

Pressure Cased Gamma (PCGK)

1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	19-Nov-14	21-Nov-14	26-Nov-14		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.750		
Log Start Depth (MD, ft)	1,181.00	6,433.00	7,443.00		
Log End Depth (MD, ft)	6,433.00	7,443.00	14,413.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	17-Nov-14 23:35	20-Nov-14 01:10	22-Nov-14 12:20		
Drill/Wipe End Date and Time	18-Nov-14 20:25	20-Nov-14 17:00	26-Nov-14 06:45		
Min Inc (deg) @ Depth (MD, ft)	0.22 @ 6,377.00	11.36 @ 6,518.00	86.39 @ 13,380.00		
Max Inc (deg) @ Depth (MD, ft)	8.86 @ 3,059.00	90.45 @ 7,443.00	93.79 @ 11,863.00		
Bit TFA(in2) / Bit Type	0.91 /	1.24 /	0.65 /		
Flow Rate (gpm)	585.42	576.06	307.59		
Max AV (fpm) / CV (fpm) @ MWD	N/A	N/A	N/A		
Fluid Type	Polymer	Polymer	Native/Spud Mud		
Density (ppg) / Viscosity (spqt)	9.10 / 48.00	10.40 / 51.00	9.15 / 37.00		
Filtrate CL (ppm)	1,100.00	1,300.00	1,100.00		
pH/ API Filtrate (mpm)	9.20 / 5	8.60 / 6	8.30 / 6		
PV (cP) / YP (lbf2)	8 / 11.00	15 / 11.00	8 / 8.00		
% Solids / % Sand	4.7 / 0.35	7.3 / 0.30	3.3 / 0.10		
% Oil / Oil:Water Ratio	0.00 / 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 F/T (lb / ft2)	170.45 / 501.4	170.70 / 501.4	812.23 / 501.4		

Max Tool Temp (degF) / Source	158.47 / PCM	172.78 / PCM	242.28 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 158.47	N/A @ 172.78	N/A @ 242.28		
Lead MWD Engineer	Henry Schmeidler	Henry Schmeidler	Henry Schmeidler		
Customer Representative	Martin Suarez	Martin Suarez	Martin Suarez		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	11404298	11404298	12310740		
Insert Serial Number	11680745	11680745	11680745		
Date and Time Initialized	17-Nov-14 11:32	19-Nov-14 16:47	21-Nov-14 18:54		
Date and Time Read	19-Nov-14 10:18	21-Nov-14 06:42	26-Nov-14 15:42		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	56.29	51.91	58.37		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11404298	11404298	12310740		
Sonde Serial Number	11638623	11638623	11638623		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	221.22	143.89	345.51		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	51.19	46.81	53.27		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11404298	11404298	12310740		
Insert/Sonde Serial Number	12037422	12037422	12037422		

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

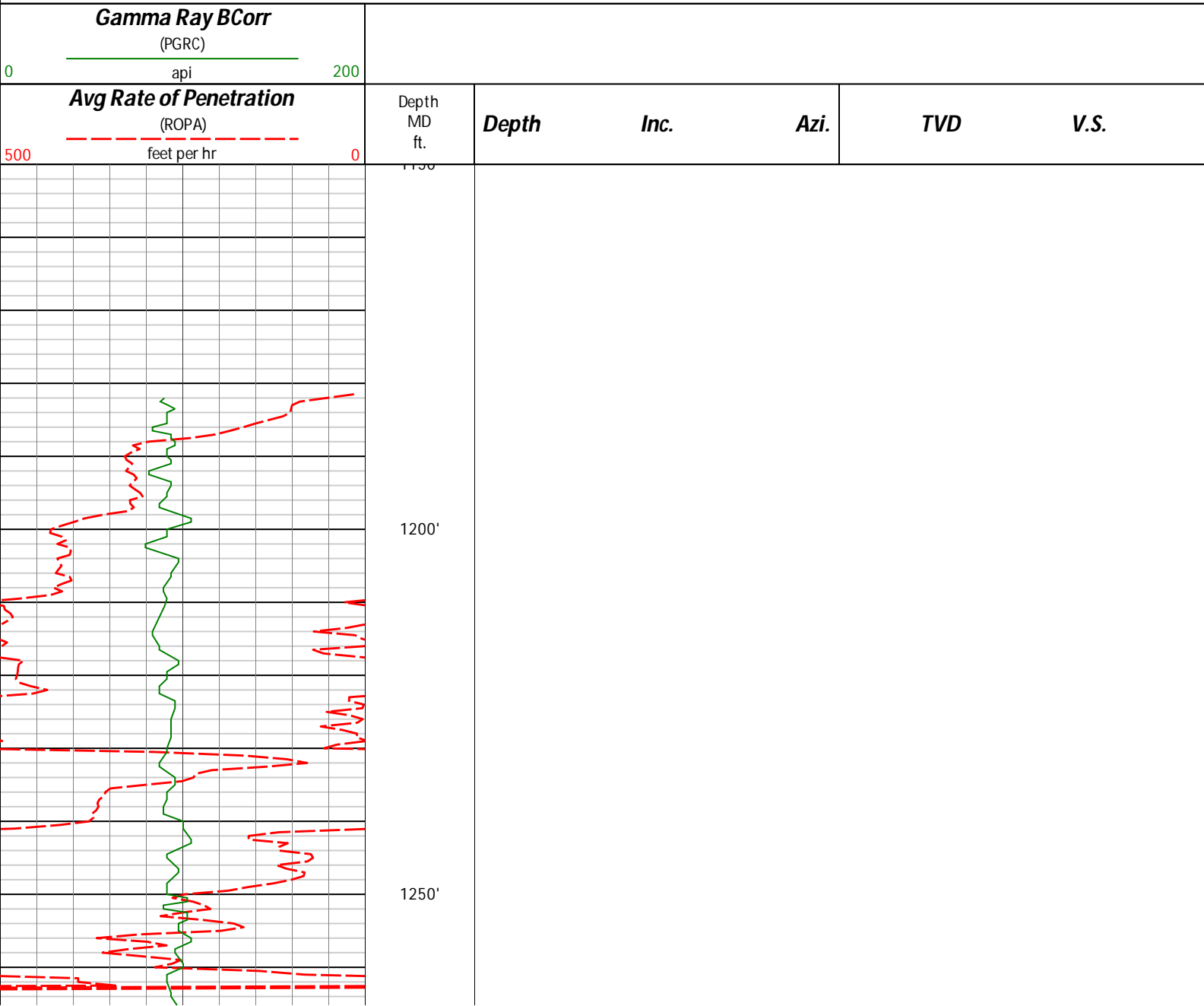
5. INSITE version 8.4.10-MLWD

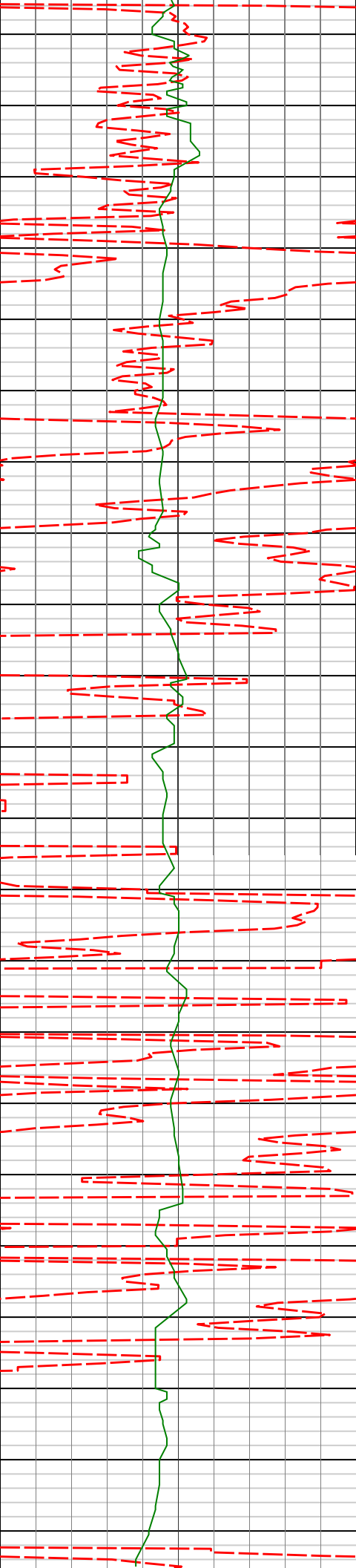
WARRANTY

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Sperry Drilling Services

MD Detail Log 1:240





1271'

0.44°

259.55°

1270.96'

0.29'

1300'

1350'

1364'

0.39°

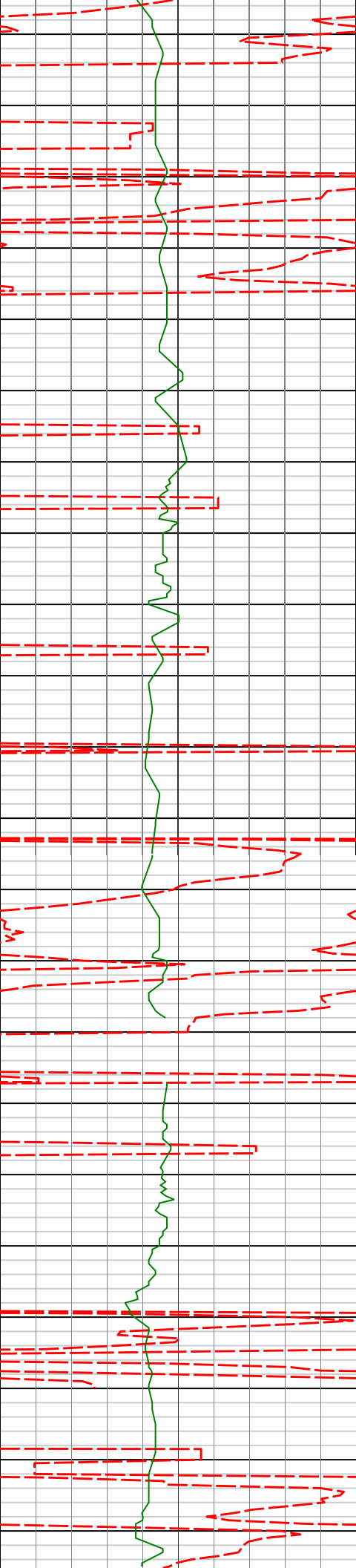
293.91°

1363.96'

0.35'

1400'

1450'



1500'

1550'

1600'

1650'

1700'

1550'

0.28°

21.74°

1549.96'

1.02'

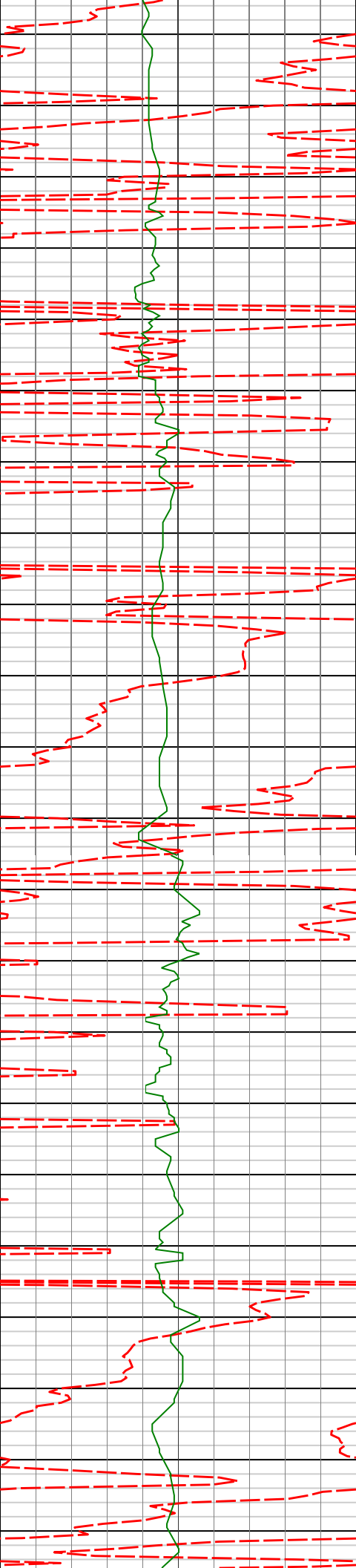
1643'

1.33°

29.12°

1642.95'

2.18'



1736'

2.41°

21.24°

1735.90'

4.95'

1750'

1800'

1850'

1900'

1828'

4.13°

25.14°

1827.74'

9.77'

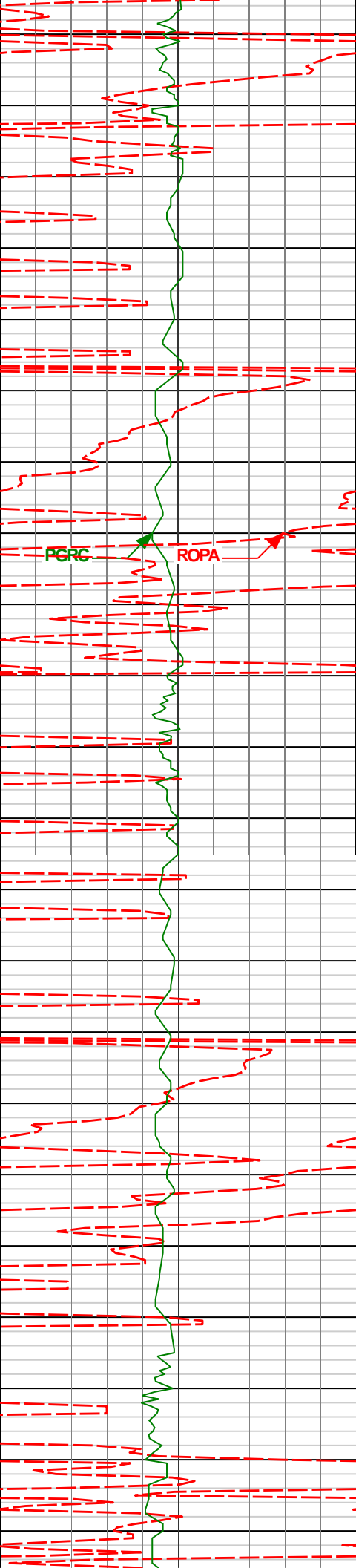
1920'

5.82°

19.16°

1919.39'

17.20'



1950'

2000'

2050'

2100'

PGRC

ROPA

2015'

7.07°

25.28°

2013.79'

27.06'

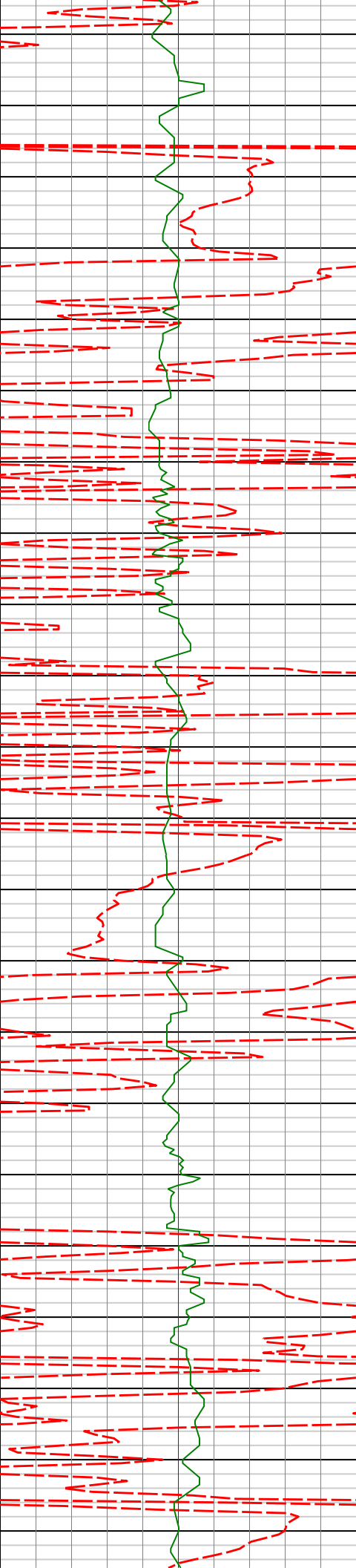
2110'

7.31°

29.13°

2108.05'

37.66'



2150'

2200'

2250'

2300'

2350'

2205'

6.94°

26.77°

2202.31'

48.10'

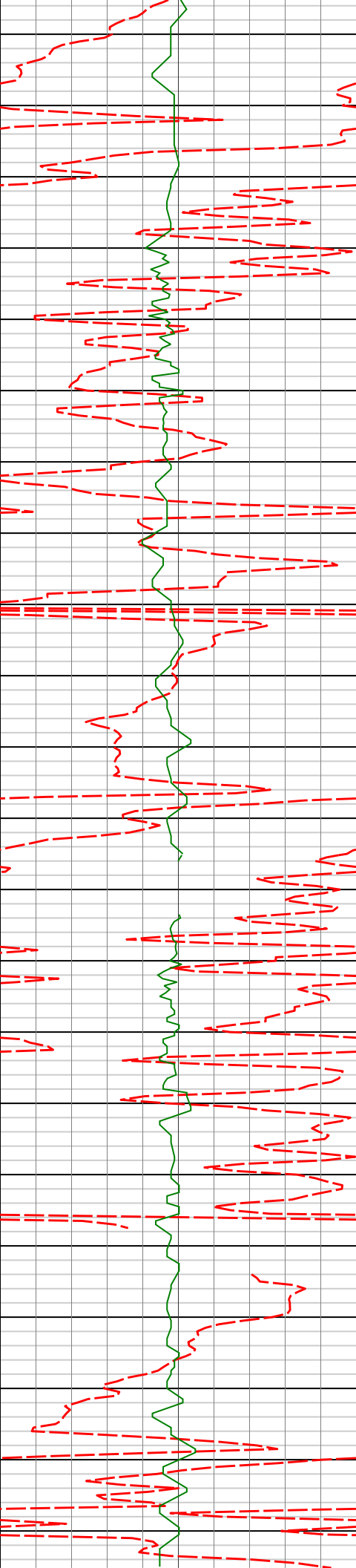
2300'

6.68°

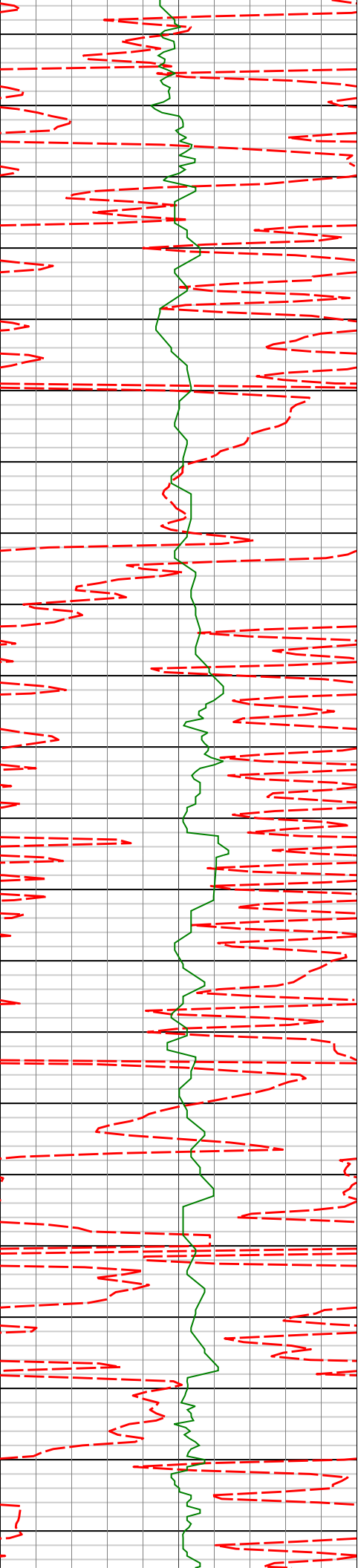
33.18°

2296.64'

57.89'



2394'	6.34°	31.67°	2390.04'	66.92'
2400'				
2450'				
2489'	7.33°	29.41°	2484.36'	76.70'
2500'				
2550'				
2584'	7.84°	26.75°	2578.53'	87.81'



2600'

2650'

2700'

2750'

2800'

2679'

8.05°

30.61°

2672.62'

99.36'

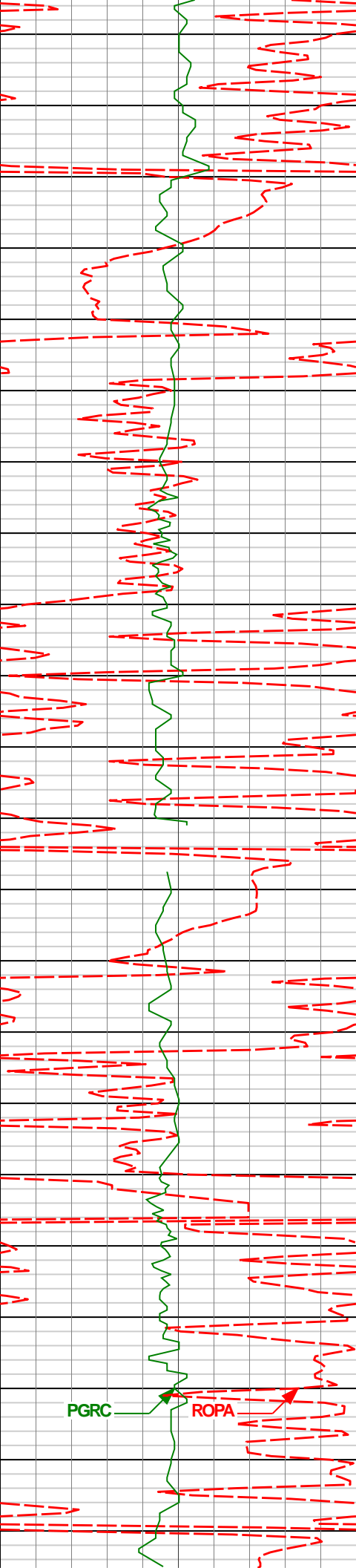
2774'

7.32°

31.67°

2766.76'

110.28'



2850'

2869'

7.47°

30.68°

2860.97'

120.79'

2900'

2950'

2964'

8.35°

35.81°

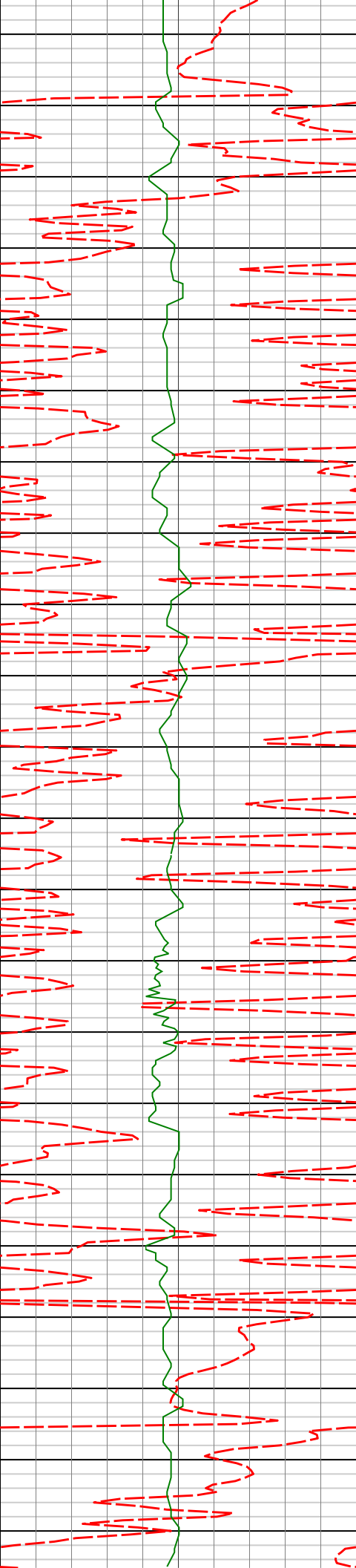
2955.07'

131.74'

3000'

PGRC

ROPA



3050'

3100'

3150'

3200'

3059'

8.86°

33.85°

3049.00'

143.47'

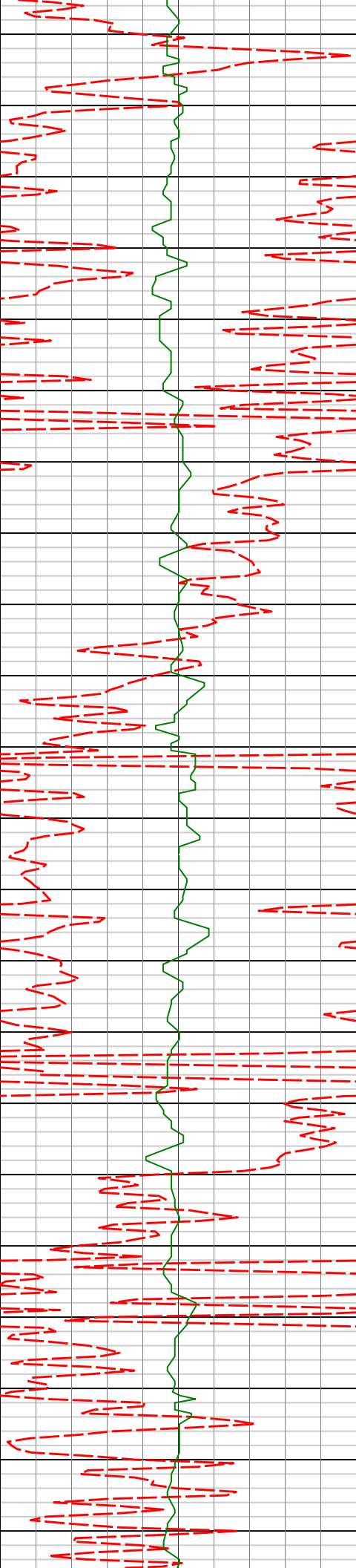
3153'

7.61°

34.21°

3142.03'

154.68'



3250'

3300'

3350'

3400'

3450'

3248'

3343'

3438'

7.79°

6.11°

5.10°

33.95°

33.79°

33.76°

3236.17'

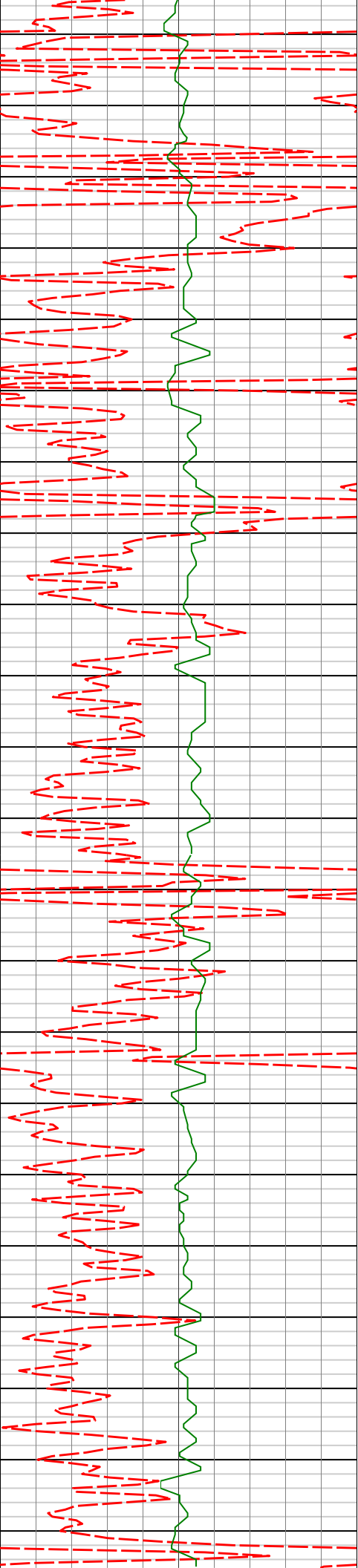
3330.47'

3425.02'

165.27'

174.86'

182.60'



3500'

3550'

3600'

3650'

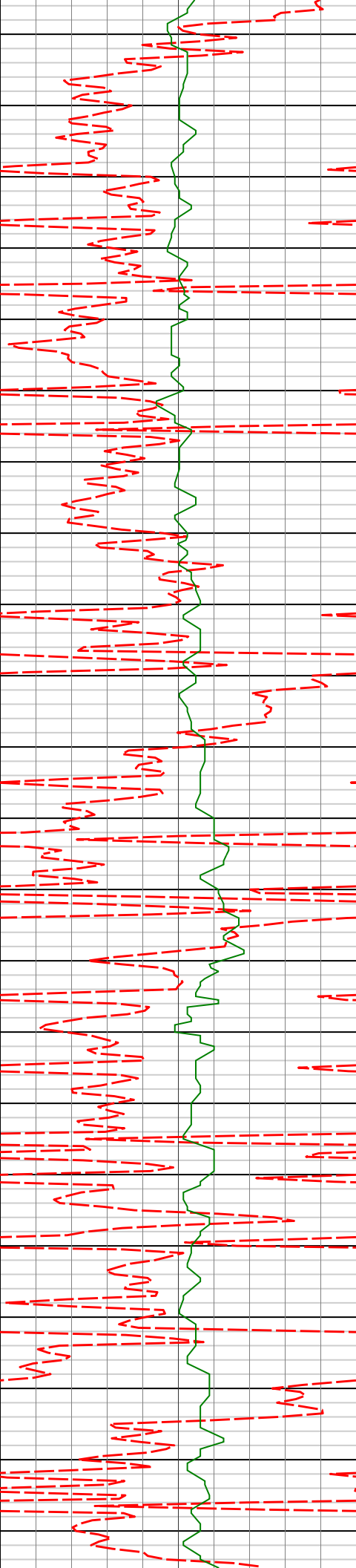
3628'

1.89°

33.89°

3614.64'

192.27'



3700'

3723'

1.27°

36.36°

3709.60'

194.43'

3750'

3800'

3818'

0.57°

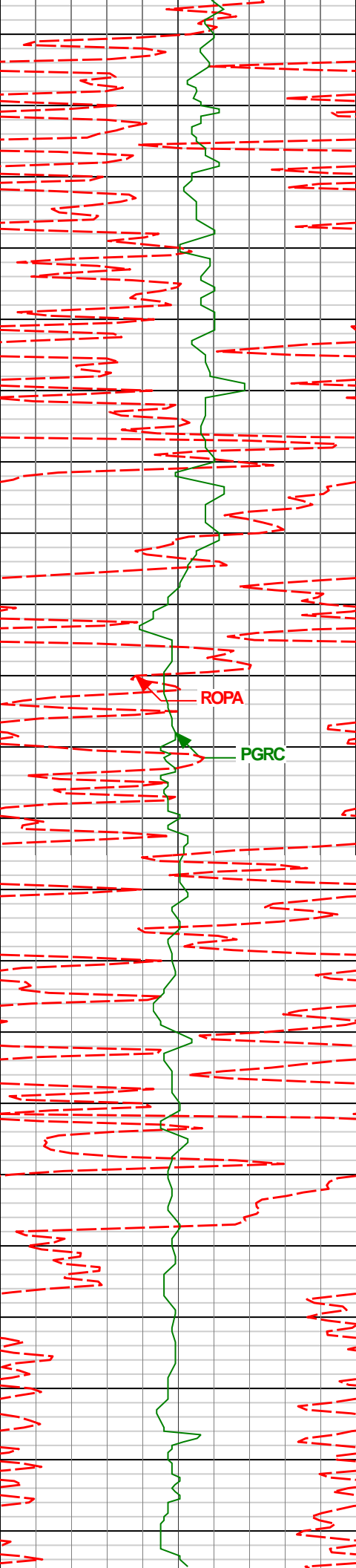
359.92°

3804.59'

195.75'

3850'

3900'



3950'

4000'

4050'

4100'

ROPA

PGRC

4008'

0.78°

220.73°

3994.58'

195.71'

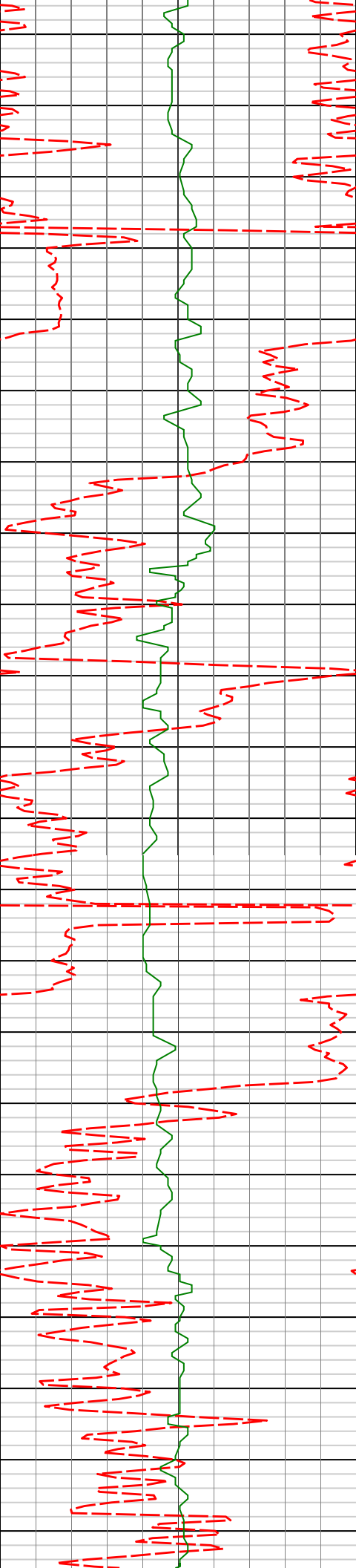
4103'

1.18°

222.35°

4089.57'

194.49'



4150'

4200'

4250'

4300'

4198'

1.13°

241.00°

4184.55'

193.31'

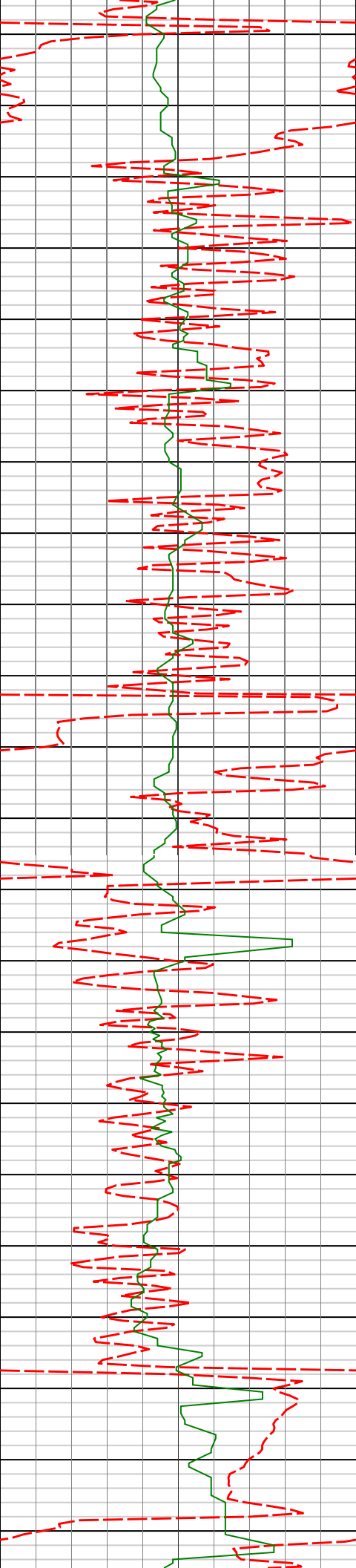
4292'

1.46°

261.31°

4278.53'

192.66'



4350'

4387'

1.57°

262.56°

4373.49'

192.29'

4400'

4450'

4482'

1.80°

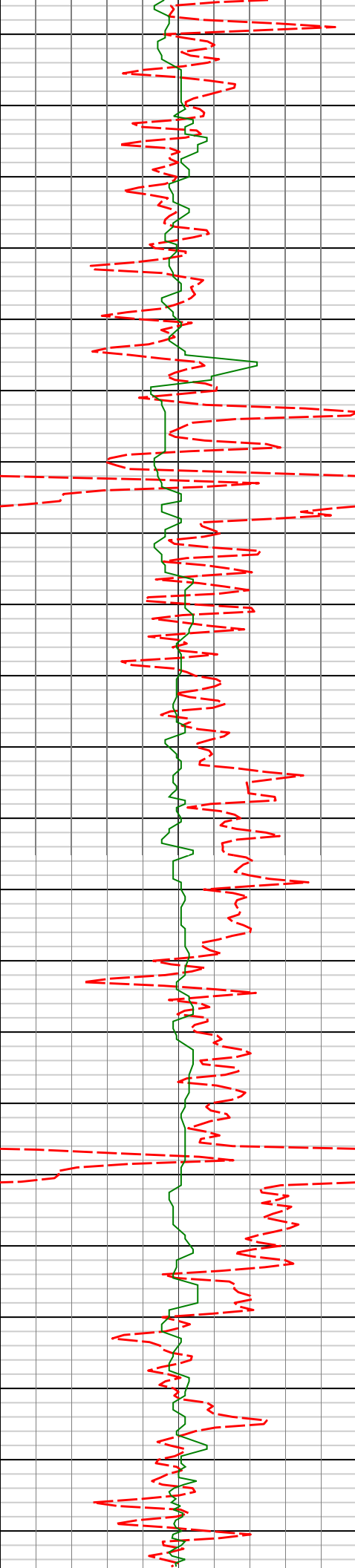
267.56°

4468.45'

192.04'

4500'

4550'



4600'

4650'

4700'

4750'

4577'

1.36°

292.83°

4563.42'

192.40'

4672'

1.20°

280.63°

4658.39'

193.01'

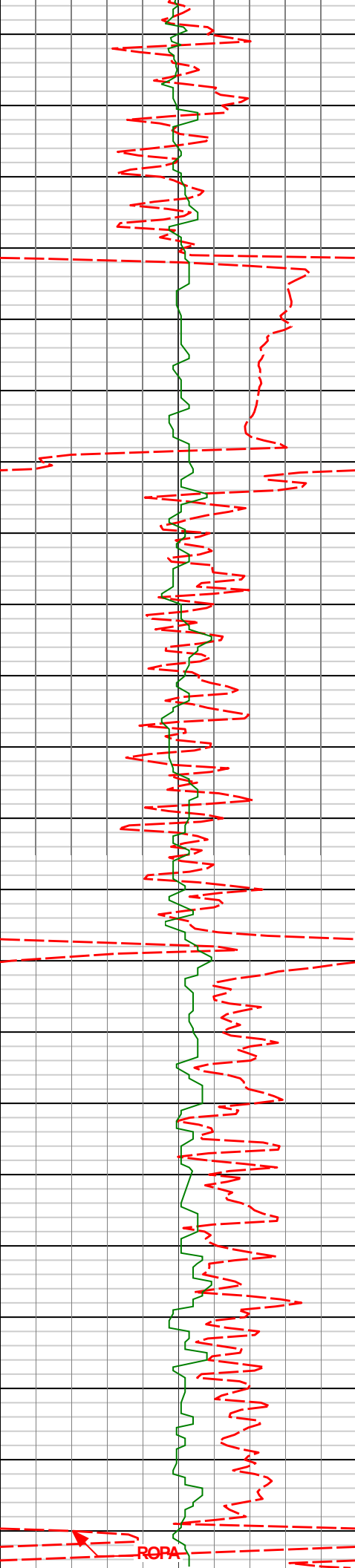
4767'

1.54°

262.53°

4753.37'

193.01'



4800'

4850'

4900'

4950'

5000'

4862'

0.98°

22.09°

4848.35'

193.59'

4956'

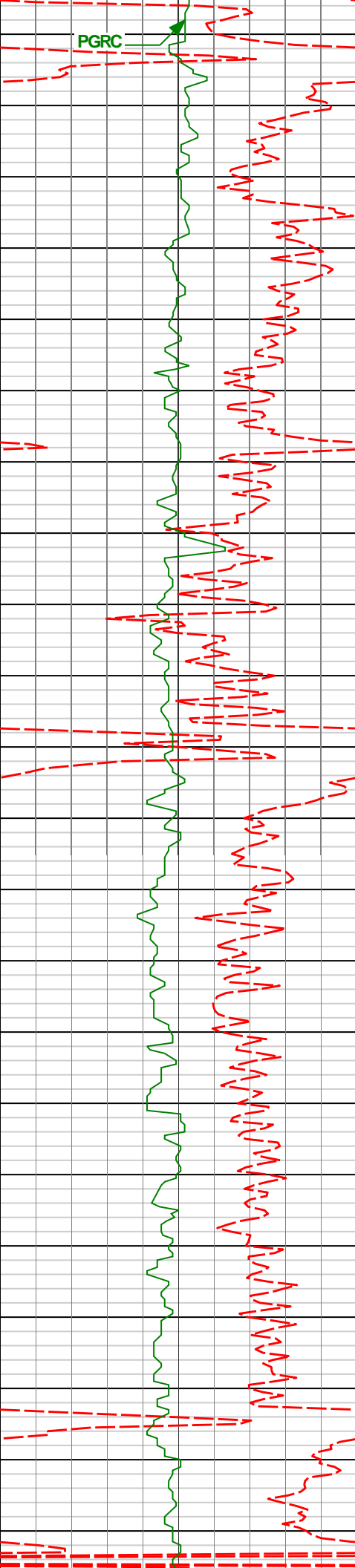
0.64°

52.76°

4942.35'

194.66'

ROPA



5050'

5051'

1.29°

99.03°

5037.33'

194.82'

5100'

5150'

5146'

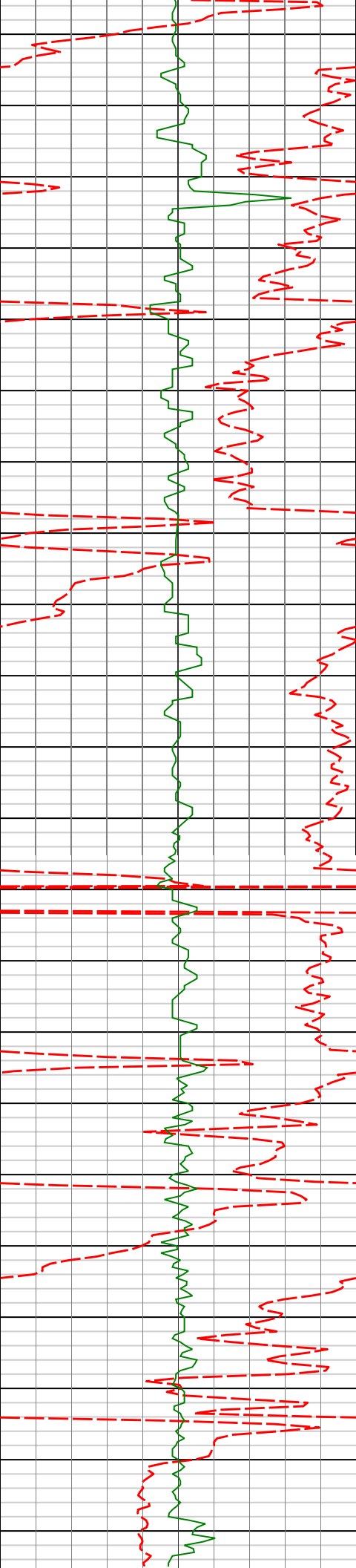
1.23°

87.23°

5132.31'

194.72'

5200'



5241'

0.78°

90.74°

5227.29'

194.77'

5250'

5300'

5336'

0.49°

84.12°

5322.29'

194.81'

5350'

5400'

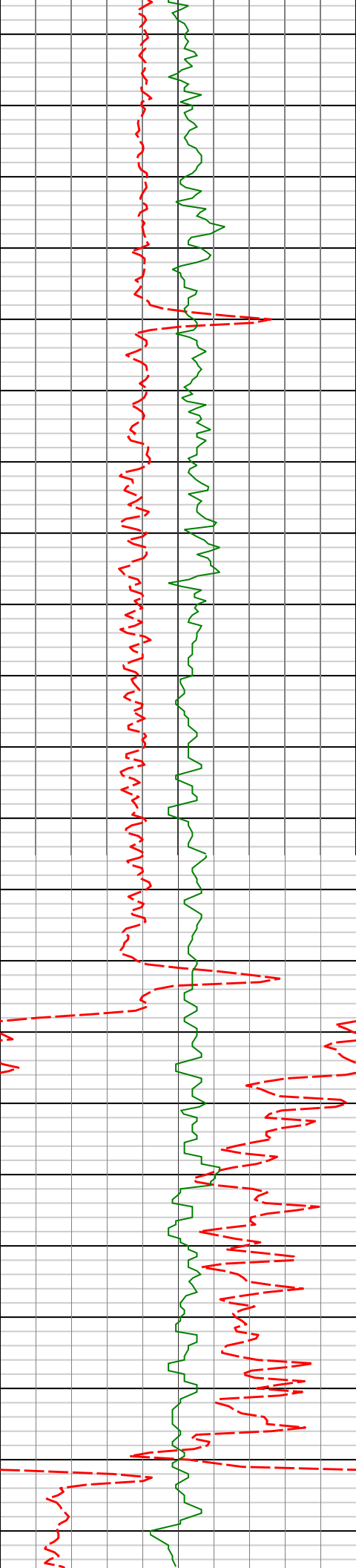
5430'

0.51°

94.56°

5416.29'

194.82'



5450'

5500'

5525'

0.48°

69.12°

5511.28'

194.94'

5550'

5600'

5620'

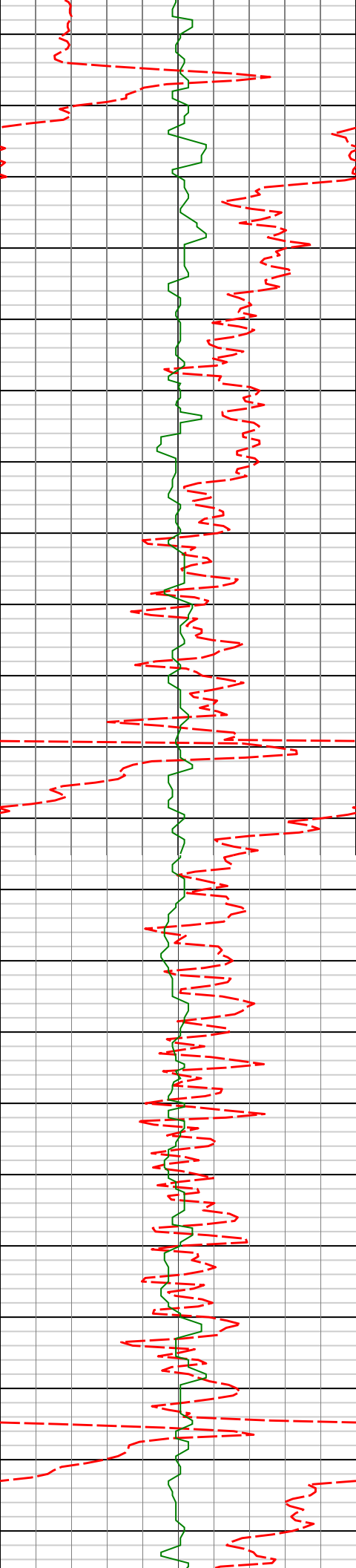
0.43°

88.59°

5606.28'

195.09'

5650'



5700'

5715'

0.68°

90.97°

5701.27'

195.10'

5750'

5800'

5810'

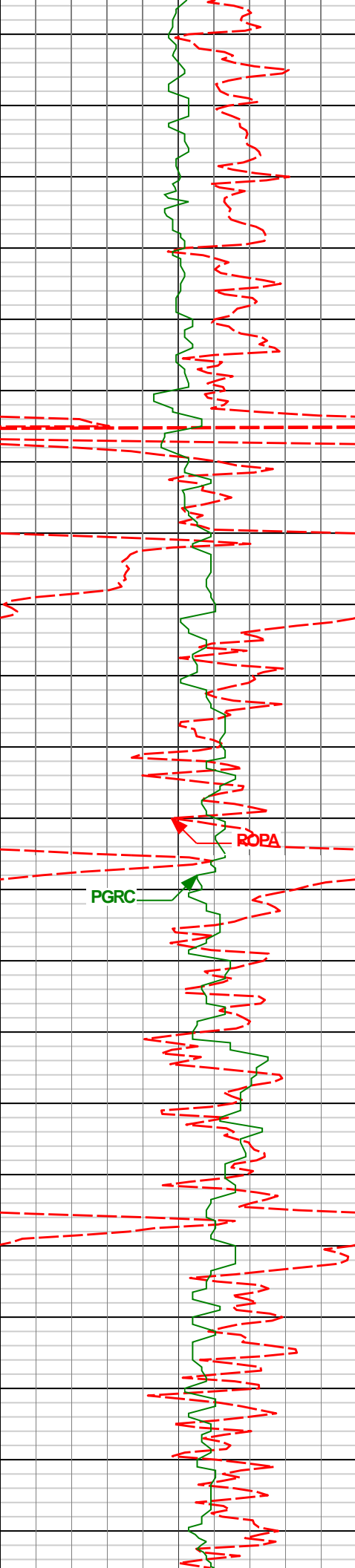
0.72°

78.04°

5796.27'

195.22'

5850'



5900'

5905'

0.90°

15.04°

5891.26'

196.07'

5950'

6000'

5999'

0.84°

19.53°

5985.25'

197.43'

6050'

6100'

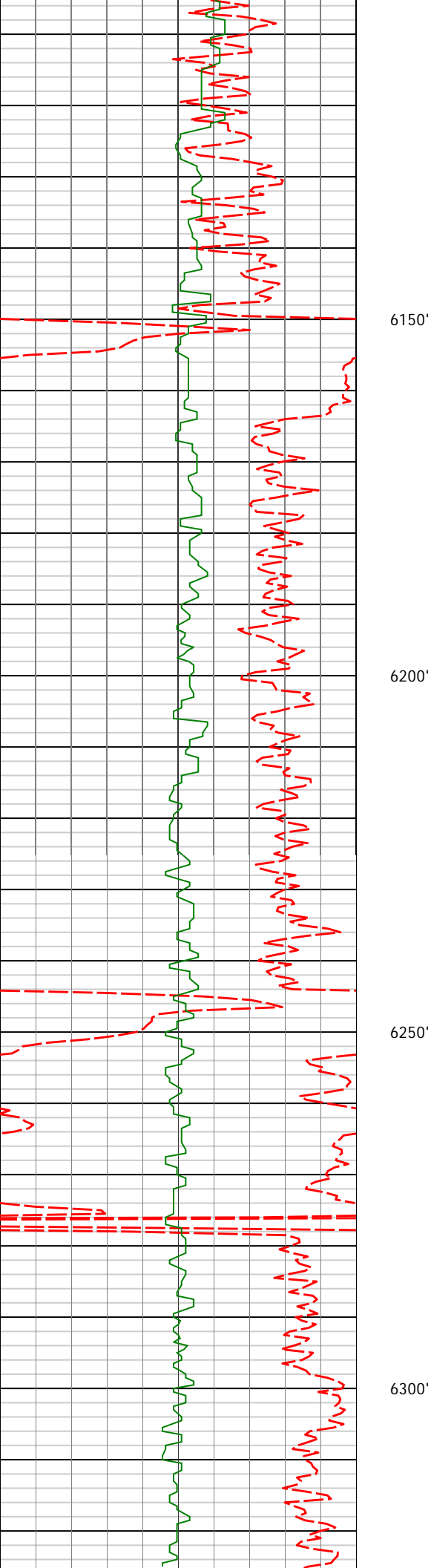
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8.32°

6080.24'

198.71'



6189'

0.62°

348.13°

6175.23'

199.82'

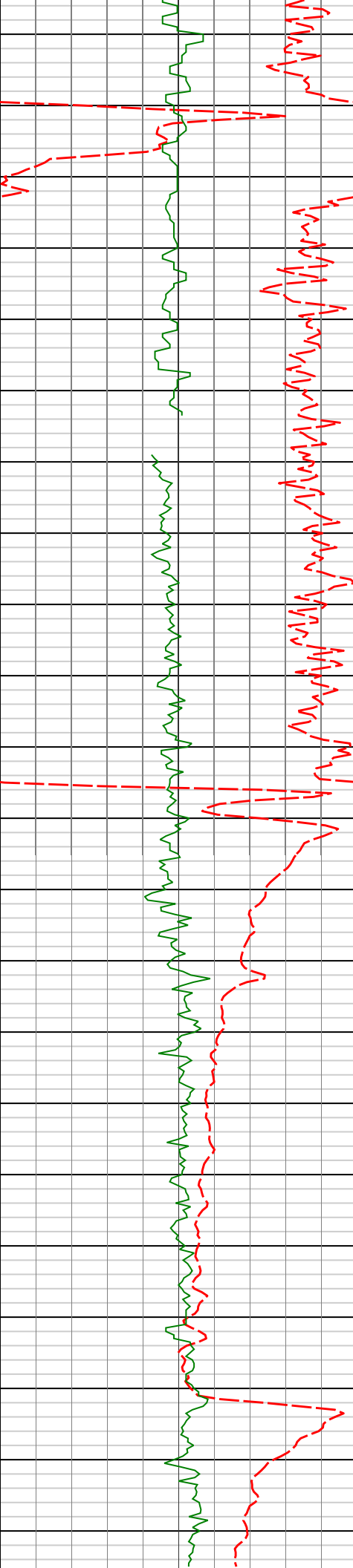
6284'

0.36°

41.19°

6270.23'

200.55'



6350'

6377'

0.22°

19.15°

6363.23'

200.94'

6400'

6450'

6500'

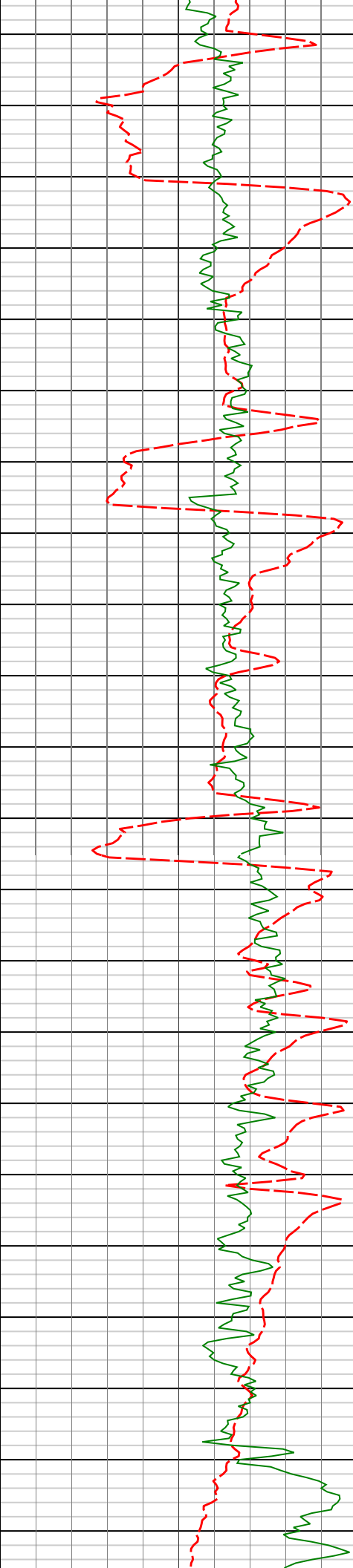
6518'

11.36°

356.15°

6503.29'

215.09'



6550'

6565'

14.77°

354.43°

6549.07'

225.67'

6600'

6613'

17.57°

352.43°

6595.16'

238.93'

6650'

6660'

20.19°

353.64°

6639.63'

254.02'

6700'

6750'

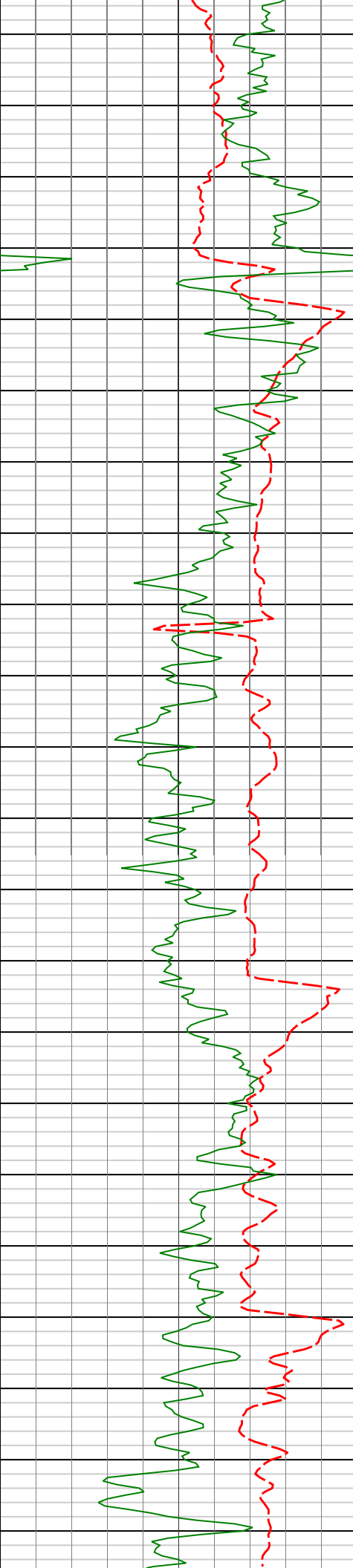
6755'

25.02°

6.83°

6727.36'

290.30'



6800'

6850'

6900'

6950'

6849'

34.79°

4.63°

6808.75'

336.91'

6897'

39.45°

1.59°

6847.02'

365.84'

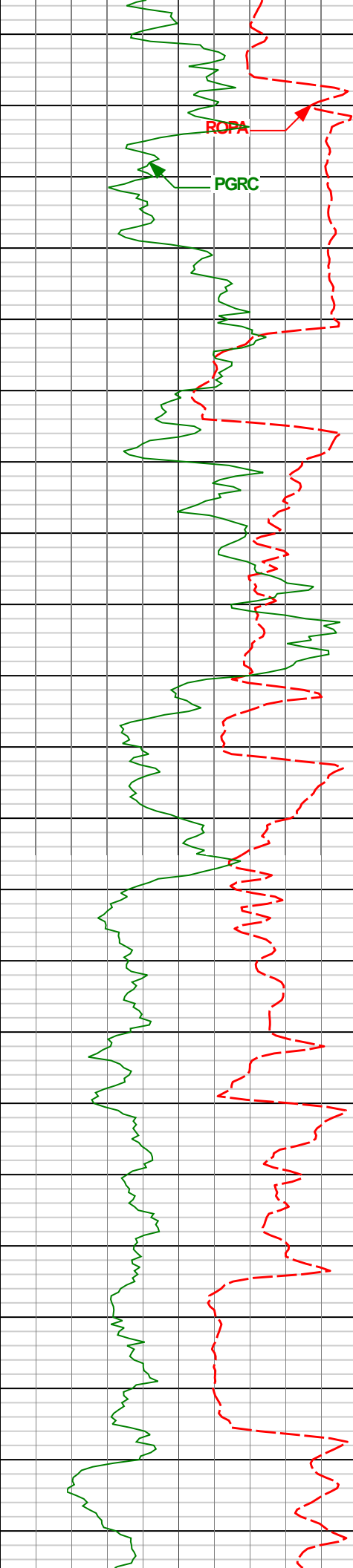
6944'

44.89°

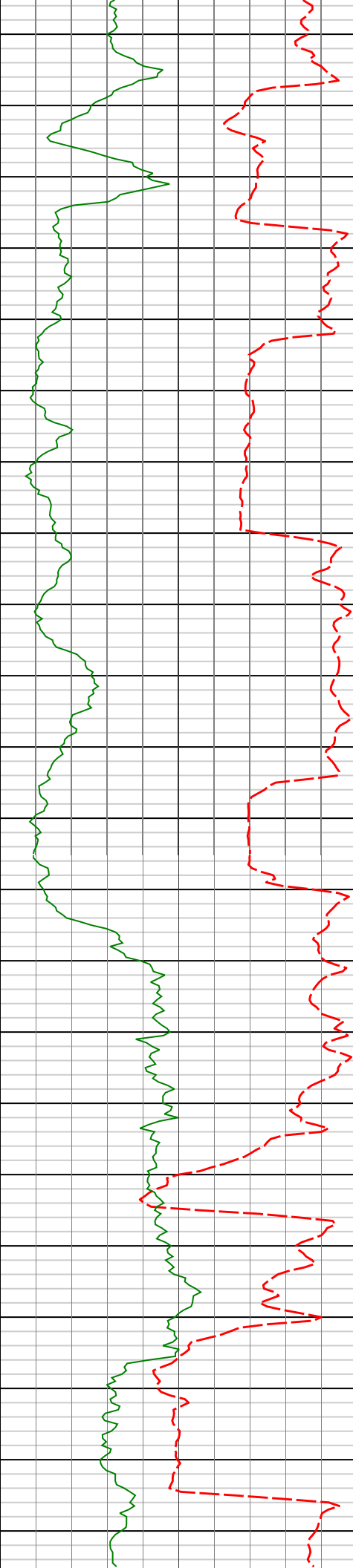
0.19°

6881.84'

397.37'



6992'	49.96°	356.72°	6914.31'	432.68'
7039'	54.14°	355.75°	6943.21'	469.63'
7087'	60.14°	355.44°	6969.24'	509.79'
7134'	65.68°	355.08°	6990.64'	551.45'
7182'	69.54°	356.11°	7008.92'	595.67'



7250'

7277'

7300'

7324'

7350'

7389'

7400'



7450'

7480'

91.63°

359.14°

7052.38'

888.04'

7500'

7543'

90.65°

357.02°

7051.13'

950.97'

7550'

7600'

7638'

89.97°

356.50°

7050.61'

1045.78'



7650'

7700'

7750'

7800'

7850'

7733'

91.51°

357.26°

7049.39'

1140.59'

7826'

91.63°

357.49°

7046.84'

1233.42'



7900'

7920'

89.26°

357.69°

7046.11'

1327.30'

7950'

8000'

PGPC

ROPA

8013'

90.49°

358.06°

7046.31'

1420.21'

8050'



8100'

8106'

89.32°

357.32°

7046.47'

1513.10'

8150'

8200'

8198'

87.45°

358.36°

7049.06'

1604.97'

8250'

8300'

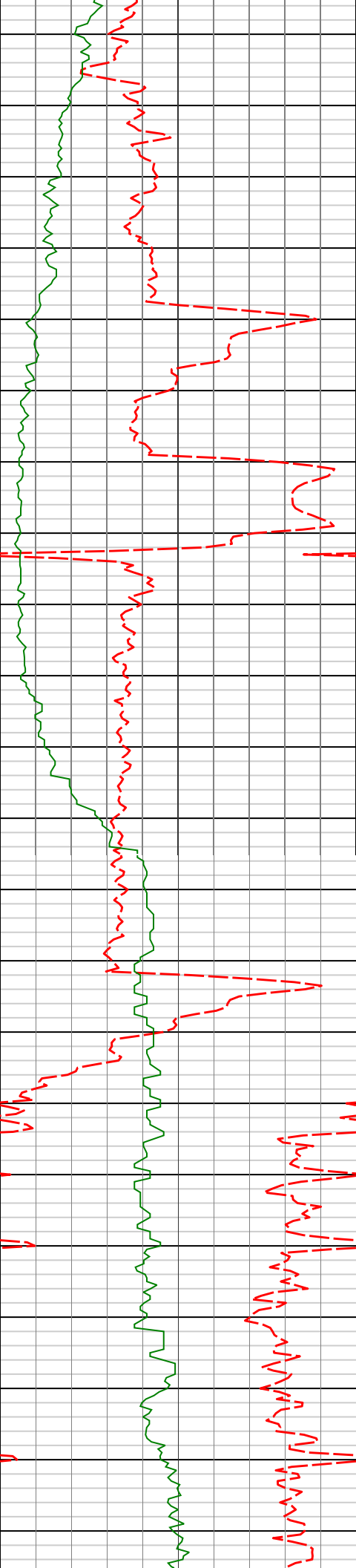
8291'

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356.75°

7053.25'

1697.76'



8350'

8400'

8450'

8500'

8384'

87.29°

356.31°

7057.58'

1790.45'

8476'

87.26°

354.58°

7061.95'

1882.00'



8550'

8567'

88.03°

355.36°

7065.69'

1972.51'

8600'

8650'

8659'

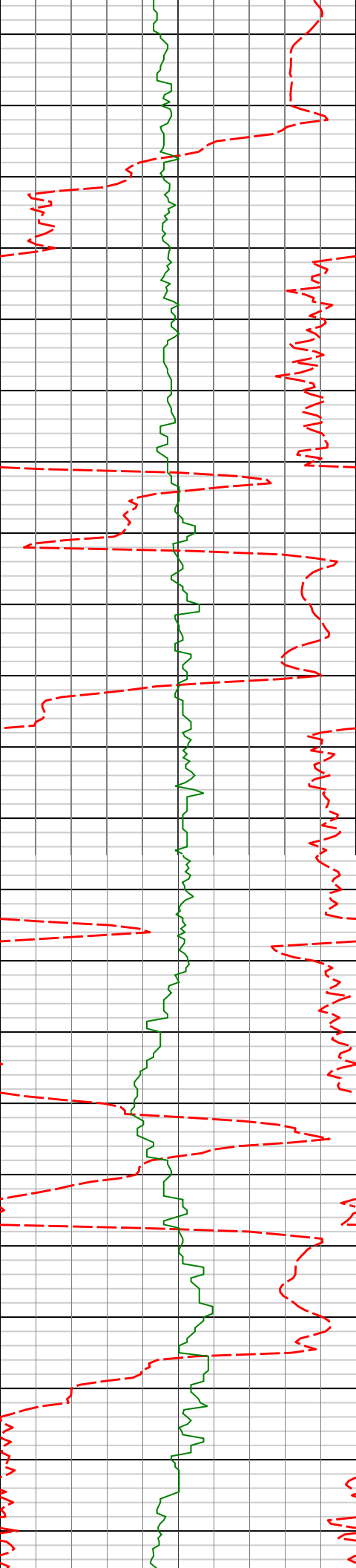
88.74°

355.57°

7068.28'

2064.14'

8700'



8750'

8800'

8850'

8900'

8950'

8751'

8844'

8936'

89.63°

90.31°

90.83°

357.80°

358.69°

359.08°

7069.59'

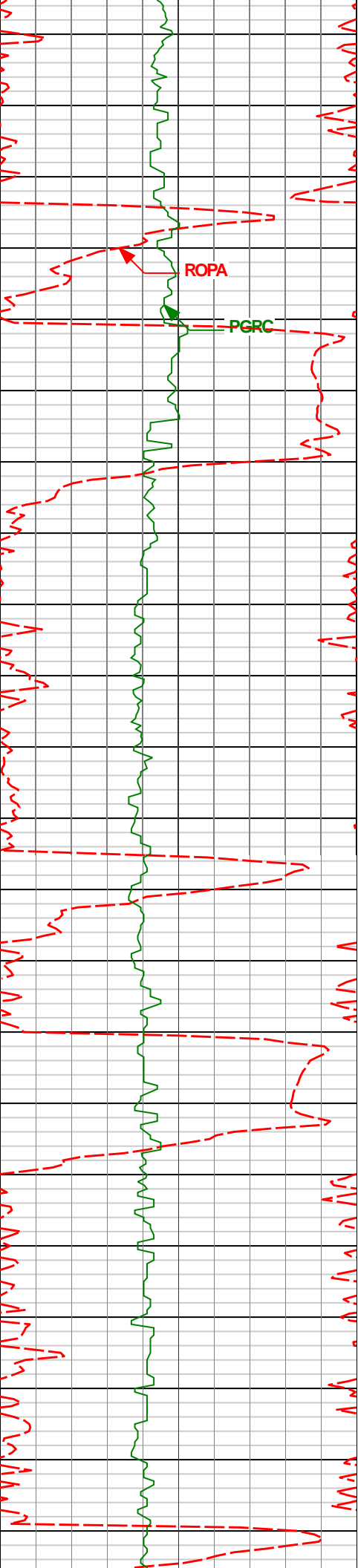
7069.64'

7068.73'

2155.93'

2248.86'

2340.82'



9000'

ROPA

PGRC

9030'

90.83°

359.71°

7067.36'

2434.80'

9050'

9100'

9123'

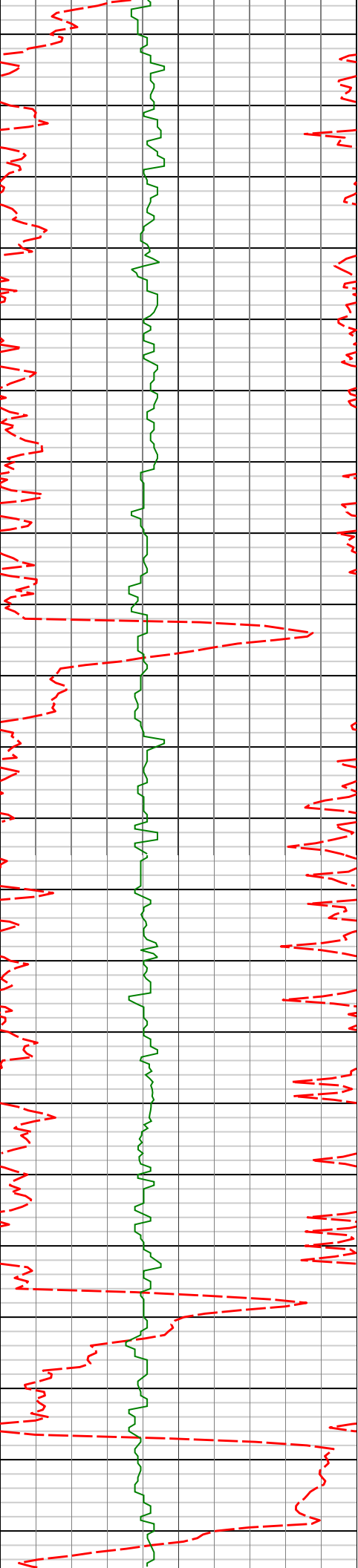
90.06°

0.19°

7066.64'

2527.79'

9150'



9200'

9216'

89.88°

359.81°

7066.69'

2620.79'

9250'

9300'

9309'

90.09°

359.48°

7066.72'

2713.78'

9350'

9400'

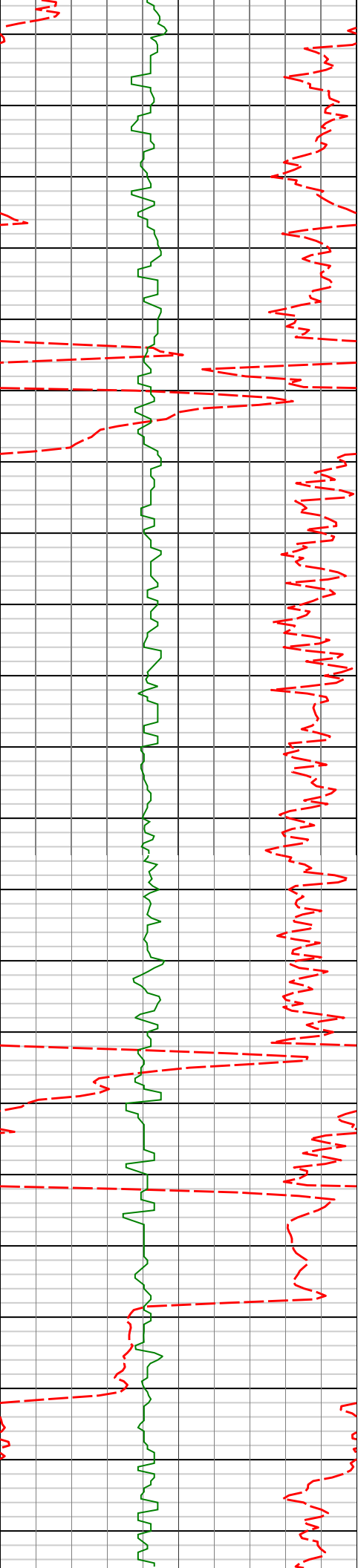
9401'

90.03°

359.32°

7066.62'

2805.77'



9450'

9494'

88.95°

359.22°

7067.45'

2898.75'

9500'

9550'

9586'

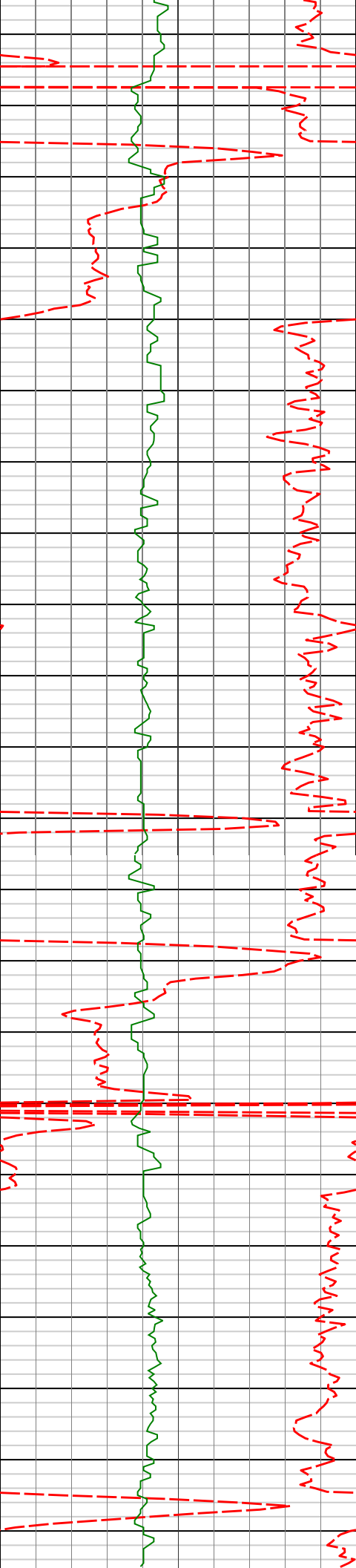
90.86°

359.25°

7067.60'

2990.72'

9600'



9650'

9700'

9750'

9800'

9681'

90.99°

359.20°

7066.07'

3085.69'

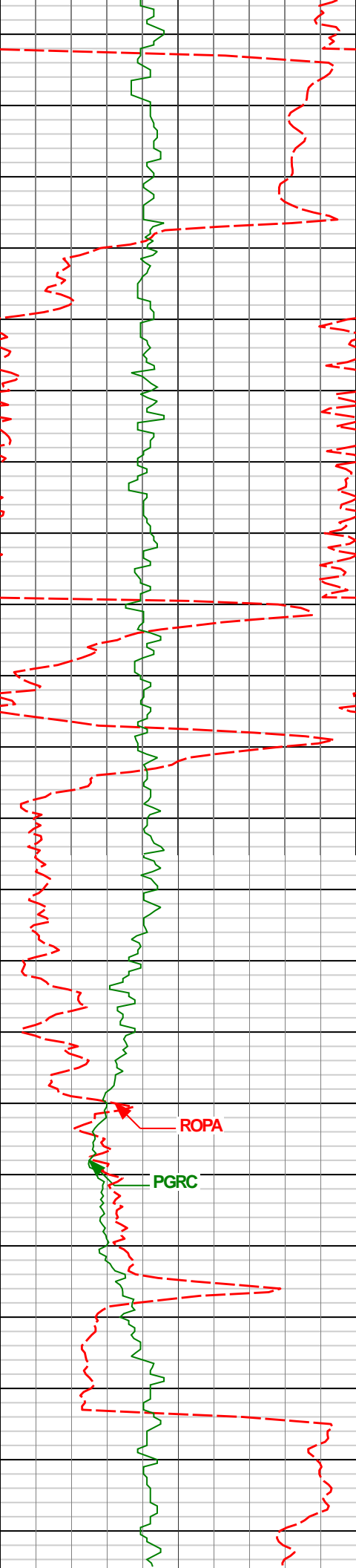
9776'

91.20°

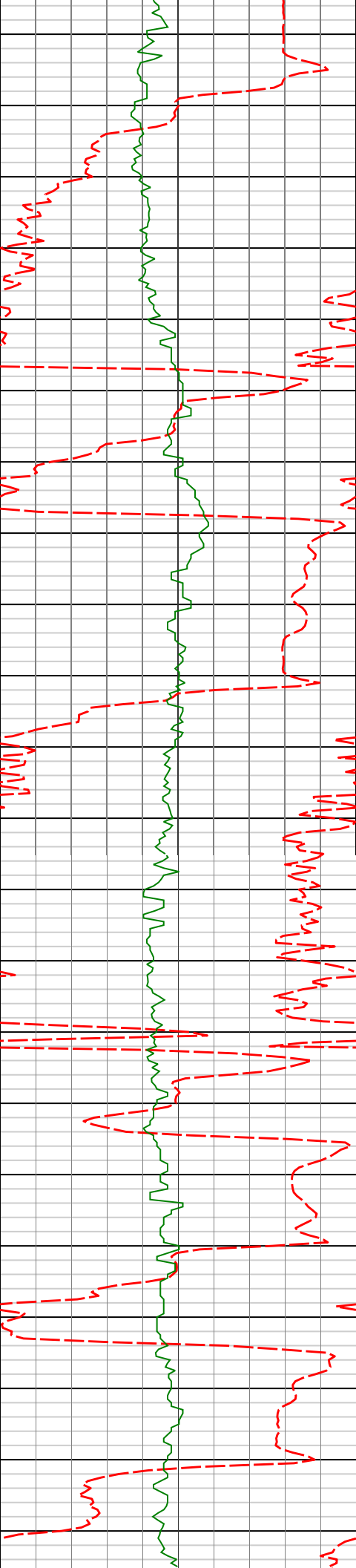
357.94°

7064.25'

3180.62'



9871'	90.22°	359.10°	7063.07'	3275.56'
9965'	89.20°	357.46°	7063.55'	3369.49'
10060'	87.08°	356.45°	7066.63'	3464.27'



10100'

10150'

10200'

10250'

10155'

88.00°

358.24°

7070.71'

3559.04'

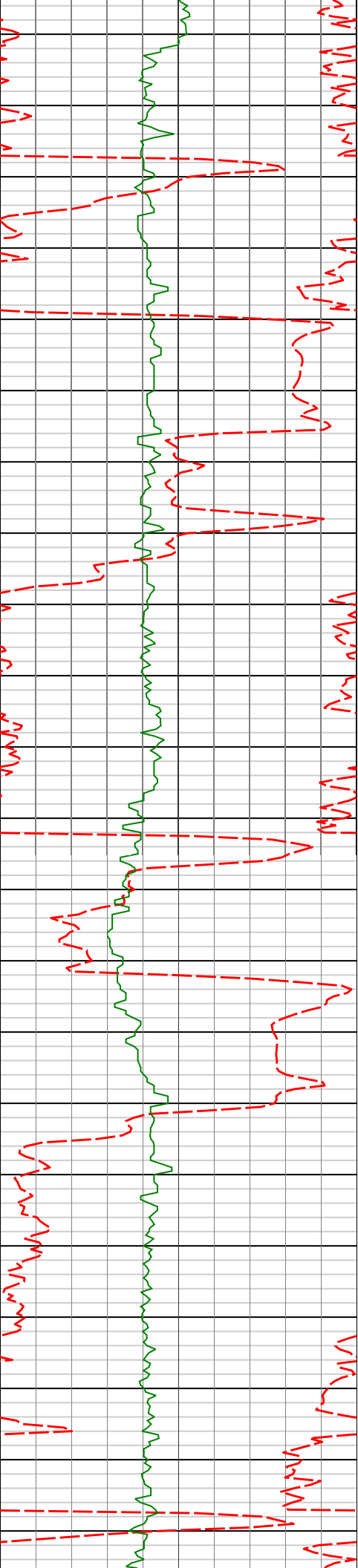
10250'

90.77°

357.42°

7071.73'

3653.93'



10300'

10345'

92.13°

0.09°

7069.33'

3748.85'

10350'

10400'

10439'

88.31°

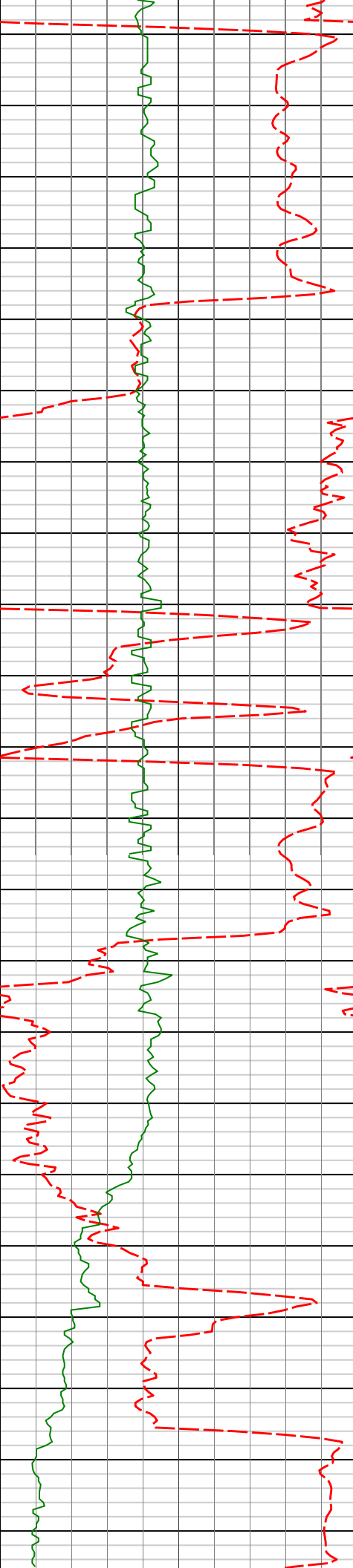
358.07°

7068.96'

3842.80'

10450'

10500'



10550'

10600'

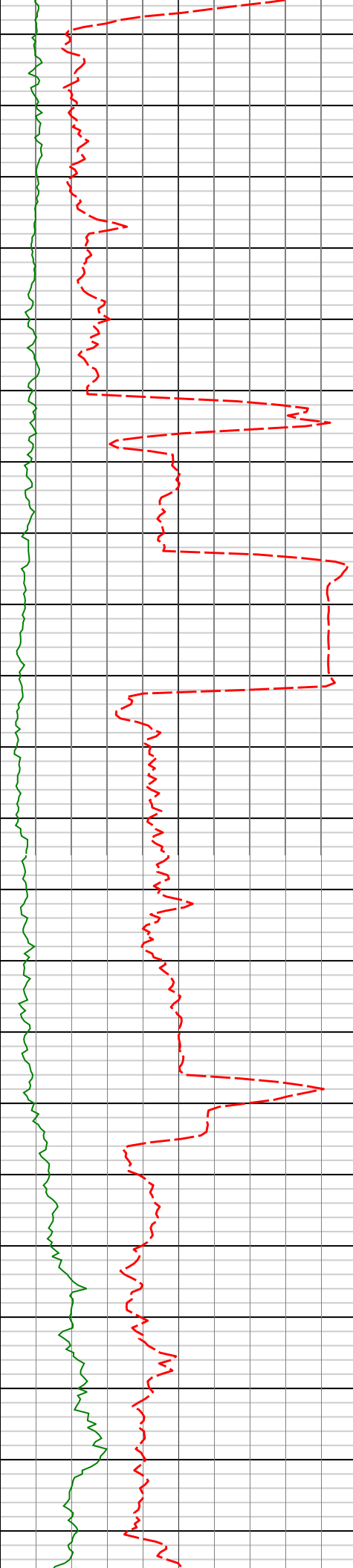
10650'

10700'

10534' 90.25° 357.67° 7070.16' 3937.70'

10629' 91.54° 0.10° 7068.67' 4032.65'

10724' 90.09° 0.56° 7067.32' 4127.63'



10750'

10800'

10850'

10900'

10819'

91.17°

1.48°

7066.28'

4222.62'

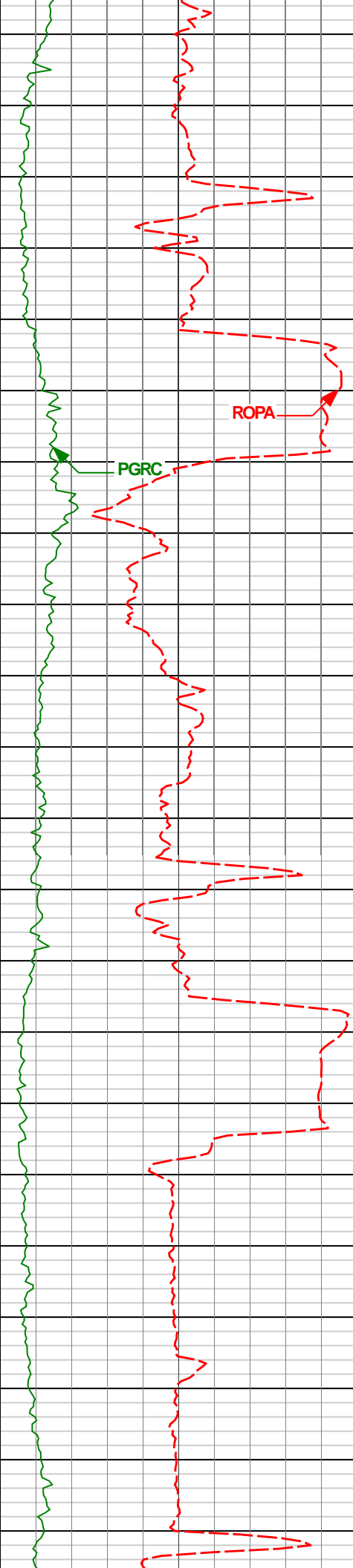
10914'

92.19°

1.37°

7063.49'

4317.56'



10950'

11000'

11050'

11100'

11150'

ROPA

PGR

11009'

91.88°

2.36°

7060.12'

4412.47'

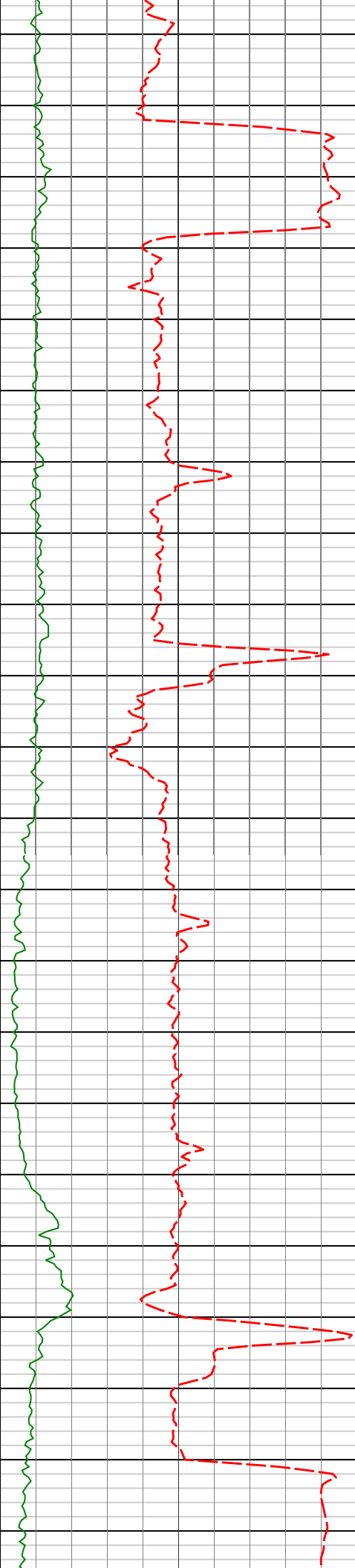
11104'

90.31°

3.12°

7058.30'

4507.37'



11200'

11250'

11300'

11350'

11199'

11293'

89.29°

90.68°

3.43°

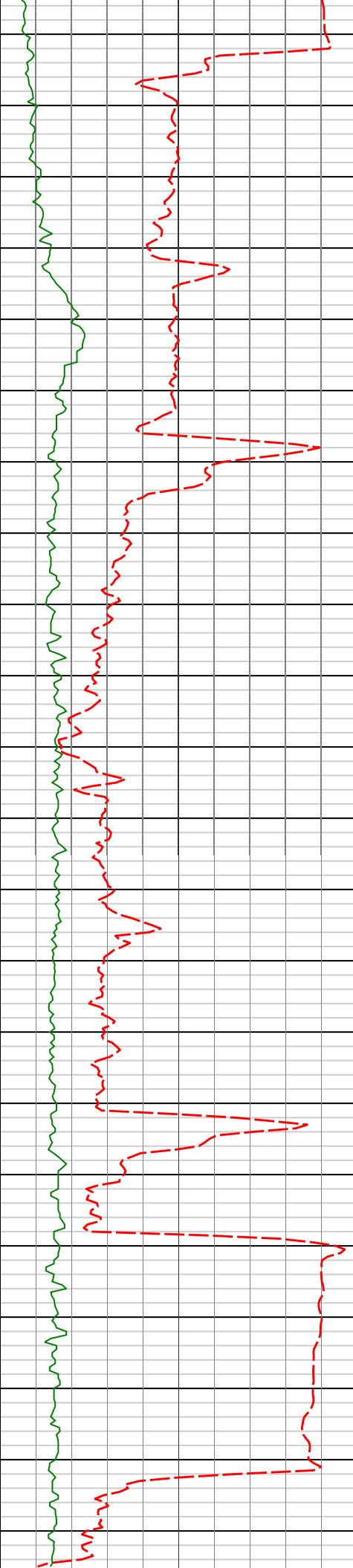
3.68°

7058.64'

7058.66'

4602.25'

4696.10'



11400'

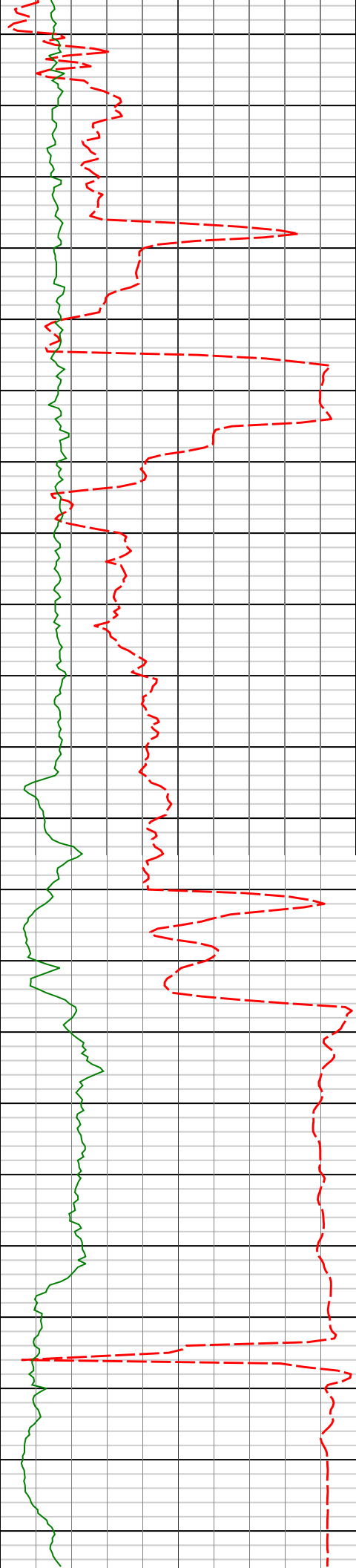
11450'

11500'

11550'

11600'

11388'	89.17°	2.40°	7058.79'	4790.99'
11483'	89.88°	3.91°	7059.57'	4885.88'
11578'	88.86°	359.36°	7060.62'	4980.82'



11650'

11700'

11750'

11800'

11673'

88.55°

353.77°

7062.77'

5075.55'

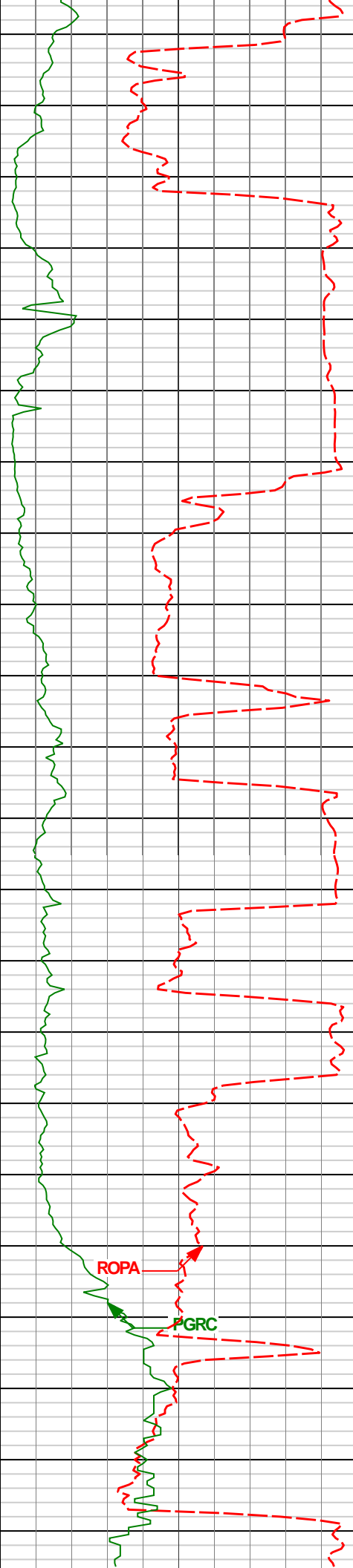
11768'

88.92°

351.94°

7064.86'

5169.70'



11850'

11863'

93.79°

357.84°

7062.62'

5264.17'

11900'

11950'

11958'

91.02°

0.24°

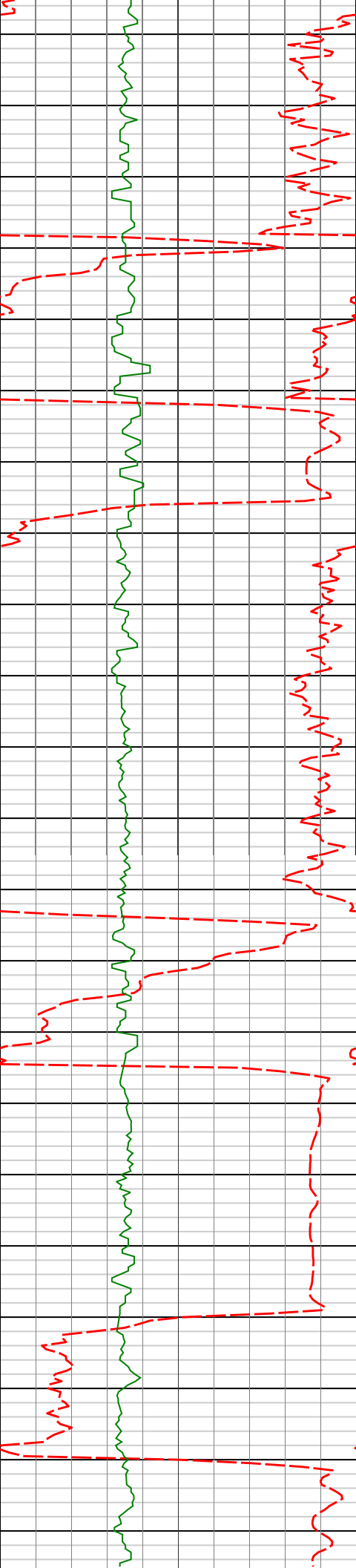
7058.63'

5359.04'

12000'

ROP

GRC



12300'

12337'

88.49°

357.73°

7060.07'

5737.91'

12350'

12400'

12432'

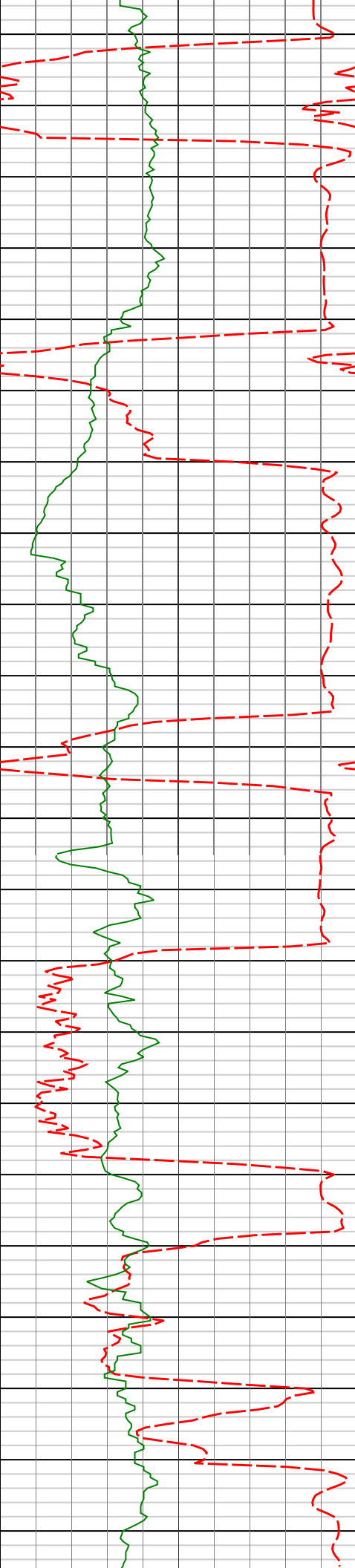
90.37°

357.03°

7061.01'

5832.77'

12450'



12500'

12527'

87.13°

359.18°

7063.09'

5927.66'

12550'

12600'

12622'

90.74°

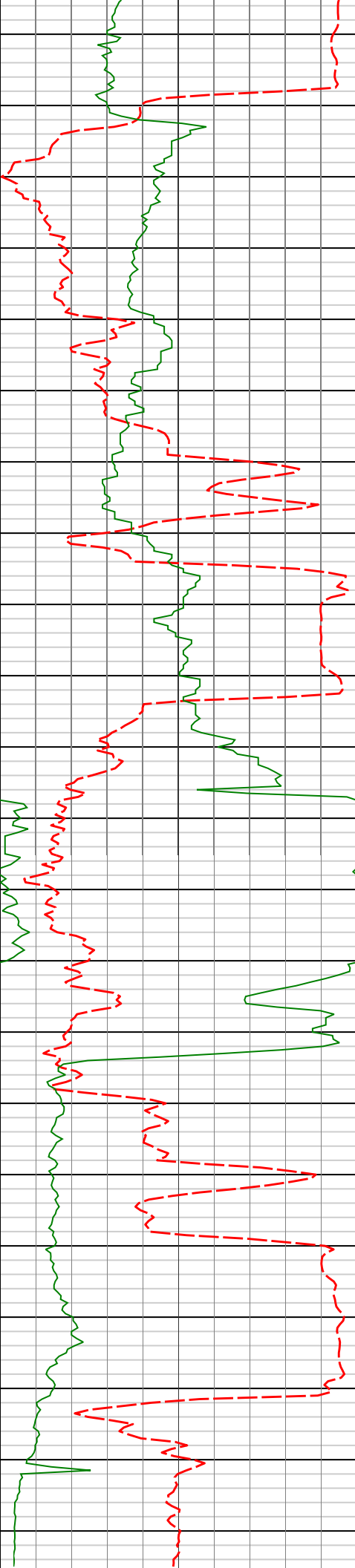
1.69°

7064.85'

6022.62'

12650'

12700'



12717'	91.94°	3.01°	7062.63'	6117.53'
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12750'

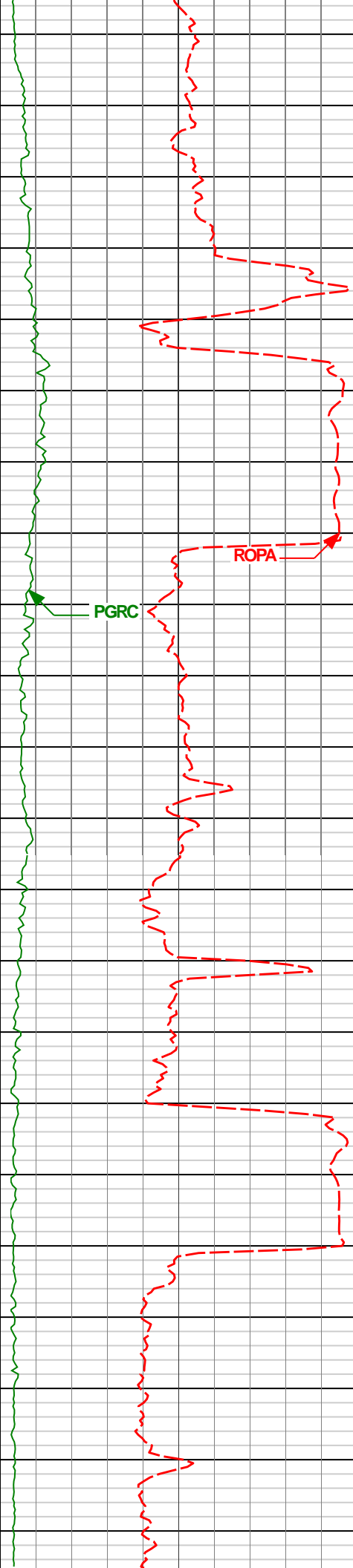
12800'

12812'	91.11°	3.25°	7060.10'	6212.39'
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12850'

12900'

12907'	89.63°	2.76°	7059.49'	6307.28'
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12950'

13000'

13050'

13100'

13001'

89.75°

4.54°

7060.00'

6401.13'

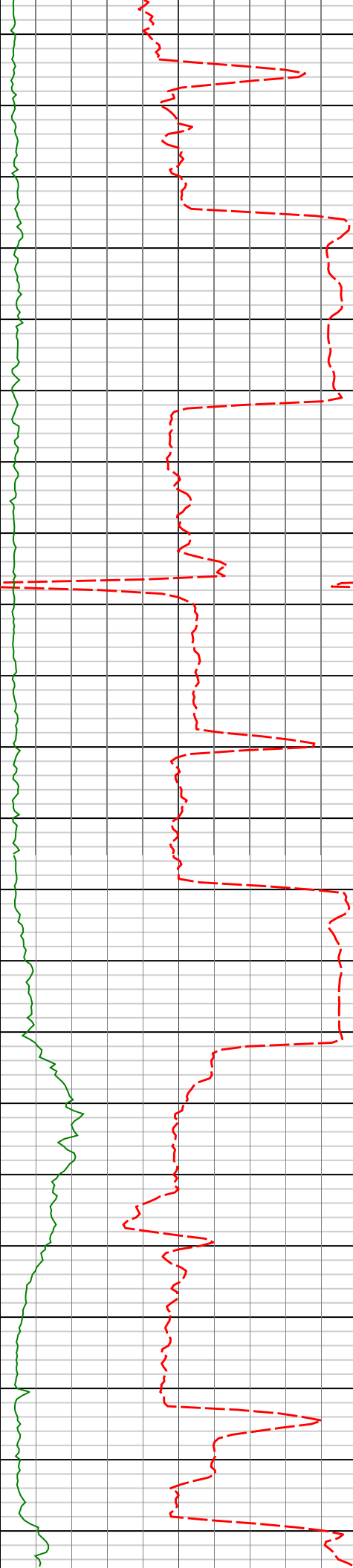
13096'

89.60°

5.15°

7060.54'

6495.84'



13150'

13191'

89.38°

6.96°

7061.38'

6590.37'

13200'

13250'

13285'

87.78°

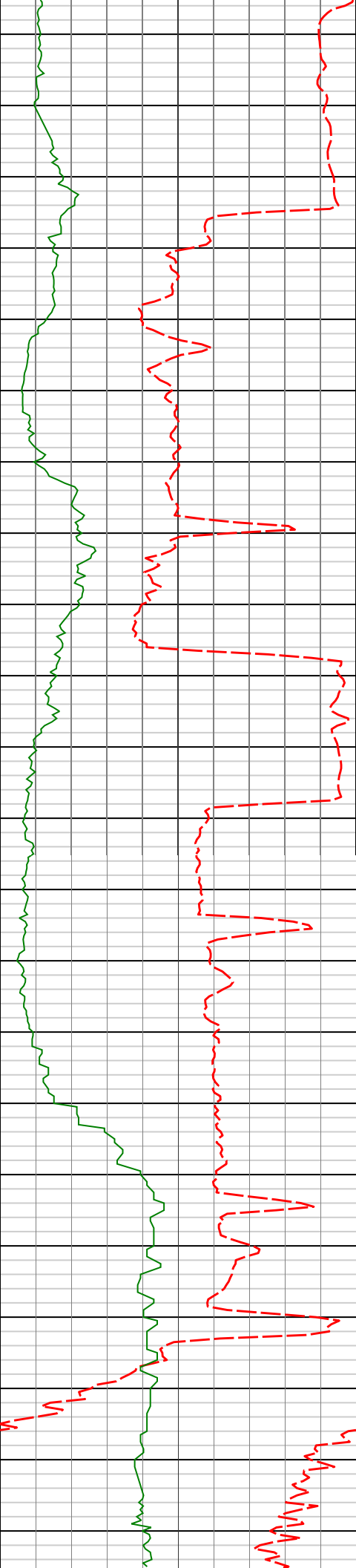
7.01°

7063.71'

6683.71'

13300'

13350'



13380'

86.39°

4.05°

7068.54'

6778.20'

13400'

13450'

13475'

87.72°

2.70°

7073.42'

6872.94'

13500'

13550'

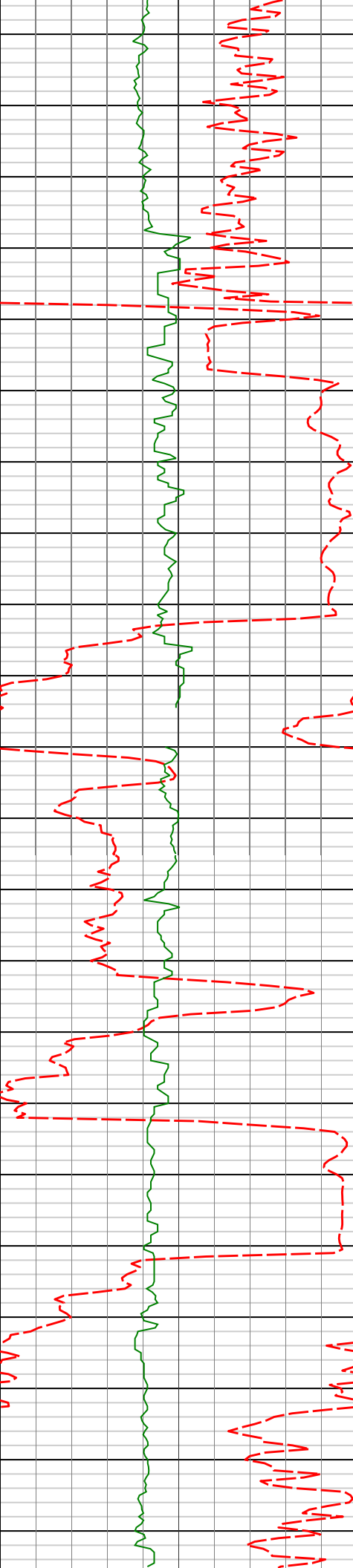
13570'

87.81°

1.06°

7077.13'

6967.83'



13600'

13650'

13700'

13750'

13800'

13665'

89.82°

0.47°

7079.09'

7062.80'

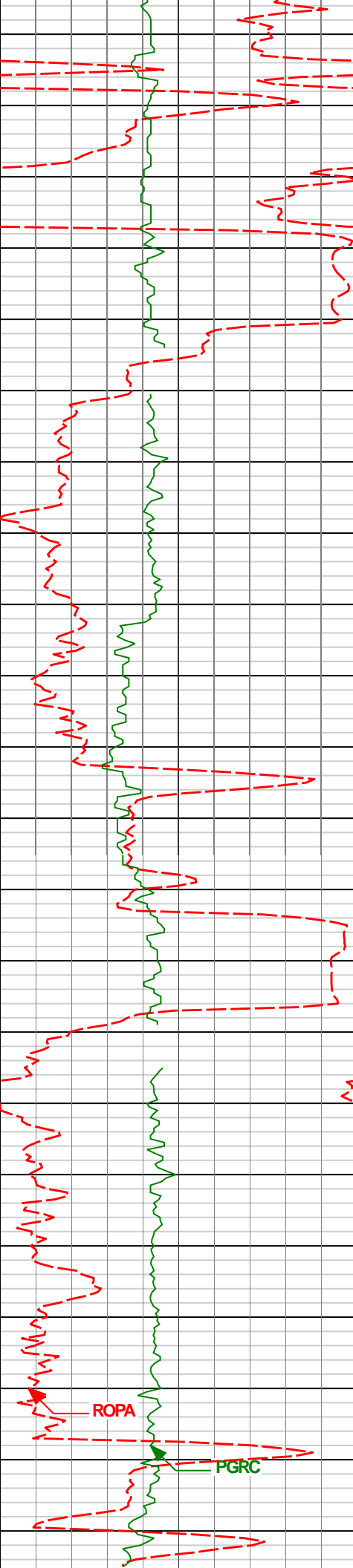
13759'

91.05°

0.71°

7078.38'

7156.80'



13850'

13900'

13950'

14000'

13854'

90.89°

0.68°

7076.77'

7251.78'

13949'

89.42°

0.27°

7076.52'

7346.78'

ROPA

PGRC



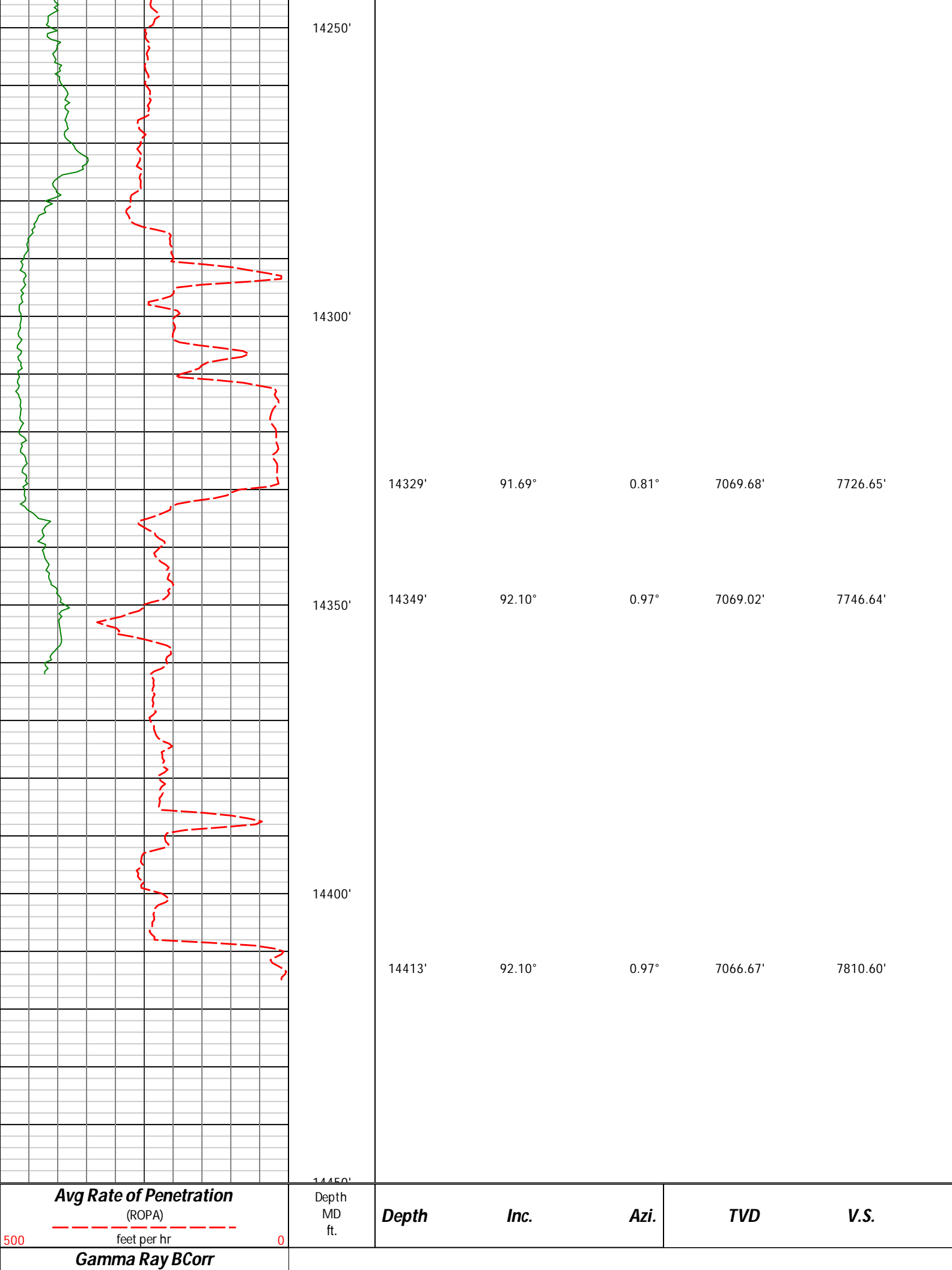
14050'

14100'

14150'

14200'

14044'	90.43°	1.65°	7076.64'	7441.77'
14139'	90.92°	0.92°	7075.52'	7536.75'
14234'	92.22°	0.64°	7072.92'	7631.71'



HALLIBURTON**DIRECTIONAL SURVEY REPORT**

Noble Energy
Oscar Y10-74-1HC
Wattenberg
Weld Colorado
USA
CA-XX-0901675723

<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>
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
534.00	0.50	243.51	533.99	1.87 S	1.64 W	-1.88	0.12
750.00	0.60	266.31	749.98	2.36 S	3.61 W	-2.39	0.11
995.00	0.60	332.71	994.97	1.30 S	5.48 W	-1.34	0.27
1149.00	0.50	326.61	1148.96	0.03 S	6.22 W	-0.07	0.08
1271.00	0.44	259.55	1270.96	0.33 N	6.97 W	0.29	0.43
1364.00	0.39	293.91	1363.96	0.40 N	7.61 W	0.35	0.27
1550.00	0.28	21.74	1549.96	1.08 N	8.02 W	1.02	0.25
1643.00	1.33	29.12	1642.95	2.23 N	7.41 W	2.18	1.13
1736.00	2.41	21.24	1735.90	5.00 N	6.18 W	4.95	1.19
1828.00	4.13	25.14	1827.74	9.80 N	4.07 W	9.77	1.88
1920.00	5.82	19.16	1919.39	17.20 N	1.13 W	17.20	1.92
2015.00	7.07	25.28	2013.79	27.04 N	2.94 E	27.06	1.50
2110.00	7.31	29.13	2108.05	37.61 N	8.38 E	37.66	0.57
2205.00	6.94	26.77	2202.31	48.01 N	13.91 E	48.10	0.50
2300.00	6.68	33.18	2296.64	57.76 N	19.52 E	57.89	0.85
2394.00	6.34	31.67	2390.04	66.75 N	25.24 E	66.92	0.40
2489.00	7.33	29.41	2484.36	76.50 N	30.97 E	76.70	1.08
2584.00	7.84	26.75	2578.53	87.56 N	36.86 E	87.81	0.65
2679.00	8.05	30.61	2672.62	99.07 N	43.16 E	99.36	0.60
2774.00	7.32	31.67	2766.76	109.95 N	49.73 E	110.28	0.78
2869.00	7.47	30.68	2860.97	120.41 N	56.06 E	120.79	0.21
2964.00	8.35	35.81	2955.07	131.31 N	63.24 E	131.74	1.19
3059.00	8.86	33.85	3049.00	142.98 N	71.35 E	143.47	0.62
3153.00	7.61	34.21	3142.03	154.14 N	78.89 E	154.68	1.33
3248.00	7.79	33.95	3236.17	164.69 N	86.02 E	165.27	0.19
3343.00	6.11	33.79	3330.47	174.23 N	92.43 E	174.86	1.77
3438.00	5.10	33.76	3425.02	181.94 N	97.58 E	182.60	1.06
3628.00	1.89	33.89	3614.64	191.57 N	104.03 E	192.27	1.69
3723.00	1.27	36.36	3709.60	193.72 N	105.52 E	194.43	0.66
3818.00	0.57	359.92	3804.59	195.04 N	106.15 E	195.75	0.93
4008.00	0.78	220.73	3994.58	195.00 N	105.30 E	195.71	0.67
4103.00	1.18	222.35	4089.57	193.79 N	104.22 E	194.49	0.42
4198.00	1.13	241.00	4184.55	192.61 N	102.74 E	193.31	0.40
4292.00	1.46	261.31	4278.53	191.98 N	100.75 E	192.66	0.60
4387.00	1.57	262.56	4373.49	191.63 N	98.26 E	192.29	0.12
4482.00	1.80	267.56	4468.45	191.40 N	95.48 E	192.04	0.29
4577.00	1.36	292.83	4563.42	191.77 N	92.95 E	192.40	0.86
4672.00	1.20	280.63	4658.39	192.39 N	90.93 E	193.01	0.33
4767.00	1.54	262.53	4753.37	192.41 N	88.69 E	193.01	0.58
4862.00	0.98	22.09	4848.35	193.00 N	87.73 E	193.59	2.31
4956.00	0.64	52.76	4942.35	194.06 N	88.45 E	194.66	0.57
5051.00	1.29	99.03	5037.33	194.21 N	89.93 E	194.82	1.02
5146.00	1.23	87.23	5132.31	194.09 N	92.00 E	194.72	0.28
5241.00	0.78	90.74	5227.29	194.13 N	93.67 E	194.77	0.48
5336.00	0.49	84.12	5322.29	194.17 N	94.72 E	194.81	0.31
5430.00	0.51	94.56	5416.29	194.18 N	95.54 E	194.82	0.10
5525.00	0.48	69.12	5511.28	194.28 N	96.33 E	194.94	0.23
5620.00	0.43	88.59	5606.28	194.43 N	97.06 E	195.09	0.17
5715.00	0.68	90.97	5701.27	194.43 N	97.98 E	195.10	0.26
5810.00	0.72	78.04	5796.27	194.55 N	99.13 E	195.22	0.17
5905.00	0.90	15.04	5891.26	195.39 N	99.90 E	196.07	0.91

5999.00	0.84	19.53	5985.25	196.75 N	100.32 E	197.43	0.10
6094.00	0.75	8.32	6080.24	198.03 N	100.65 E	198.71	0.19
6189.00	0.62	348.13	6175.23	199.14 N	100.63 E	199.82	0.29
6284.00	0.36	41.19	6270.23	199.87 N	100.72 E	200.55	0.52
6377.00	0.22	19.15	6363.23	200.26 N	100.97 E	200.94	0.19
6518.00	11.36	356.15	6503.29	214.42 N	100.13 E	215.09	7.91
6565.00	14.77	354.43	6549.07	225.00 N	99.23 E	225.67	7.30
6613.00	17.57	352.43	6595.16	238.27 N	97.69 E	238.93	5.95
6660.00	20.19	353.64	6639.63	253.37 N	95.85 E	254.02	5.64
6755.00	25.02	6.83	6727.36	289.65 N	96.43 E	290.30	7.34
6849.00	34.79	4.63	6808.75	336.24 N	100.97 E	336.91	10.46
6897.00	39.45	1.59	6847.02	365.15 N	102.50 E	365.84	10.43
6944.00	44.89	0.19	6881.84	396.68 N	102.97 E	397.37	11.75
6992.00	49.96	356.72	6914.31	431.99 N	101.97 E	432.68	11.83
7039.00	54.14	355.75	6943.21	468.97 N	99.53 E	469.63	9.04
7087.00	60.14	355.44	6969.24	509.15 N	96.43 E	509.79	12.51
7134.00	65.68	355.08	6990.64	550.83 N	92.97 E	551.45	11.81
7182.00	69.54	356.11	7008.92	595.07 N	89.57 E	595.67	8.28
7229.00	73.51	356.36	7023.81	639.55 N	86.64 E	640.12	8.46
7277.00	77.15	356.05	7035.96	685.87 N	83.57 E	686.42	7.61
7324.00	81.66	356.58	7044.60	731.96 N	80.60 E	732.49	9.66
7389.00	86.80	359.72	7051.13	796.57 N	78.52 E	797.09	9.25
7480.00	91.63	359.14	7052.38	887.53 N	77.62 E	888.04	5.35
7543.00	90.65	357.02	7051.13	950.48 N	75.51 E	950.97	3.71
7638.00	89.97	356.50	7050.61	1045.32 N	70.14 E	1045.78	0.90
7733.00	91.51	357.26	7049.39	1140.17 N	64.97 E	1140.59	1.81
7826.00	91.63	357.49	7046.84	1233.04 N	60.71 E	1233.42	0.28
7920.00	89.26	357.69	7046.11	1326.95 N	56.76 E	1327.30	2.53
8013.00	90.49	358.06	7046.31	1419.88 N	53.31 E	1420.21	1.38
8106.00	89.32	357.32	7046.47	1512.80 N	49.56 E	1513.10	1.49
8198.00	87.45	358.36	7049.06	1604.69 N	46.09 E	1604.97	2.33
8291.00	87.38	356.75	7053.25	1697.51 N	42.13 E	1697.76	1.73
8384.00	87.29	356.31	7057.58	1790.24 N	36.51 E	1790.45	0.48
8476.00	87.26	354.58	7061.95	1881.84 N	29.21 E	1882.00	1.88
8567.00	88.03	355.36	7065.69	1972.41 N	21.24 E	1972.51	1.20
8659.00	88.74	355.57	7068.28	2064.09 N	13.97 E	2064.14	0.80
8751.00	89.63	357.80	7069.59	2155.92 N	8.65 E	2155.93	2.61
8844.00	90.31	358.69	7069.64	2248.87 N	5.80 E	2248.86	1.20
8936.00	90.83	359.08	7068.73	2340.85 N	4.01 E	2340.82	0.71
9030.00	90.83	359.71	7067.36	2434.84 N	3.02 E	2434.80	0.67
9123.00	90.06	0.19	7066.64	2527.83 N	2.93 E	2527.79	0.98
9216.00	89.88	359.81	7066.69	2620.83 N	2.93 E	2620.79	0.45
9309.00	90.09	359.48	7066.72	2713.83 N	2.36 E	2713.78	0.42
9401.00	90.03	359.32	7066.62	2805.83 N	1.39 E	2805.77	0.19
9494.00	88.95	359.22	7067.45	2898.81 N	0.21 E	2898.75	1.17
9586.00	90.86	359.25	7067.60	2990.80 N	1.02 W	2990.72	2.08
9681.00	90.99	359.20	7066.07	3085.78 N	2.30 W	3085.69	0.15
9776.00	91.20	357.94	7064.25	3180.73 N	4.67 W	3180.62	1.34
9871.00	90.22	359.10	7063.07	3275.69 N	7.13 W	3275.56	1.60
9965.00	89.20	357.46	7063.55	3369.64 N	9.95 W	3369.49	2.05
10060.00	87.08	356.45	7066.63	3464.45 N	14.99 W	3464.27	2.47
10155.00	88.00	358.24	7070.71	3559.26 N	19.39 W	3559.04	2.12
10250.00	90.77	357.42	7071.73	3654.17 N	22.98 W	3653.93	3.04
10345.00	92.13	0.09	7069.33	3749.11 N	25.05 W	3748.85	3.15
10439.00	88.31	358.07	7068.96	3843.07 N	26.56 W	3842.80	4.60
10534.00	90.25	357.67	7070.16	3937.99 N	30.09 W	3937.70	2.09
10629.00	91.54	0.10	7068.67	4032.96 N	31.94 W	4032.65	2.90
10724.00	90.09	0.56	7067.32	4127.94 N	31.39 W	4127.63	1.60
10819.00	91.17	1.48	7066.28	4222.92 N	29.70 W	4222.62	1.49
10914.00	92.19	1.37	7063.49	4317.85 N	27.34 W	4317.56	1.08
11009.00	91.88	2.36	7060.12	4412.74 N	24.25 W	4412.47	1.09
11104.00	90.31	3.12	7058.30	4507.61 N	19.71 W	4507.37	1.84
11199.00	89.29	3.43	7058.64	4602.45 N	14.28 W	4602.25	1.12
11293.00	90.68	3.68	7058.66	4696.27 N	8.45 W	4696.10	1.50
11388.00	89.17	2.40	7058.79	4791.13 N	3.41 W	4790.99	2.08
11483.00	89.88	3.91	7059.57	4885.98 N	1.81 E	4885.88	1.76
11578.00	88.86	359.36	7060.62	4980.91 N	4.52 E	4980.82	4.91
11673.00	88.55	353.77	7062.77	5075.67 N	1.16 W	5075.55	5.89
11768.00	88.92	351.94	7064.86	5169.91 N	12.98 W	5169.70	1.96
11863.00	93.79	357.84	7062.62	5264.43 N	21.43 W	5264.17	8.05
11958.00	91.02	0.24	7058.63	5359.32 N	23.02 W	5359.04	3.86
12052.00	89.57	2.14	7058.15	5453.29 N	21.07 W	5453.02	2.54

12147.00	89.75	2.23	7058.71	5548.22 N	17.45 W	5547.97	0.21
12242.00	90.06	0.51	7058.87	5643.19 N	15.18 W	5642.96	1.84
12337.00	88.49	357.73	7060.07	5738.16 N	16.64 W	5737.91	3.36
12432.00	90.37	357.03	7061.01	5833.05 N	20.98 W	5832.77	2.11
12527.00	87.13	359.18	7063.09	5927.96 N	24.12 W	5927.66	4.09
12622.00	90.74	1.69	7064.85	6022.92 N	23.40 W	6022.62	4.63
12717.00	91.94	3.01	7062.63	6117.81 N	19.50 W	6117.53	1.88
12812.00	91.11	3.25	7060.10	6212.63 N	14.32 W	6212.39	0.91
12907.00	89.63	2.76	7059.49	6307.49 N	9.34 W	6307.28	1.64
13001.00	89.75	4.54	7060.00	6401.30 N	3.35 W	6401.13	1.90
13096.00	89.60	5.15	7060.54	6495.96 N	4.67 E	6495.84	0.66
13191.00	89.38	6.96	7061.38	6590.42 N	14.69 E	6590.37	1.92
13285.00	87.78	7.01	7063.71	6683.69 N	26.12 E	6683.71	1.70
13380.00	86.39	4.05	7068.54	6778.11 N	35.26 E	6778.20	3.44
13475.00	87.72	2.70	7073.42	6872.82 N	40.84 E	6872.94	1.99
13570.00	87.81	1.06	7077.13	6967.69 N	43.96 E	6967.83	1.73
13665.00	89.82	0.47	7079.09	7062.66 N	45.23 E	7062.80	2.21
13759.00	91.05	0.71	7078.38	7156.65 N	46.19 E	7156.80	1.33
13854.00	90.89	0.68	7076.77	7251.63 N	47.35 E	7251.78	0.17
13949.00	89.42	0.27	7076.52	7346.62 N	48.13 E	7346.78	1.61
14044.00	90.43	1.65	7076.64	7441.60 N	49.73 E	7441.77	1.80
14139.00	90.92	0.92	7075.52	7536.57 N	51.86 E	7536.75	0.93
14234.00	92.22	0.64	7072.92	7631.53 N	53.15 E	7631.71	1.40
14329.00	91.69	0.81	7069.68	7726.46 N	54.35 E	7726.65	0.59
14349.00	92.10	0.97	7069.02	7746.45 N	54.66 E	7746.64	2.20
14413.00	92.10	0.97	7066.67	7810.40 N	55.74 E	7810.60	0.00
14684.00	92.10	0.97	7056.74	8081.18 N	60.33 E	8081.40	0.00

CALCULATION BASED ON MINIMUM CURVATURE METHOD

SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT
TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT

VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 0.39 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 14684.00 FEET
IS 8081.40 FEET ALONG 0.43 DEGREES (GRID)