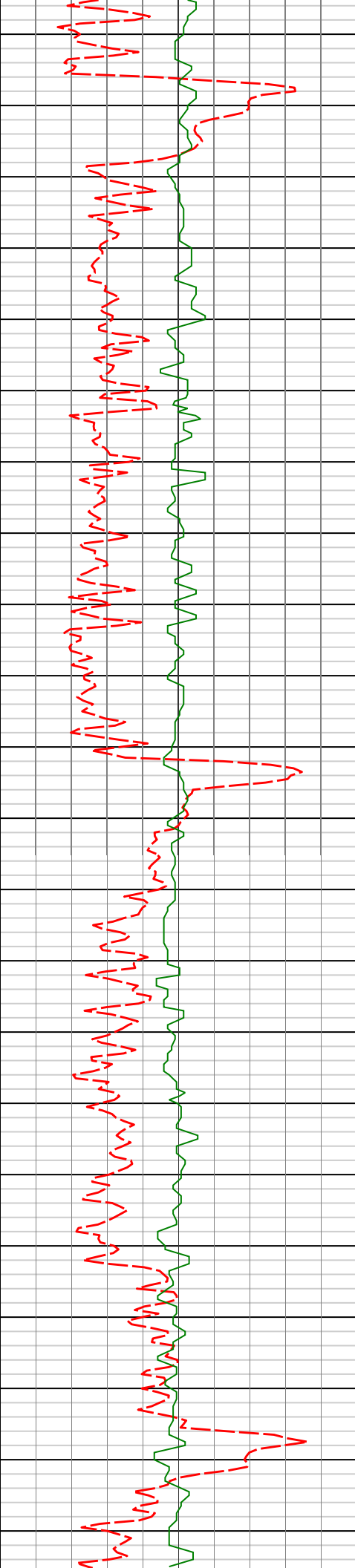
5617'

0.83°

95.38°

5600.33'

218.05'



5700'

5750'

5800'

5850'

5712'

0.85°

85.36°

5695.32'

218.03'

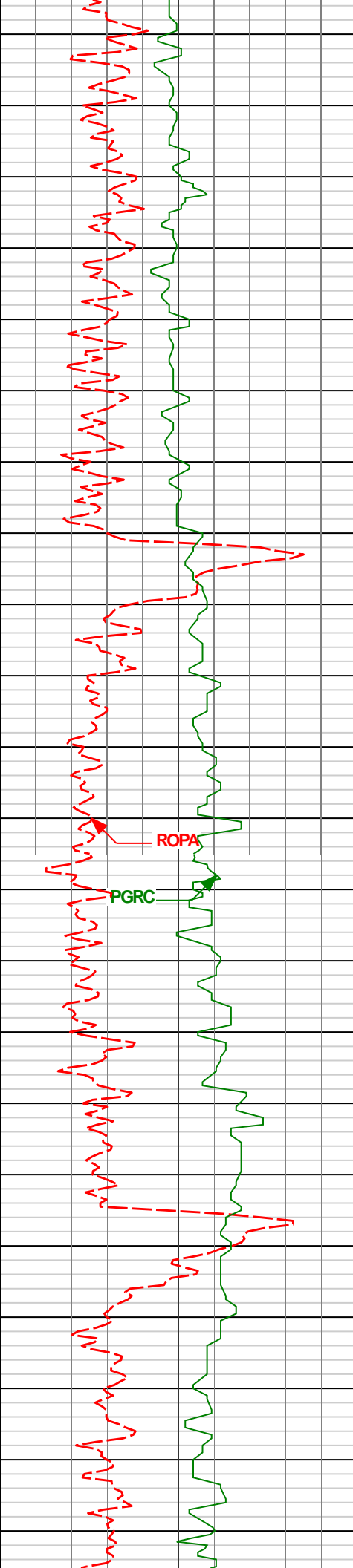
5807'

0.37°

46.44°

5790.31'

218.29'



5900'

5902'

0.20°

11.82°

5885.31'

218.67'

5950'

6000'

ROPA

PGRC

5997'

0.36°

351.81°

5980.31'

219.12'

6050'

6100'

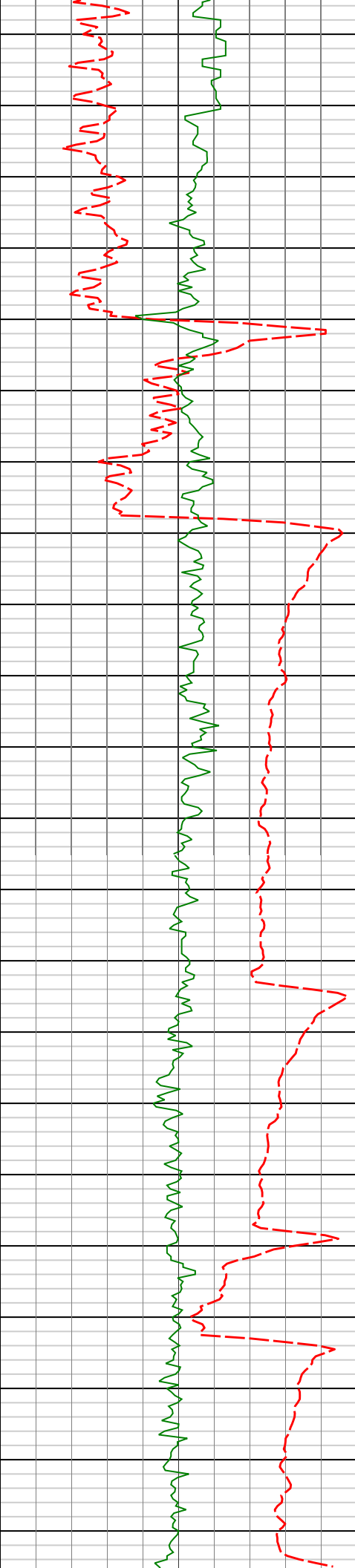
6091'

0.47°

317.90°

6074.31'

219.70'



6150'

6200'

6250'

6300'

6234'

7.76°

355.06°

6216.85'

229.78'

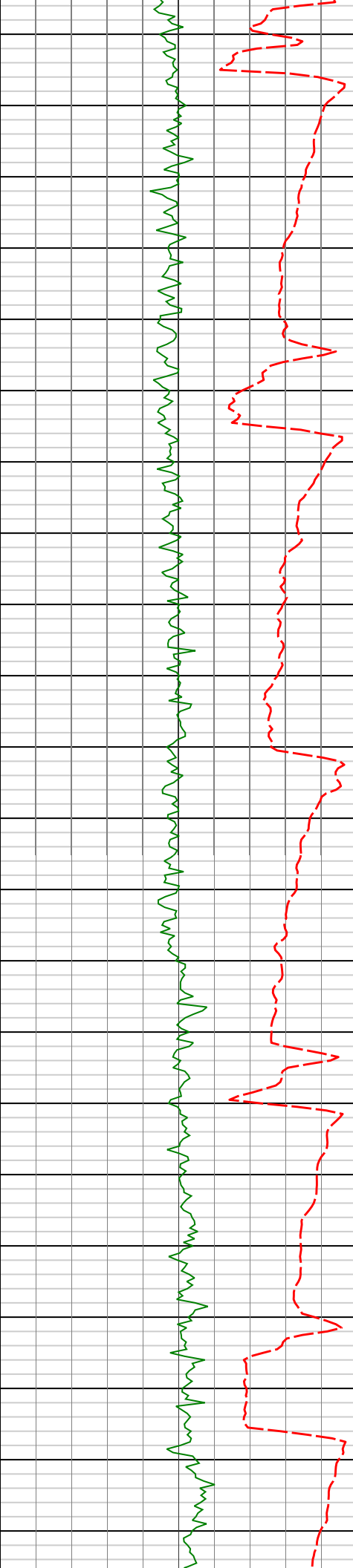
6281'

12.19°

1.78°

6263.13'

237.91'



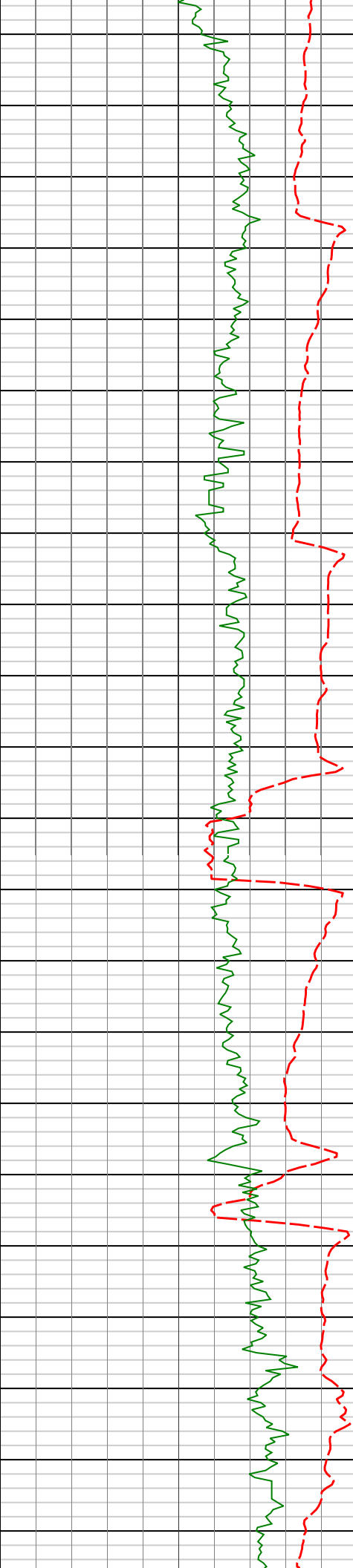
6350'

6400'

6450'

6500'

6329'	14.95°	8.92°	6309.79'	249.08'
6376'	18.01°	7.19°	6354.85'	262.27'
6424'	22.24°	8.90°	6399.91'	278.59'
6471'	26.62°	10.53°	6442.69'	297.71'
6519'	27.87°	5.29°	6485.37'	319.43'



6550'

6566'

32.02°

2.20°

6526.09'

342.82'

6600'

6650'

6661'

40.68°

357.22°

6602.55'

399.03'

6700'

6709'

44.81°

356.72°

6637.79'

431.57'

6750'

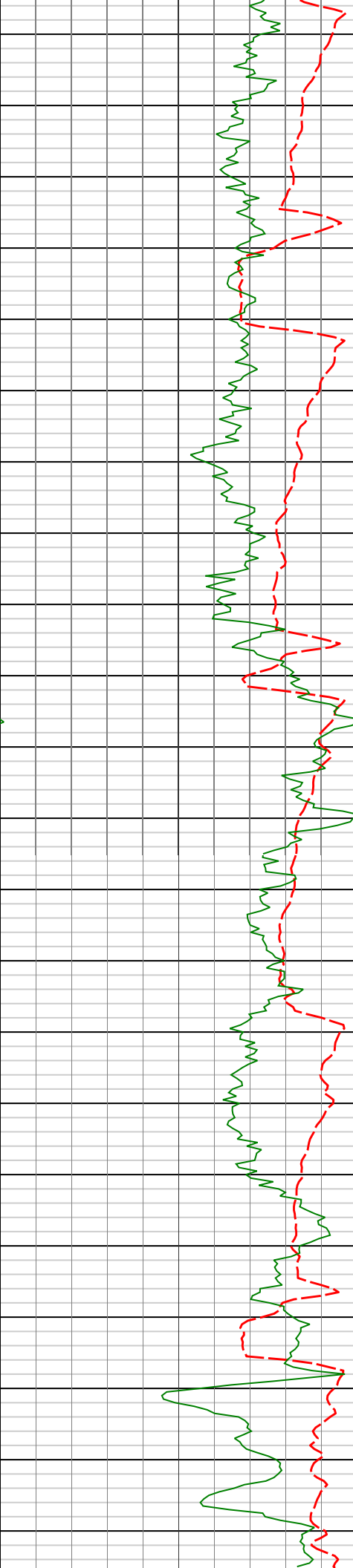
6756'

48.01°

358.04°

6670.19'

465.59'



6800'

6804'

51.58°

359.22°

6701.18'

502.23'

6850'

6850'

56.42°

358.90°

6728.21'

539.44'

6900'

6898'

61.52°

358.62°

6752.94'

580.55'

6950'

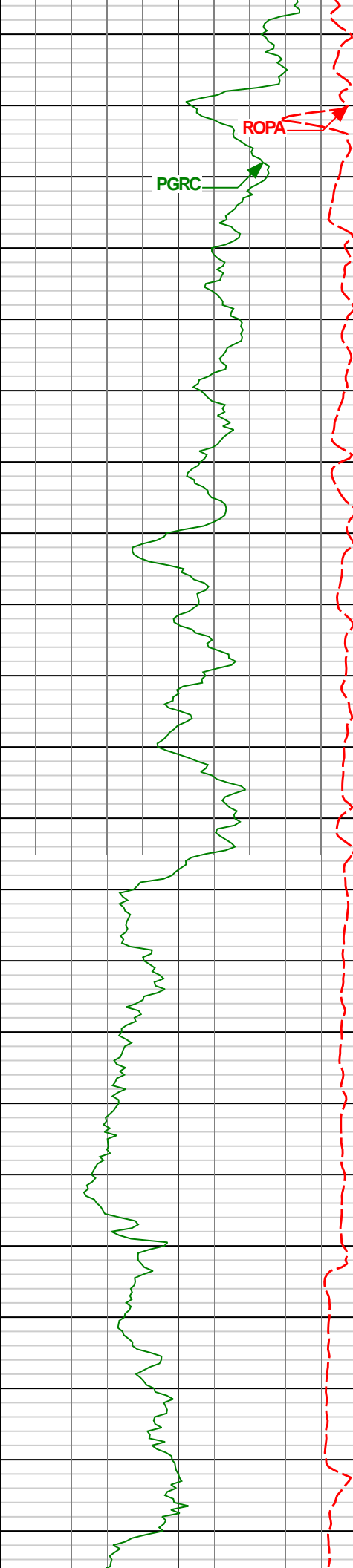
6945'

65.52°

358.82°

6773.89'

622.61'



7000'

ROPA

PGRC

7040'

71.51°

357.88°

6808.67'

710.95'

7050'

7100'

7102'

76.63°

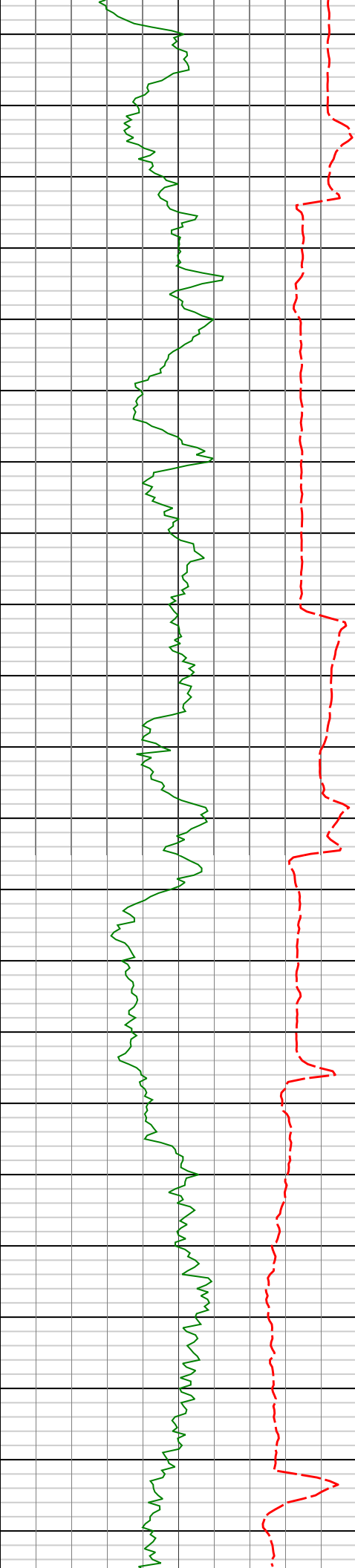
359.37°

6825.68'

770.54'

7150'

7200'



7232'

86.55°

3.18°

6844.68'

898.89'

7250'

7300'

7350'

7353'

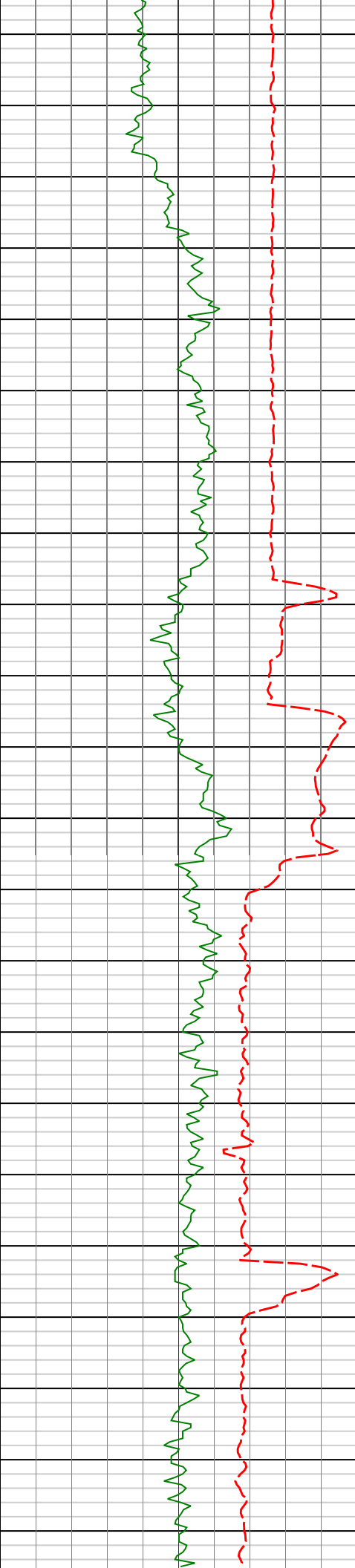
91.85°

1.43°

6846.37'

1019.69'

7400'



7450'

7448'

92.43°

1.67°

6842.82'

1114.56'

7500'

7543'

89.91°

359.86°

6840.88'

1209.50'

7550'

7600'

7638'

90.12°

0.03°

6840.86'

1304.50'



7650'

7700'

7750'

7800'

7850'

7733'

90.03°

358.60°

6840.73'

1399.50'

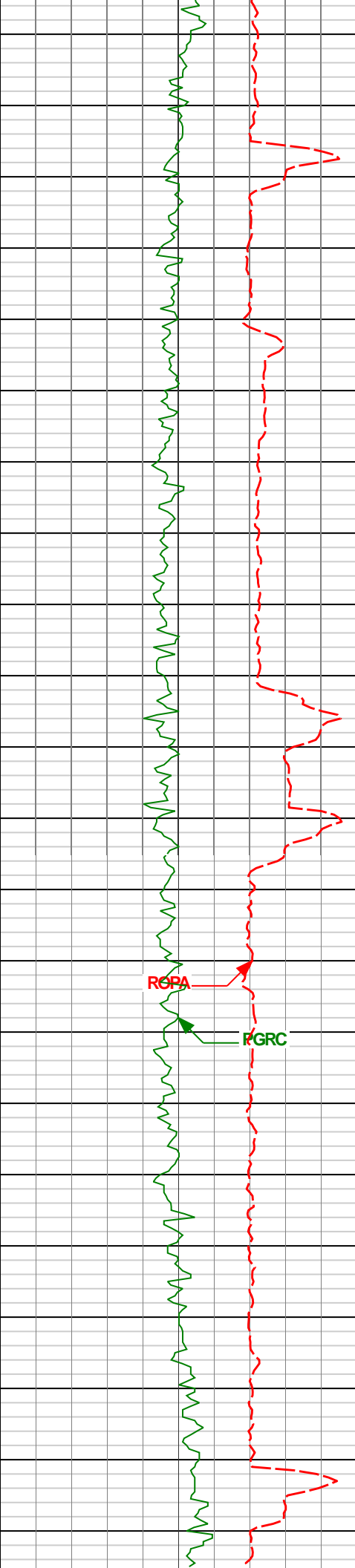
7826'

89.57°

357.39°

6841.06'

1492.46'



7900'

7920'

89.75°

357.84°

6841.62'

1586.41'

7950'

8000'

RORA

RGRC

8013'

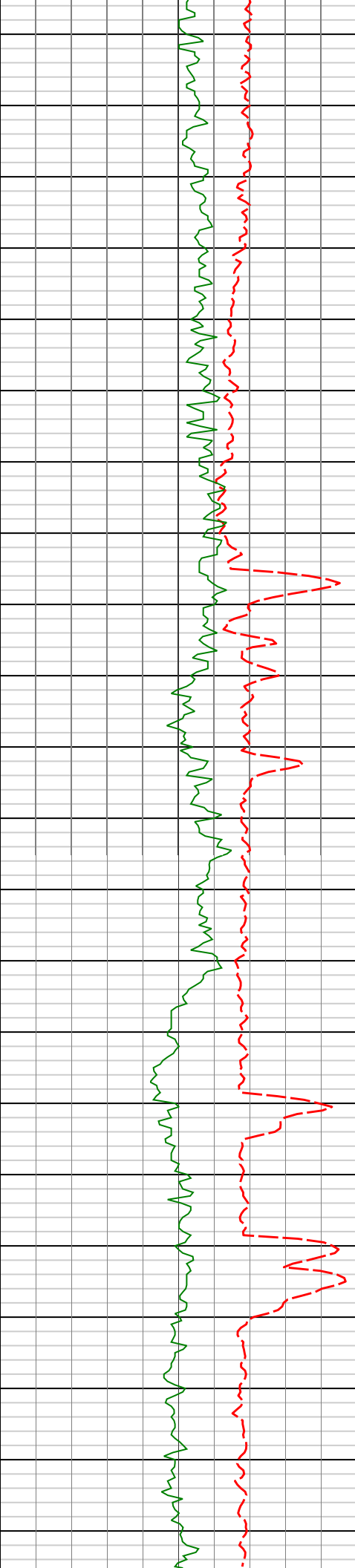
90.34°

358.26°

6841.54'

1679.38'

8050'



8100'

8106'

90.40°

358.58°

6840.94'

1772.36'

8150'

8200'

8198'

89.97°

357.98°

6840.65'

1864.34'

8250'

8300'

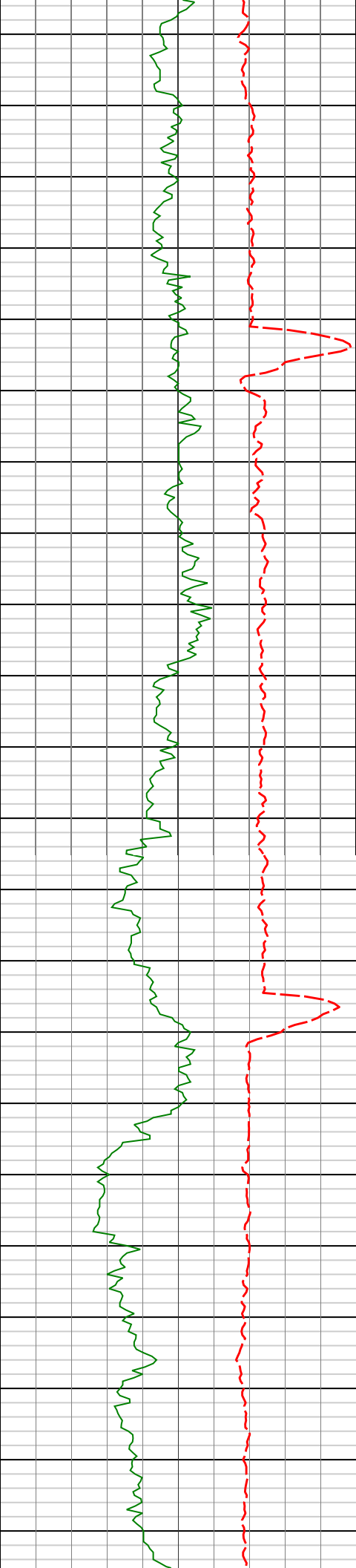
8291'

90.40°

357.59°

6840.35'

1957.30'



8350'

8400'

8450'

8500'

8384'

90.28°

357.72°

6839.79'

2050.25'

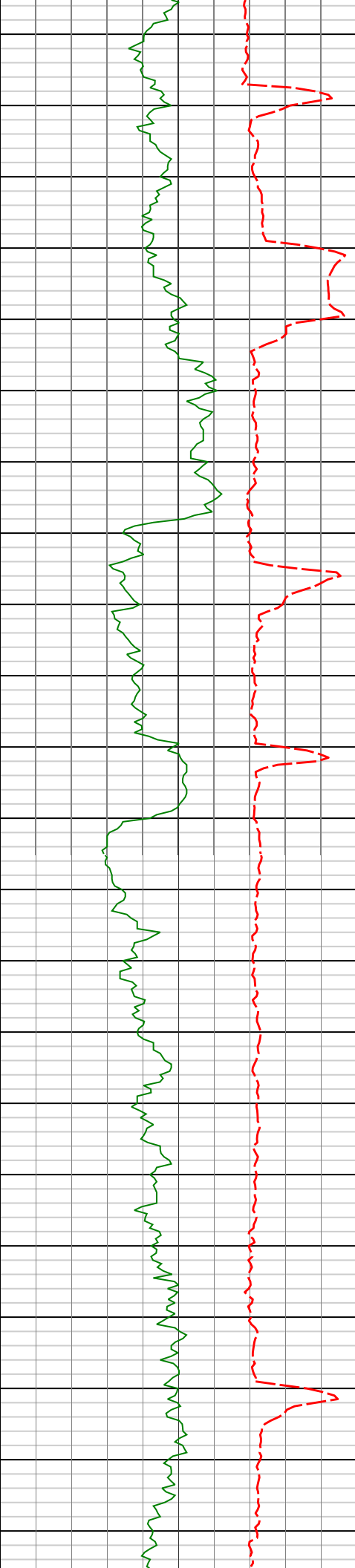
8476'

90.65°

357.23°

6839.05'

2142.19'



8550'

8567'

89.97°

357.95°

6838.55'

2233.13'

8600'

8650'

8659'

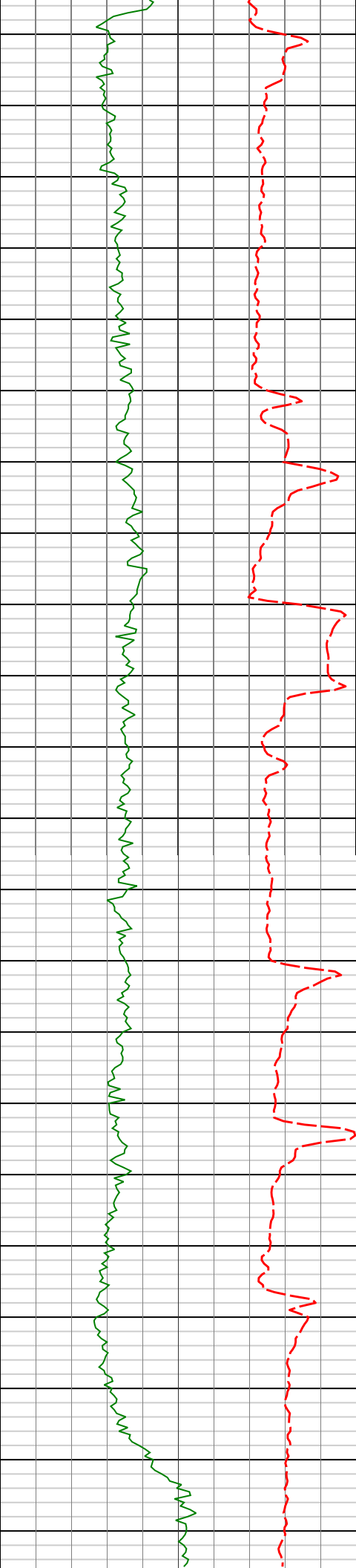
90.15°

358.32°

6838.46'

2325.11'

8700'



8750'

8800'

8850'

8900'

8950'

8751'

8844'

8936'

89.82°

89.20°

89.91°

357.48°

358.10°

357.31°

6838.48'

6839.28'

6839.99'

2417.07'

2510.02'

2601.97'



ROPA

PGRC

9000'

9030'

89.32°

359.10°

6840.62'

2695.94'

9050'

9100'

9123'

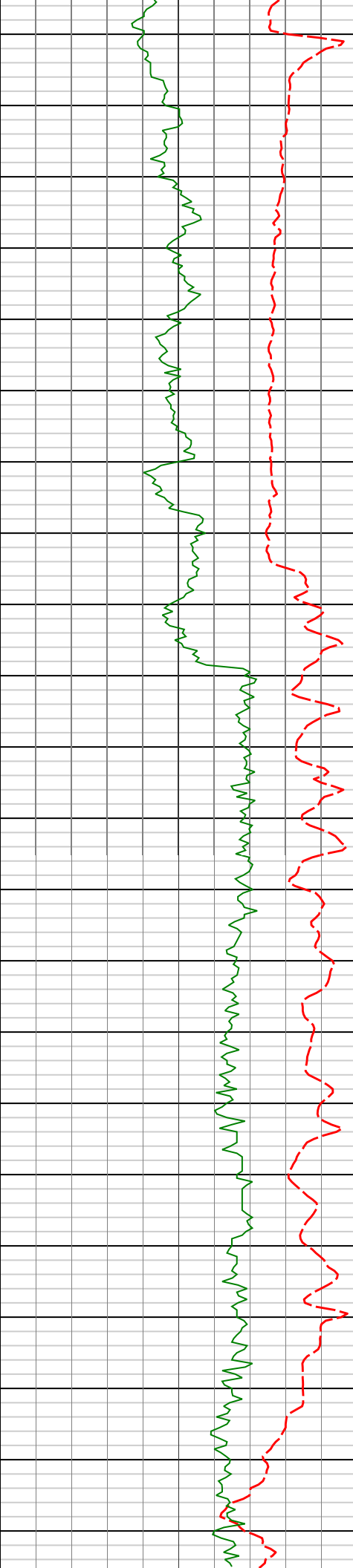
89.29°

359.20°

6841.75'

2788.94'

9150'



9200'

9250'

9300'

9350'

9400'

9216'

89.45°

359.03°

6842.77'

2881.93'

9309'

89.41°

358.74°

6843.70'

2974.92'

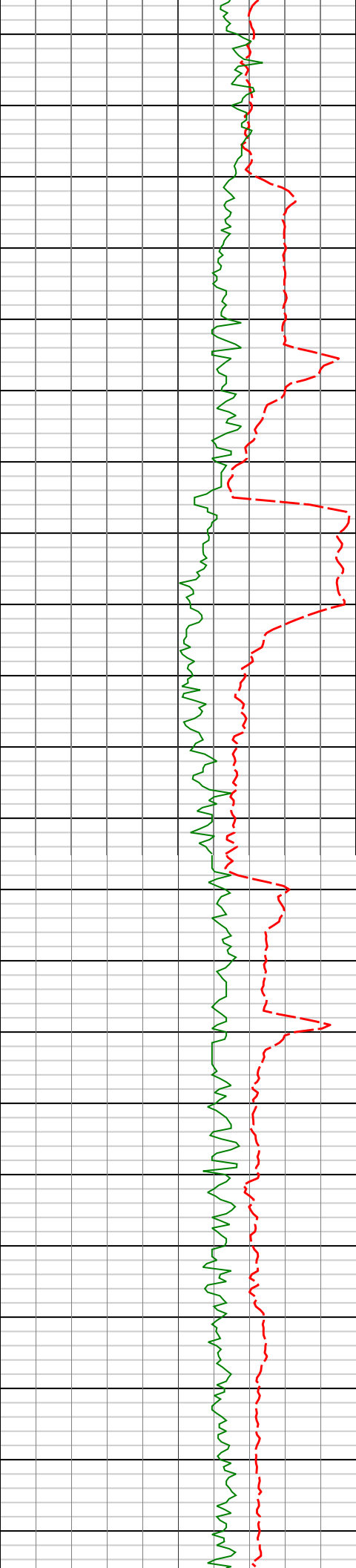
9401'

89.45°

358.53°

6844.62'

3066.90'



9450'

9493'

90.25°

359.33°

6844.86'

3158.90'

9500'

9550'

9585'

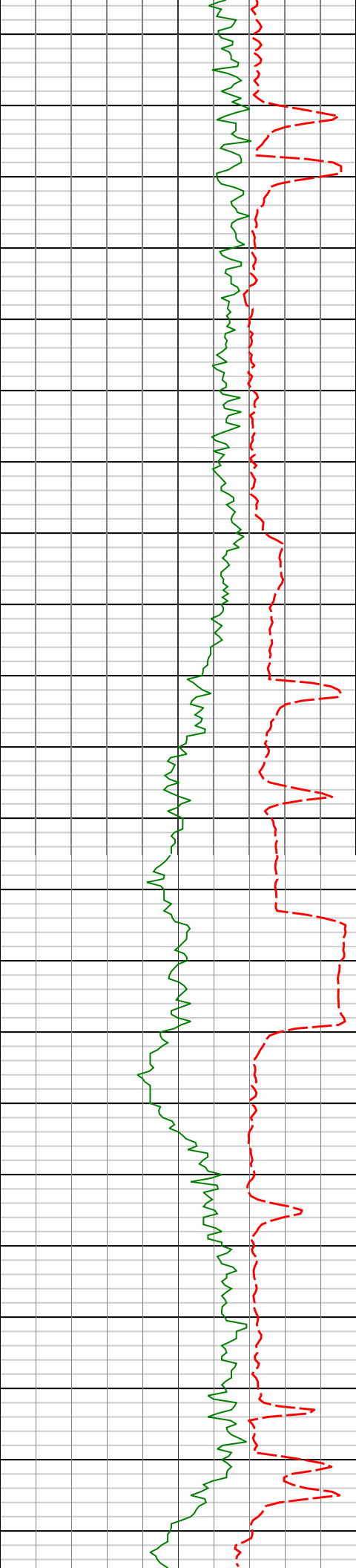
90.43°

359.56°

6844.31'

3250.89'

9600'



9650'

9680'

91.08°

0.00°

6843.06'

3345.88'

9700'

9750'

9775'

89.44°

359.75°

6842.63'

3440.88'

9800'



9850'

9870'

88.49°

359.44°

6844.34'

3535.86'

9900'

9950'

9965'

88.98°

358.99°

6846.44'

3630.84'

10000'

ROPA

PGRC

10050'

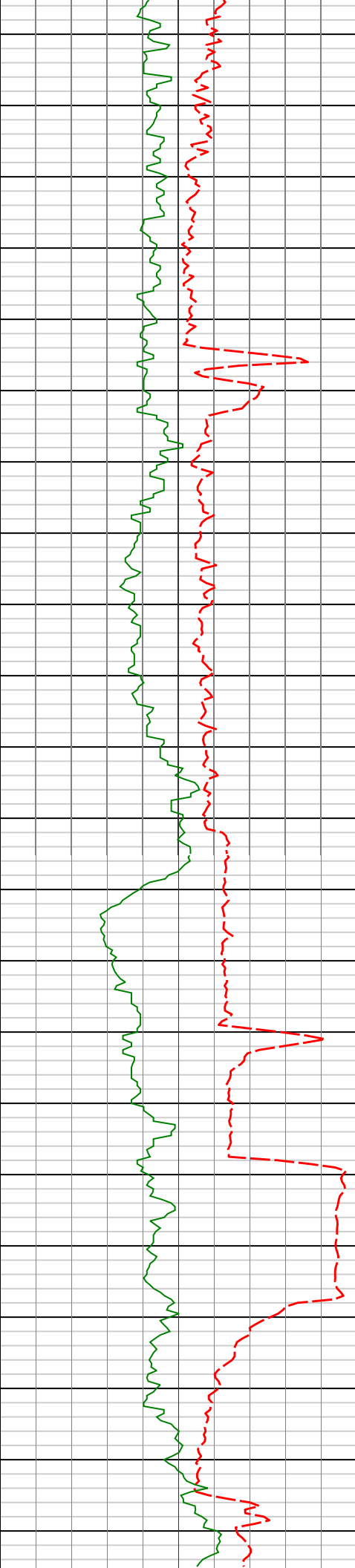
10059'

90.28°

359.21°

6847.05'

3724.83'



10100'

10150'

10200'

10250'

10154'

93.11°

359.66°

6844.24'

3819.78'

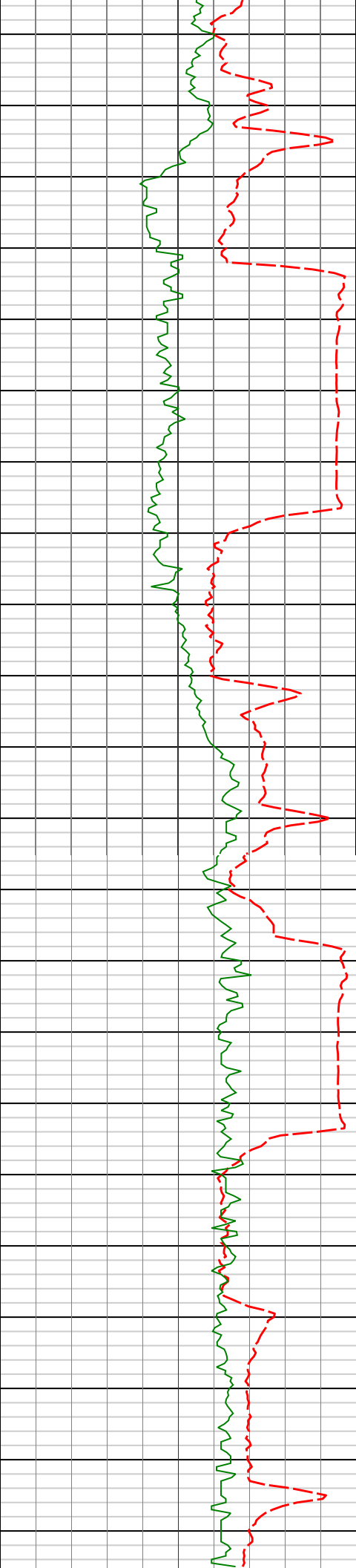
10249'

93.21°

0.13°

6839.00'

3914.63'



10300'

10344'

91.91°

359.91°

6834.76'

4009.53'

10350'

10400'

10439'

90.49°

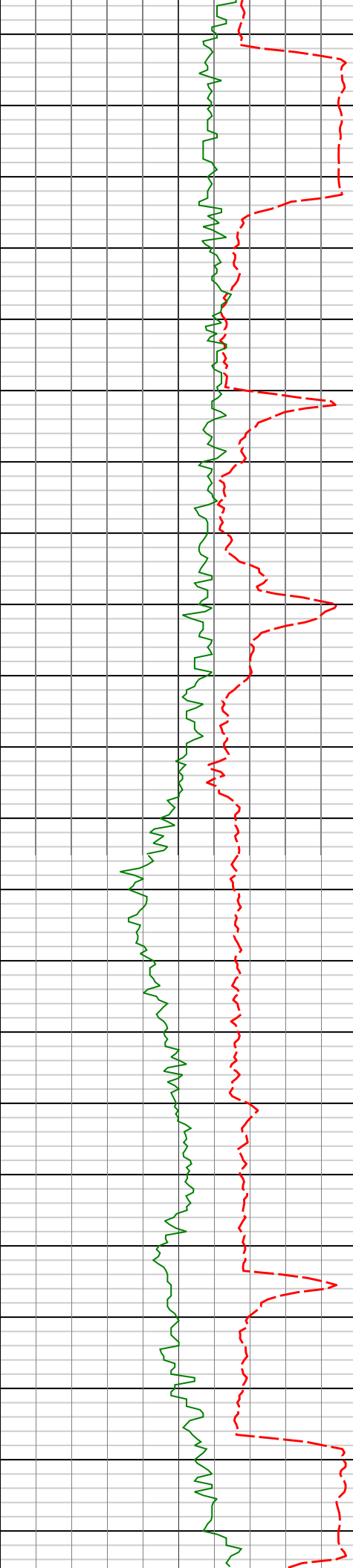
0.70°

6832.77'

4104.50'

10450'

10500'



10534'	89.23°	0.88°	6833.00'	4199.47'
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10550'

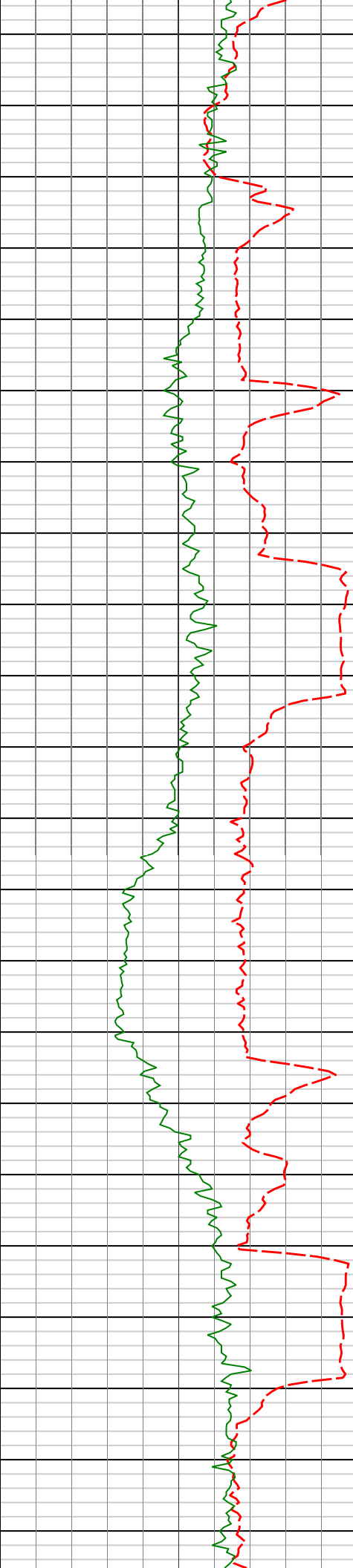
10600'

10628'	90.22°	0.85°	6833.45'	4293.44'
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10650'

10700'

10724'	90.34°	0.56°	6832.98'	4389.42'
--------	--------	-------	----------	----------



10750'

10800'

10850'

10900'

10818'

89.81°

0.12°

6832.86'

4483.41'

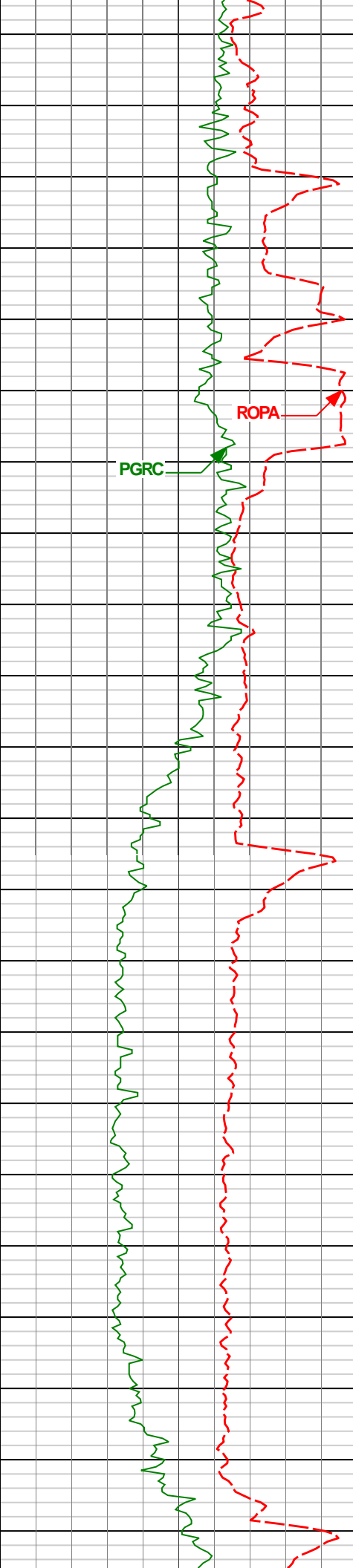
10913'

89.14°

359.88°

6833.73'

4578.40'



10950'

11000'

11050'

11100'

11150'

PGRC

ROPA

11008'

89.04°

359.65°

6835.24'

4673.39'

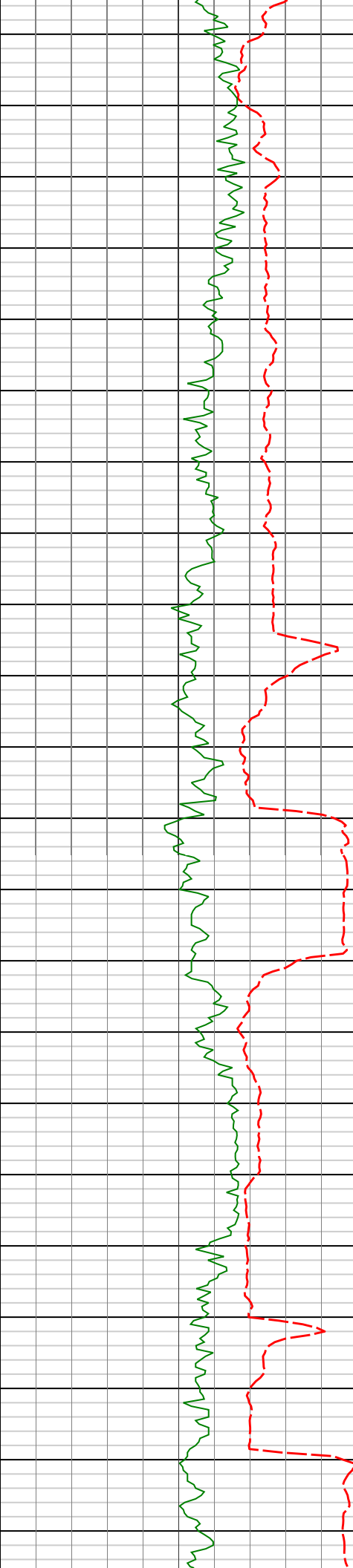
11103'

88.74°

359.04°

6837.08'

4768.37'



11200'

11250'

11300'

11350'

11198'

90.31°

358.42°

6837.87'

4863.35'

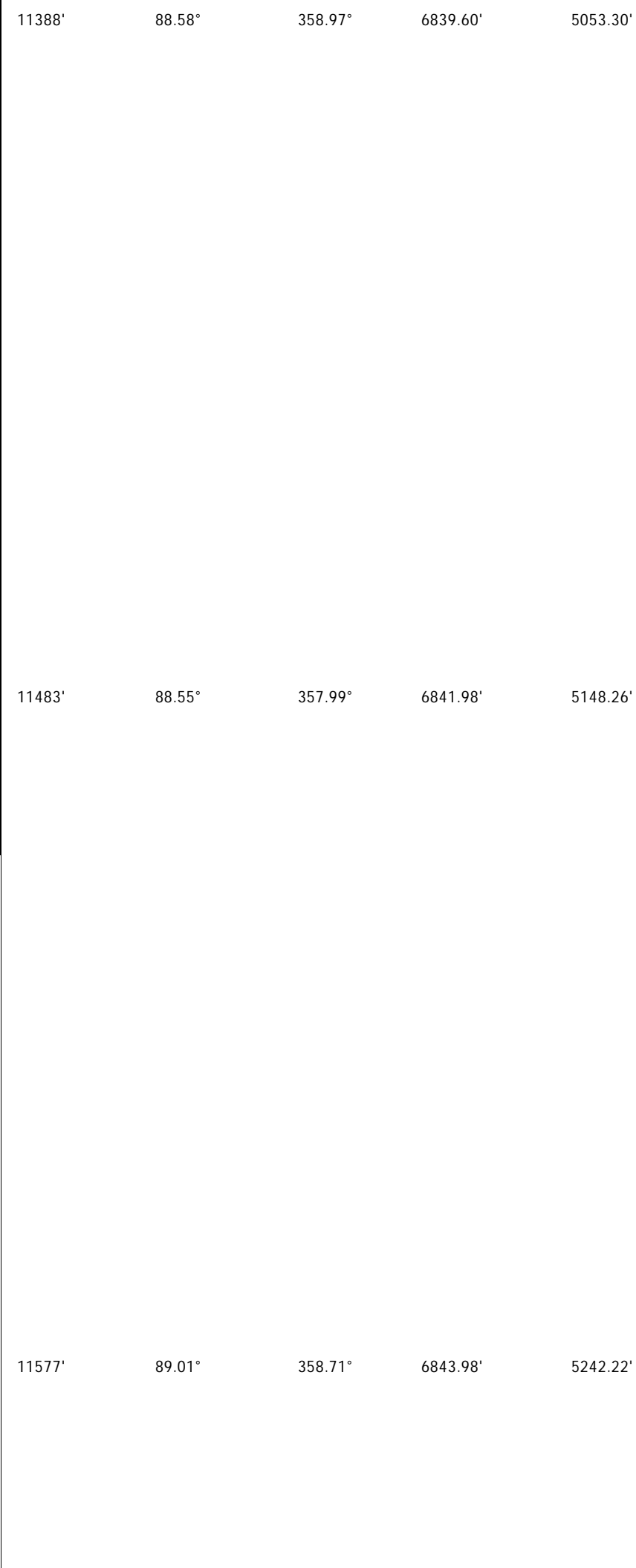
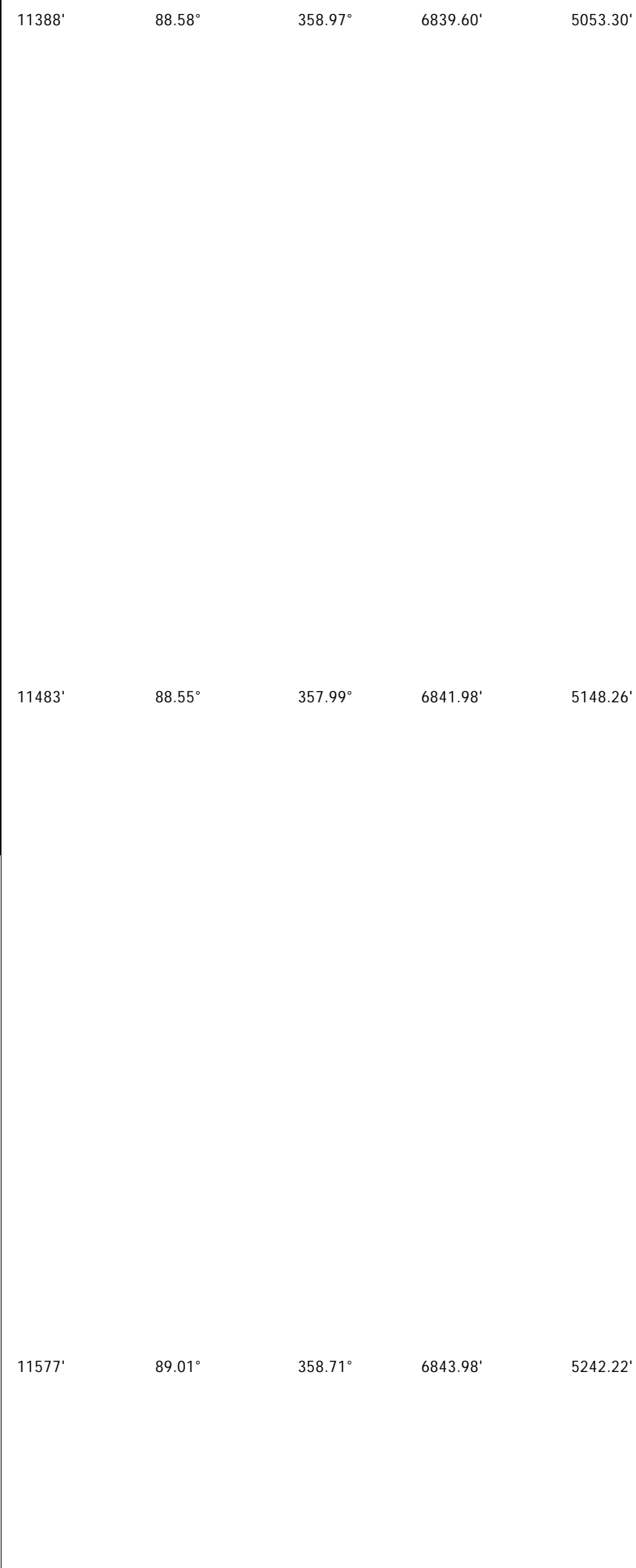
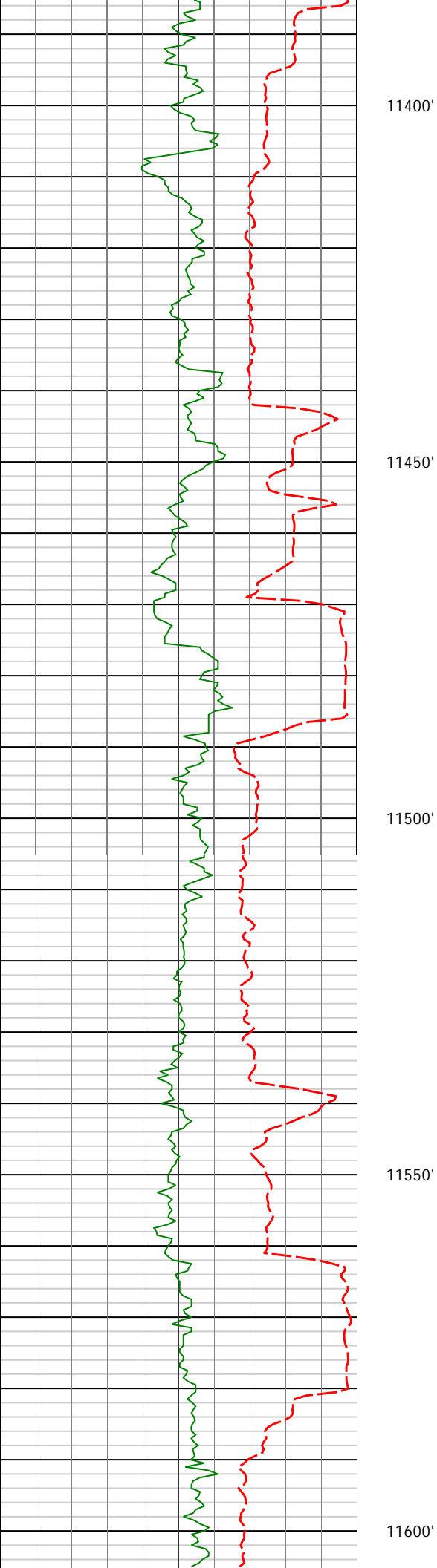
11293'

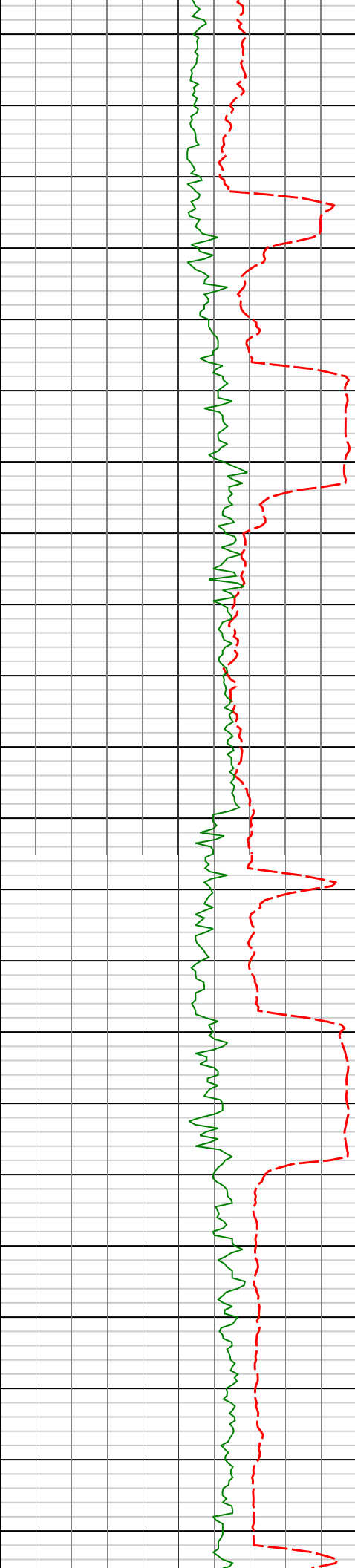
89.51°

358.15°

6838.02'

4958.33'





11650'

11672'

90.89°

359.09°

6844.06'

5337.21'

11700'

11750'

11767'

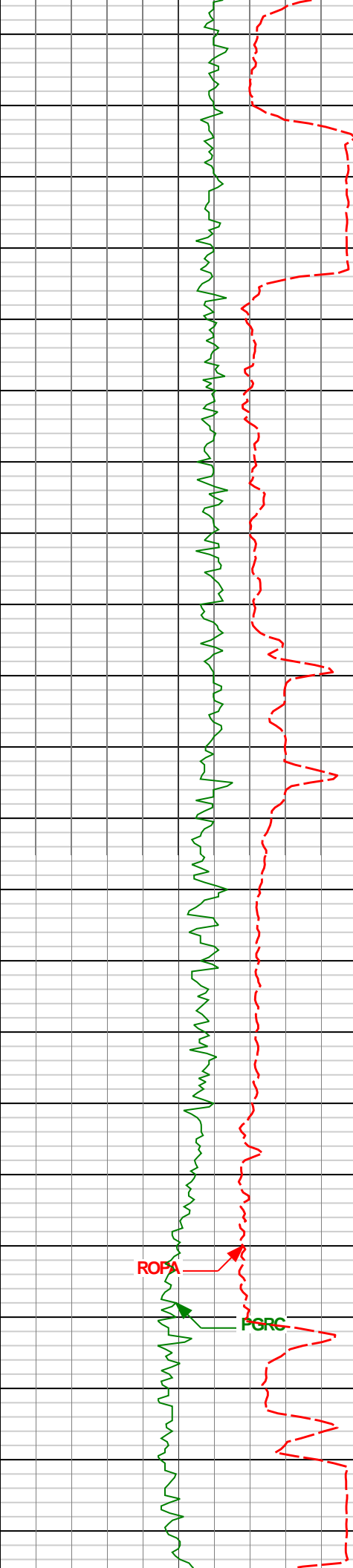
90.96°

359.68°

6842.53'

5432.19'

11800'



11850'

11862'

89.66°

0.04°

6842.02'

5527.19'

11900'

11950'

11957'

90.18°

358.63°

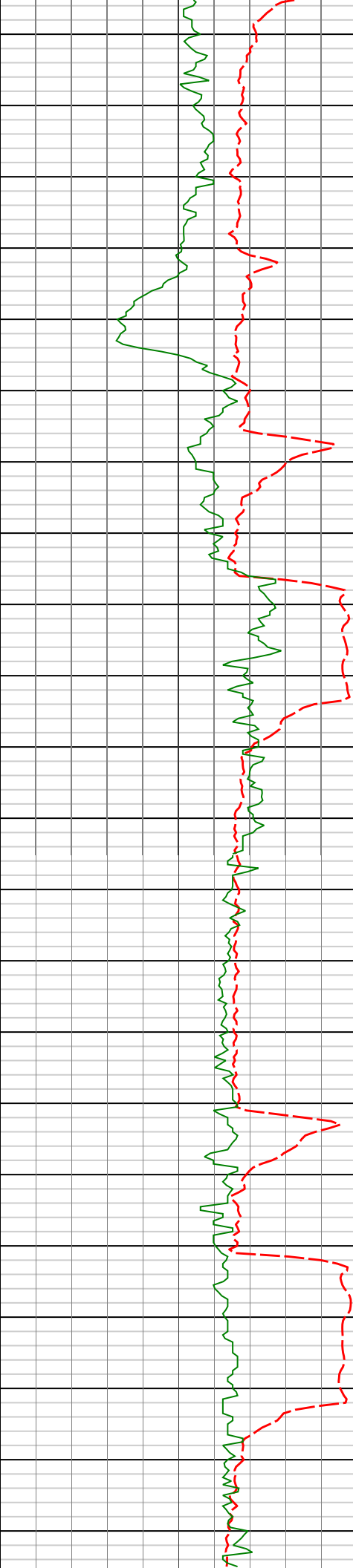
6842.15'

5622.19'

12000'

ROPA

PORC



12050'

12100'

12150'

12200'

12250'

12052'

12147'

12242'

90.62°

91.45°

90.37°

359.35°

0.16°

0.66°

6841.48'

6839.77'

6838.26'

5717.18'

5812.16'

5907.13'



12300'

12337'

90.06°

359.75°

6837.90'

6002.13'

12350'

12400'

12431'

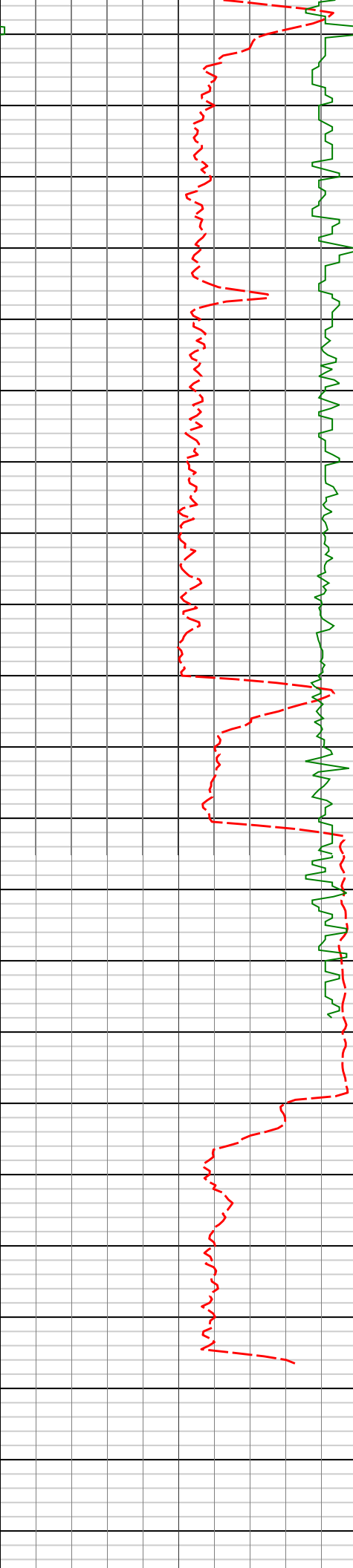
89.69°

359.70°

6838.11'

6096.12'

12450'



12500'

12526'

89.04°

357.09°

6839.16'

6191.09'

12550'

12600'

12621'

88.39°

357.00°

6841.29'

6285.98'

12650'

12678'

88.39°

357.00°

6842.89'

6342.90'

12700'

Avg Rate of Penetration (ROPA) ----- feet per hr										Depth MD ft.										Depth Inc. Azi. TVD V.S.									
Gamma Ray BCorr (PGRC) ----- api																													

HALLIBURTON

DIRECTIONAL SURVEY REPORT

**Noble Energy
Oscar Y10-74HN
Wattenberg
Weld Colorado
USA
CA-XX-0901675820**

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
733.00	0.60	215.20	732.99	1.39 S	2.26 W	-1.37	0.21
984.00	0.40	141.01	983.98	3.14 S	2.47 W	-3.12	0.25
1293.00	0.81	179.70	1292.97	6.17 S	1.78 W	-6.15	0.18
1386.00	0.81	174.42	1385.96	7.48 S	1.71 W	-7.46	0.08
1478.00	0.81	174.09	1477.95	8.77 S	1.58 W	-8.76	0.01
1570.00	0.90	170.35	1569.94	10.13 S	1.39 W	-10.12	0.12
1663.00	1.07	162.38	1662.93	11.68 S	1.01 W	-11.67	0.23
1755.00	1.10	163.81	1754.91	13.35 S	0.50 W	-13.34	0.04
1847.00	2.22	89.32	1846.88	14.17 S	1.53 E	-14.19	2.39
1938.00	3.06	55.90	1937.79	12.79 S	5.30 E	-12.84	1.89
2031.00	4.06	36.23	2030.61	8.74 S	9.30 E	-8.82	1.68
2123.00	6.11	12.63	2122.25	1.34 S	12.30 E	-1.44	3.14
2216.00	7.89	8.81	2214.55	9.80 N	14.36 E	9.68	1.98
2309.00	8.39	1.76	2306.62	22.89 N	15.54 E	22.76	1.20
2402.00	8.87	2.24	2398.57	36.84 N	16.03 E	36.70	0.52
2495.00	9.10	5.42	2490.43	51.32 N	17.01 E	51.17	0.59
2589.00	8.78	355.76	2583.29	65.88 N	17.18 E	65.73	1.63
2681.00	8.75	356.50	2674.21	79.87 N	16.23 E	79.72	0.13
2773.00	8.40	1.27	2765.19	93.57 N	15.96 E	93.43	0.86
2865.00	9.20	359.46	2856.10	107.64 N	16.04 E	107.50	0.92
2960.00	9.39	357.34	2949.86	122.98 N	15.60 E	122.84	0.41
3055.00	9.26	1.86	3043.60	138.36 N	15.49 E	138.22	0.78
3150.00	8.57	358.56	3137.45	153.07 N	15.56 E	152.93	0.90
3245.00	8.59	5.91	3231.39	167.21 N	16.12 E	167.06	1.15
3340.00	7.28	3.50	3325.48	180.27 N	17.21 E	180.12	1.42
3435.00	6.38	359.91	3419.81	191.56 N	17.57 E	191.40	1.05
3530.00	5.33	352.04	3514.31	201.21 N	16.95 E	201.05	1.39
3624.00	4.52	344.44	3607.97	209.10 N	15.35 E	208.96	1.10
3719.00	3.46	347.82	3702.73	215.51 N	13.75 E	215.38	1.14
3814.00	2.44	339.98	3797.61	220.21 N	12.45 E	220.09	1.15
3909.00	1.94	329.32	3892.54	223.49 N	10.94 E	223.39	0.68
4004.00	1.60	298.75	3987.49	225.52 N	8.95 E	225.43	1.04
4099.00	1.46	320.55	4082.46	227.09 N	7.02 E	227.02	0.63
4194.00	0.52	347.25	4177.45	228.44 N	6.16 E	228.38	1.08
4289.00	0.95	259.97	4272.44	228.73 N	5.29 E	228.67	1.12
4383.00	0.99	113.01	4366.44	228.27 N	5.27 E	228.22	1.98
4478.00	0.92	132.89	4461.42	227.43 N	6.58 E	227.37	0.35
4573.00	0.50	162.08	4556.42	226.52 N	7.27 E	226.45	0.57
4668.00	0.88	179.25	4651.41	225.40 N	7.40 E	225.32	0.45

4763.00	0.34	139.69	4746.40	224.45 N	7.60 E	224.38	0.69
4858.00	0.31	188.49	4841.40	223.98 N	7.74 E	223.91	0.28
4953.00	0.72	190.54	4936.40	223.14 N	7.59 E	223.07	0.43
5048.00	0.91	172.35	5031.39	221.81 N	7.58 E	221.73	0.34
5143.00	0.84	159.49	5126.38	220.41 N	7.93 E	220.33	0.22
5238.00	0.61	143.92	5221.37	219.35 N	8.47 E	219.26	0.32
5333.00	0.74	95.65	5316.36	218.88 N	9.38 E	218.79	0.59
5428.00	0.98	96.54	5411.35	218.72 N	10.80 E	218.62	0.25
5522.00	0.98	103.79	5505.34	218.44 N	12.38 E	218.32	0.13
5617.00	0.83	95.38	5600.33	218.18 N	13.85 E	218.05	0.21
5712.00	0.85	85.36	5695.32	218.18 N	15.24 E	218.03	0.16
5807.00	0.37	46.44	5790.31	218.44 N	16.16 E	218.29	0.64
5902.00	0.20	11.82	5885.31	218.82 N	16.42 E	218.67	0.25
5997.00	0.36	351.81	5980.31	219.27 N	16.41 E	219.12	0.19
6091.00	0.47	317.90	6074.31	219.85 N	16.11 E	219.70	0.28
6234.00	7.76	355.06	6216.85	229.92 N	14.88 E	229.78	5.17
6281.00	12.19	1.78	6263.13	238.05 N	14.76 E	237.91	9.73
6329.00	14.95	8.92	6309.79	249.23 N	15.88 E	249.08	6.72
6376.00	18.01	7.19	6354.85	262.43 N	17.73 E	262.27	6.59
6424.00	22.24	8.90	6399.91	278.78 N	20.07 E	278.59	8.90
6471.00	26.62	10.53	6442.69	297.93 N	23.37 E	297.71	9.43
6519.00	27.87	5.29	6485.37	319.67 N	26.37 E	319.43	5.63
6566.00	32.02	2.20	6526.09	343.07 N	27.86 E	342.82	9.42
6661.00	40.68	357.22	6602.55	399.29 N	27.32 E	399.03	9.62
6709.00	44.81	356.72	6637.79	431.81 N	25.60 E	431.57	8.63
6756.00	48.01	358.04	6670.19	465.81 N	24.05 E	465.59	7.11
6804.00	51.58	359.22	6701.18	502.46 N	23.18 E	502.23	7.67
6850.00	56.42	358.90	6728.21	539.65 N	22.57 E	539.44	10.54
6898.00	61.52	358.62	6752.94	580.76 N	21.68 E	580.55	10.64
6945.00	65.52	358.82	6773.89	622.81 N	20.74 E	622.61	8.52
7040.00	71.51	357.88	6808.67	711.13 N	18.18 E	710.95	6.37
7102.00	76.63	359.37	6825.68	770.71 N	16.76 E	770.54	8.58
7232.00	86.55	3.18	6844.68	899.10 N	19.67 E	898.89	8.16
7353.00	91.85	1.43	6846.37	1019.94 N	24.54 E	1019.69	4.61
7448.00	92.43	1.67	6842.82	1114.84 N	27.10 E	1114.56	0.66
7543.00	89.91	359.86	6840.88	1209.80 N	28.37 E	1209.50	3.27
7638.00	90.12	0.03	6840.86	1304.80 N	28.28 E	1304.50	0.28
7733.00	90.03	358.60	6840.73	1399.79 N	27.14 E	1399.50	1.51
7826.00	89.57	357.39	6841.06	1492.73 N	23.89 E	1492.46	1.39
7920.00	89.75	357.84	6841.62	1586.64 N	19.98 E	1586.41	0.52
8013.00	90.34	358.26	6841.54	1679.59 N	16.81 E	1679.38	0.78
8106.00	90.40	358.58	6840.94	1772.55 N	14.25 E	1772.36	0.35
8198.00	89.97	357.98	6840.65	1864.51 N	11.49 E	1864.34	0.80
8291.00	90.40	357.59	6840.35	1957.44 N	7.89 E	1957.30	0.62
8384.00	90.28	357.72	6839.79	2050.36 N	4.09 E	2050.25	0.19
8476.00	90.65	357.23	6839.05	2142.27 N	0.04 E	2142.19	0.67
8567.00	89.97	357.95	6838.55	2233.18 N	3.79 W	2233.13	1.09
8659.00	90.15	358.32	6838.46	2325.14 N	6.79 W	2325.11	0.45
8751.00	89.82	357.48	6838.48	2417.07 N	10.16 W	2417.07	0.98
8844.00	89.20	358.10	6839.28	2510.00 N	13.74 W	2510.02	0.94
8936.00	89.91	357.31	6839.99	2601.92 N	17.43 W	2601.97	1.15
9030.00	89.32	359.10	6840.62	2695.87 N	20.37 W	2695.94	2.00
9123.00	89.29	359.20	6841.75	2788.85 N	21.75 W	2788.94	0.11
9216.00	89.45	359.03	6842.77	2881.84 N	23.19 W	2881.93	0.25
9309.00	89.41	358.74	6843.70	2974.81 N	25.00 W	2974.92	0.31
9401.00	89.45	358.53	6844.62	3066.78 N	27.19 W	3066.90	0.23
9493.00	90.25	359.33	6844.86	3158.76 N	28.91 W	3158.90	1.23
9585.00	90.43	359.56	6844.31	3250.76 N	29.80 W	3250.89	0.32
9680.00	91.08	0.00	6843.06	3345.75 N	30.16 W	3345.88	0.83
9775.00	89.44	359.75	6842.63	3440.74 N	30.37 W	3440.88	1.75
9870.00	88.49	359.44	6844.34	3535.73 N	31.04 W	3535.86	1.05
9965.00	88.98	358.99	6846.44	3630.69 N	32.34 W	3630.84	0.70
10059.00	90.28	359.21	6847.05	3724.68 N	33.82 W	3724.83	1.40
10154.00	93.11	359.66	6844.24	3819.62 N	34.76 W	3819.78	3.02
10249.00	93.21	0.13	6839.00	3914.48 N	34.93 W	3914.63	0.51
10344.00	91.91	359.91	6834.76	4009.38 N	34.90 W	4009.53	1.39
10439.00	90.49	0.70	6832.77	4104.35 N	34.39 W	4104.50	1.71
10534.00	89.23	0.88	6833.00	4199.34 N	33.08 W	4199.47	1.34
10628.00	90.22	0.85	6833.45	4293.33 N	31.66 W	4293.44	1.05
10724.00	90.34	0.56	6832.98	4389.32 N	30.48 W	4389.42	0.33
10818.00	89.81	0.12	6832.86	4483.32 N	29.92 W	4483.41	0.73
10913.00	89.14	359.88	6833.73	4578.31 N	29.92 W	4578.40	0.75
11008.00	89.04	359.65	6835.24	4673.32 N	29.34 W	4673.39	0.26

11008.00	89.04	359.65	6835.24	4873.30 N	30.31 W	4873.39	0.26
11103.00	88.74	359.04	6837.08	4768.28 N	31.40 W	4768.37	0.72
11198.00	90.31	358.42	6837.87	4863.25 N	33.50 W	4863.35	1.78
11293.00	89.51	358.15	6838.02	4958.20 N	36.35 W	4958.33	0.89
11388.00	88.58	358.97	6839.60	5053.16 N	38.73 W	5053.30	1.31
11483.00	88.55	357.99	6841.98	5148.09 N	41.25 W	5148.26	1.03
11577.00	89.01	358.71	6843.98	5242.03 N	43.96 W	5242.22	0.91
11672.00	90.89	359.09	6844.06	5337.01 N	45.78 W	5337.21	2.02
11767.00	90.96	359.68	6842.53	5431.99 N	46.80 W	5432.19	0.63
11862.00	89.66	0.04	6842.02	5526.99 N	47.04 W	5527.19	1.42
11957.00	90.18	358.63	6842.15	5621.98 N	48.14 W	5622.19	1.58
12052.00	90.62	359.35	6841.48	5716.96 N	49.81 W	5717.18	0.89
12147.00	91.45	0.16	6839.77	5811.94 N	50.22 W	5812.16	1.22
12242.00	90.37	0.66	6838.26	5906.93 N	49.54 W	5907.13	1.25
12337.00	90.06	359.75	6837.90	6001.92 N	49.20 W	6002.13	1.01
12431.00	89.69	359.70	6838.11	6095.92 N	49.65 W	6096.12	0.40
12526.00	89.04	357.09	6839.16	6190.87 N	52.31 W	6191.09	2.83
12621.00	88.39	357.00	6841.29	6285.72 N	57.21 W	6285.98	0.69
12678.00	88.39	357.00	6842.89	6342.62 N	60.19 W	6342.90	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 359.50 DEGREES (GRID)
A TOTAL CORRECTION OF 7.71 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 12678.00 FEET
IS 6342.91 FEET ALONG 359.46 DEGREES (GRID)**