

## Pressure Cased Gamma (PCGK)



1 : 240

[illegible]

## WELL INFORMATION

<b>MWD Run Number</b>	100	200	300		
<b>Date run completed</b>	19-May-14	20-May-14	23-May-14		
<b>Rig Bit Number</b>	2	3	4		
<b>Bit Size (in)</b>	8.750	8.750	6.125		
<b>Tool Nominal OD (in)</b>	6.750	6.750	4.750		
<b>Log Start Depth (MD, ft)</b>	810.00	6,258.00	7,294.00		
<b>Log End Depth (MD, ft)</b>	6,258.00	7,294.00	11,368.00		
<b>Drill or Wipe</b>	Drill	Drill	Drill		
<b>Drill/Wipe Start Date and Time</b>	18-May-14 16:20	20-May-14 00:00	21-May-14 20:30		
<b>Drill/Wipe End Date and Time</b>	19-May-14 14:10	20-May-14 12:20	22-May-14 22:15		
<b>Min Inc (deg) @ Depth (MD, ft)</b>	0.14 @ 6,014.00	1.02 @ 6,259.00	83.73 @ 7,319.00		
<b>Max Inc (deg) @ Depth (MD, ft)</b>	9.58 @ 3,831.00	84.78 @ 7,294.00	91.79 @ 7,794.00		
<b>Bit TFA(in2) / Bit Type</b>	1.74 / PDC	1.74 / PDC	0.75 / PDC		
<b>Flow Rate (gpm)</b>	587.09	571.90	290.74		
<b>Max AV (fpm) / CV (fpm) @ MWD</b>	N/A	N/A	N/A		
<b>Fluid Type</b>	Polymer	Polymer	Native/Spud Mud		
<b>Density (ppg) / Viscosity (spqt)</b>	9.20 / 32.00	10.50 / 41.00	9.30 / 33.00		
<b>Filtrate CL (ppm)</b>	2,000.00	2,100.00	1,900.00		
<b>pH / API Filtrate (mptm)</b>	9.00 / 9	9.20 / 9	8.80 / 8		
<b>PV (cP) / YP (lbf2)</b>	4 / 5.00	11 / 13.00	9 / 8.00		
<b>% Solids / % Sand</b>	1.7 / 1.50	9.2 / 1.00	3.2 / 0.35		
<b>% Oil / Oil:Water Ratio</b>	N/A	N/A	N/A		
<b>Rm @ Measured Temp (degF)</b>	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		
<b>Rmc @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A		
<b>Max Tool Temp (deg F) @ 100 ft</b>	122.83 / 100 ft	170.87 / 100 ft	200.83 / 100 ft		

Max Tool Temp (degF) / Source	162.80 / PCM	170.37 / PCM	236.82 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Christopher Sorensen	Christopher Sorensen	Henry Schmeidler		
Customer Representative	Martin Suarez	Martin Suarez	Martin Suarez		

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11254959	11254959	12361802		
Insert Serial Number	11620295	11620295	11227487		
Date and Time Initialized	17-May-14 23:29	17-May-14 23:29	21-May-14 07:38		
Date and Time Read	20-May-14 19:12	20-May-14 19:06	23-May-14 07:11		
ECMB SW Version	N/A	N/A	N/A		

### Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	54.22	52.07	56.73		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11254959	11254959	12361802		
Sonde Serial Number	11297574	11297574	11145688		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	45.00	246.01	268.87		

### Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	49.22	47.07	51.75		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11254959	11254959	12361802		
Insert/Sonde Serial Number	11293380	11293380	11579802		

## REMARKS

1. All depths are measured depths, referenced from 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 (memory data) unless otherwise stated.  
- ROPA: Average Rate of Penetration is real time data.

4. The following smoothing parameters have been applied to the data:

PGRC (PCG 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 8.5.0 Build 10

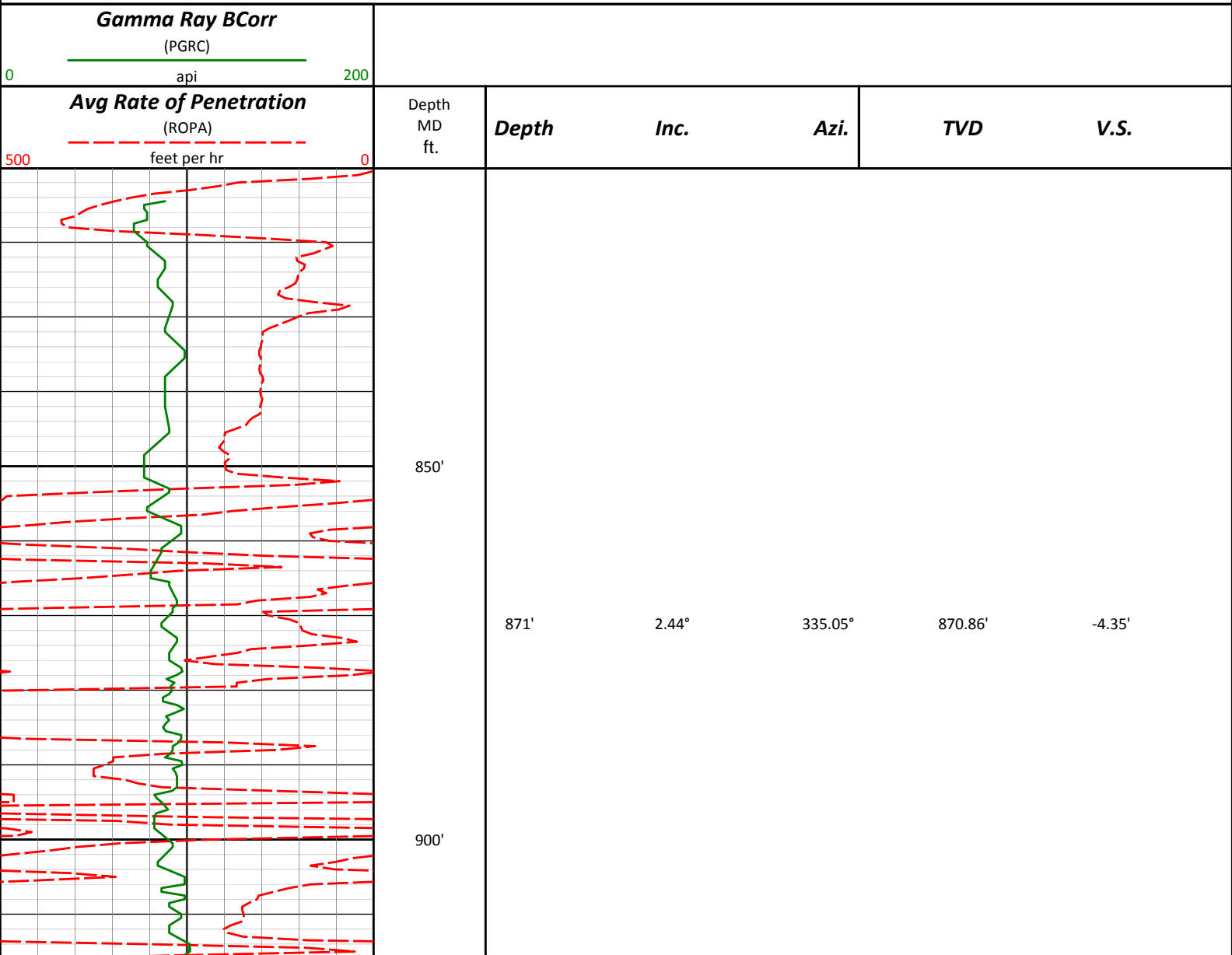
6. Gamma presented inside casing/cement from 7247 ft. MD to 7288 ft. MD

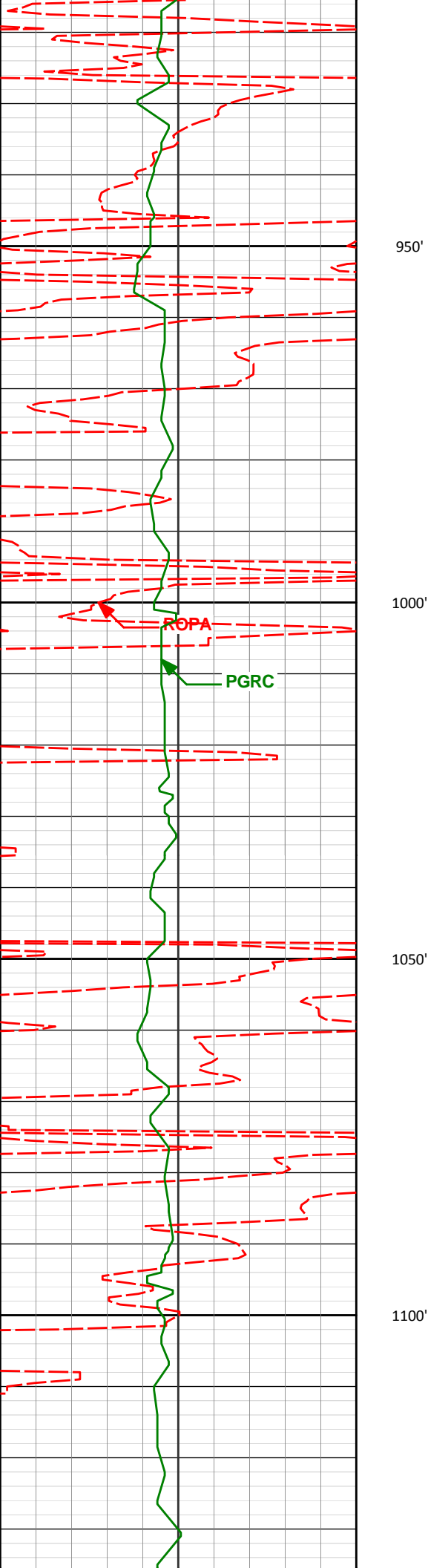
WARRANTY

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Sperry Drilling Services

MD Detail Log 1:240





993'

1.57°

10.15°

992.79'

-8.34'

1000'

ROPA

PGRC

1050'

1086'

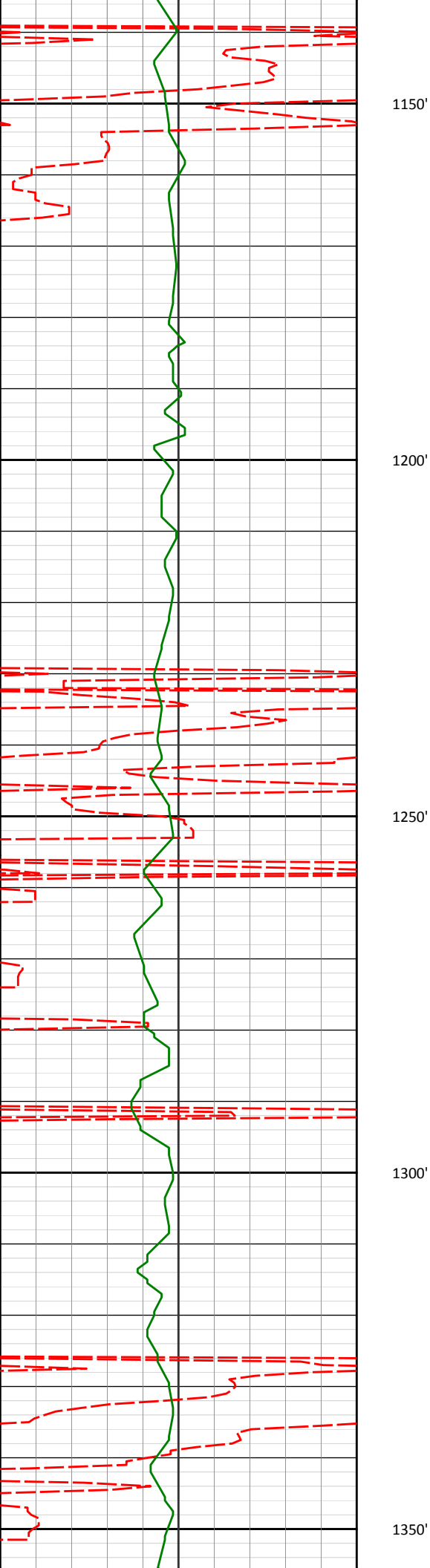
1.69°

9.21°

1085.75'

-10.96'

1100'



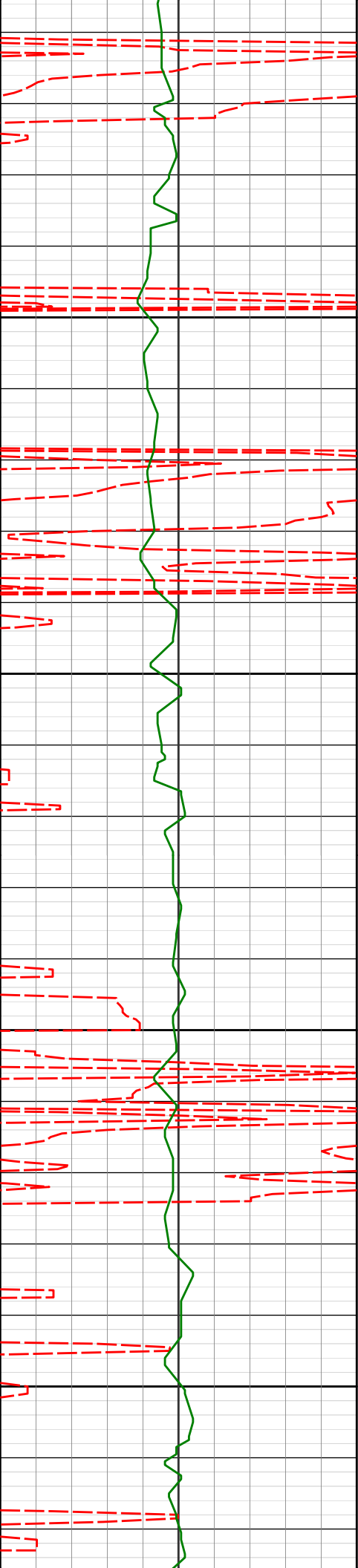
1273'

1.64°

3.10°

1272.67'

-16.37'



1400'

1450'

1500'

1550'

1457'

2.00°

13.18°

1456.58'

-22.13'

1552'

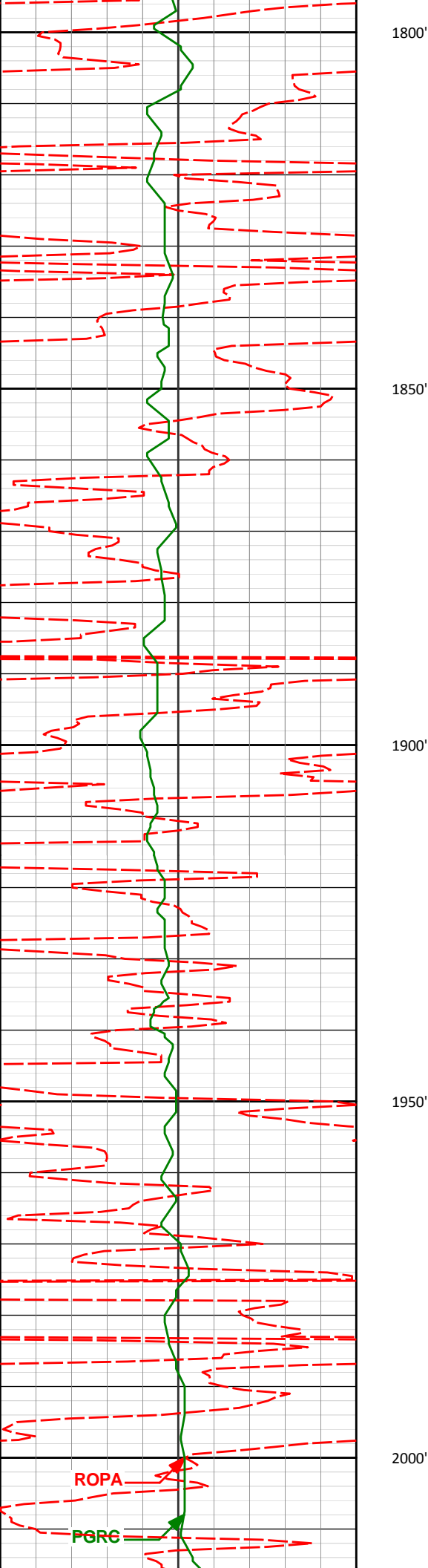
1.97°

12.40°

1551.52'

-25.35'





1837'

0.70°

152.10°

1836.45'

-29.16'

1932'

1.02°

165.89°

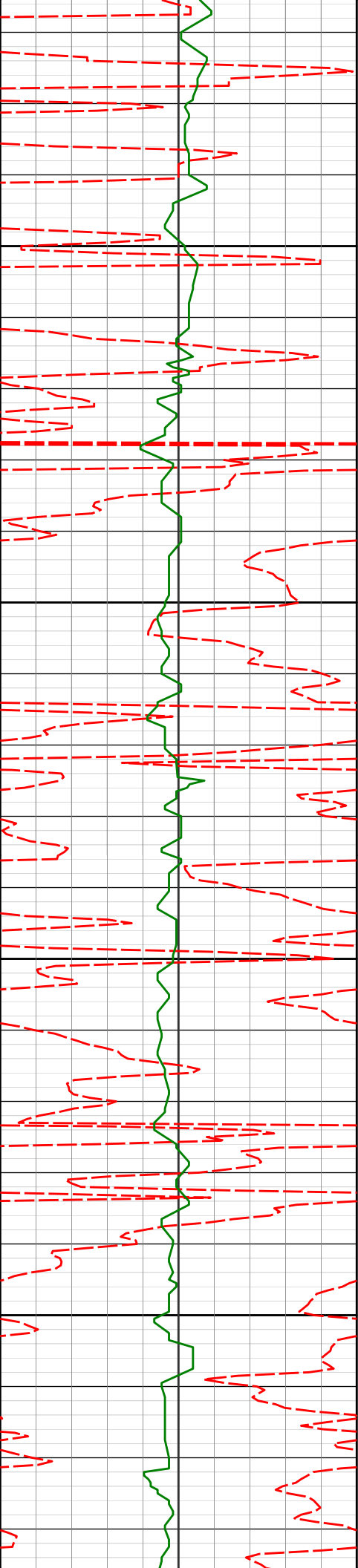
1931.43'

-27.83'

ROPA

PORC





2050'

2100'

2150'

2200'

2027'

1.54°

178.78°

2026.41'

-25.74'

2122'

1.23°

183.71°

2121.38'

-23.44'

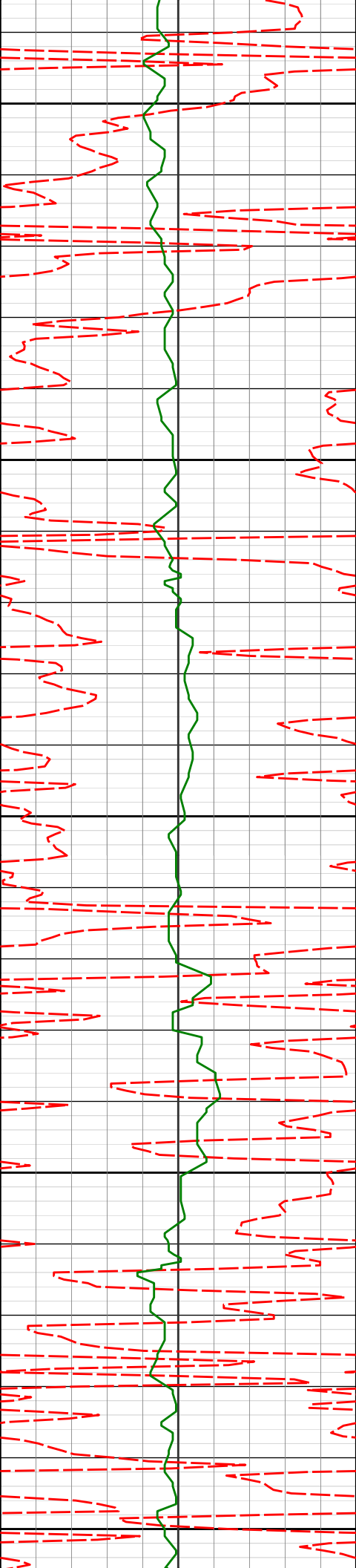
2217'

1.24°

174.82°

2216.36'

-21.39'



2250'

2300'

2350'

2400'

2450'

2312'

1.42°

205.83°

2311.34'

-19.30'

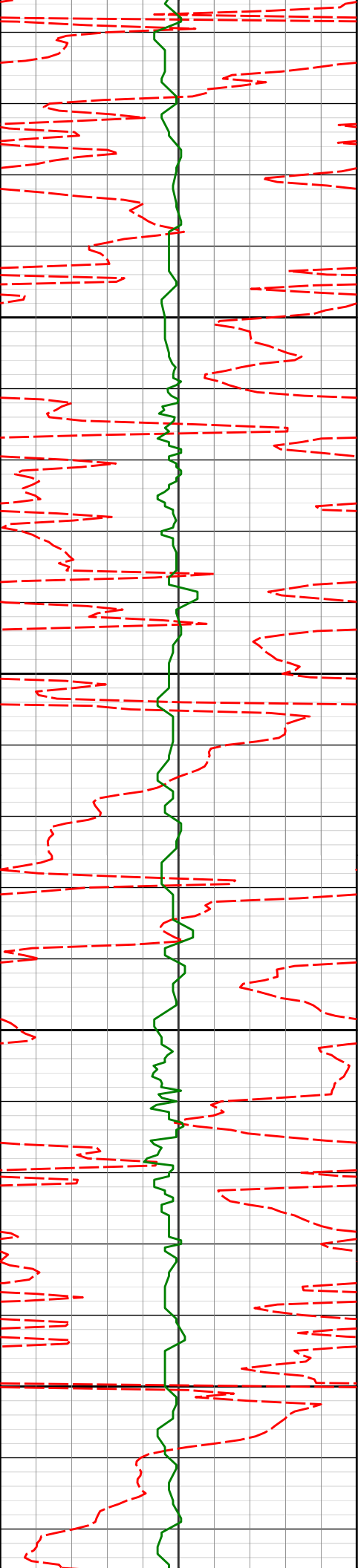
2407'

1.25°

179.54°

2406.31'

-17.20'



2500'

2502'

1.00°

193.68°

2501.29'

-15.36'

2550'

2600'

2650'

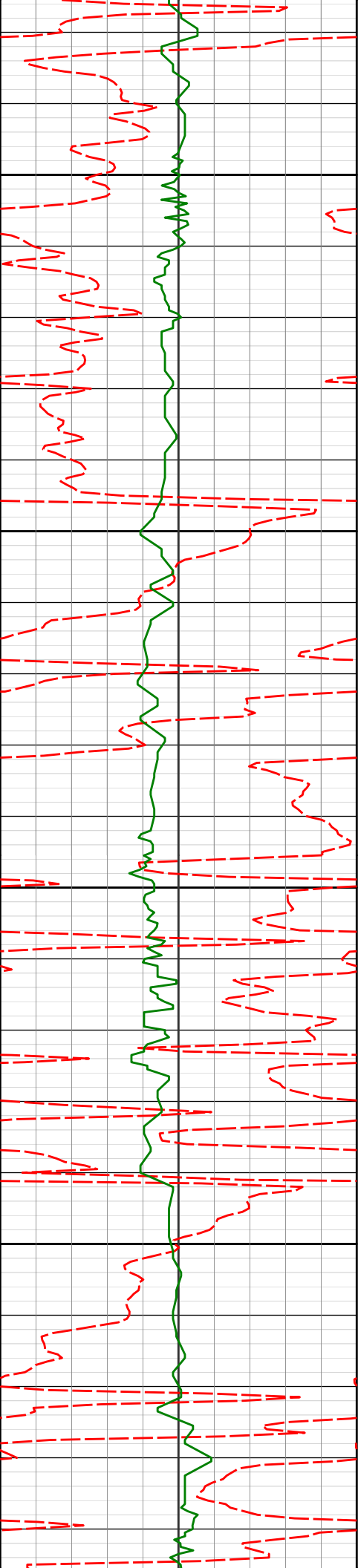
2596'

1.32°

269.76°

2595.28'

-14.54'



2700'

2750'

2800'

2850'

2691'

3.23°

295.06°

2690.20'

-15.61'

2786'

3.80°

307.65°

2785.02'

-18.59'

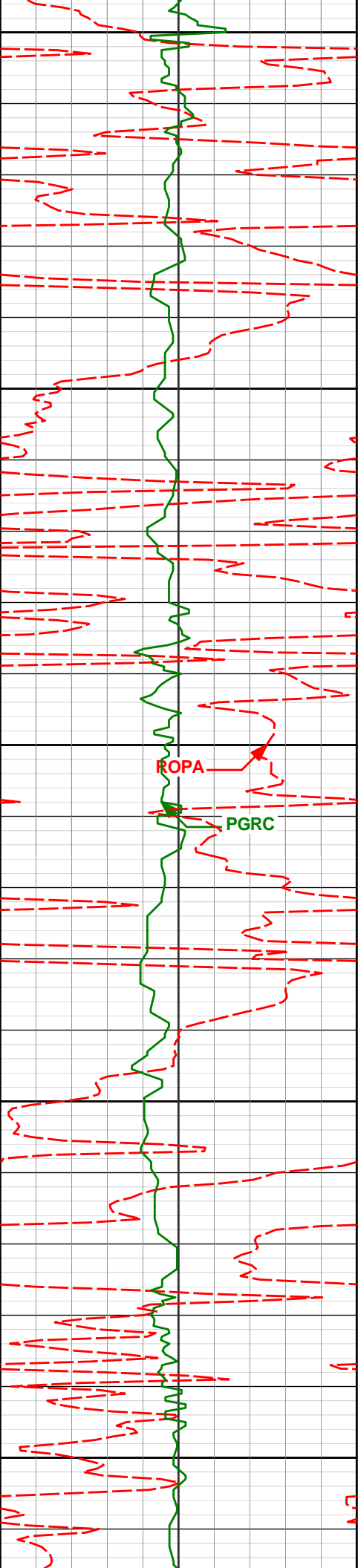
2881'

5.59°

322.44°

2879.70'

-24.10'



2900'

2950'

2976'

7.12°

320.90°

2974.12'

-32.23'

3000'

ROPA

PGRC

3050'

3071'

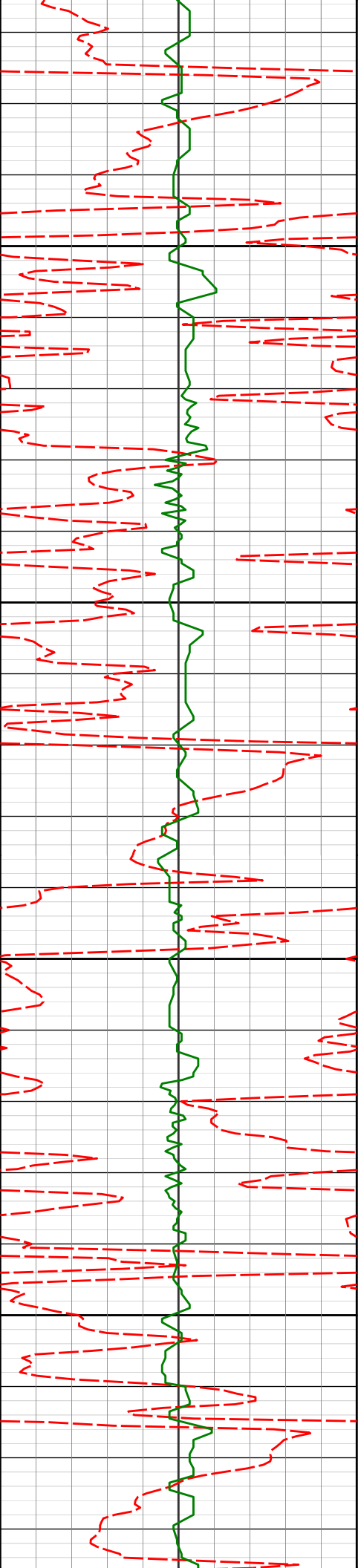
8.03°

331.80°

3068.29'

-42.54'

3100'



3150'

3166'

7.77°

338.47°

3162.39'

-54.28'

3200'

3250'

3261'

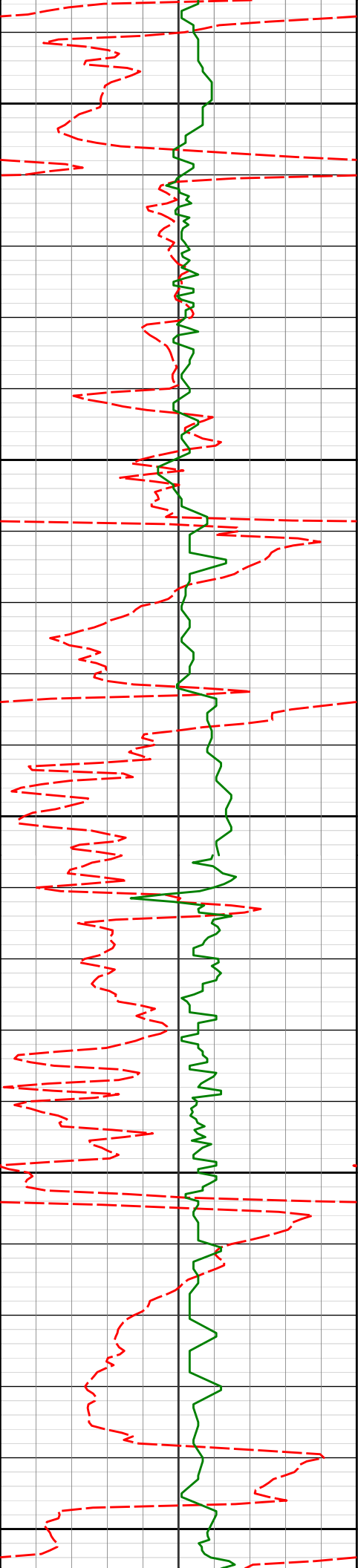
7.83°

341.46°

3256.51'

-66.31'

3300'



3350'

3356'

7.25°

347.14°

3350.69'

-78.24'

3400'

3450'

3451'

5.89°

345.35°

3445.07'

-88.76'

3500'

3550'

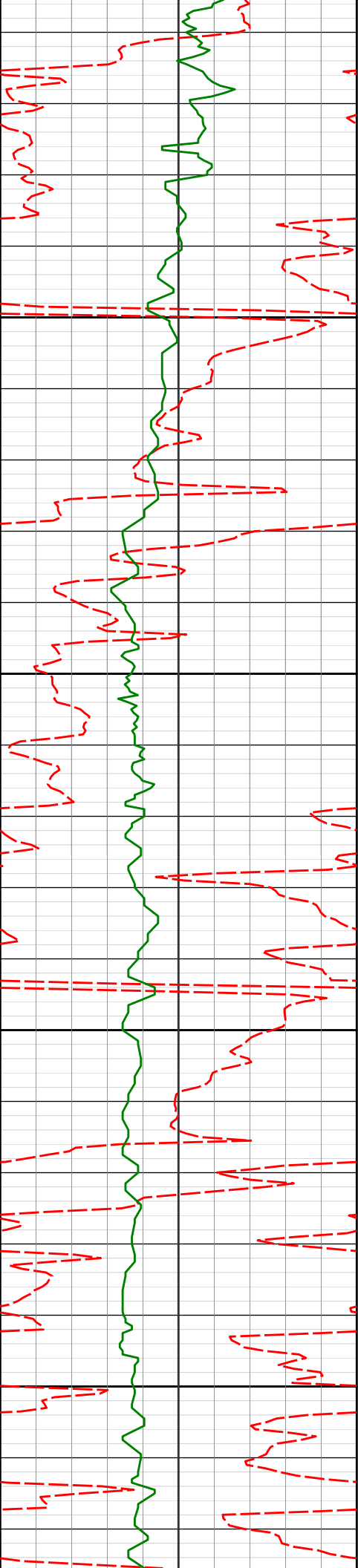
3546'

7.67°

354.73°

3539.40'

-99.76'



3600'

3641'

8.27°

346.61°

3633.48'

-112.68'

3650'

3700'

3736'

9.23°

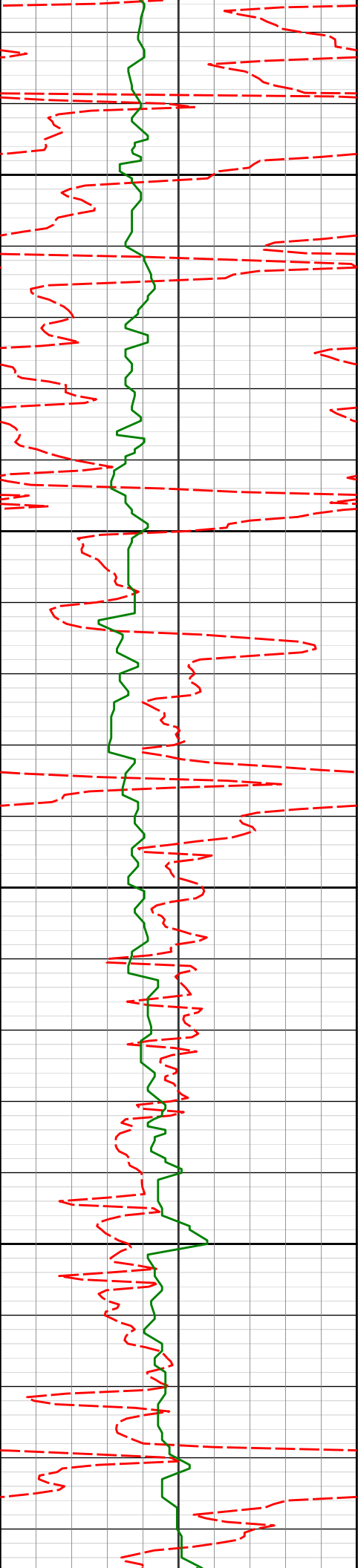
335.99°

3727.38'

-126.21'

3750'





3800'

3831'

9.58°

335.58°

3821.11'

-140.26'

3850'

3900'

3926'

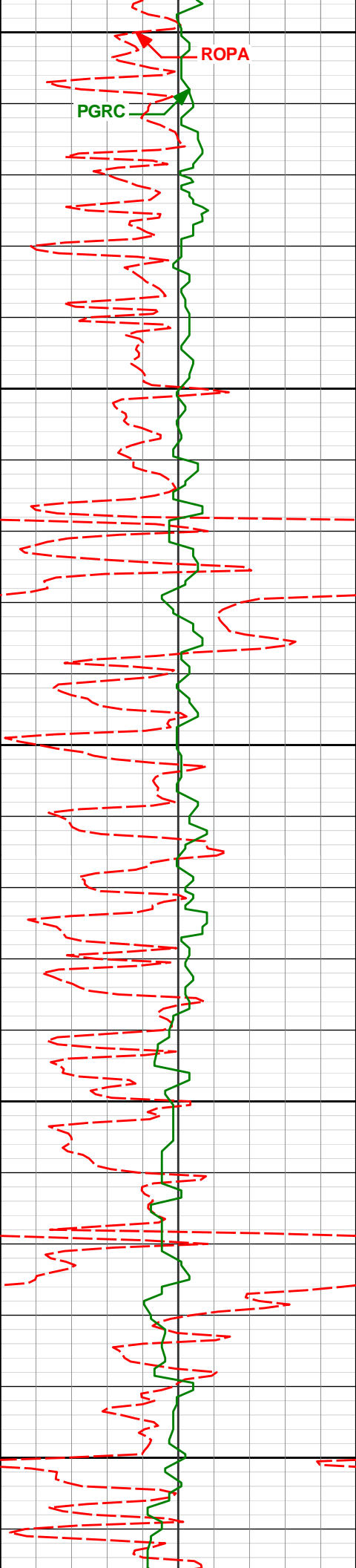
9.56°

337.00°

3914.79'

-154.61'

3950'



4000'

4021'

8.99°

336.50°

4008.54'

-168.59'

4050'

4100'

4115'

7.64°

335.78°

4101.55'

-180.93'

4150'

4200'

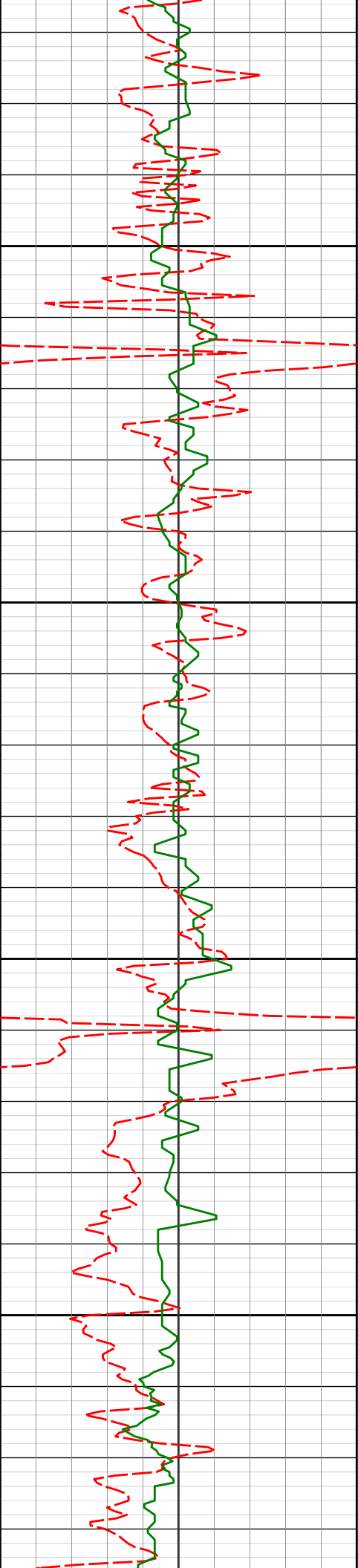
4210'

6.33°

339.09°

4195.84'

-191.52'



4250'

4300'

4350'

4400'

4305'

5.63°

336.94°

4290.33'

-200.64'

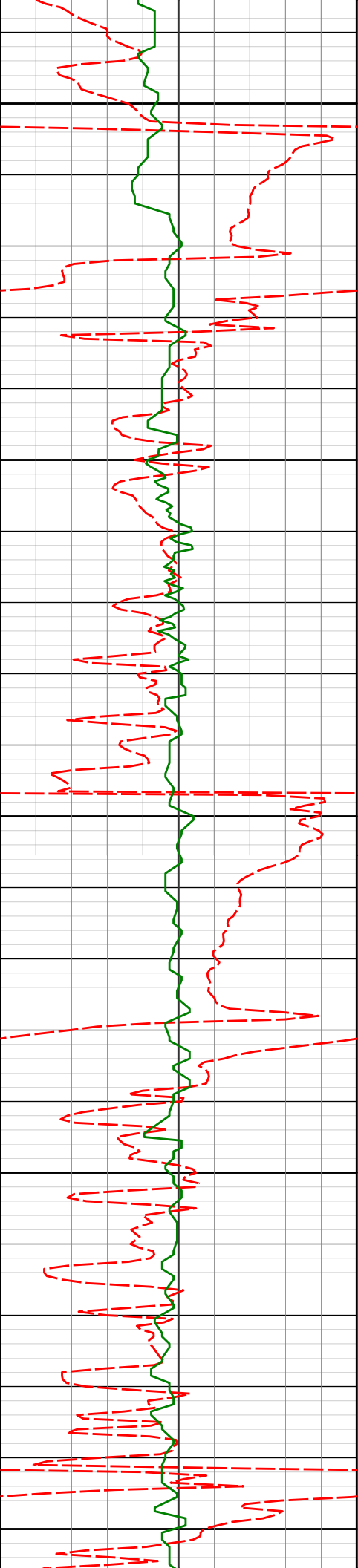
4400'

3.95°

332.59°

4384.99'

-207.77'



4450'

4495'

3.07°

329.72°

4479.81'

-212.82'

4500'

4550'

4590'

1.07°

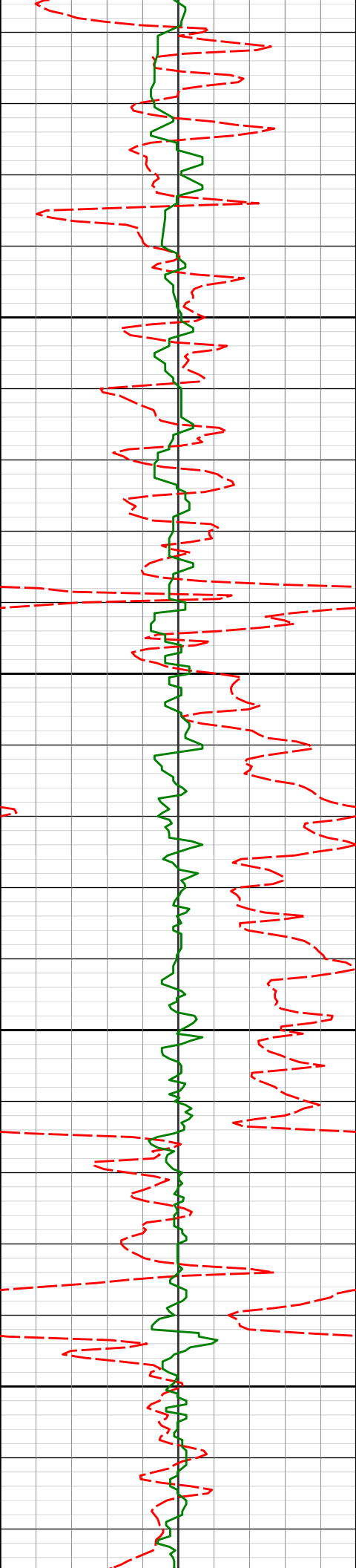
337.86°

4574.75'

-215.82'

4600'

4650'



4700'

4750'

4800'

4850'

4685'

1.47°

6.69°

4669.72'

-217.85'

4780'

2.14°

0.91°

4764.68'

-220.83'

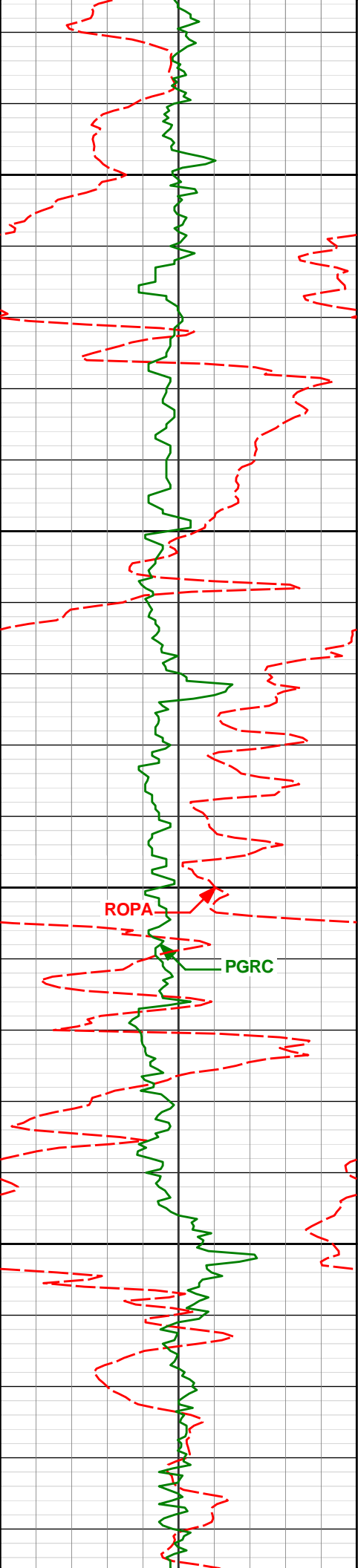
4875'

3.02°

15.18°

4859.58'

-225.03'



4900'

4950'

5000'

5050'

ROPAL

PGRC

4970'

1.28°

7.58°

4954.51'

-228.51'

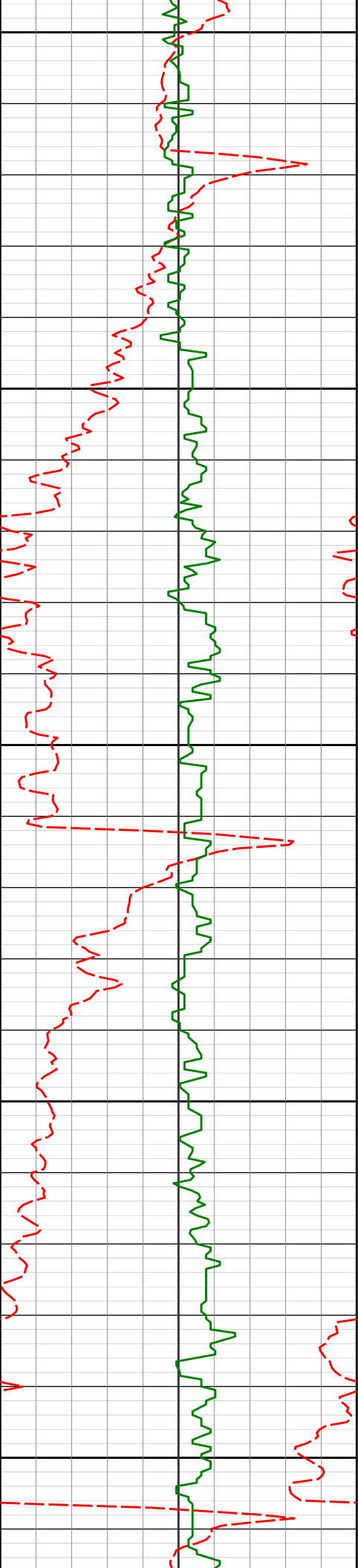
5064'

0.97°

10.57°

5048.49'

-230.33'



5100'

5150'

5200'

5250'

5300'

5159'

1.25°

15.73°

5143.47'

-232.13'

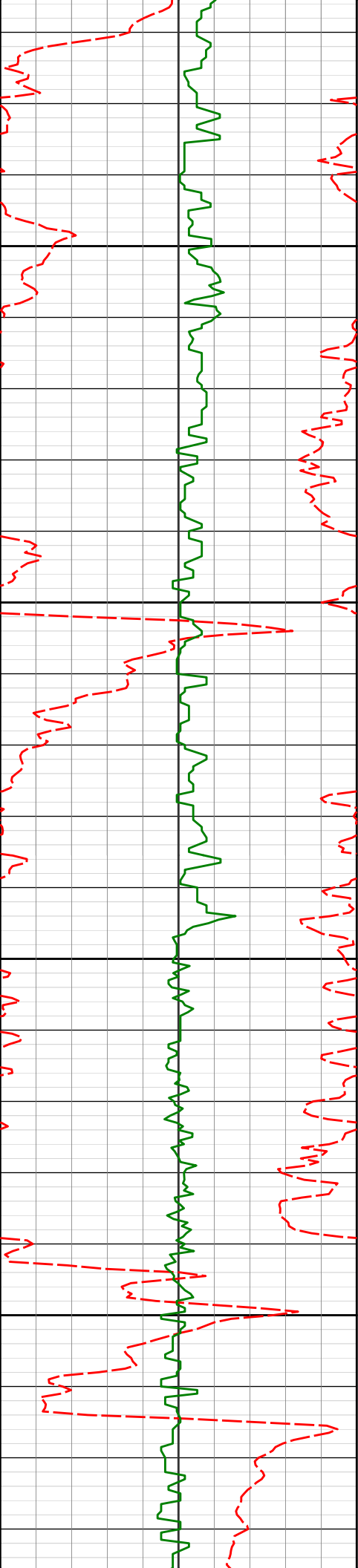
5254'

1.50°

354.06°

5238.45'

-234.37'



5350'

5400'

5450'

5500'

5444'

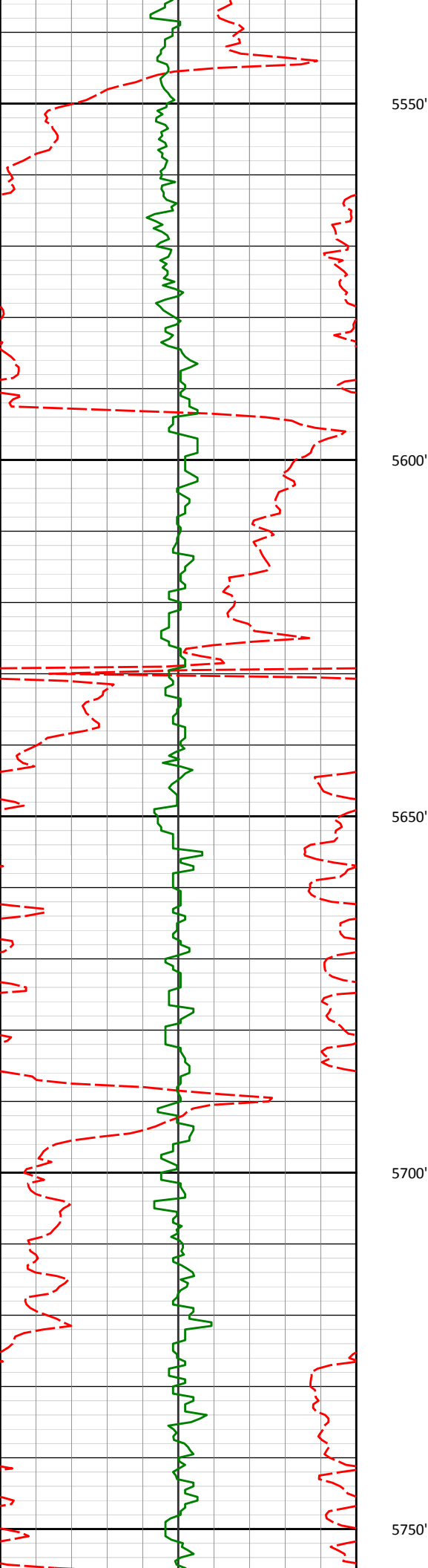
2.09°

348.26°

5428.35'

-240.22'





5539'

2.54°

273.51°

5523.29'

-242.00'

5550'

5600'

5634'

0.35°

1.68°

5618.26'

-242.39'

5650'

5700'

5729'

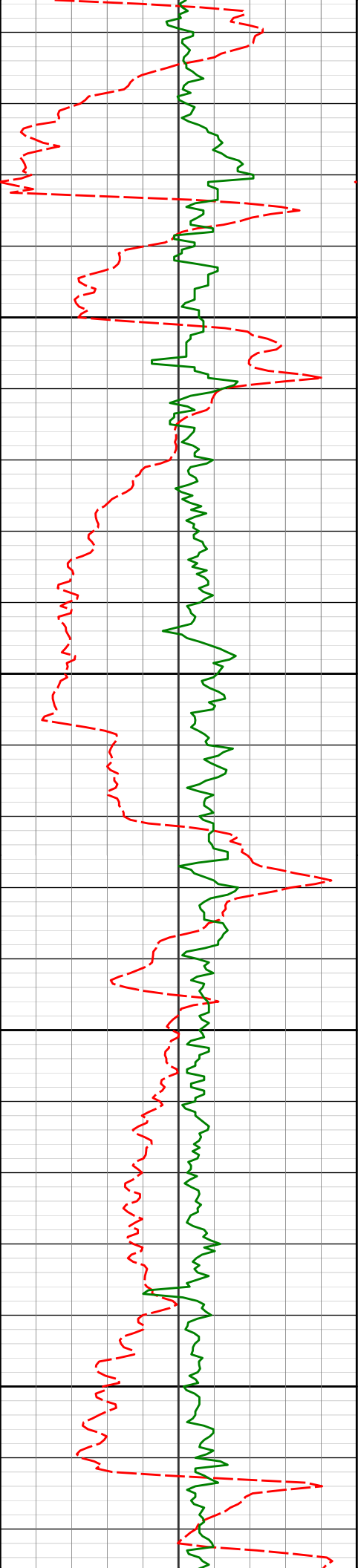
0.17°

169.49°

5713.26'

-242.54'

5750'



5800'

5824'

0.72°

359.16°

5808.26'

-243.00'

5850'

5900'

5919'

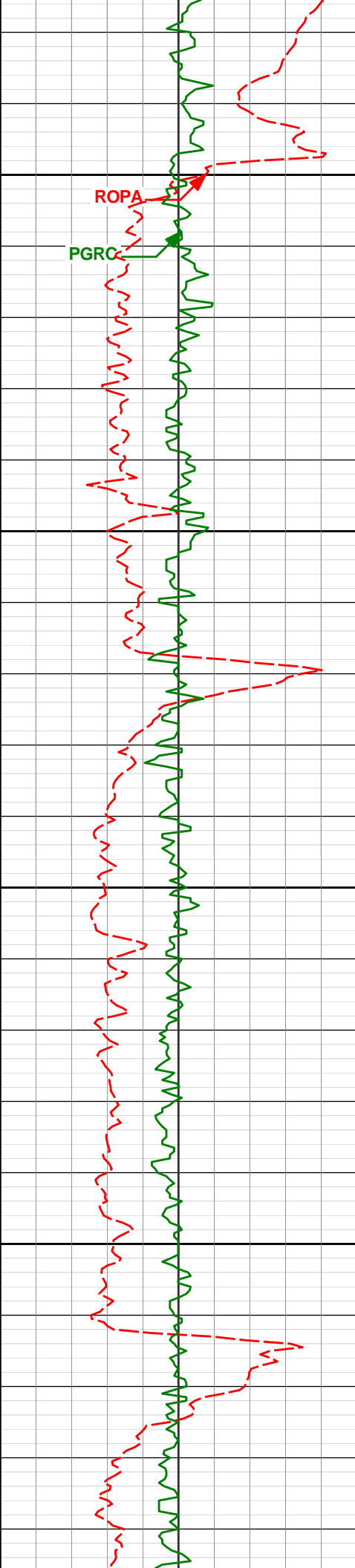
0.87°

350.63°

5903.25'

-244.30'

5950'



6000'

6014'

0.14°

68.71°

5998.25'

-245.06'

6050'

6100'

6109'

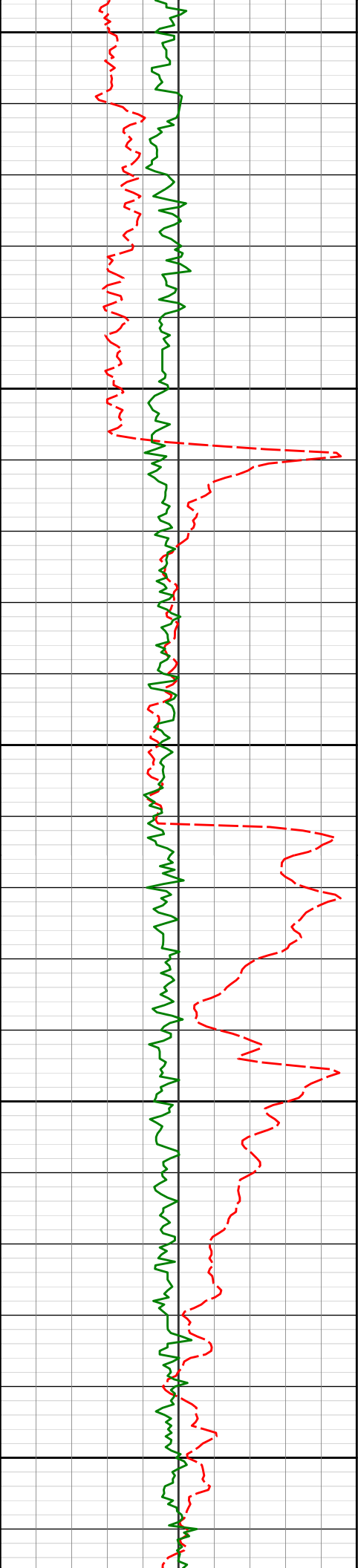
0.45°

283.62°

6093.25'

-245.18'

6150'



6200'

6202'

0.77°

315.87°

6186.24'

-245.71'

6250'

6259'

1.02°

321.98°

6243.23'

-246.37'

6300'

6350'

6400'

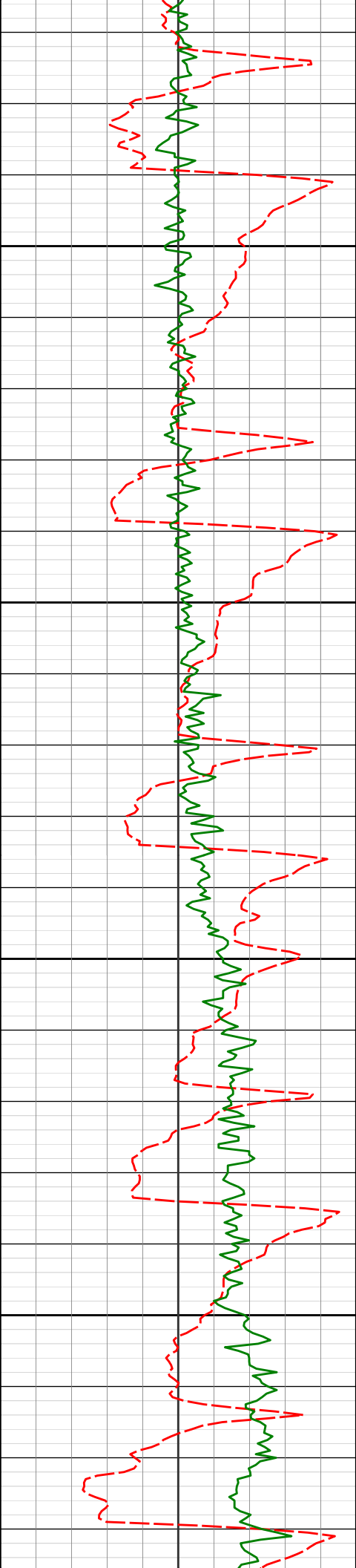
6388'

7.25°

172.39°

6371.92'

-239.20'



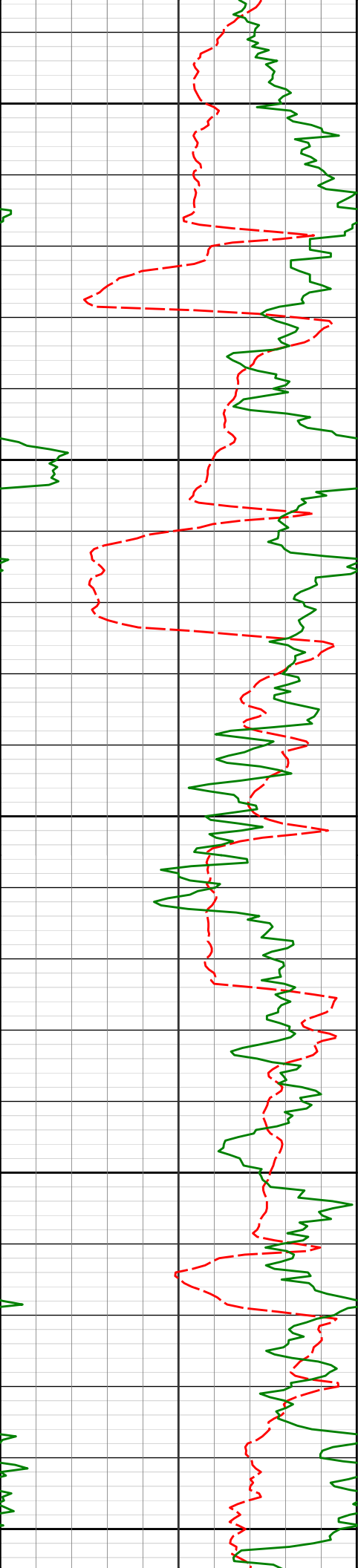
6450'

6500'

6550'

6600'

6436'	11.91°	165.59°	6419.24'	-231.42'
6483'	16.89°	169.58°	6464.75'	-220.04'
6531'	21.78°	172.52°	6510.03'	-204.38'
6578'	24.91°	175.70°	6553.18'	-185.90'
6626'	29.29°	177.33°	6595.90'	-164.10'



6650'

6673'

34.38°

181.01°

6635.82'

-139.34'

6700'

6721'

37.50°

184.06°

6674.68'

-111.19'

6750'

6768'

38.60°

181.59°

6711.70'

-82.24'

6800'

6816'

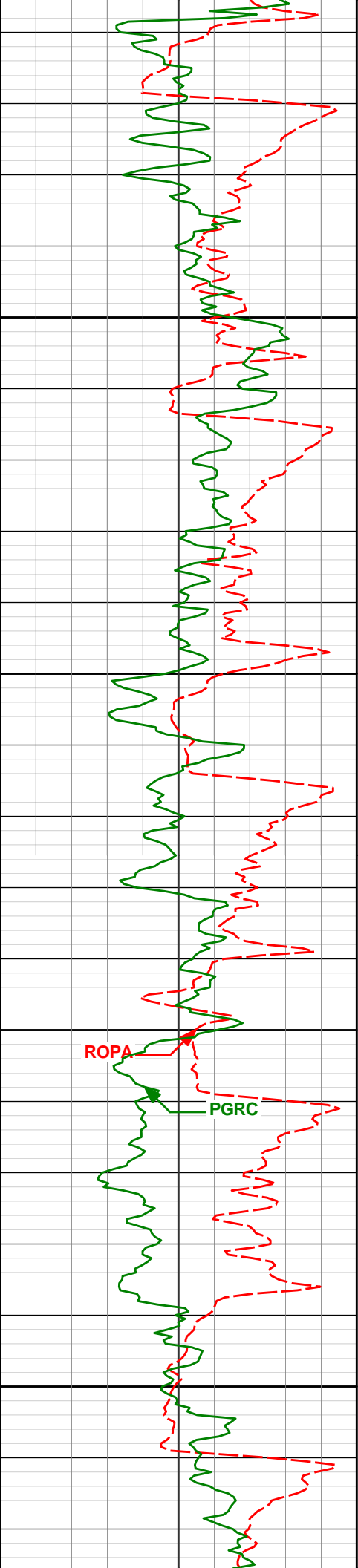
42.90°

180.97°

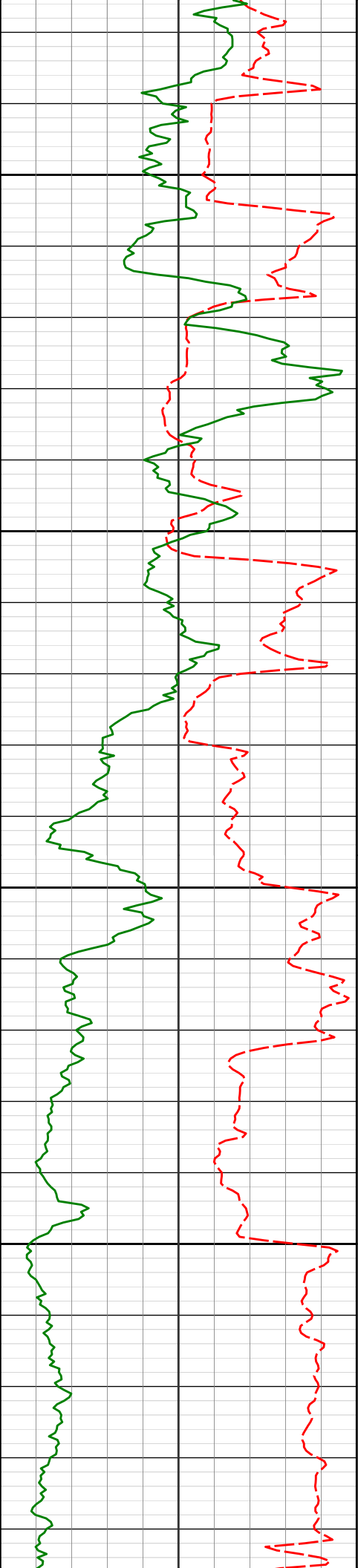
6748.05'

-50.92'

6850'



6863'	48.35°	180.83°	6780.91'	-17.33'
6911'	54.60°	181.93°	6810.79'	20.20'
6958'	59.70°	182.84°	6836.28'	59.66'
7006'	63.39°	181.90°	6859.14'	101.84'
7053'	66.65°	182.19°	6878.99'	144.42'



7100'

7101'

70.77°

181.48°

6896.41'

189.13'

7150'

7148'

72.72°

180.98°

6911.13'

233.77'

7200'

7196'

75.23°

179.95°

6924.39'

279.89'

7250'

7240'

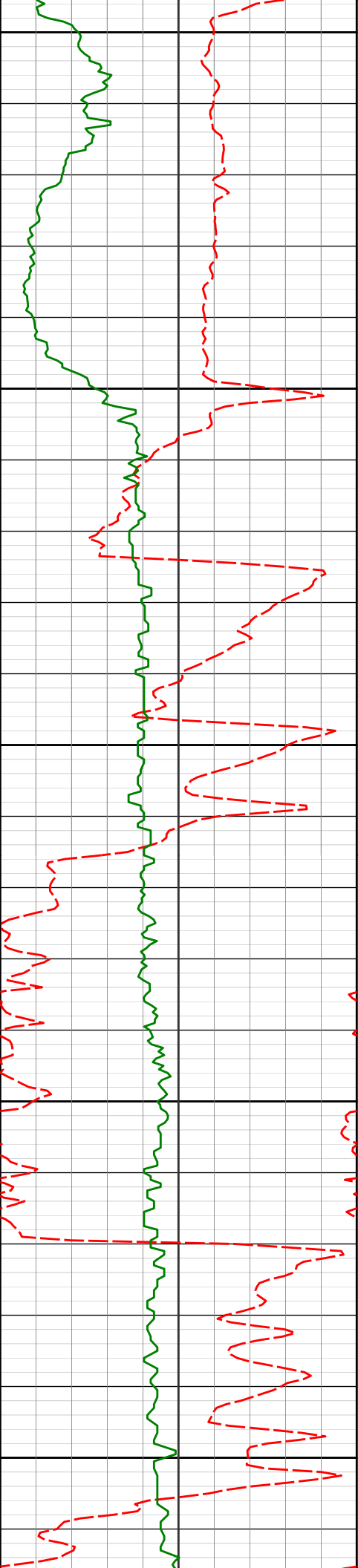
78.04°

180.35°

6934.56'

322.69'





7300'

7319'

83.73°

180.39°

6947.06'

400.66'

7350'

7400'

7450'

7500'

7414'

85.47°

179.84°

6956.01'

495.23'

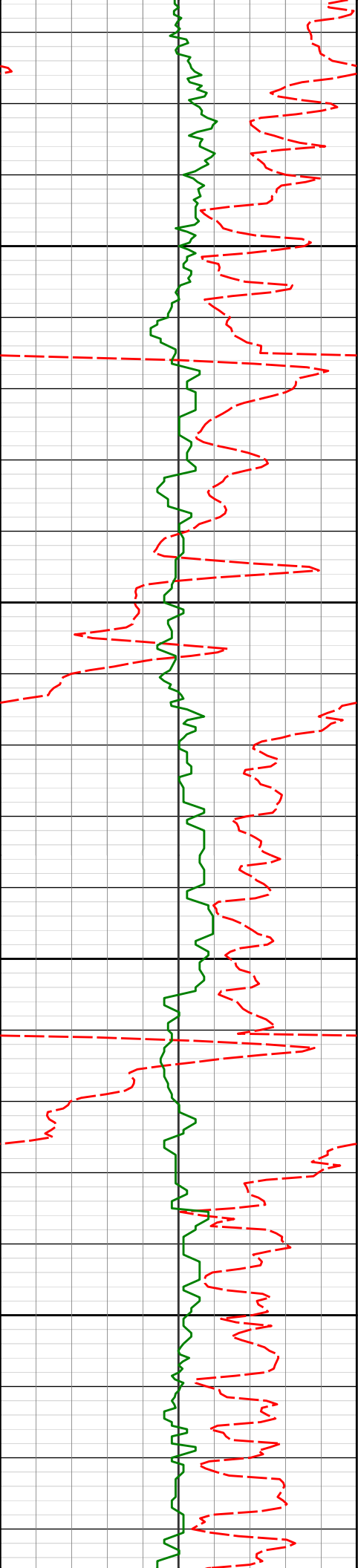
7509'

87.47°

180.15°

6961.86'

590.03'



7550'

7600'

7650'

7700'

7604'

90.25°

180.98°

6963.75'

685.00'

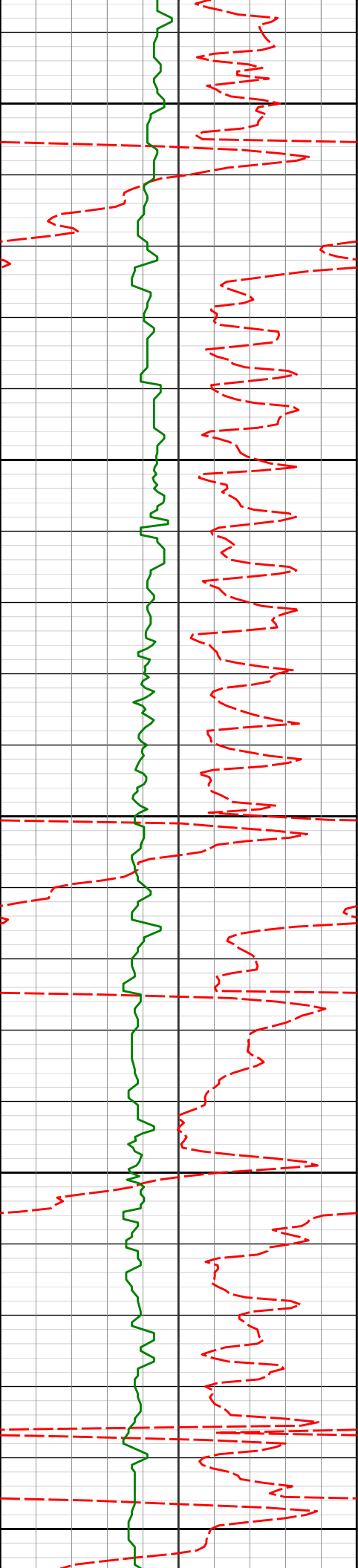
7699'

90.09°

179.92°

6963.47'

779.99'



7750'

7794'

91.79°

181.06°

6961.91'

874.97'

7800'

7850'

7889'

90.65°

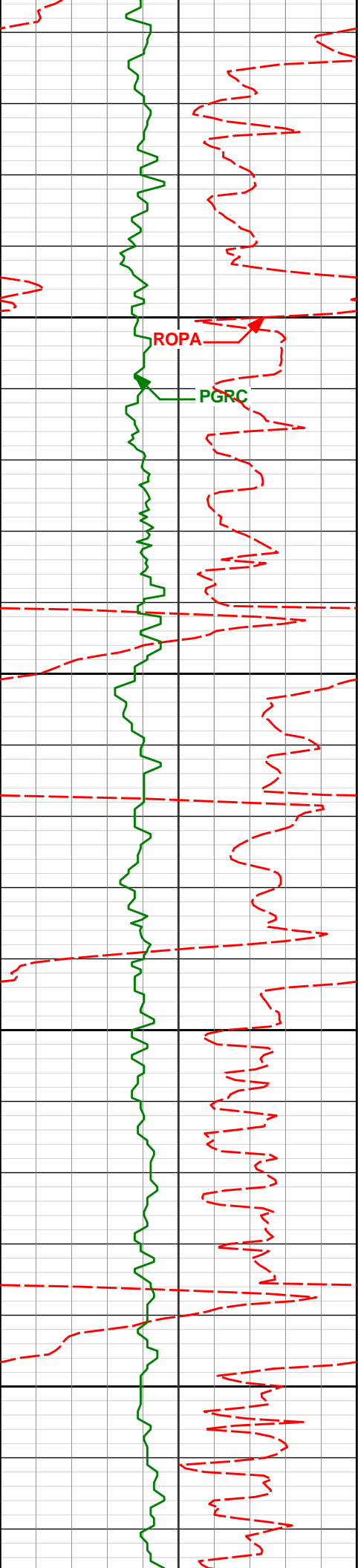
180.20°

6959.89'

969.95'

7900'

7950'



7983'

90.56°

179.62°

6958.90'

1063.93'

8000'

ROPA

PGRC

8050'

8078'

89.08°

178.61°

6959.21'

1158.87'

8100'

8150'

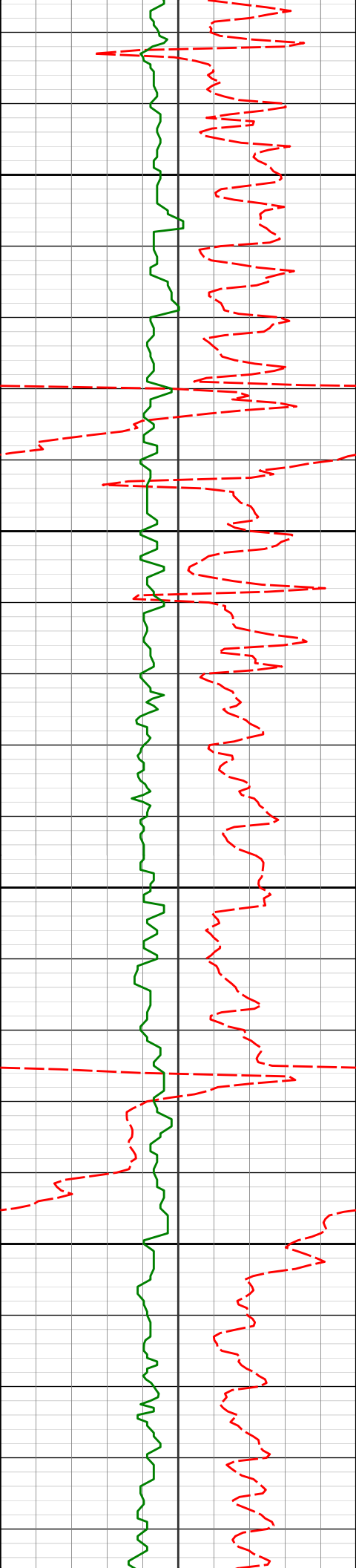
8173'

89.38°

178.31°

6960.49'

1253.78'



8200'

8250'

8268'

89.69°

178.04°

6961.25'

1348.66'

8300'

8350'

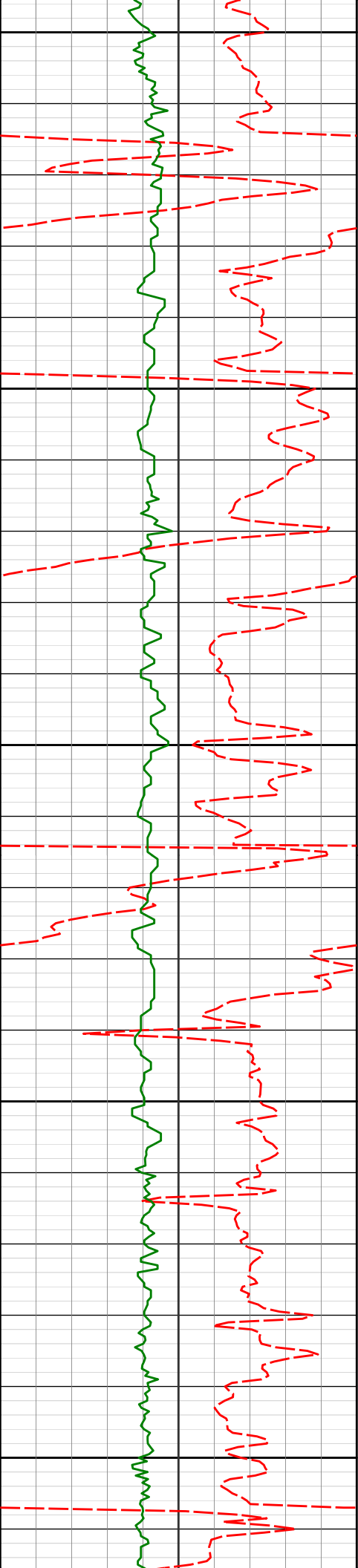
8363'

90.99°

178.52°

6960.69'

1443.56'



8400'

8450'

8500'

8550'

8600'

8457'

90.74°

178.31°

6959.28'

1537.46'

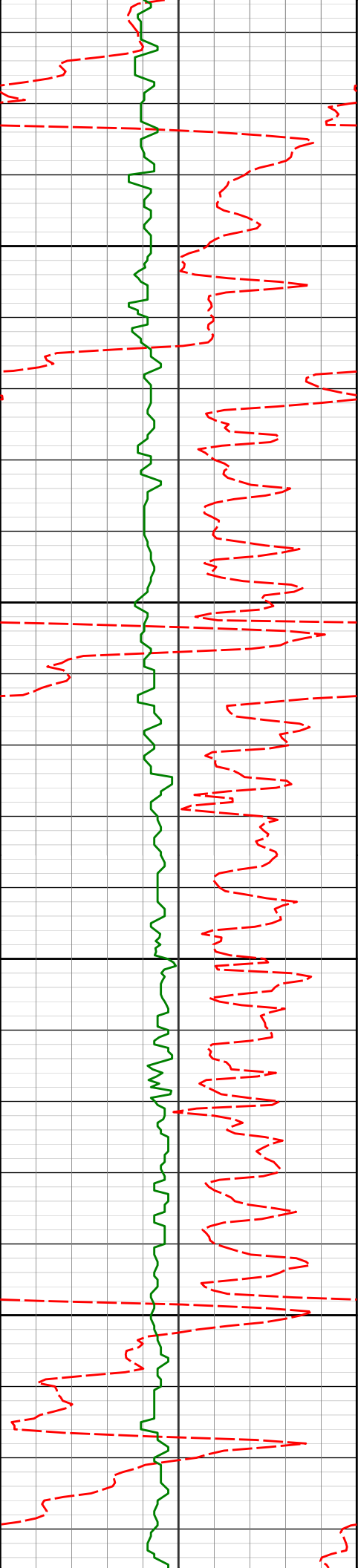
8552'

90.77°

178.51°

6958.02'

1632.36'



8650'

8647'

89.41°

178.05°

6957.87'

1727.25'

8700'

8742'

89.75°

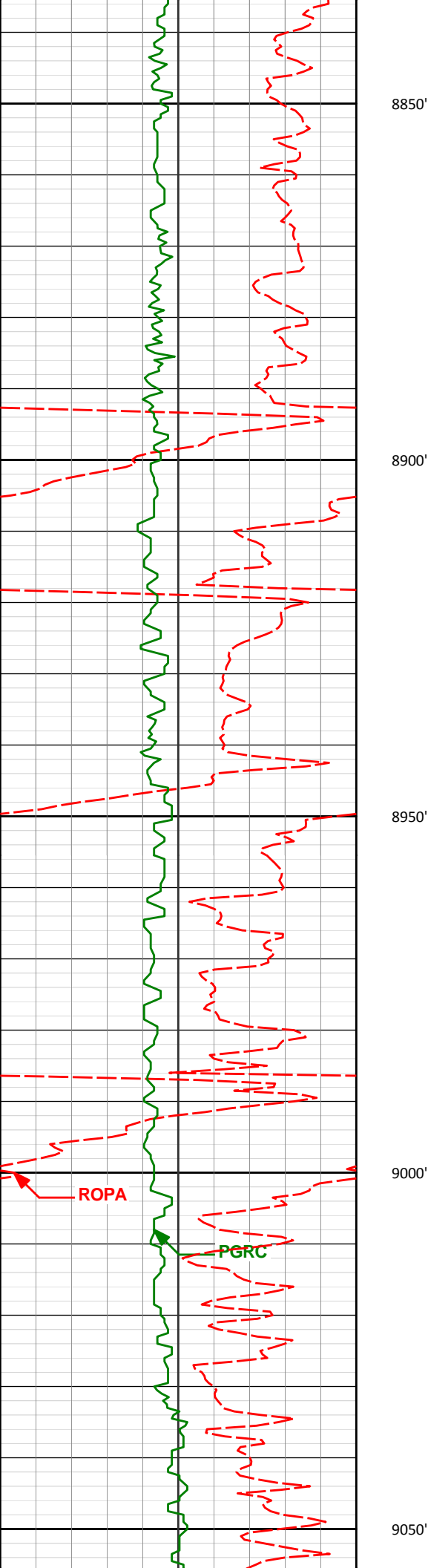
178.70°

6958.56'

1822.16'

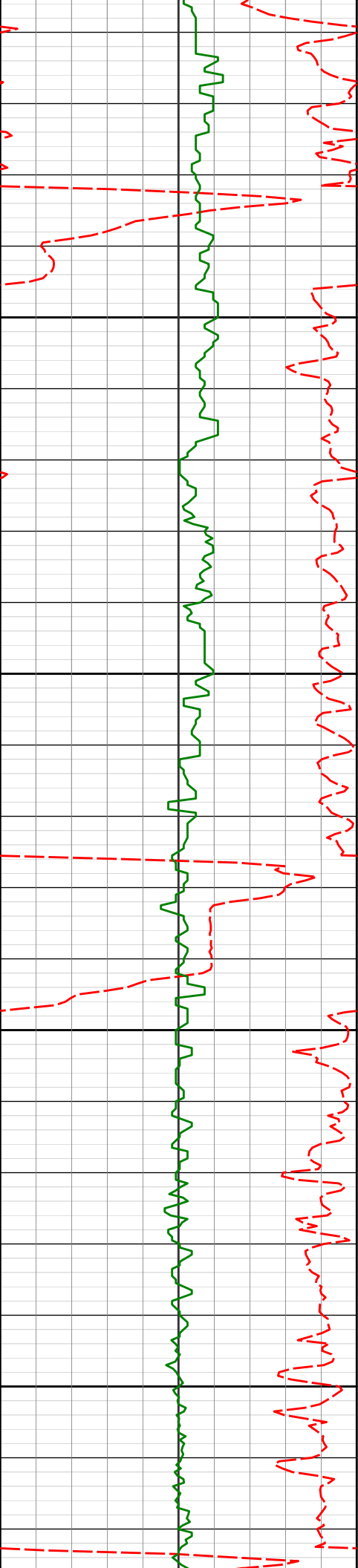
8750'

8800'



8837'	90.28°	179.09°	6958.53'	1917.09'
8932'	89.32°	179.98°	6958.87'	2012.06'
9026'	89.41°	179.79°	6959.90'	2106.04'





9100'

9121'

90.31°

180.45°

6960.13'

2201.03'

9150'

9200'

9216'

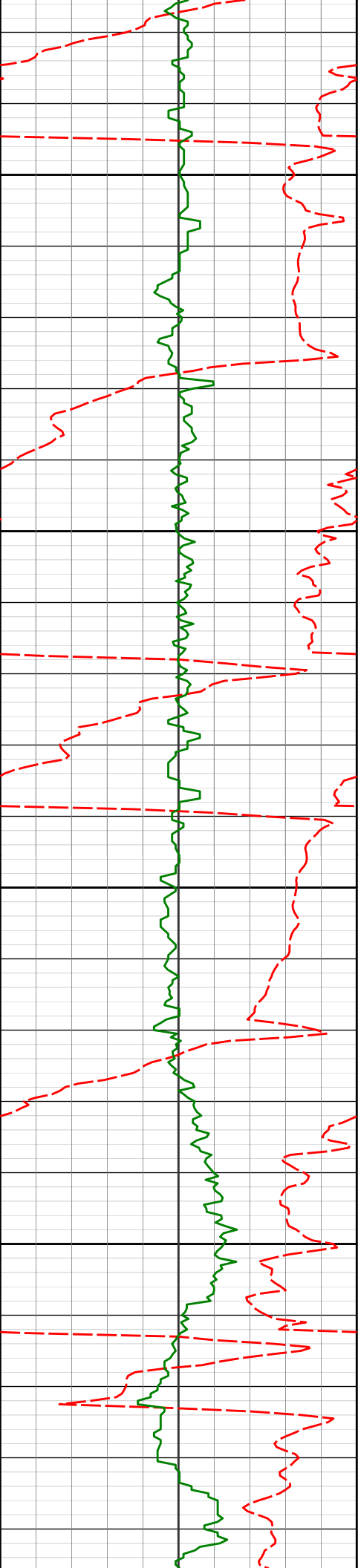
91.36°

181.26°

6958.75'

2296.02'

9250'



9300'

9311'

90.92°

182.31°

6956.86'

2390.99'

9350'

9400'

9406'

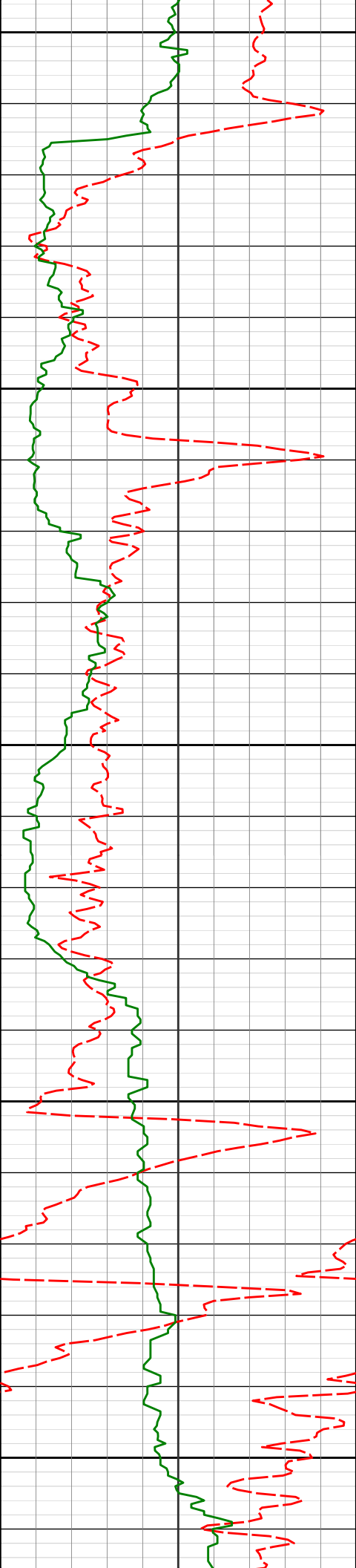
90.65°

183.01°

6955.56'

2485.93'

9450'



9500'

9501'

87.87°

179.99°

6956.79'

2580.90'

9550'

9600'

9596'

87.63°

179.45°

6960.52'

2675.81'

9650'

9700'

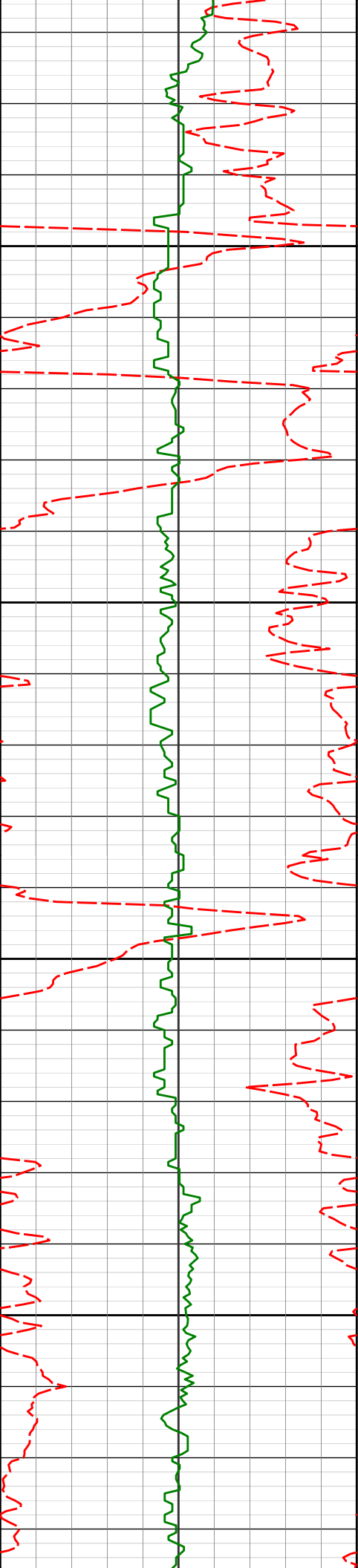
9691'

87.19°

179.05°

6964.81'

2770.67'



9750'

9785'

88.46°

179.52°

6968.37'

2864.56'

9800'

9850'

9880'

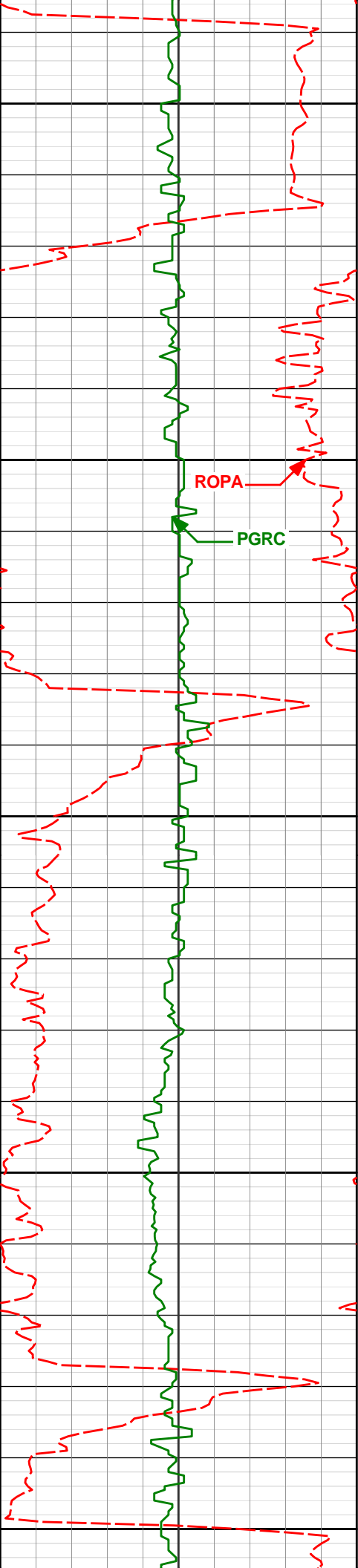
89.38°

180.18°

6970.16'

2959.53'

9900'



9950'

9975'

88.77°

178.14°

6971.69'

3054.46'

10000'

ROPA

PGRC

10050'

10070'

88.68°

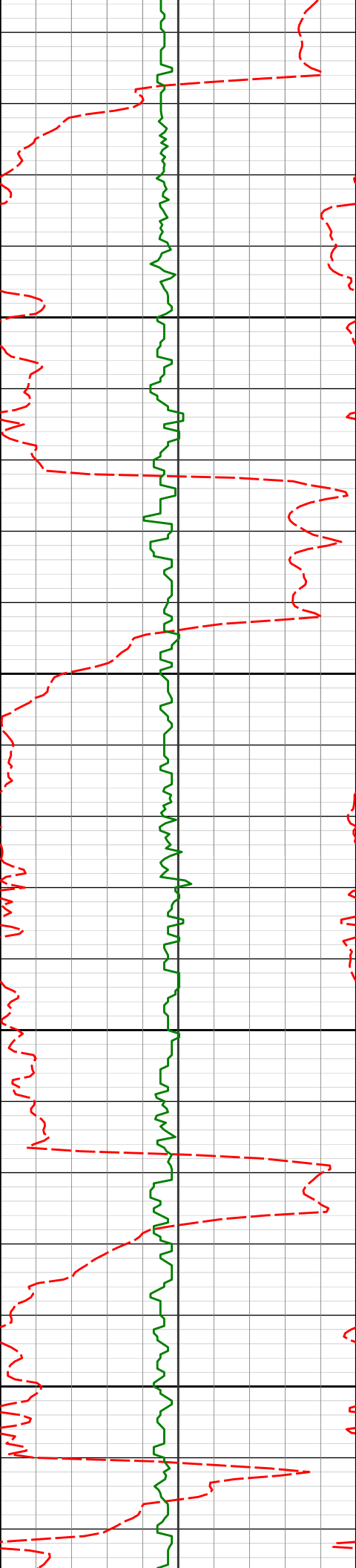
176.91°

6973.82'

3149.27'

10100'

10150'



10165'

89.20°

177.64°

6975.58'

3244.06'

10200'

10250'

10260'

90.03°

177.68°

6976.22'

3338.90'

10300'

10350'

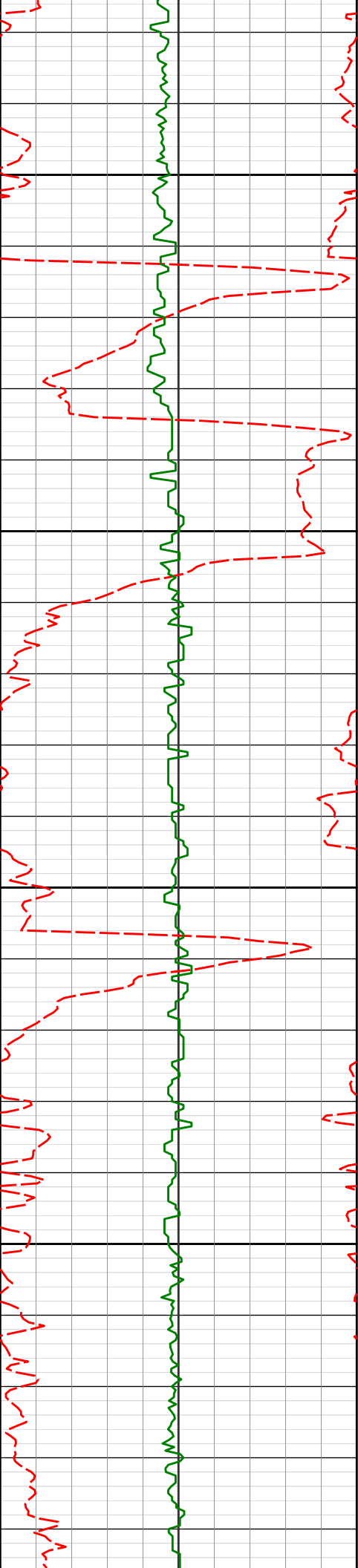
10355'

91.11°

177.64°

6975.27'

3433.74'



10400'

10450'

10500'

10550'

10450'

90.46°

178.37°

6973.97'

3528.60'

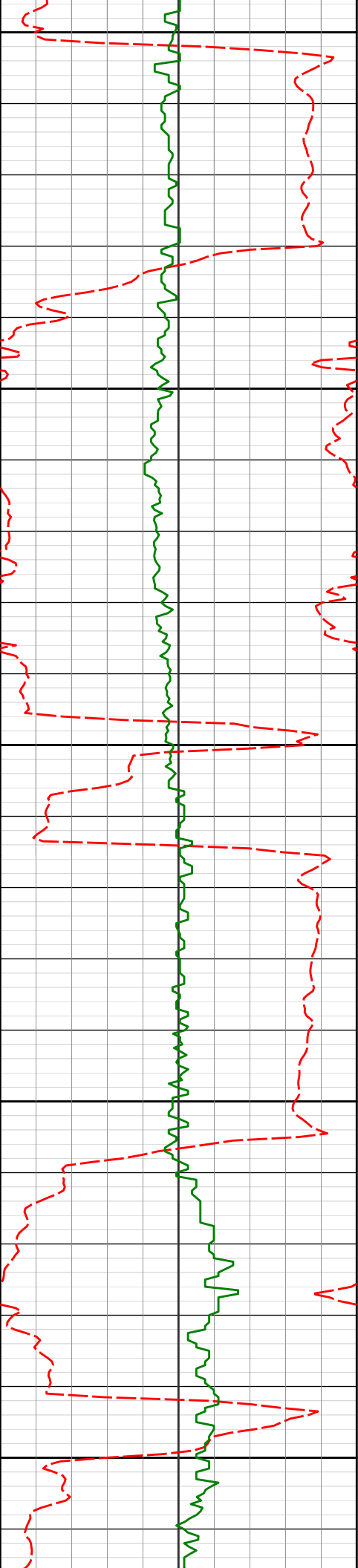
10544'

89.94°

176.22°

6973.64'

3622.41'



10600'

10639'

89.78°

177.15°

6973.87'

3717.15'

10650'

10700'

10750'

10800'

10734'

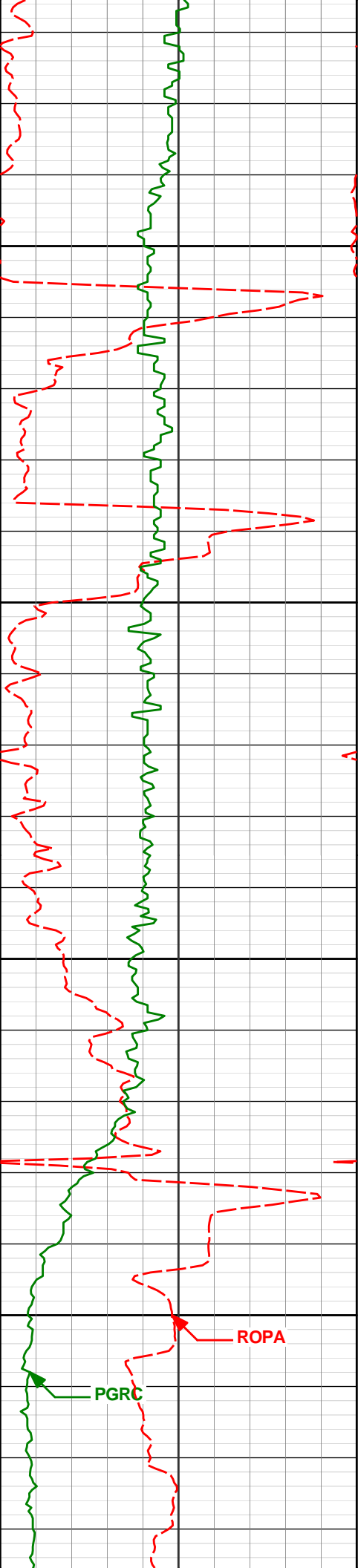
89.38°

178.67°

6974.56'

3812.01'





10829'

90.19°

179.59°

6974.92'

3906.96'

10850'

10900'

10924'

90.15°

179.05°

6974.63'

4001.92'

10950'

11000'

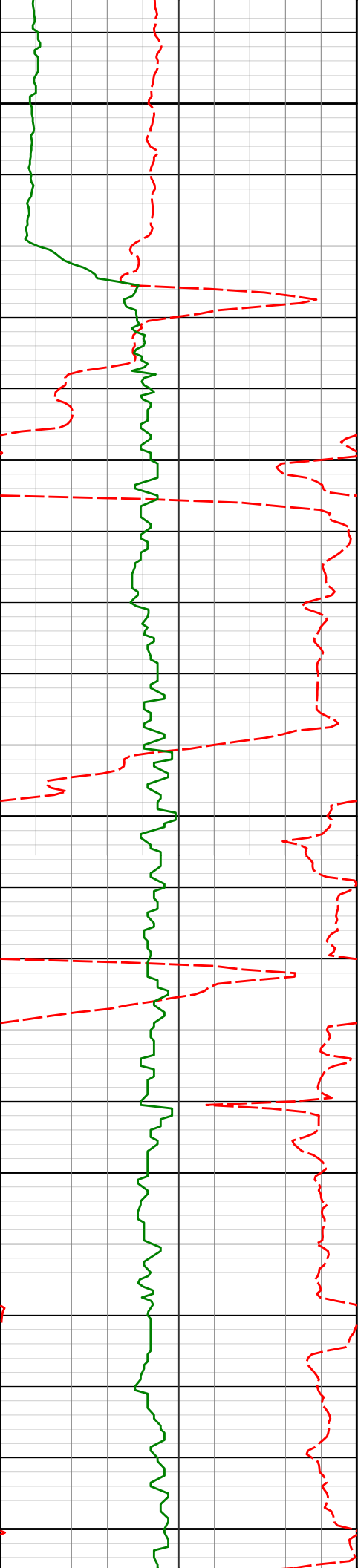
11019'

89.78°

177.96°

6974.69'

4096.84'



11050'

11100'

11150'

11200'

11250'

11114'

88.92°

177.49°

6975.76'

4191.68'

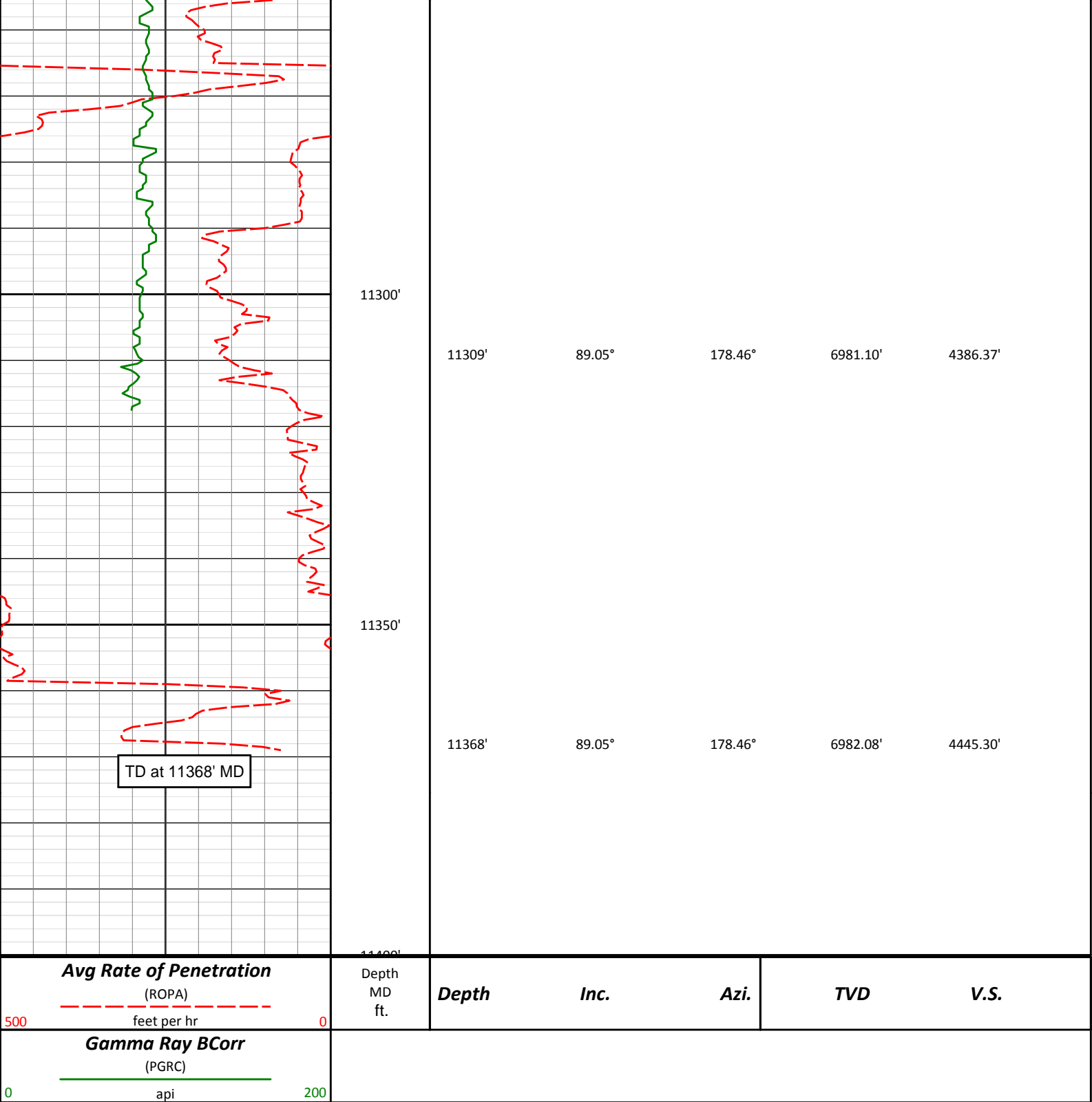
11208'

87.87°

178.24°

6978.39'

4285.51'



**HALLIBURTON**

**DIRECTIONAL SURVEY REPORT**

**Noble Energy  
Storis E24-73HC  
Wattenberg  
Weld Colorado  
USA  
CA-XX-0901173067**

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
765.00	1.70	269.96	764.91	2.50 N	9.79 W	-2.34	0.43
871.00	2.44	335.05	870.86	4.55 N	12.32 W	-4.35	2.18
993.00	1.57	10.15	992.79	8.56 N	13.12 W	-8.34	1.20
1086.00	1.69	9.21	1085.75	11.17 N	12.67 W	-10.96	0.13
1273.00	1.64	3.10	1272.67	16.57 N	12.09 W	-16.37	0.10
1457.00	2.00	13.18	1456.58	22.32 N	11.21 W	-22.13	0.26
1552.00	1.97	12.40	1551.52	25.52 N	10.49 W	-25.35	0.04
1647.00	1.77	12.87	1646.47	28.54 N	9.81 W	-28.38	0.21
1742.00	0.68	97.88	1741.45	29.89 N	8.93 W	-29.74	1.93
1837.00	0.70	152.10	1836.45	29.30 N	8.10 W	-29.16	0.66
1932.00	1.02	165.89	1931.43	27.96 N	7.62 W	-27.83	0.40
2027.00	1.54	178.78	2026.41	25.86 N	7.38 W	-25.74	0.62
2122.00	1.23	183.71	2121.38	23.56 N	7.42 W	-23.44	0.35
2217.00	1.24	174.82	2216.36	21.52 N	7.40 W	-21.39	0.20
2312.00	1.42	205.83	2311.34	19.43 N	7.82 W	-19.30	0.77
2407.00	1.25	179.54	2406.31	17.33 N	8.32 W	-17.20	0.66
2502.00	1.00	193.68	2501.29	15.50 N	8.51 W	-15.36	0.39
2596.00	1.32	269.76	2595.28	14.70 N	9.78 W	-14.54	1.54
2691.00	3.23	295.06	2690.20	15.83 N	13.30 W	-15.61	2.23
2786.00	3.80	307.65	2785.02	18.89 N	18.22 W	-18.59	1.01
2881.00	5.59	322.44	2879.70	24.48 N	23.53 W	-24.10	2.26
2976.00	7.12	320.90	2974.12	32.72 N	30.07 W	-32.23	1.62
3071.00	8.03	331.80	3068.29	43.14 N	36.92 W	-42.54	1.79
3166.00	7.77	338.47	3162.39	54.97 N	42.41 W	-54.28	1.00
3261.00	7.83	341.46	3256.51	67.08 N	46.83 W	-66.31	0.43
3356.00	7.25	347.14	3350.69	79.06 N	50.22 W	-78.24	0.99
3451.00	5.89	345.35	3445.07	89.62 N	52.79 W	-88.76	1.44
3546.00	7.67	354.73	3539.40	100.66 N	54.60 W	-99.76	2.20
3641.00	8.27	346.61	3633.48	113.62 N	56.77 W	-112.68	1.34
3736.00	9.23	335.99	3727.38	127.23 N	61.45 W	-126.21	1.97
3831.00	9.58	335.58	3821.11	141.38 N	67.82 W	-140.26	0.37
3926.00	9.56	337.00	3914.79	155.84 N	74.17 W	-154.61	0.25
4021.00	8.99	336.50	4008.54	169.91 N	80.21 W	-168.59	0.61
4115.00	7.64	335.78	4101.55	182.35 N	85.70 W	-180.93	1.44
4210.00	6.33	339.09	4195.84	193.00 N	90.17 W	-191.52	1.44
4305.00	5.63	336.94	4290.33	202.19 N	93.86 W	-200.64	0.78
4400.00	3.95	332.59	4384.99	209.37 N	97.19 W	-207.77	1.81
4495.00	3.07	329.72	4479.81	214.48 N	99.98 W	-212.82	0.94
4590.00	1.07	337.86	4574.75	217.50 N	101.60 W	-215.82	2.13
4685.00	1.47	6.69	4669.72	219.53 N	101.79 W	-217.85	0.78
4780.00	2.14	0.91	4764.68	222.51 N	101.62 W	-220.83	0.73
4875.00	3.02	15.18	4859.58	226.70 N	100.94 W	-225.03	1.14
4970.00	1.28	7.58	4954.51	230.17 N	100.14 W	-228.51	1.86
5064.00	0.97	10.57	5048.49	231.98 N	99.86 W	-230.33	0.34
5159.00	1.25	15.73	5143.47	233.77 N	99.43 W	-232.13	0.32
5254.00	1.50	354.06	5238.45	236.01 N	99.28 W	-234.37	0.60
5444.00	2.09	348.26	5428.35	241.88 N	100.24 W	-240.22	0.32
5539.00	2.54	273.51	5523.29	243.70 N	102.70 W	-242.00	2.98
5634.00	0.35	1.68	5618.26	244.12 N	104.79 W	-242.39	2.69
5729.00	0.17	169.49	5713.26	244.27 N	104.75 W	-242.54	0.55
5824.00	0.72	359.16	5808.26	244.73 N	104.74 W	-243.00	0.94
5919.00	0.87	350.63	5903.25	246.04 N	104.86 W	-244.30	0.20
6014.00	0.14	68.71	5998.25	246.79 N	104.87 W	-245.06	0.90
6109.00	0.45	283.62	6093.25	246.92 N	105.13 W	-245.18	0.60
6202.00	0.77	315.87	6186.24	247.46 N	105.93 W	-245.71	0.49
6259.00	1.02	321.98	6243.23	248.13 N	106.51 W	-246.37	0.46
6388.00	7.25	172.39	6371.92	240.95 N	106.13 W	-239.20	6.31
6436.00	11.91	165.59	6419.24	233.14 N	104.50 W	-231.42	9.97
6483.00	16.89	169.58	6464.75	221.72 N	102.05 W	-220.04	10.79
6531.00	21.78	172.52	6510.03	206.03 N	99.63 W	-204.38	10.39
6578.00	24.91	175.70	6553.18	187.51 N	97.75 W	-185.90	7.18
6626.00	29.29	177.33	6595.90	165.69 N	96.45 W	-164.10	9.25
6673.00	34.38	181.01	6635.82	140.92 N	96.15 W	-139.34	11.60
6721.00	37.50	184.06	6674.68	112.78 N	97.42 W	-111.19	7.49
6768.00	38.60	181.59	6711.70	83.86 N	98.84 W	-82.24	3.99
6816.00	42.90	180.97	6748.05	52.54 N	99.53 W	-50.92	9.01
6863.00	48.35	180.83	6780.91	18.96 N	100.06 W	-17.33	11.58
6911.00	54.60	181.93	6810.79	18.56 S	100.98 W	20.20	13.16
6958.00	59.70	182.84	6836.28	58.00 S	102.63 W	59.66	10.97
7006.00	62.30	181.00	6850.14	100.15 S	104.37 W	104.84	7.86

7006.00	65.39	181.90	6859.14	100.15 S	104.37 W	101.84	7.86
7053.00	66.65	182.19	6878.99	142.72 S	105.89 W	144.42	6.97
7101.00	70.77	181.48	6896.41	187.42 S	107.32 W	189.13	8.69
7148.00	72.72	180.98	6911.13	232.04 S	108.28 W	233.77	4.27
7196.00	75.23	179.95	6924.39	278.17 S	108.65 W	279.89	5.61
7240.00	78.04	180.35	6934.56	320.97 S	108.76 W	322.69	6.47
7319.00	83.73	180.39	6947.06	398.94 S	109.27 W	400.66	7.20
7414.00	85.47	179.84	6956.01	493.51 S	109.47 W	495.23	1.92
7509.00	87.47	180.15	6961.86	588.33 S	109.46 W	590.03	2.14
7604.00	90.25	180.98	6963.75	683.30 S	110.39 W	685.00	3.05
7699.00	90.09	179.92	6963.47	778.29 S	111.14 W	779.99	1.12
7794.00	91.79	181.06	6961.91	873.27 S	111.95 W	874.97	2.15
7889.00	90.65	180.20	6959.89	968.24 S	113.00 W	969.95	1.50
7983.00	90.56	179.62	6958.90	1062.23 S	112.85 W	1063.93	0.63
8078.00	89.08	178.61	6959.21	1157.22 S	111.38 W	1158.87	1.88
8173.00	89.38	178.31	6960.49	1252.18 S	108.83 W	1253.78	0.45
8268.00	89.69	178.04	6961.25	1347.12 S	105.81 W	1348.66	0.43
8363.00	90.99	178.52	6960.69	1442.08 S	102.97 W	1443.56	1.45
8457.00	90.74	178.31	6959.28	1536.03 S	100.36 W	1537.46	0.35
8552.00	90.77	178.51	6958.02	1630.99 S	97.73 W	1632.36	0.22
8647.00	89.41	178.05	6957.87	1725.94 S	94.88 W	1727.25	1.51
8742.00	89.75	178.70	6958.56	1820.90 S	92.18 W	1822.16	0.77
8837.00	90.28	179.09	6958.53	1915.88 S	90.35 W	1917.09	0.69
8932.00	89.32	179.98	6958.87	2010.87 S	89.57 W	2012.06	1.37
9026.00	89.41	179.79	6959.90	2104.87 S	89.38 W	2106.04	0.22
9121.00	90.31	180.45	6960.13	2199.87 S	89.58 W	2201.03	1.17
9216.00	91.36	181.26	6958.75	2294.84 S	91.00 W	2296.02	1.40
9311.00	90.92	182.31	6956.86	2389.78 S	93.97 W	2390.99	1.19
9406.00	90.65	183.01	6955.56	2484.67 S	98.38 W	2485.93	0.79
9501.00	87.87	179.99	6956.79	2579.60 S	100.87 W	2580.90	4.32
9596.00	87.63	179.45	6960.52	2674.53 S	100.41 W	2675.81	0.63
9691.00	87.19	179.05	6964.81	2769.42 S	99.17 W	2770.67	0.62
9785.00	88.46	179.52	6968.37	2863.35 S	98.00 W	2864.56	1.43
9880.00	89.38	180.18	6970.16	2958.33 S	97.75 W	2959.53	1.19
9975.00	88.77	178.14	6971.69	3053.30 S	96.35 W	3054.46	2.24
10070.00	88.68	176.91	6973.82	3148.19 S	92.25 W	3149.27	1.30
10165.00	89.20	177.64	6975.58	3243.06 S	87.72 W	3244.06	0.95
10260.00	90.03	177.68	6976.22	3337.98 S	83.84 W	3338.90	0.88
10355.00	91.11	177.64	6975.27	3432.89 S	79.95 W	3433.74	1.14
10450.00	90.46	178.37	6973.97	3527.83 S	76.64 W	3528.60	1.03
10544.00	89.94	176.22	6973.64	3621.71 S	72.20 W	3622.41	2.35
10639.00	89.78	177.15	6973.87	3716.55 S	66.71 W	3717.15	1.00
10734.00	89.38	178.67	6974.56	3811.48 S	63.25 W	3812.01	1.66
10829.00	90.19	179.59	6974.92	3906.47 S	61.81 W	3906.96	1.28
10924.00	90.15	179.05	6974.63	4001.46 S	60.69 W	4001.92	0.57
11019.00	89.78	177.96	6974.69	4096.43 S	58.21 W	4096.84	1.22
11114.00	88.92	177.49	6975.76	4191.35 S	54.44 W	4191.68	1.03
11208.00	87.87	178.24	6978.39	4285.24 S	50.94 W	4285.51	1.37
11309.00	89.05	178.46	6981.10	4386.16 S	48.03 W	4386.37	1.18
11368.00	89.05	178.46	6982.08	4445.13 S	46.44 W	4445.30	0.01

# 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 180.93 DEGREES (GRID)  
A TOTAL CORRECTION OF 7.86 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11368.00 FEET  
IS 4445.38 FEET ALONG 180.60 DEGREES (GRID)

Surface surveys at 235ft, 480 ft, and 765 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

The last survey is a projection to bit at 11368 ft MD