

## PCGK - Pressure Case Gamma



1 : 240

Country	: USA
Field	: Wattenburg
Location	: Lat: 40° 11' 24.69" North Long: 104° 41' 1.18" West
Well	: RW 15N-32HZ
Company	: Anadarko Petroleum Corp
Rig	: PD 464
<div> <div> <div>LOCATION</div> <div> <div> <div>UTM Easting = 1,728,761.225 usft</div> <div>UTM Northing = 14,596,148.228 usft</div> </div> <div> <div>Latitude : 40° 11' 24.69" North</div> <div>Longitude : 104° 41' 1.18" West</div> </div> </div> <div> <div>Other Services</div> <div>Directional Drilling</div> </div> </div> <div> <div>API Number : 05-123-44754</div> <div>Country : USA</div> <div>Field : Wattenburg</div> <div>Well : RW 15N-32HZ</div> <div>Rig : PD 464</div> <div>Company : Anadarko Petroleum Corp</div> </div> </div>	

## WELL INFORMATION

MWD Run Number	100				
Date run completed	13-Sep-17				
Rig Bit Number	2				
Bit Size (in)	7.875				
Tool Nominal OD (in)	6.750				
Log Start Depth (MD, ft)	1,865.00				
Log End Depth (MD, ft)	13,294.00				
Drill or Wipe	Drill				
Drill/Wipe Start Date and Time	11-Sep-17 09:00				
Drill/Wipe End Date and Time	13-Sep-17 15:30				
Min Inc (deg) @ Depth (MD, ft)	0.07 @ 6,171.00				
Max Inc (deg) @ Depth (MD, ft)	92.96 @ 7,875.00				
Bit TFA(in2) / Bit Type	1.0523 / PDC				
Flow Rate (gpm)	566.12				
Max AV (fpm) / CV (fpm) @ MWD	541.4 / 559.3				
Fluid Type	Diesel Mud Base				
Density (ppg) / Viscosity (spqt)	9.22 / 61.00				
Filtrate CL (ppm)	43,000.00				
pH / API Filtrate (mptm)	N/A / 0				
PV (cP) / YP (lbf2)	22 / 11.00				
% Solids / % Sand	9.50 / 0.00				
% Oil / Oil:Water Ratio	68.00 / 75:25				
Rm @ Measured Temp (degF)	N/A @ N/A				
Rmf @ Measured Temp (degF)	N/A @ N/A				
Rmc @ Measured Temp (degF)	N/A @ N/A				
Max Tool Temp (deg F) / C	217.75 / 120.00				

Max Tool Temp (degF) / Source	247.78 / PCM				
Rm @ Max Tool Temp (degF)	N/A @ 247.78				
Lead MWD Engineer	Max Trainoff				
Customer Representative	Jackie McKinley				

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM				
Software Version	5.93				
Sub Serial Number	12004211				
Insert Serial Number	11680814				
Date and Time Initialized	11-Sep-17 05:04				
Date and Time Read	14-Sep-17 00:05				
ECMB SW Version	N/A				

### Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	45.00				
Software Version	6.33				
Sub Serial Number	12004211				
Sonde Serial Number	11478128				
Sensor ID Number	N/A				
Toolface Offset (deg)	198.40				

### Gamma Ray Sensor Information

Tool Type	PCG-K				
Distance From Bit (ft)	48.25				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	12004211				
Insert/Sonde Serial Number	11680983				

## REMARKS

1. All depths are measured 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 (Gamma Ray Corrected):

Interval Resolution: 0.5ft

Interval Distance: 0.6ft

Gap Fill: 3.0ft

ROPA (Average Rate of Penetration):

Interval Resolution: 0.5ft

Interval Distance: 1.2ft

Gap Fill: 3.0ft

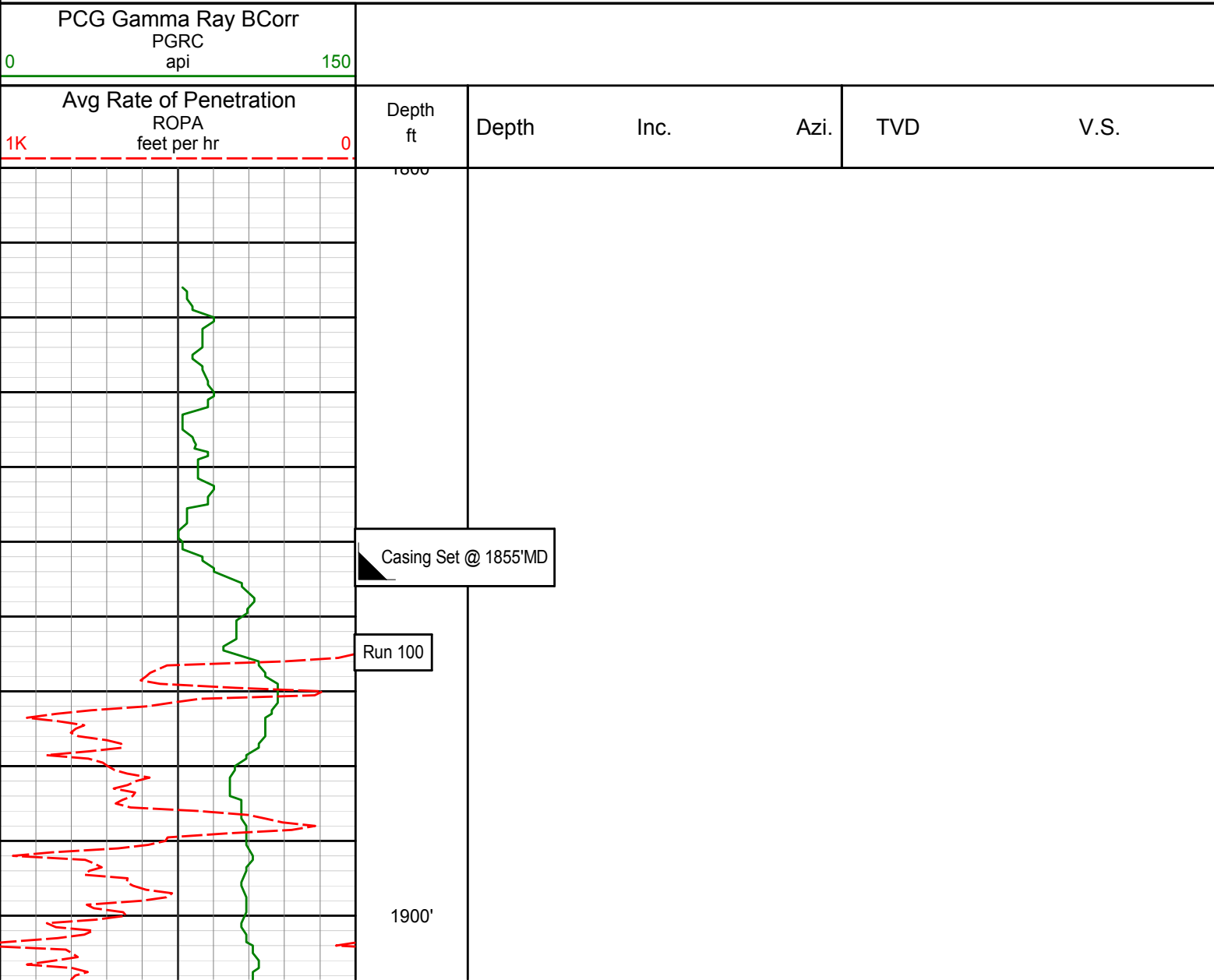
5. Gaps in gamma due to high ROP at connection.

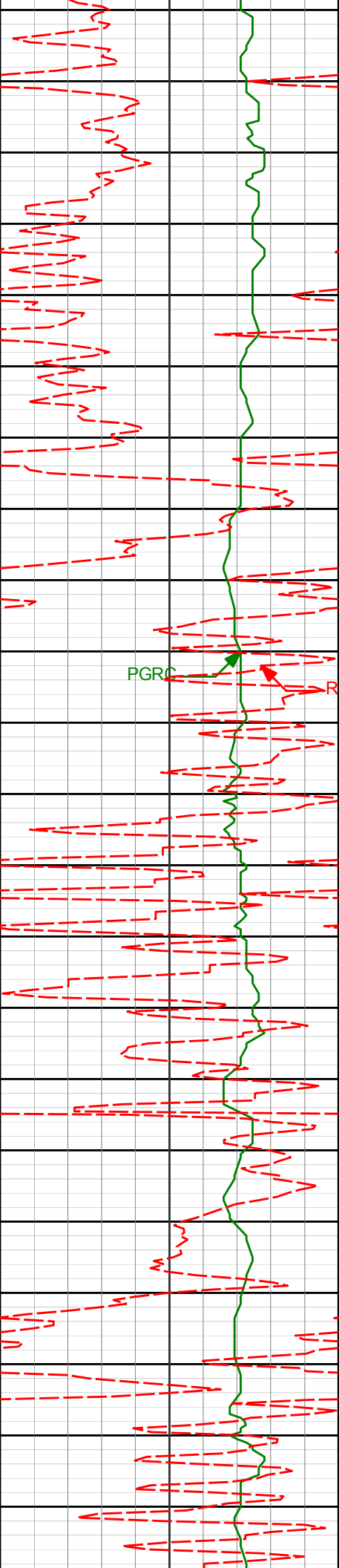
INSITE Version 8.5.2 -MLWD

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Detail Log 1:240





1934'	11.14°	12.22°	1905.47'	-281.46'
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1950'

2000'

2023'	10.33°	9.62°	1992.91'	-297.76'
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2050'

2100'



2150'

2200'

2250'

2300'

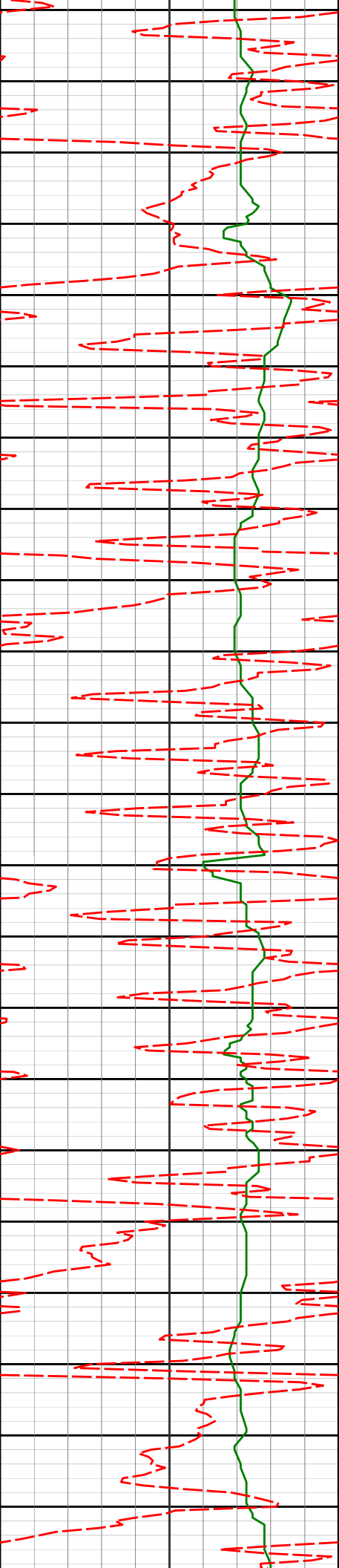
2202'

11.28°

12.01°

2168.73'

-330.76'



2381'

12.11°

11.21°

2344.02'

-366.37'

2471'

11.72°

9.37°

2432.08'

-384.68'

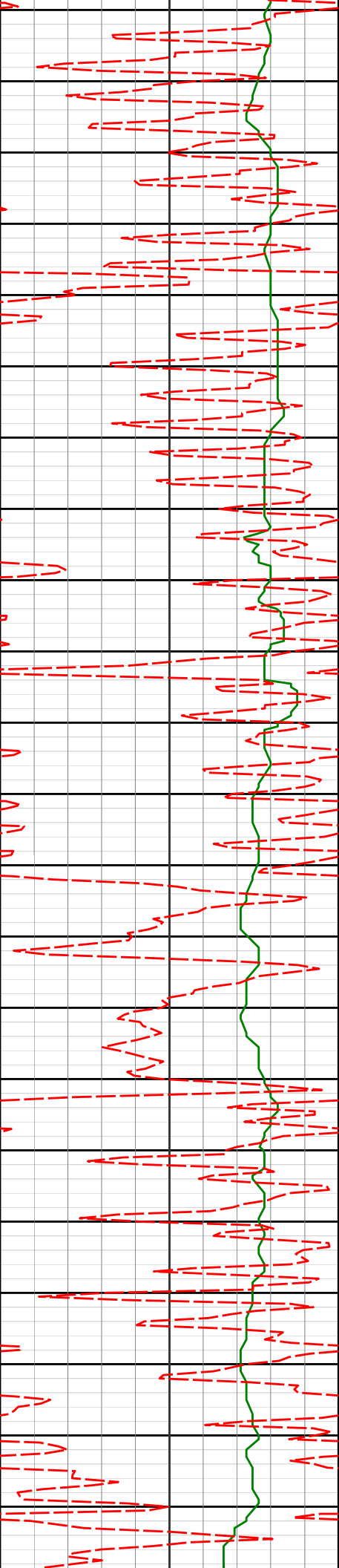
2560'

12.95°

15.06°

2519.03'

-403.26'



2600'

2650'

2650'

11.77°

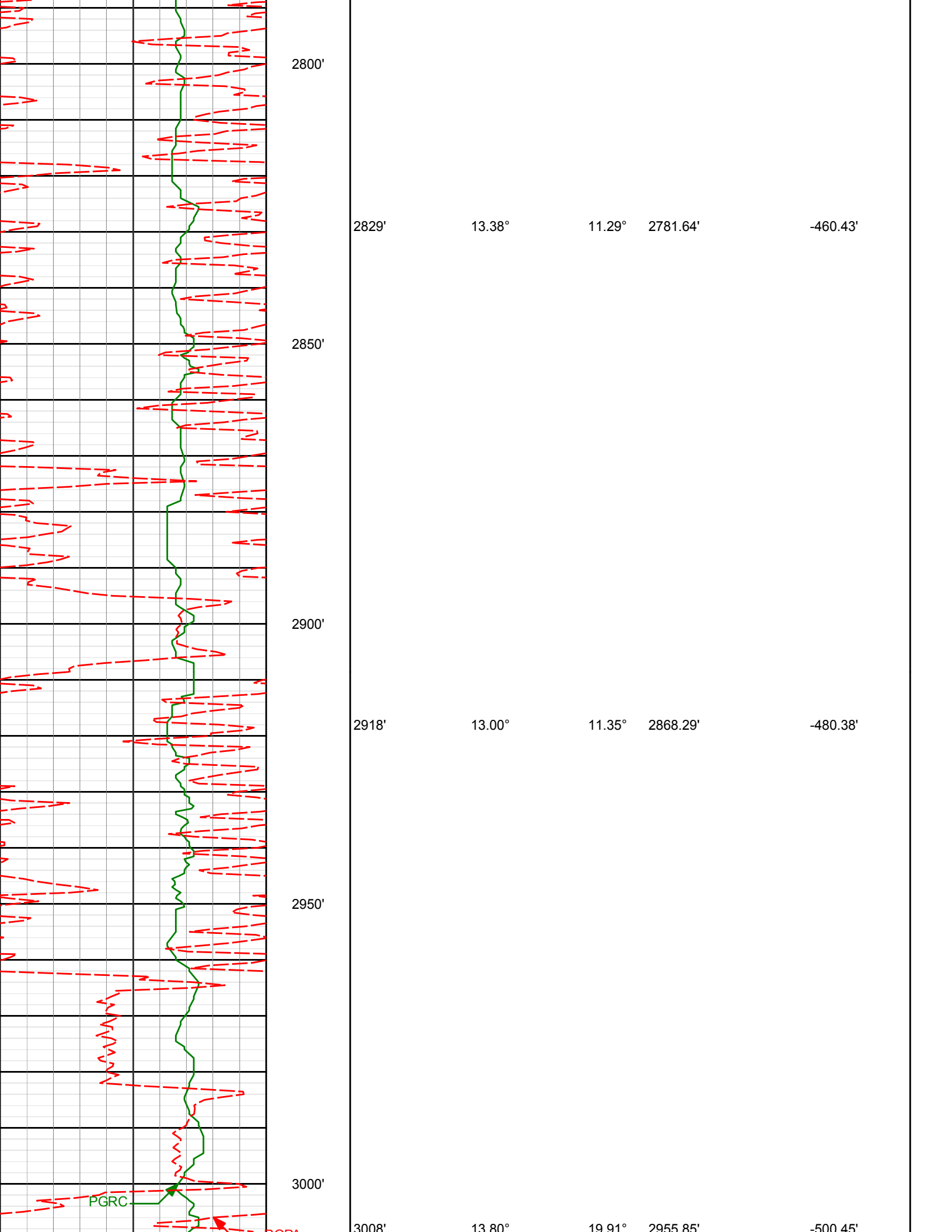
10.15°

2606.94'

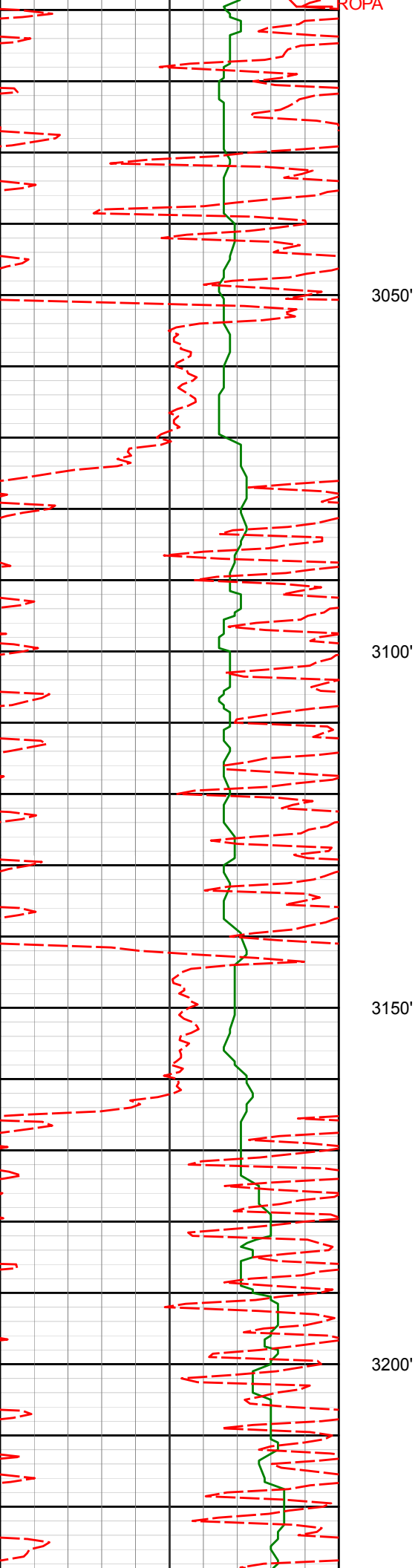
-422.08'

2700'

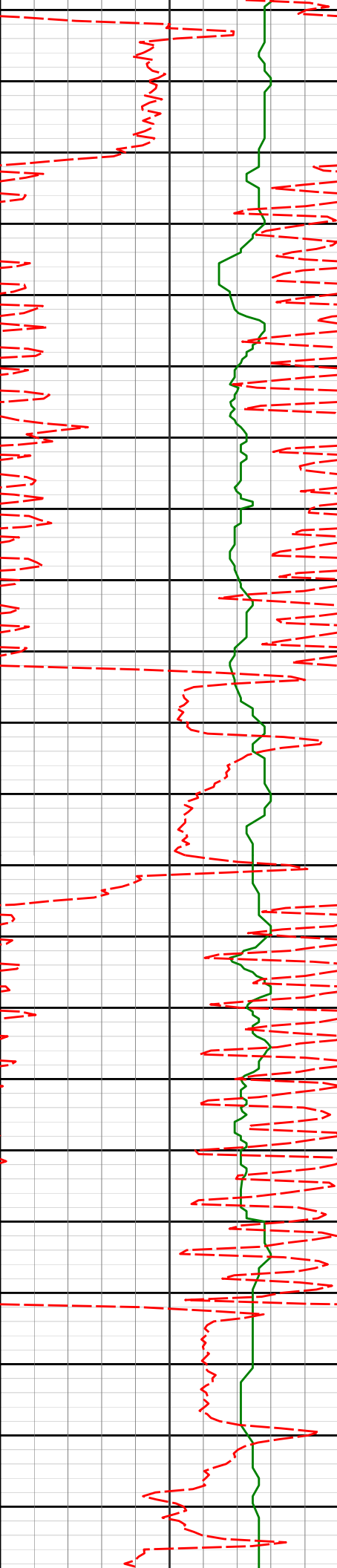
2750'







3050'				
3097'	13.00°	18.04°	3042.43'	-520.01'
3100'				
3150'				
3200'				



3250'

3277'

10.91°

11.53°

3218.52'

-556.04'

3300'

3350'

3366'

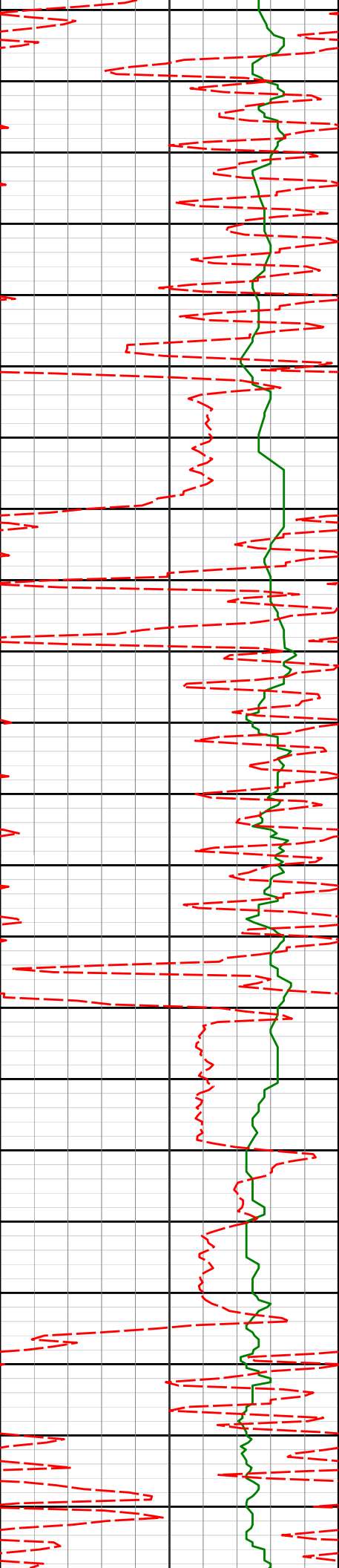
9.50°

26.83°

3306.13'

-570.90'

3400'



3456'

10.93°

24.92°

3394.70'

-585.33'

3500'

3546'

8.71°

23.65°

3483.37'

-599.37'

3550'

3600'

3635'

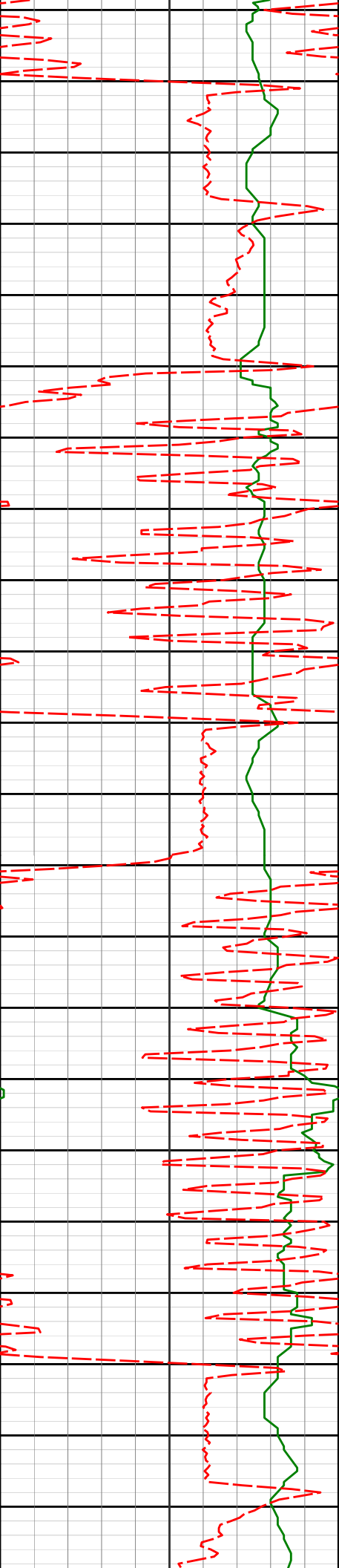
10.39°

23.19°

3571.14'

-612.97'

3650'



3700'

3725'

12.21°

16.63°

3659.39'

-629.61'

3750'

3800'

3815'

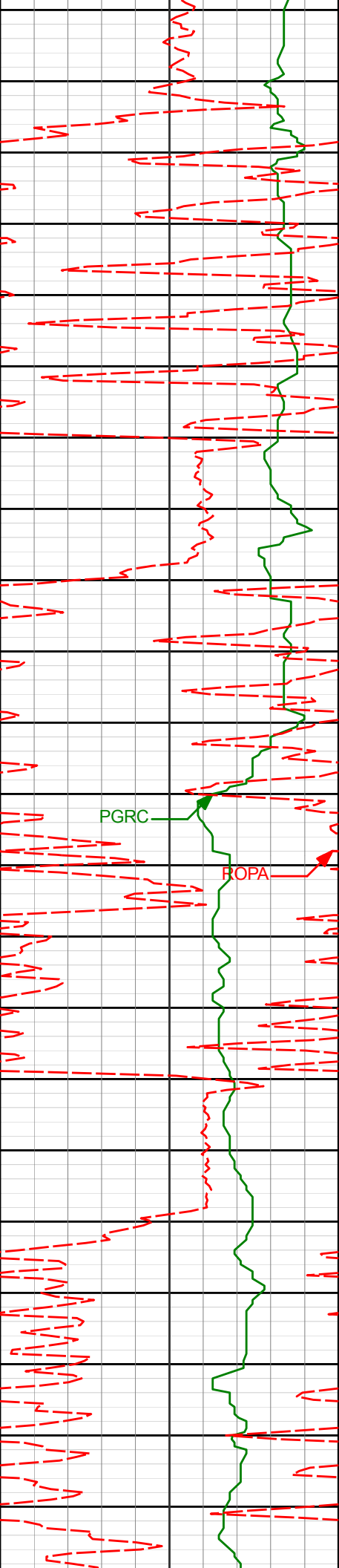
10.66°

15.29°

3747.60'

-646.80'

3850'



3900'

3904'

13.65°

16.75°

3834.60'

-664.85'

3950'

4000'

PGRC

ROPA

4050'

4083'

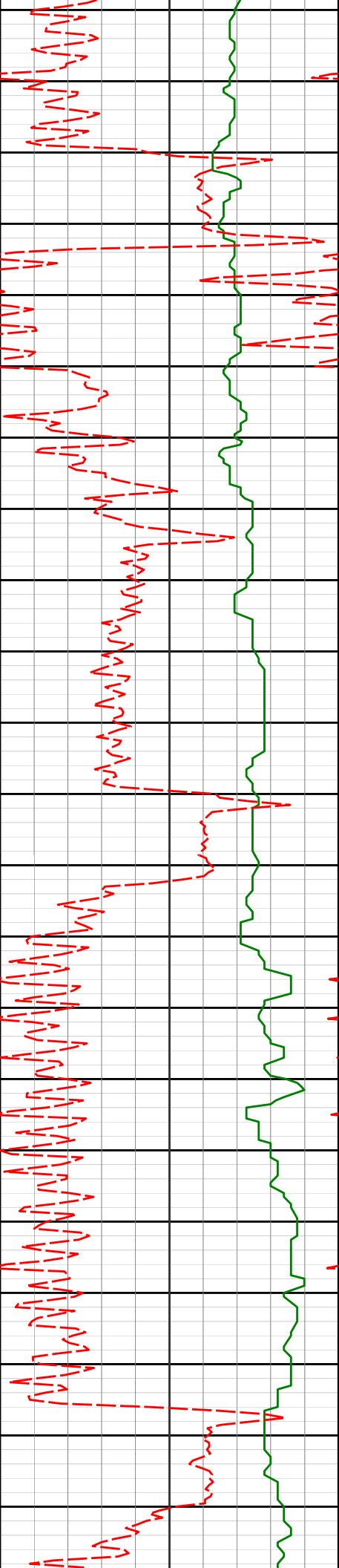
11.37°

13.73°

4009.34'

-702.31'

4100'



4150'

4172'

11.30°

16.57°

4096.60'

-719.23'

4200'

4250'

4262'

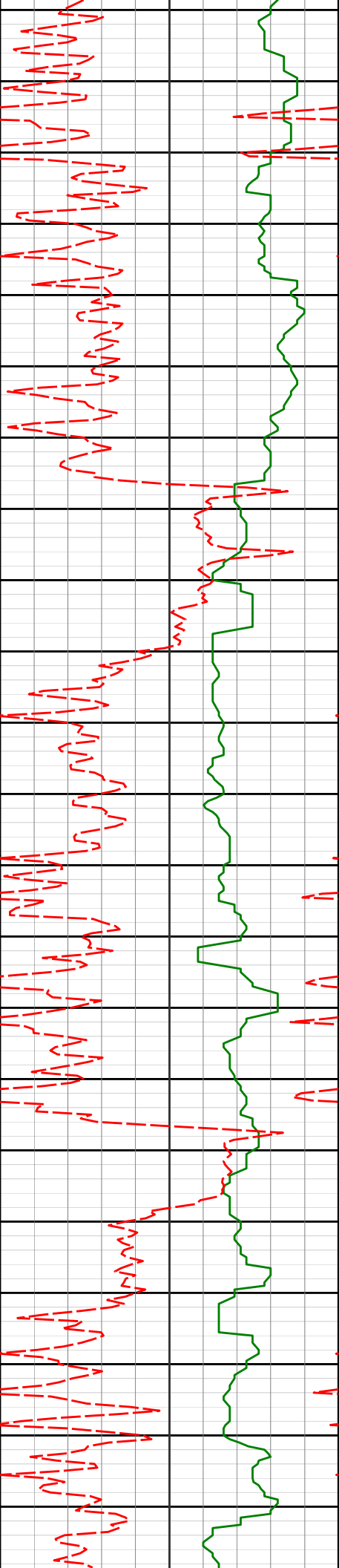
10.34°

14.61°

4185.00'

-735.54'

4300'



4350'

4351'

8.93°

10.96°

4272.75'

-750.08'

4400'

4441'

8.45°

8.54°

4361.71'

-763.50'

4450'

4500'

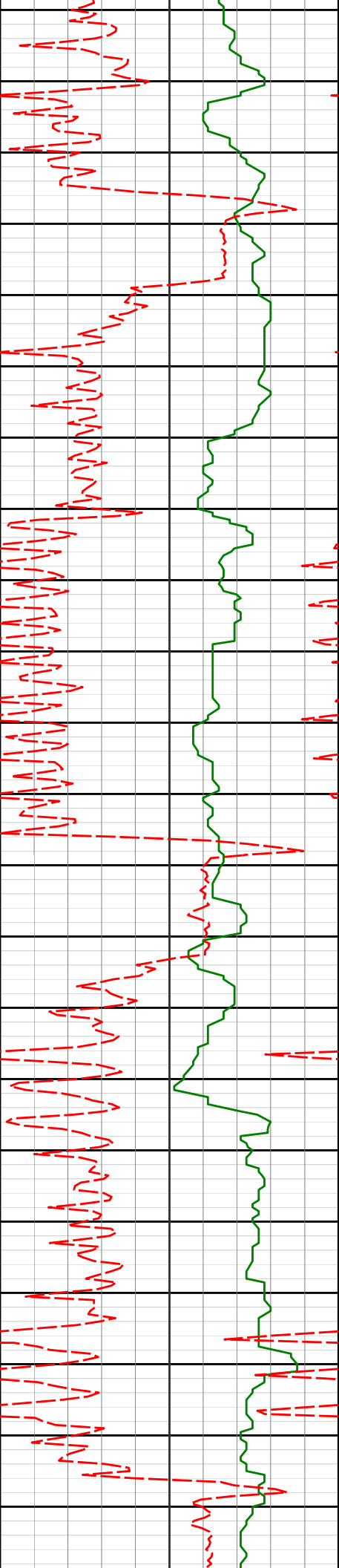
4531'

7.58°

7.01°

4450.83'

-775.95'



4550'

4600'

4621'

7.12°

6.83°

4540.09'

-787.39'

4650'

4700'

4710'

6.22°

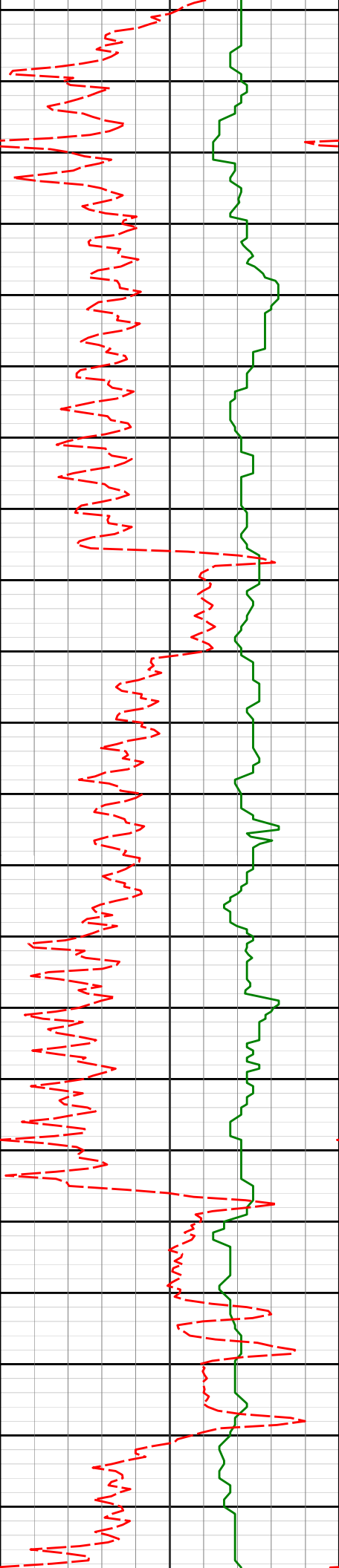
0.31°

4628.49'

-797.70'

4750'





4800'

4800'

5.96°

356.44°

4717.98'

-807.23'

4850'

4889'

5.08°

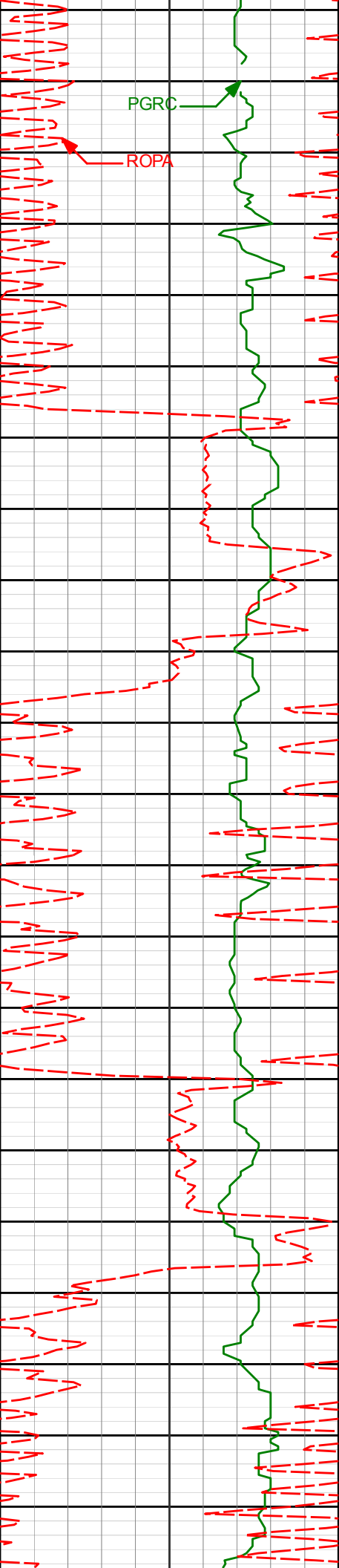
353.53°

4806.57'

-815.75'

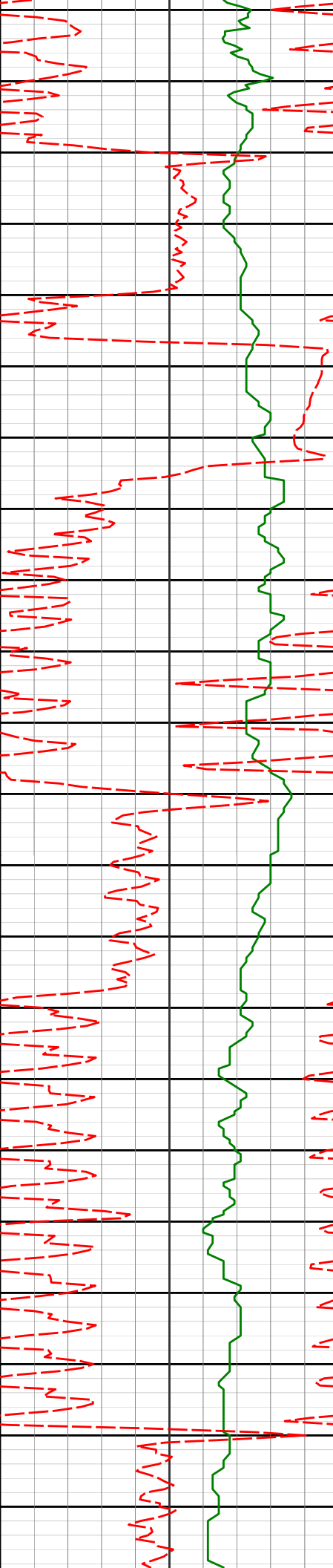
4900'

4950'



See Remark 5

5005'	3.87°	346.95°	4922.22'	-824.65'
5050'				
5095'	1.86°	325.49°	5012.10'	-828.80'
5100'				
5150'				
5185'	1.99°	306.26°	5102.05'	-830.91'
5200'				



5250'

5300'

5350'

5400'

5274'

0.31°

80.35°

5191.04'

-831.86'

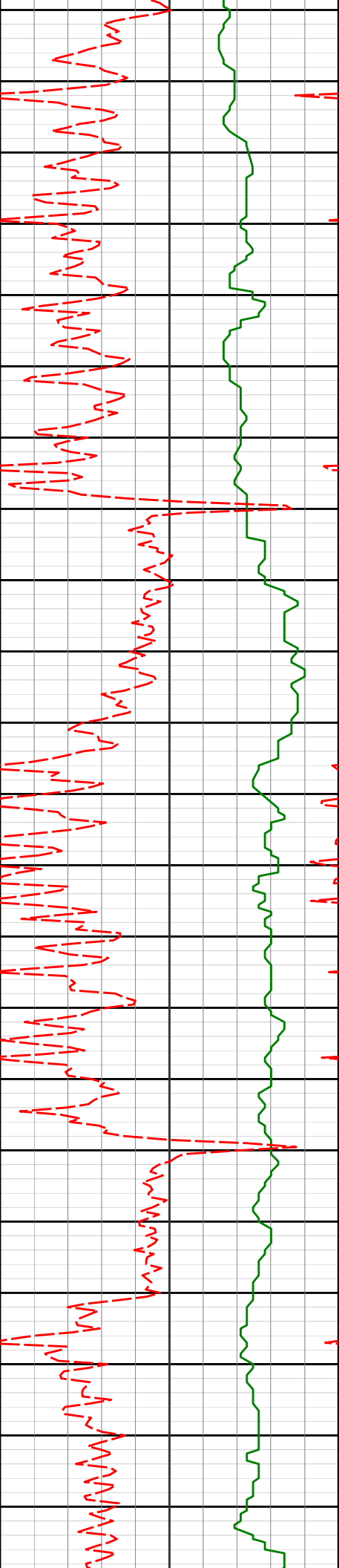
5364'

0.17°

181.48°

5281.03'

-831.77'



5450'

5454'

0.25°

236.39°

5371.03'

-831.52'

5500'

5543'

0.58°

260.28°

5460.03'

-831.33'

5550'

5600'

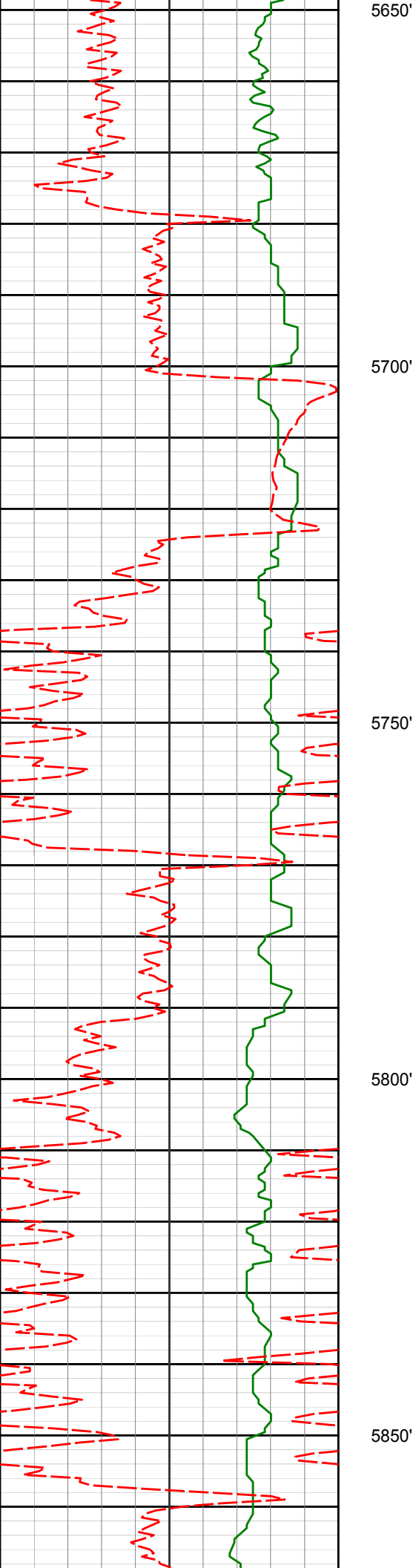
5633'

0.76°

284.66°

5550.03'

-831.40'



5723'

2.07°

88.50°

5640.01'

-831.60'

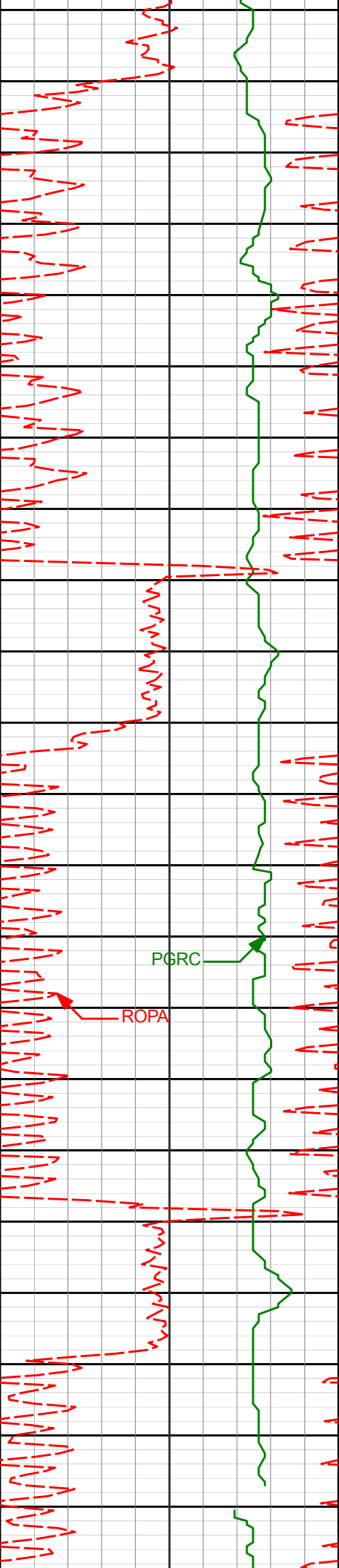
5813'

1.64°

83.15°

5729.96'

-831.82'



5900'

5902'

1.52°

84.20°

5818.93'

-832.12'

5950'

5992'

1.41°

90.28°

5908.90'

-832.25'

6000'

PGRC

ROPA

6050'

See Remark 5

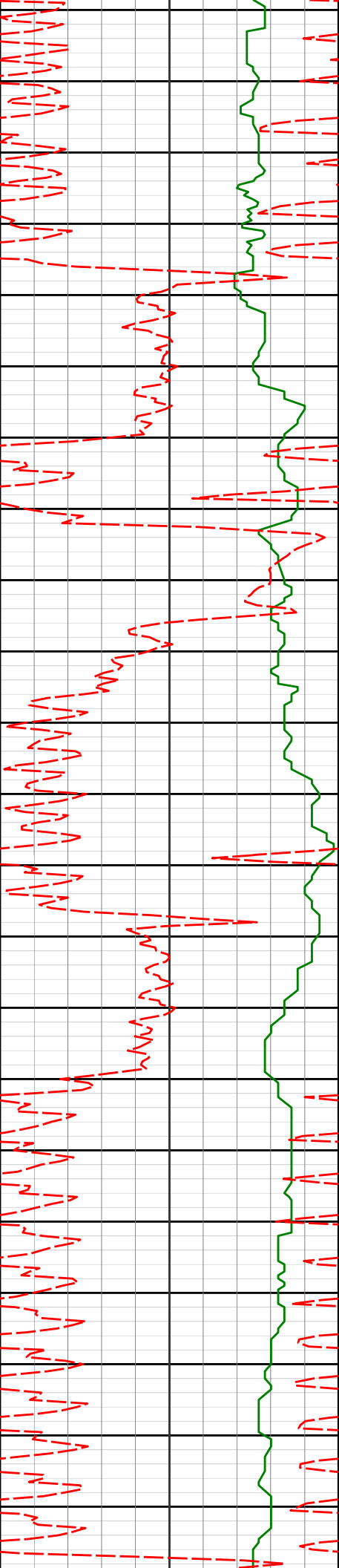
6082'

1.19°

90.19°

5998.88'

-832.26'



6100'

6150'

6171'

0.07°

319.62°

6087.87'

-832.31'

6200'

6250'

6261'

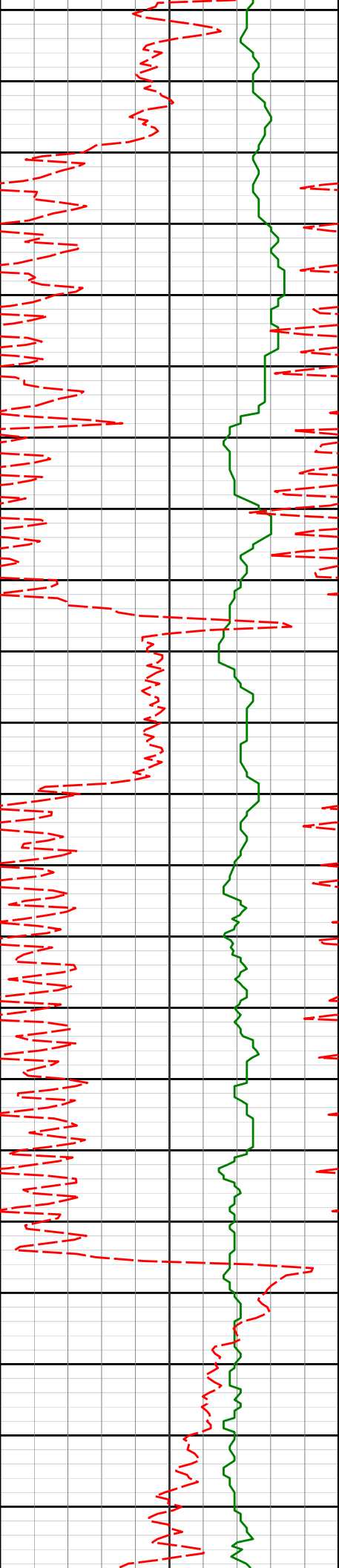
0.25°

311.04°

6177.87'

-832.48'

6300'



6350'

6351'

0.48°

331.91°

6267.87'

-832.94'

6400'

6440'

0.87°

336.88°

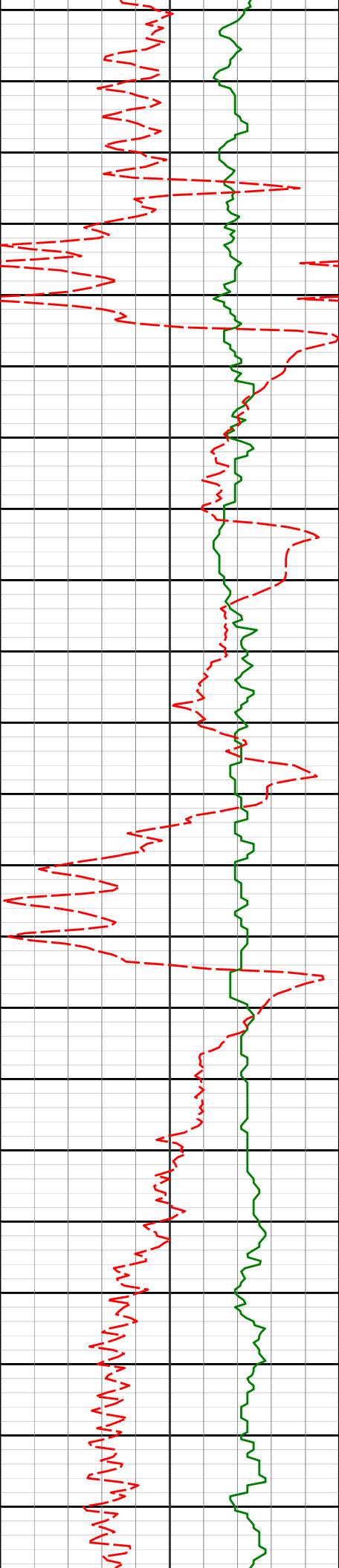
6356.86'

-833.89'

6450'

6500'





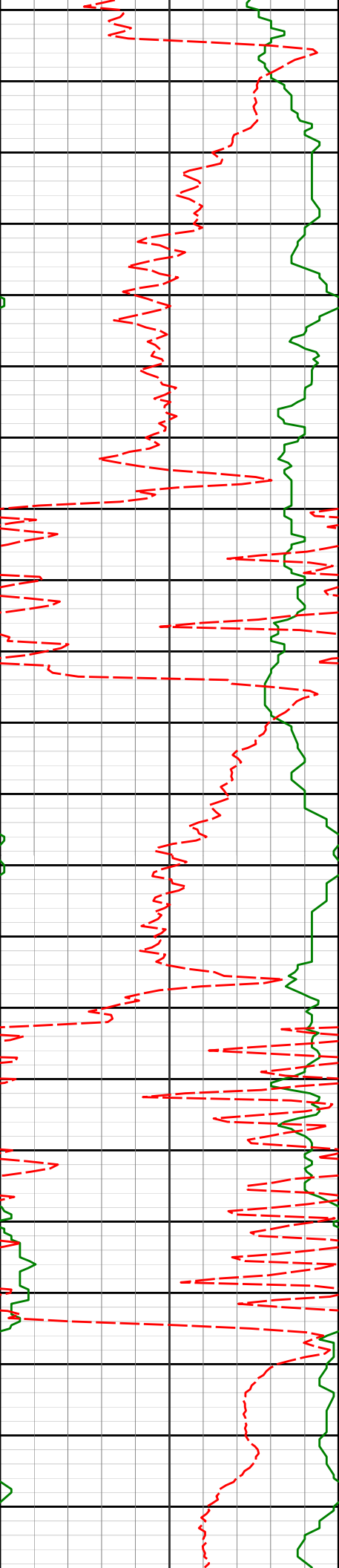
6550'

6600'

6650'

6700'

6530'	4.94°	177.98°	6446.77'	-830.64'
6620'	6.88°	176.93°	6536.28'	-821.38'
6709'	15.55°	178.12°	6623.50'	-804.11'



6750'

6800'

6850'

6900'

6950'

6799'

29.77°

182.87°

6706.35'

-769.55'

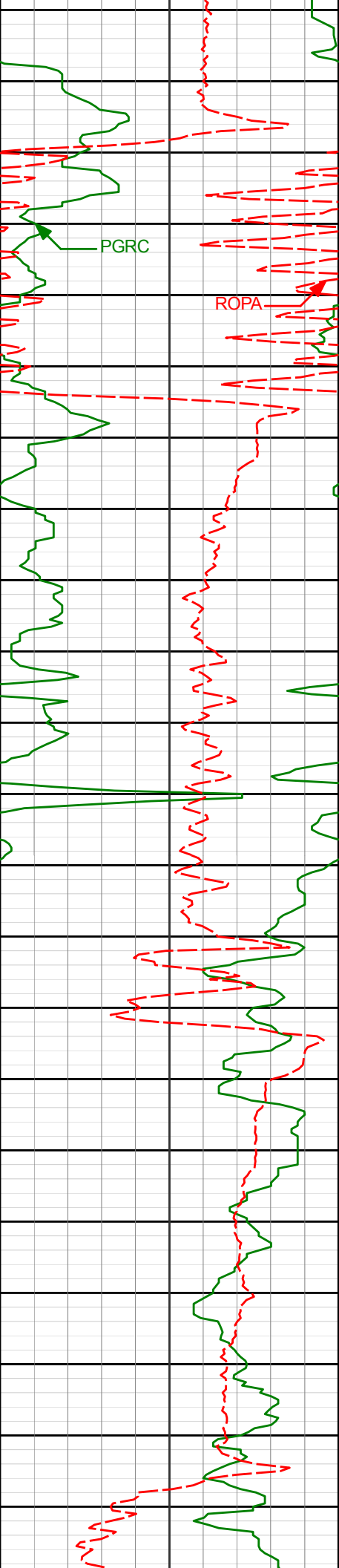
6889'

35.69°

182.93°

6782.02'

-720.96'



6978'

38.23°

177.39°

6853.15'

-667.50'

7000'

PGRC

ROPA

7050'

7068'

45.73°

174.62°

6920.02'

-607.55'

7100'

7150'

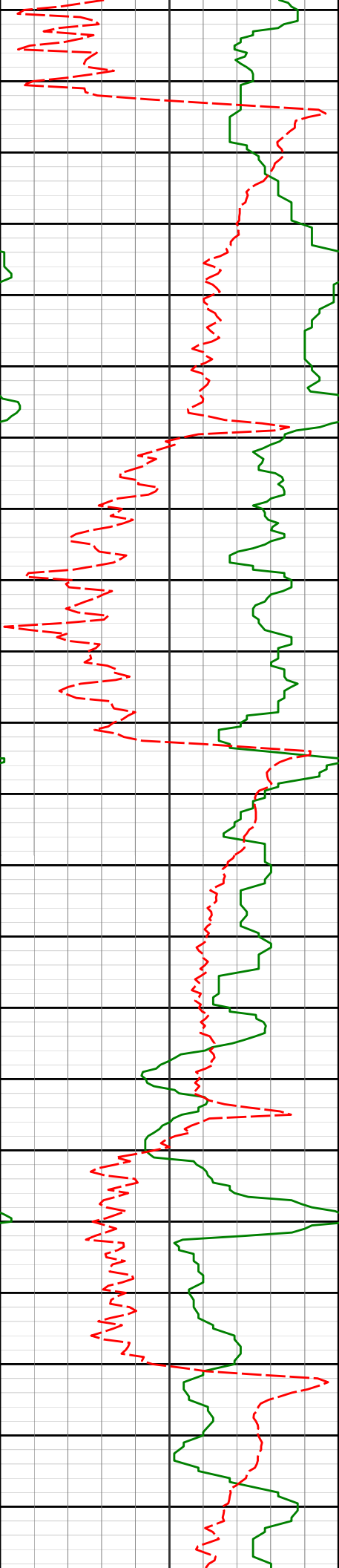
7158'

58.05°

177.78°

6975.46'

-537.08'



7200'

7250'

7300'

7350'

7400'

7247'

66.40°

181.12°

7016.91'

-458.43'

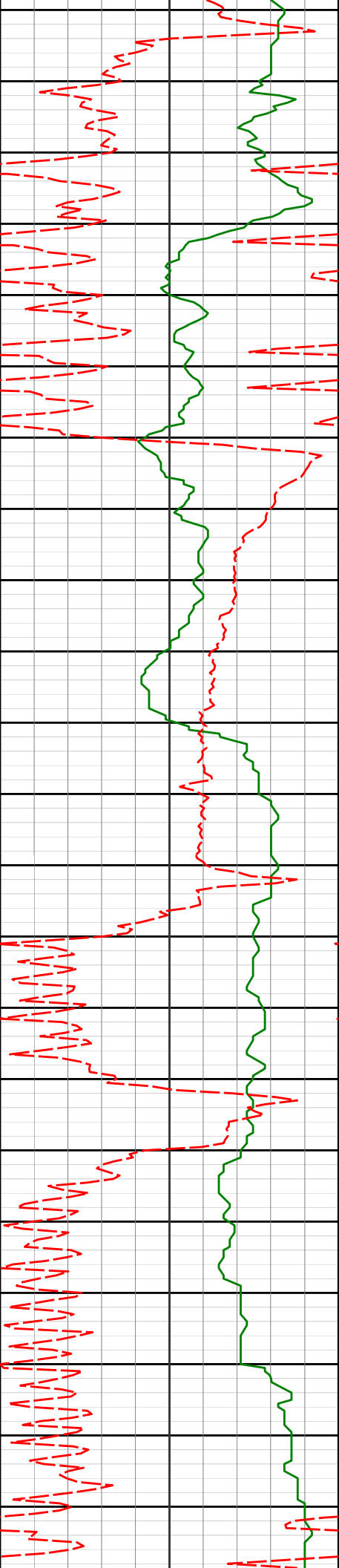
7337'

73.26°

179.74°

7047.92'

-374.00'



7427'

78.19°

179.73°

7070.11'

-286.82'

7450'

7500'

7517'

86.24°

180.09°

7082.29'

-197.73'

7550'

7600'

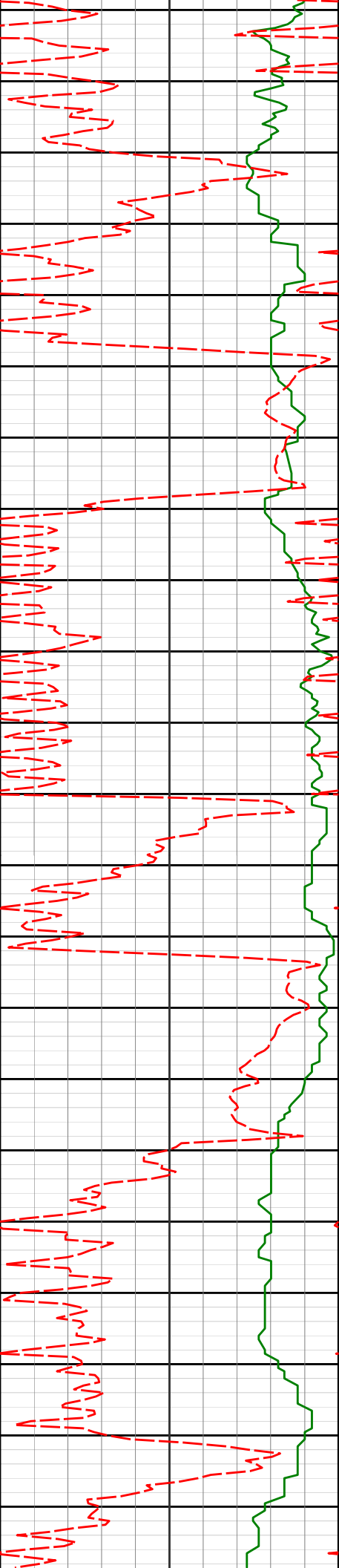
7606'

87.29°

180.43°

7087.31'

-108.87'



7650'

7695'

88.86°

181.17°

7090.30'

-19.92'

7700'

7750'

7785'

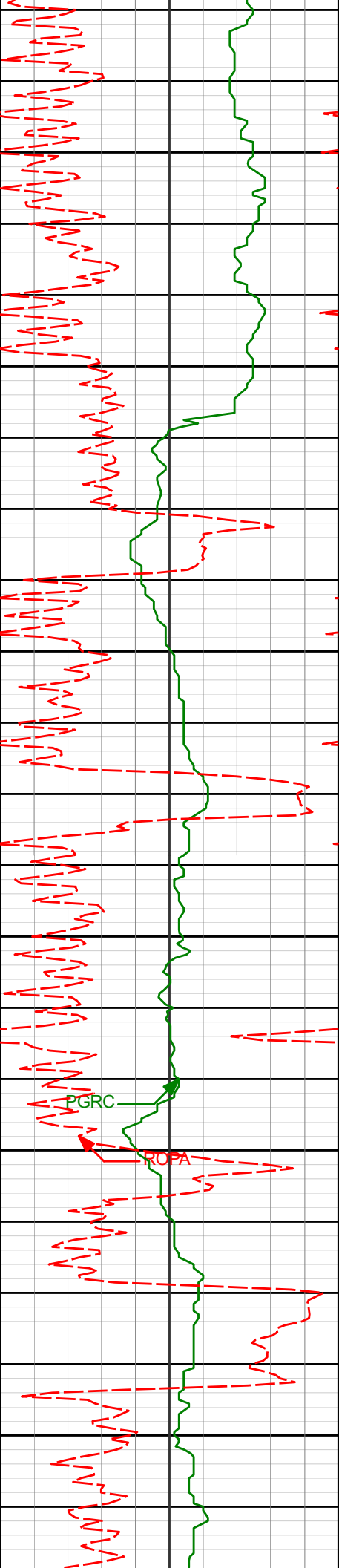
92.53°

179.83°

7089.21'

70.05'

7800'



7850'

7875'

92.96°

180.20°

7084.90'

159.94'

7900'

7950'

7965'

92.96°

180.33°

7080.25'

249.82'

8000'

PGRC

ROPA

8050'

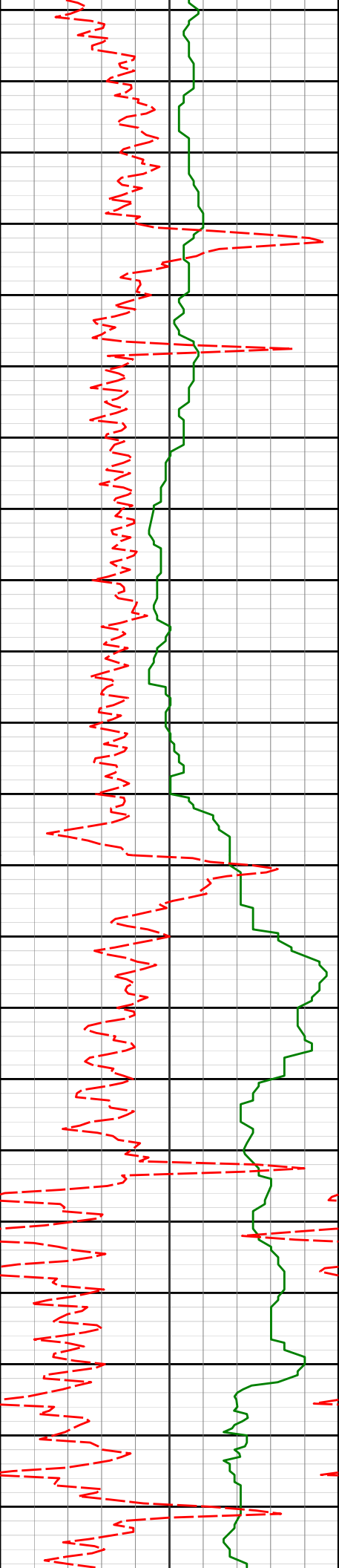
8054'

91.17°

180.88°

7077.05'

338.76'



8100'

8150'

8200'

8250'

8144'

91.23°

180.62°

7075.16'

428.74'

8234'

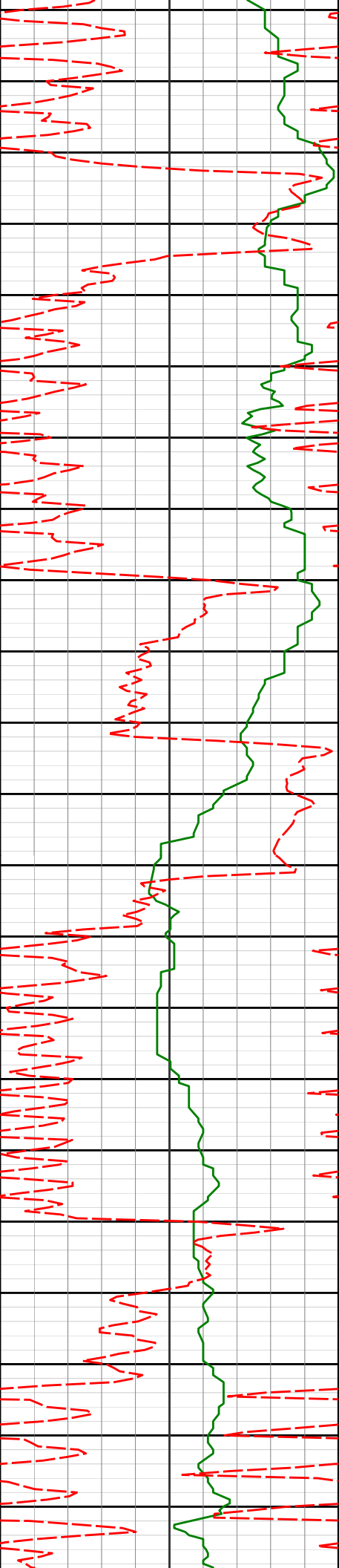
91.82°

180.19°

7072.77'

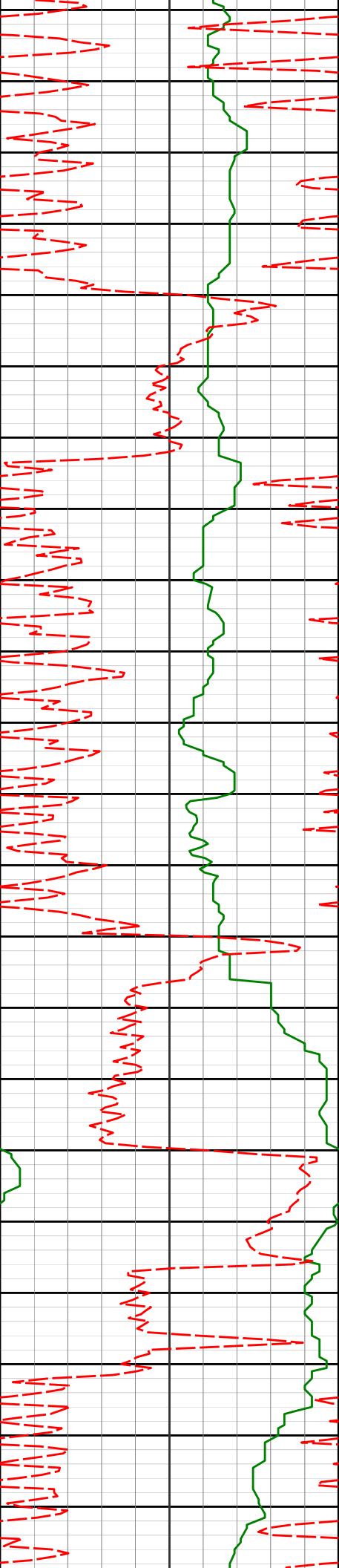
518.71'





The diagram illustrates three horizontal lines representing different elevations. Each line is associated with five data points, likely representing measurements at specific locations. The data points are labeled with values that include units of feet (') and degrees (°).

Elevation	Point 1	Point 2	Point 3	Point 4	Point 5
8300'	8323'	91.39°	178.92°	7070.27'	607.66'
8400'	8413'	89.82°	180.22°	7069.32'	697.64'
8500'	8502'	89.94°	179.50°	7069.51'	786.63'



8550'

8600'

8650'

8682'

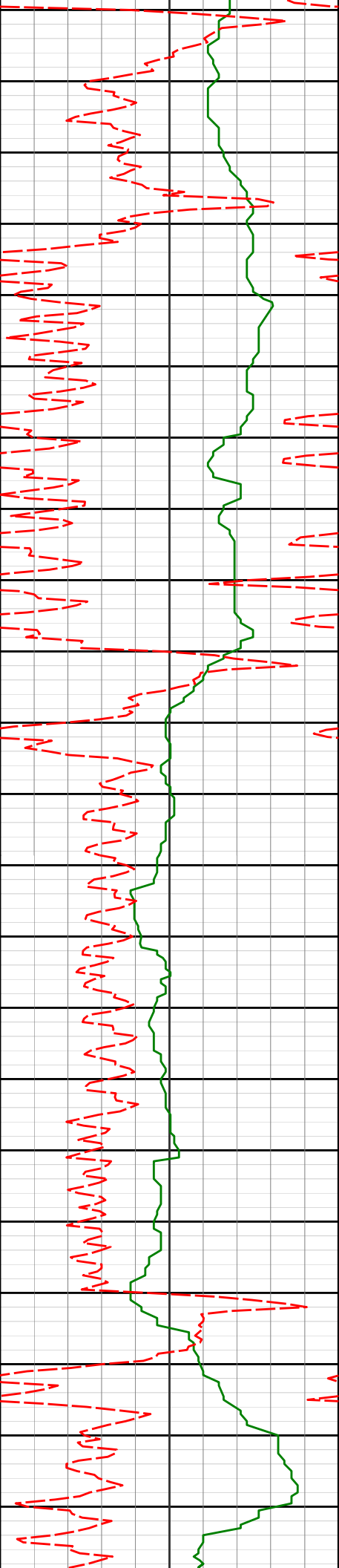
8700'

89.11°

179.60°

7071.00'

966.60'



8750'

8772'

90.00°

180.02°

7071.70'

1056.58'

8800'

8850'

8861'

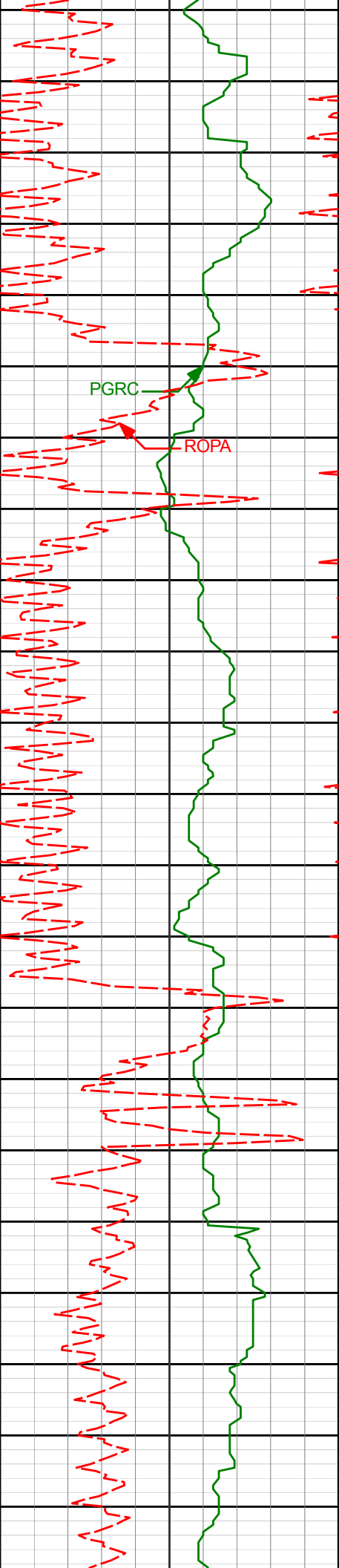
89.78°

180.24°

7071.87'

1145.58'

8900'



8950'

9000'

9050'

9100'

9150'

8951'

9041'

9130'

89.04°

88.55°

89.11°

179.60°

179.67°

180.35°

7072.80'

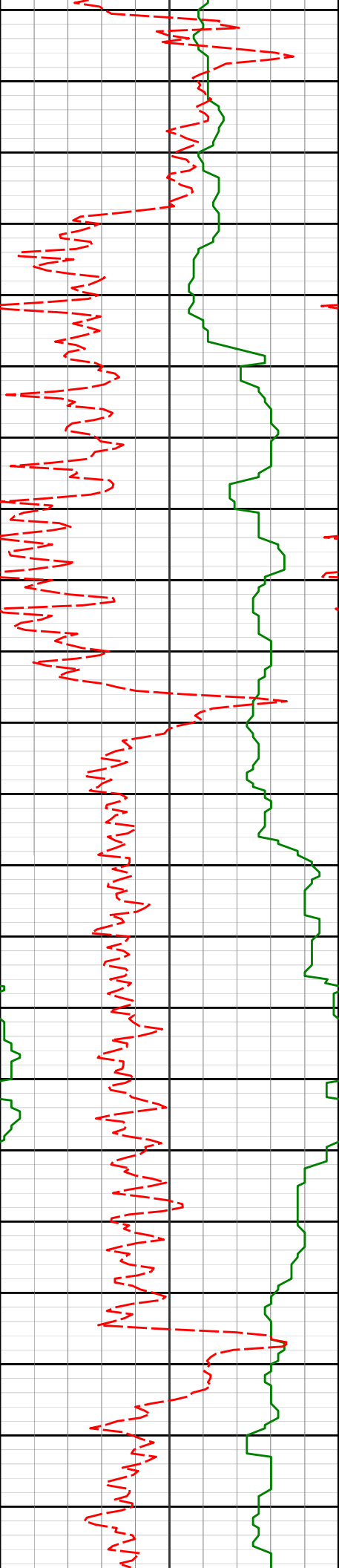
7074.69'

7076.51'

1235.57'

1325.54'

1414.52'



9200'

9250'

9300'

9350'

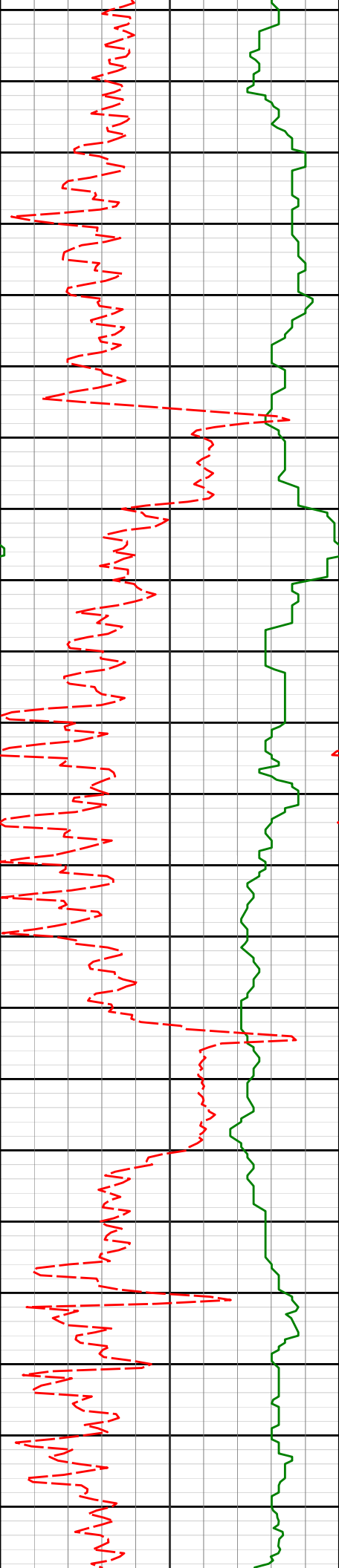
9310'

90.06°

179.28°

7077.81'

1594.49'



9400'

9399'

89.60°

179.31°

7078.08'

1683.47'

9450'

9489'

89.85°

179.98°

7078.51'

1773.46'

9500'

9550'

9579'

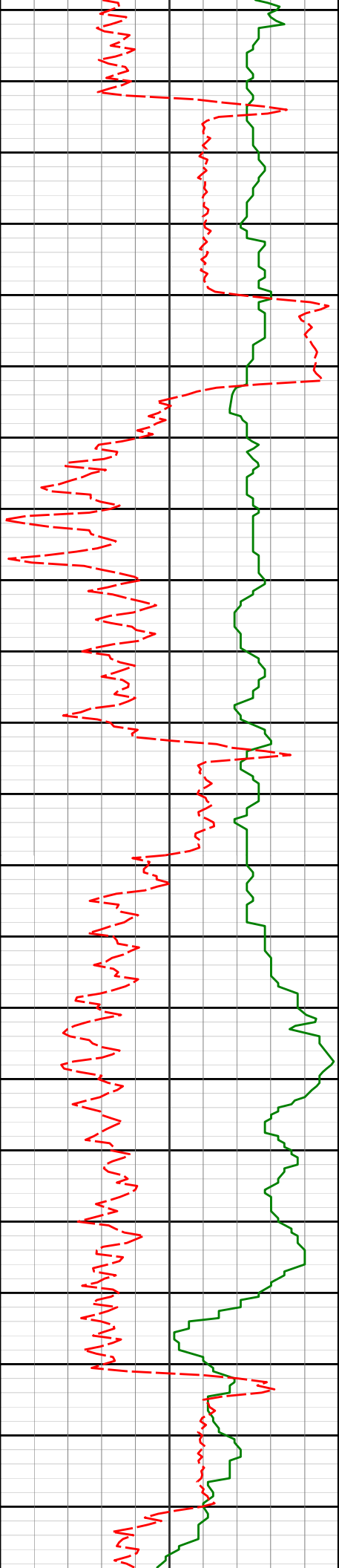
89.51°

180.22°

7079.01'

1863.46'

9600'



9650'

9668'

89.78°

181.17°

7079.56'

1952.45'

9700'

9750'

9758'

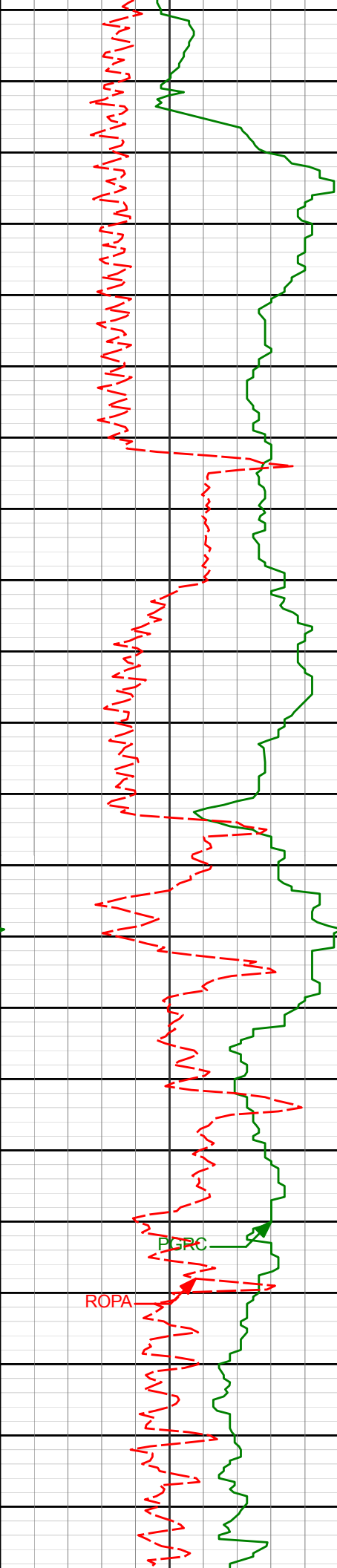
89.08°

180.66°

7080.46'

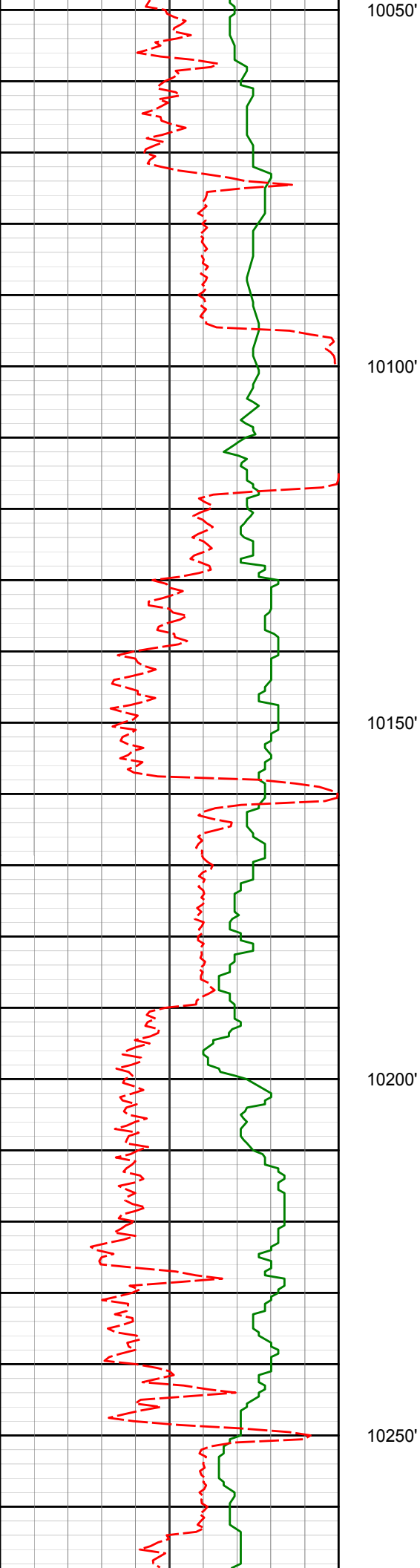
2042.44'

9800'



9847'	88.68°	180.71°	7082.20'	2131.43'
9850'				
9900'				
9937'	88.55°	180.32°	7084.37'	2221.40'
9950'				
10000'				
10027'	88.64°	180.12°	7086.58'	2311.37'





10116'

91.23°

183.08°

7086.68'

2400.34'

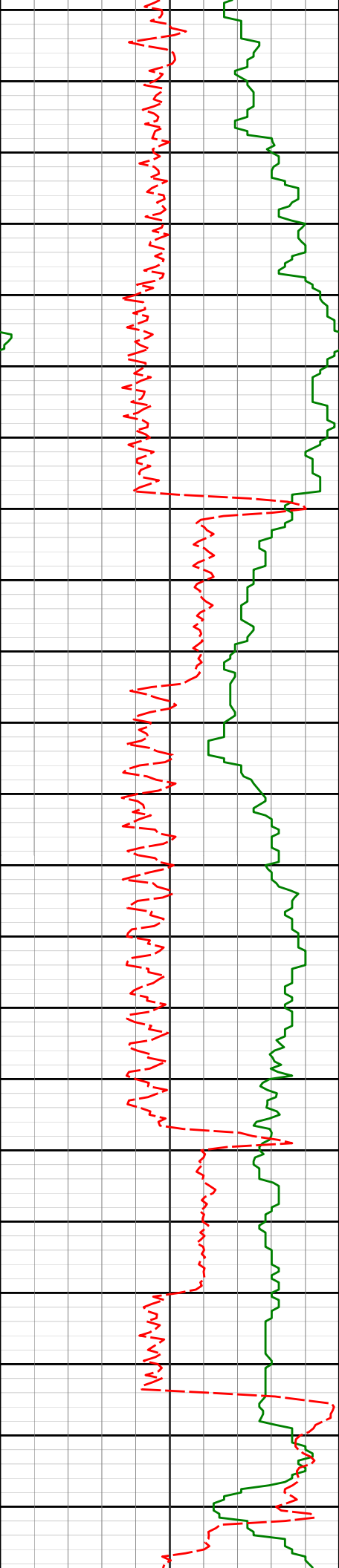
10206'

91.45°

183.60°

7084.58'

2490.21'



10300'

10350'

10400'

10450'

10295'

91.11°

183.81°

7082.59'

2579.05'

10385'

91.17°

183.57°

7080.80'

2668.89'

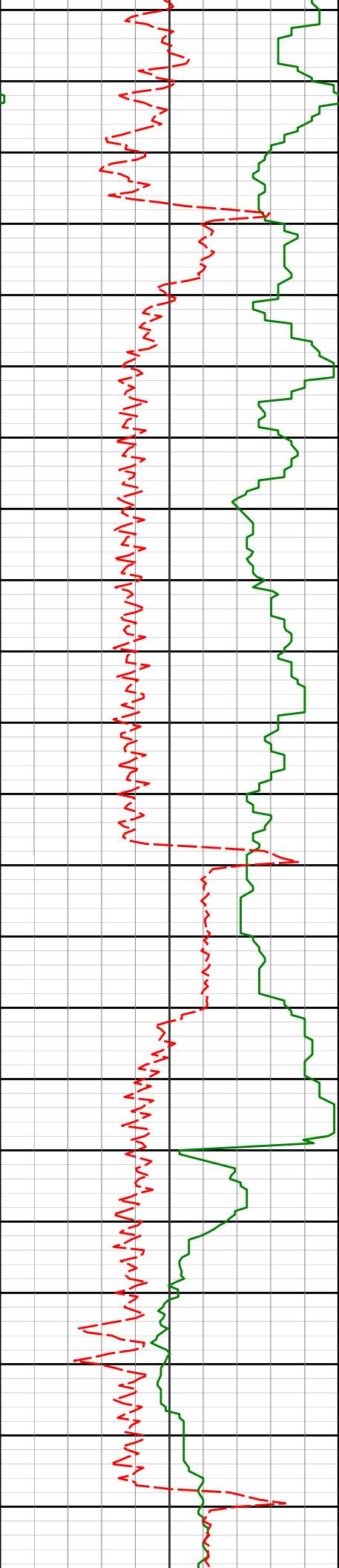
10474'

89.35°

182.68°

7080.39'

2757.80'



10500'

10550'

10600'

10650'

10700'

10564'

10654'

88.61°

88.25°

182.92°

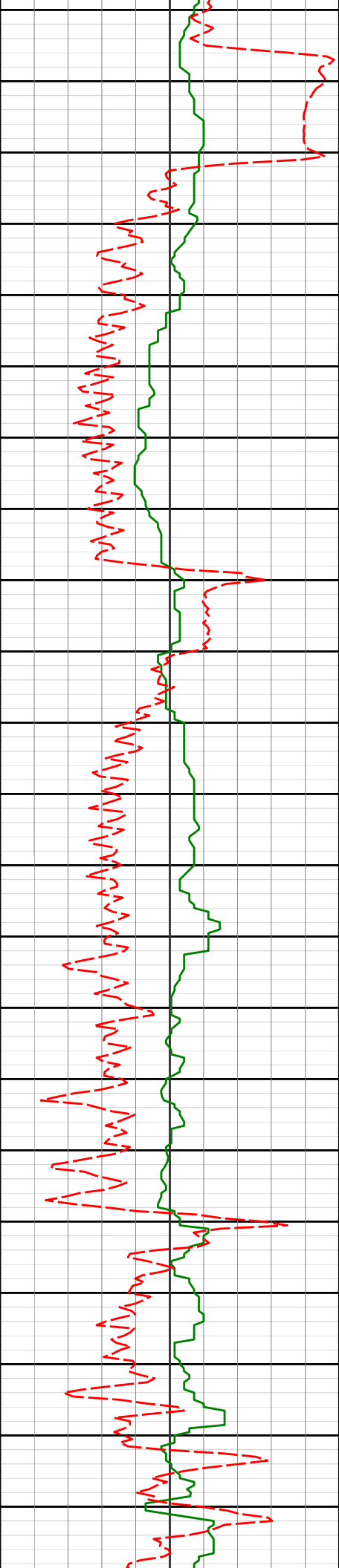
182.46°

7082.00'

7084.46'

2847.71'

2937.61'



10743'

89.54°

181.06°

7086.18'

3026.57'

10750'

10800'

10833'

89.51°

180.96°

7086.92'

3116.56'

10850'

10900'

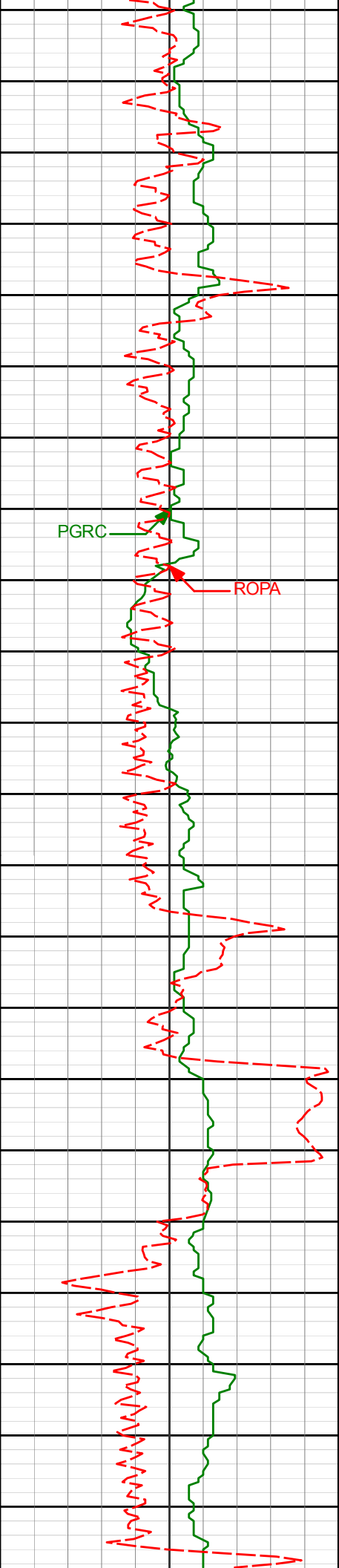
10922'

89.29°

180.15°

7087.86'

3205.56'



10950'

11000'

PGRC

ROPA

11012'

88.83°

179.68°

7089.33'

3295.54'

11050'

11100'

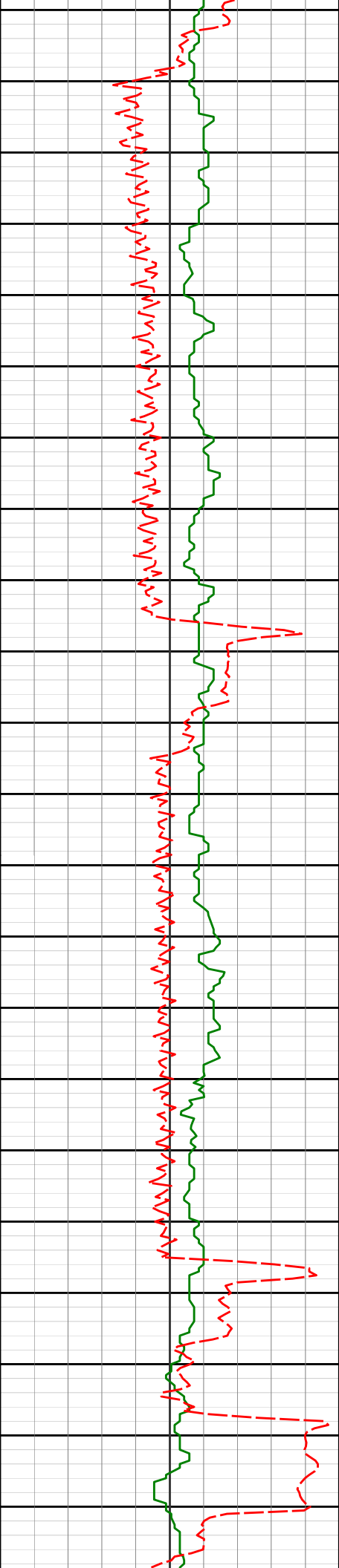
11102'

89.87°

180.00°

7090.35'

3385.53'



11191'

90.34°

180.13°

7090.19'

3474.52'

11200'

11250'

11281'

90.99°

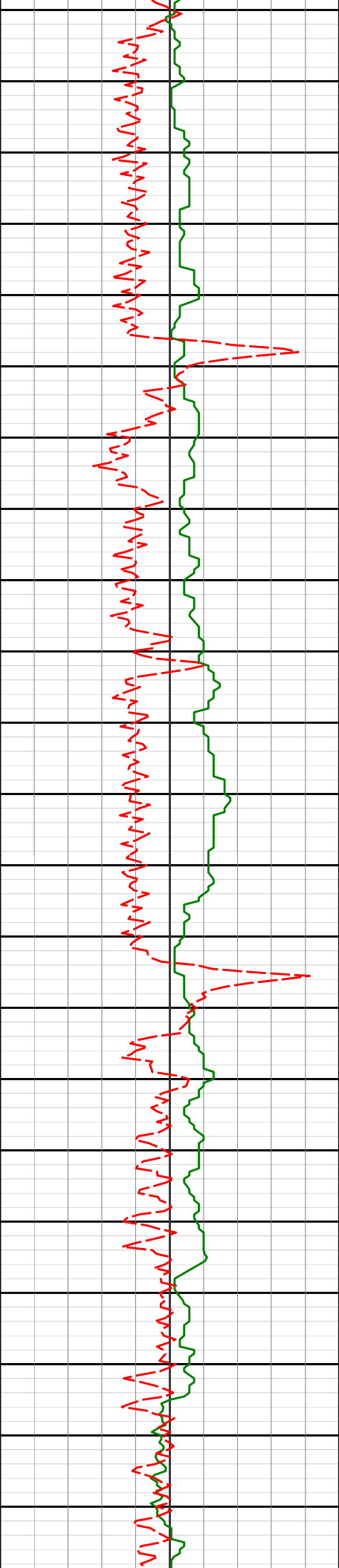
179.99°

7089.15'

3564.51'

11300'

11350'



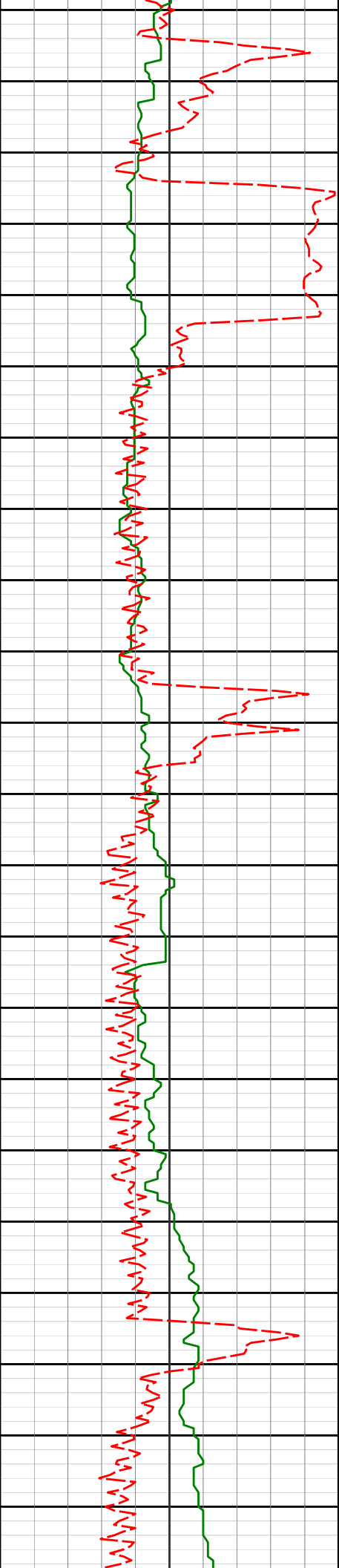
11400'

11450'

11500'

11550'

11370'	89.66°	179.25°	7088.64'	3653.50'
11460'	89.48°	178.70°	7089.32'	3743.46'
11550'	89.20°	178.61°	7090.35'	3833.41'



11600'

11640'

11650'

11700'

11750'

11800'

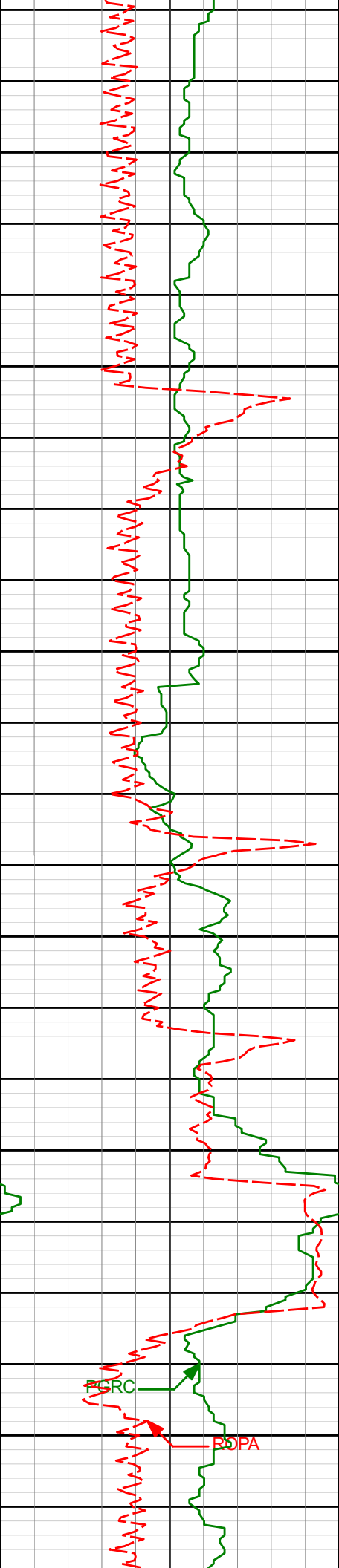
90.09°

180.51°

7090.91'

3923.39'





11850'

11900'

11950'

12000'

11819'

90.58°

180.28°

7089.86'

4102.39'

11908'

90.86°

179.98°

7088.75'

4191.38'

11998'

89.54°

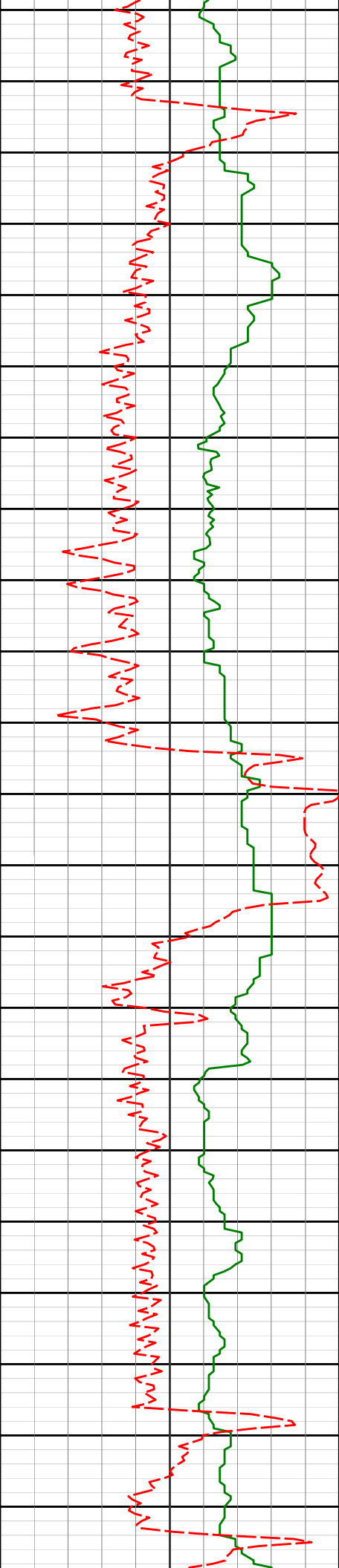
181.24°

7088.43'

4281.37'

PRC

POPA



12050'

12088'

88.92°

180.29°

7089.64'

4371.36'

12100'

12150'

12178'

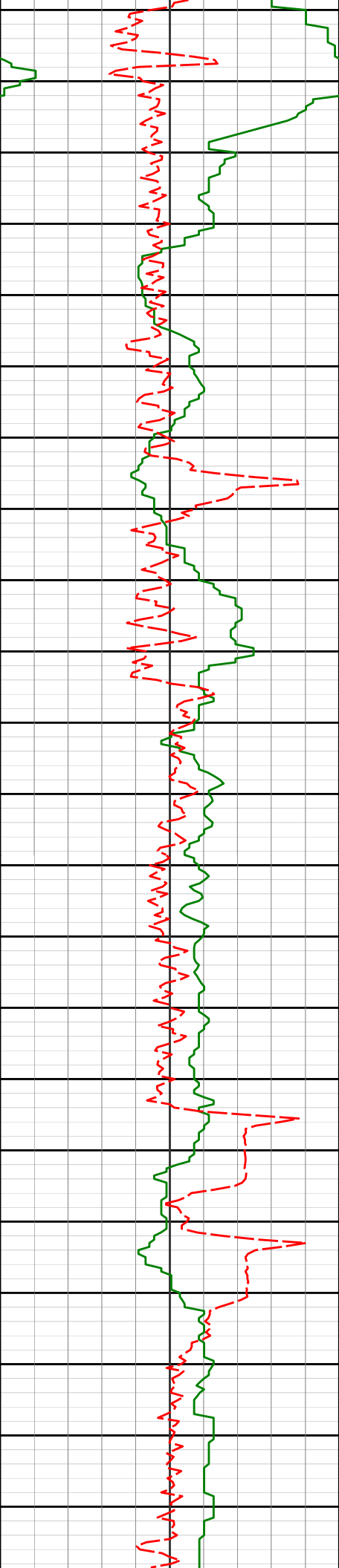
90.18°

181.30°

7090.35'

4461.35'

12200'



12357'

90.43°

180.38°

7089.40'

4640.35'

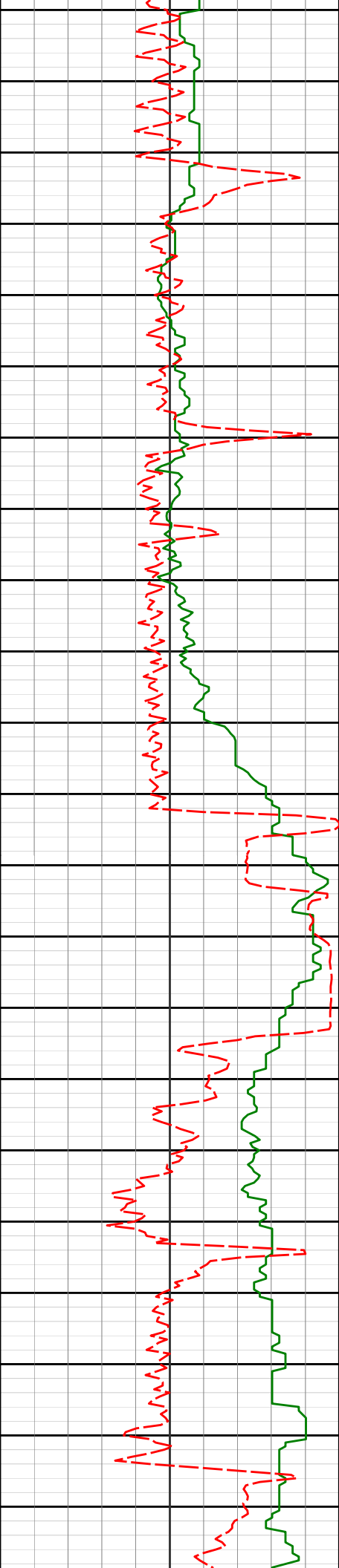
12446'

90.92°

180.37°

7088.35'

4729.34'



12500'

12536'

91.17°

180.32°

7086.71'

4819.32'

12550'

12600'

12626'

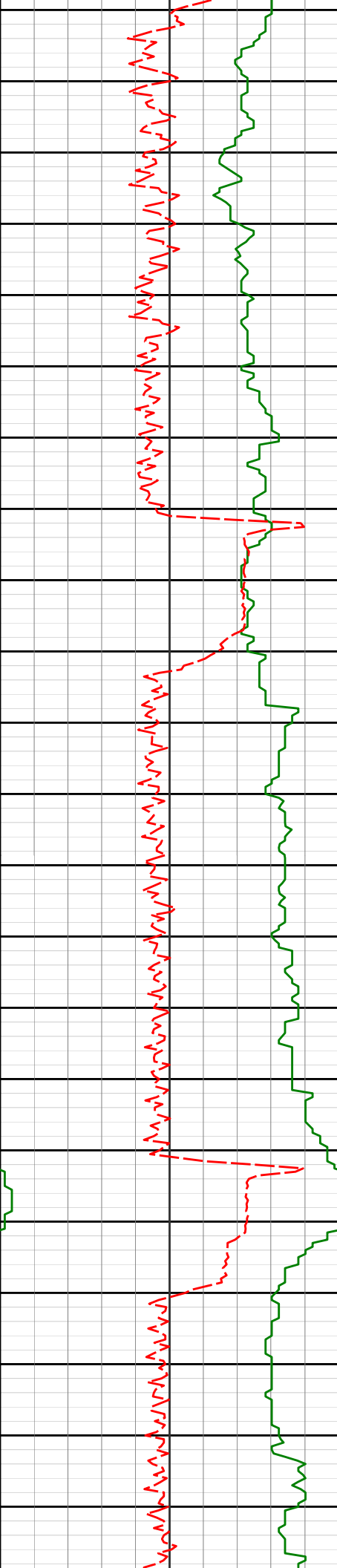
90.03°

181.79°

7085.76'

4909.31'

12650'



12700'

12715'

89.66°

181.52°

7086.00'

4998.29'

12750'

12800'

12805'

89.57°

182.54°

7086.61'

5088.26'

12850'

12895'

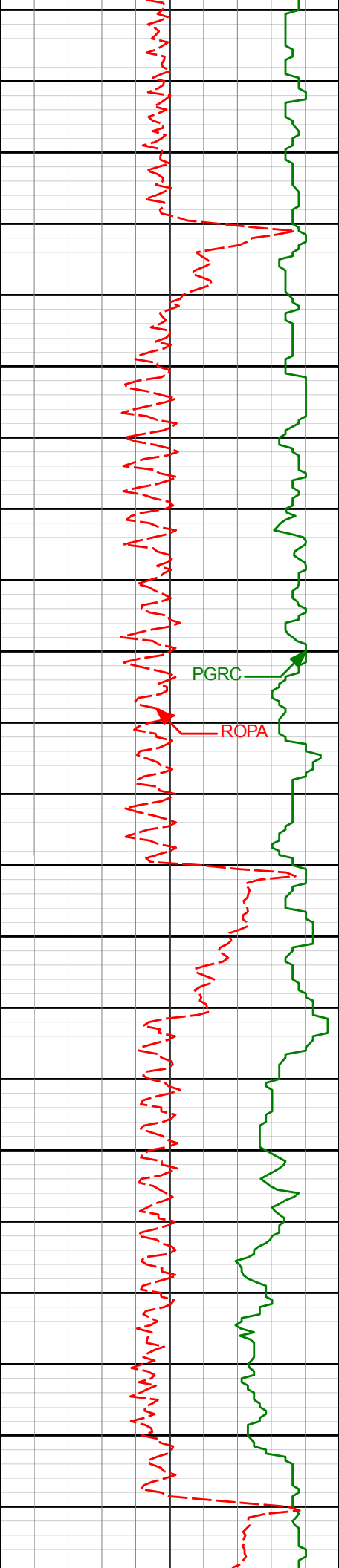
89.17°

182.77°

7087.60'

5178.19'

12900'



12950'

12984'

88.46°

182.23°

7089.44'

5267.12'

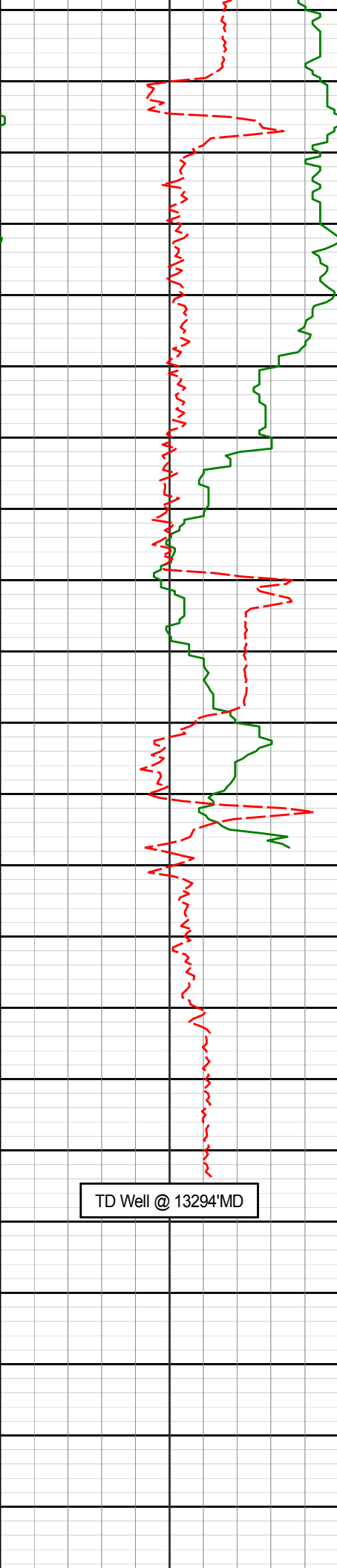
13000'

PGRC

ROPA

13050'

13100'



13150'

13164'

87.32°

181.00°

7096.07'

5446.96'

13200'

13250'

13249'

87.69°

181.01°

7099.77'

5531.88'



Casing set @13284

13294'

87.69°

181.01°

7101.58'

5576.84'

13300'

TD Well @ 13294'MD

Avg Rate of Penetration ROPA feet per hr		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
1K	0						
PCG Gamma Ray BCorr PGRC api							
0	150						

## HALLIBURTON

### DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp  
 RW 15N-32HZ  
 Wattenburg  
 Weld Colorado  
 USA  
 CA-XX-0904218785

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
13.00	0.00	0.00	13.00	0.00 N	0.00 E	0.00	0.00
132.00	0.88	321.75	132.00	0.72 N	0.57 W	-0.71	0.74
163.00	1.01	333.44	162.99	1.15 N	0.84 W	-1.14	0.75
195.00	1.36	357.17	194.98	1.78 N	0.98 W	-1.77	1.86
227.00	1.14	352.16	226.98	2.48 N	1.04 W	-2.47	0.77
259.00	1.36	359.55	258.97	3.17 N	1.09 W	-3.16	0.85
290.00	1.49	4.47	289.96	3.94 N	1.06 W	-3.93	0.58
322.00	1.76	3.76	321.95	4.85 N	1.00 W	-4.84	0.85
354.00	2.37	21.08	353.93	5.95 N	0.73 W	-5.95	2.71
385.00	2.81	16.07	384.89	7.28 N	0.28 W	-7.28	1.59
417.00	2.81	23.36	416.86	8.75 N	0.24 E	-8.76	1.12
449.00	3.65	24.33	448.80	10.40 N	0.97 E	-10.41	2.63
481.00	4.04	25.12	480.73	12.35 N	1.87 E	-12.37	1.23
512.00	4.61	16.33	511.64	14.54 N	2.69 E	-14.56	2.82
544.00	5.36	18.97	543.52	17.18 N	3.53 E	-17.22	2.45
575.00	5.84	18.79	574.38	20.05 N	4.51 E	-20.09	1.55
607.00	6.20	22.48	606.20	23.18 N	5.70 E	-23.24	1.65
670.00	7.51	20.02	668.75	30.20 N	8.41 E	-30.27	2.13
702.00	7.60	17.83	700.47	34.18 N	9.77 E	-34.26	0.94
734.00	7.56	17.03	732.19	38.20 N	11.04 E	-38.30	0.35
765.00	8.13	15.63	762.90	42.26 N	12.22 E	-42.37	1.94
797.00	8.96	13.34	794.54	46.87 N	13.41 E	-46.99	2.80
829.00	9.67	15.28	826.12	51.88 N	14.69 E	-52.02	2.43
860.00	10.11	13.52	856.66	57.04 N	16.01 E	-57.19	1.72
892.00	11.03	12.73	888.12	62.76 N	17.35 E	-62.92	2.91
923.00	11.25	12.46	918.53	68.60 N	18.65 E	-68.77	0.73
955.00	11.43	11.06	949.91	74.76 N	19.93 E	-74.94	1.03
987.00	12.09	14.40	981.24	81.12 N	21.37 E	-81.32	2.96
1018.00	12.44	13.17	1011.53	87.52 N	22.94 E	-87.73	1.41
1050.00	11.78	10.62	1042.82	94.08 N	24.33 E	-94.30	2.65
1082.00	12.48	10.62	1074.10	100.69 N	25.57 E	-100.92	2.19
1113.00	12.48	11.94	1104.37	107.26 N	26.88 E	-107.51	0.92
1145.00	12.35	13.43	1135.62	113.97 N	28.39 E	-114.23	1.08
1177.00	12.26	13.61	1166.89	120.60 N	29.98 E	-120.88	0.31
1208.00	12.44	10.62	1197.17	127.08 N	31.37 E	-127.37	2.14
1240.00	12.92	9.74	1228.39	134.00 N	32.61 E	-134.29	1.62
1272.00	13.05	12.20	1259.57	141.06 N	33.98 E	-141.36	1.77
1303.00	13.67	15.89	1289.73	148.00 N	35.73 E	-148.32	3.40
1335.00	13.40	14.31	1320.85	155.23 N	37.68 E	-155.57	1.43



RW 15N-32HZ

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
1366.00	13.32	16.60	1351.01	162.13 N	39.59 E	-162.49	1.73
1398.00	13.97	14.93	1382.10	169.40 N	41.63 E	-169.78	2.38
1430.00	13.18	15.98	1413.21	176.64 N	43.63 E	-177.03	2.59
1461.00	12.79	15.19	1443.42	183.35 N	45.51 E	-183.76	1.38
1493.00	12.83	13.17	1474.62	190.22 N	47.24 E	-190.65	1.41
1525.00	13.18	13.26	1505.80	197.23 N	48.89 E	-197.68	1.10
1557.00	12.66	15.98	1536.99	204.16 N	50.69 E	-204.62	2.50
1588.00	12.70	17.21	1567.23	210.68 N	52.64 E	-211.15	0.88
1650.00	13.62	15.28	1627.60	224.23 N	56.58 E	-224.74	1.64
1682.00	13.01	17.91	1658.74	231.29 N	58.68 E	-231.82	2.69
1714.00	12.22	18.53	1689.97	237.93 N	60.86 E	-238.48	2.50
1746.00	12.17	15.80	1721.25	244.39 N	62.85 E	-244.96	1.81
1778.00	11.65	15.63	1752.56	250.74 N	64.64 E	-251.33	1.63
1815.00	11.60	13.87	1788.80	257.95 N	66.54 E	-258.56	0.97
1934.00	11.14	12.22	1905.47	280.80 N	71.84 E	-281.46	0.47
2023.00	10.33	9.62	1992.91	297.07 N	75.00 E	-297.76	1.06
2202.00	11.28	12.01	2168.73	330.02 N	81.32 E	-330.76	0.59
2381.00	12.11	11.21	2344.02	365.56 N	88.61 E	-366.37	0.47
2471.00	11.72	9.37	2432.08	383.84 N	91.94 E	-384.68	0.60
2560.00	12.95	15.06	2519.03	402.39 N	96.00 E	-403.26	1.94
2650.00	11.77	10.15	2606.94	421.17 N	100.24 E	-422.08	1.75
2829.00	13.38	11.29	2781.64	459.45 N	107.51 E	-460.43	0.91
2918.00	13.00	11.35	2868.29	479.36 N	111.50 E	-480.38	0.43
3008.00	13.80	19.91	2955.85	499.38 N	117.15 E	-500.45	2.37
3097.00	13.00	18.04	3042.43	518.88 N	123.86 E	-520.01	1.02
3277.00	10.91	11.53	3218.52	554.83 N	133.54 E	-556.04	1.38
3366.00	9.50	26.83	3306.13	569.64 N	138.54 E	-570.90	3.42
3456.00	10.93	24.92	3394.70	584.01 N	145.48 E	-585.33	1.63
3546.00	8.71	23.65	3483.37	597.99 N	151.81 E	-599.37	2.48
3635.00	10.39	23.19	3571.14	611.54 N	157.68 E	-612.97	1.89
3725.00	12.21	16.63	3659.39	628.12 N	163.60 E	-629.61	2.47
3815.00	10.66	15.29	3747.60	645.27 N	168.52 E	-646.80	1.75
3904.00	13.65	16.75	3834.60	663.27 N	173.72 E	-664.85	3.38
4083.00	11.37	13.73	4009.34	700.64 N	183.99 E	-702.31	1.32
4172.00	11.30	16.57	4096.60	717.52 N	188.56 E	-719.23	0.63
4262.00	10.34	14.61	4185.00	733.79 N	193.11 E	-735.54	1.14
4351.00	8.93	10.96	4272.75	748.30 N	196.44 E	-750.08	1.73
4441.00	8.45	8.54	4361.71	761.70 N	198.75 E	-763.50	0.67
4531.00	7.58	7.01	4450.83	774.13 N	200.46 E	-775.95	1.00
4621.00	7.12	6.83	4540.09	785.56 N	201.85 E	-787.39	0.51
4710.00	6.22	0.31	4628.49	795.86 N	202.53 E	-797.70	1.32
4800.00	5.96	356.44	4717.98	805.39 N	202.26 E	-807.23	0.54
4889.00	5.08	353.53	4806.57	813.92 N	201.53 E	-815.75	1.04
5005.00	3.87	346.95	4922.22	822.84 N	200.07 E	-824.65	1.13
5095.00	1.86	325.49	5012.10	827.00 N	198.56 E	-828.80	2.49
5185.00	1.99	306.26	5102.05	829.13 N	196.47 E	-830.91	0.73
5274.00	0.31	80.35	5191.04	830.08 N	195.46 E	-831.86	2.49
5364.00	0.17	181.48	5281.03	829.99 N	195.70 E	-831.77	0.42
5454.00	0.25	236.39	5371.03	829.75 N	195.53 E	-831.52	0.23
5543.00	0.58	260.28	5460.03	829.57 N	194.92 E	-831.33	0.41
5633.00	0.76	284.66	5550.03	829.64 N	193.90 E	-831.40	0.37
5723.00	2.07	88.50	5640.01	829.83 N	194.95 E	-831.60	3.12
5813.00	1.64	83.15	5729.96	830.03 N	197.85 E	-831.82	0.51
5902.00	1.52	84.20	5818.93	830.30 N	200.29 E	-832.12	0.14
5992.00	1.41	90.28	5908.90	830.42 N	202.58 E	-832.25	0.21
6082.00	1.19	90.19	5998.88	830.41 N	204.62 E	-832.26	0.24
6171.00	0.07	319.62	6087.87	830.45 N	205.51 E	-832.31	1.39
6261.00	0.25	311.04	6177.87	830.62 N	205.33 E	-832.48	0.20
6351.00	0.48	331.91	6267.87	831.08 N	205.00 E	-832.94	0.29
6440.00	0.87	336.88	6356.86	832.03 N	204.56 E	-833.89	0.44

RW 15N-32HZ

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
6530.00	4.94	177.98	6446.77	828.78 N	204.43 E	-830.64	6.40
6620.00	6.88	176.93	6536.28	819.53 N	204.86 E	-821.38	2.16
6709.00	15.55	178.12	6623.50	802.25 N	205.54 E	-804.11	9.74
6799.00	29.77	182.87	6706.35	767.69 N	204.81 E	-769.55	15.92
6889.00	35.69	182.93	6782.02	719.12 N	202.35 E	-720.96	6.58
6978.00	38.23	177.39	6853.15	665.66 N	202.27 E	-667.50	4.70
7068.00	45.73	174.62	6920.02	605.67 N	206.57 E	-607.55	8.58
7158.00	58.05	177.78	6975.46	535.15 N	211.09 E	-537.08	13.96
7247.00	66.40	181.12	7016.91	456.49 N	211.75 E	-458.43	9.95
7337.00	73.26	179.74	7047.92	372.07 N	211.14 E	-374.00	7.76
7427.00	78.19	179.73	7070.11	284.87 N	211.55 E	-286.82	5.48
7517.00	86.24	180.09	7082.29	195.78 N	211.68 E	-197.73	8.95
7606.00	87.29	180.43	7087.31	106.92 N	211.28 E	-108.87	1.24
7695.00	88.86	181.17	7090.30	17.98 N	210.04 E	-19.92	1.95
7785.00	92.53	179.83	7089.21	71.99 S	209.25 E	70.05	4.34
7875.00	92.96	180.20	7084.90	161.89 S	209.23 E	159.94	0.63
7965.00	92.96	180.33	7080.25	251.77 S	208.81 E	249.82	0.14
8054.00	91.17	180.88	7077.05	340.70 S	207.87 E	338.76	2.10
8144.00	91.23	180.62	7075.16	430.67 S	206.70 E	428.74	0.30
8234.00	91.82	180.19	7072.77	520.64 S	206.06 E	518.71	0.81
8323.00	91.39	178.92	7070.27	609.60 S	206.75 E	607.66	1.51
8413.00	89.82	180.22	7069.32	699.58 S	207.43 E	697.64	2.26
8502.00	89.94	179.50	7069.51	788.58 S	207.64 E	786.63	0.82
8682.00	89.11	179.60	7071.00	968.57 S	209.06 E	966.60	0.46
8772.00	90.00	180.02	7071.70	1058.57 S	209.36 E	1056.58	1.09
8861.00	89.78	180.24	7071.87	1147.57 S	209.15 E	1145.58	0.35
8951.00	89.04	179.60	7072.80	1237.56 S	209.28 E	1235.57	1.09
9041.00	88.55	179.67	7074.69	1327.54 S	209.85 E	1325.54	0.55
9130.00	89.11	180.35	7076.51	1416.52 S	209.84 E	1414.52	0.99
9310.00	90.06	179.28	7077.81	1596.51 S	210.42 E	1594.49	0.79
9399.00	89.60	179.31	7078.08	1685.50 S	211.51 E	1683.47	0.52
9489.00	89.85	179.98	7078.51	1775.50 S	212.07 E	1773.46	0.79
9579.00	89.51	180.22	7079.01	1865.50 S	211.91 E	1863.46	0.46
9668.00	89.78	181.17	7079.56	1954.49 S	210.84 E	1952.45	1.11
9758.00	89.08	180.66	7080.46	2044.47 S	209.40 E	2042.44	0.96
9847.00	88.68	180.71	7082.20	2133.45 S	208.33 E	2131.43	0.45
9937.00	88.55	180.32	7084.37	2223.42 S	207.53 E	2221.40	0.46
10027.00	88.64	180.12	7086.58	2313.39 S	207.18 E	2311.37	0.24
10116.00	91.23	183.08	7086.68	2402.34 S	204.70 E	2400.34	4.42
10206.00	91.45	183.60	7084.58	2492.16 S	199.45 E	2490.21	0.63
10295.00	91.11	183.81	7082.59	2580.95 S	193.70 E	2579.05	0.45
10385.00	91.17	183.57	7080.80	2670.75 S	187.91 E	2668.89	0.27
10474.00	89.35	182.68	7080.39	2759.61 S	183.06 E	2757.80	2.28
10564.00	88.61	182.92	7082.00	2849.48 S	178.67 E	2847.71	0.86
10654.00	88.25	182.46	7084.46	2939.35 S	174.44 E	2937.61	0.65
10743.00	89.54	181.06	7086.18	3028.29 S	171.71 E	3026.57	2.14
10833.00	89.51	180.96	7086.92	3118.27 S	170.13 E	3116.56	0.12
10922.00	89.29	180.15	7087.86	3207.26 S	169.26 E	3205.56	0.94
11012.00	88.83	179.68	7089.33	3297.25 S	169.40 E	3295.54	0.73
11102.00	89.87	180.00	7090.35	3387.24 S	169.65 E	3385.53	1.21
11191.00	90.34	180.13	7090.19	3476.24 S	169.55 E	3474.52	0.55
11281.00	90.99	179.99	7089.15	3566.23 S	169.45 E	3564.51	0.74
11370.00	89.66	179.25	7088.64	3655.23 S	170.04 E	3653.50	1.71
11460.00	89.48	178.70	7089.32	3745.21 S	171.65 E	3743.46	0.64
11550.00	89.20	178.61	7090.35	3835.18 S	173.77 E	3833.41	0.33
11640.00	90.09	180.51	7090.91	3925.17 S	174.46 E	3923.39	2.33
11819.00	90.58	180.28	7089.86	4104.16 S	173.22 E	4102.39	0.30
11908.00	90.86	179.98	7088.75	4193.16 S	173.02 E	4191.38	0.46
11998.00	89.54	181.24	7088.43	4283.15 S	172.06 E	4281.37	2.03
12088.00	88.92	180.29	7089.64	4373.13 S	170.86 E	4371.36	1.26

RW 15N-32HZ

<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>
12178.00	90.18	181.30	7090.35	4463.11 S	169.61 E	4461.35	1.79
12357.00	90.43	180.38	7089.40	4642.09 S	166.99 E	4640.35	0.53
12446.00	90.92	180.37	7088.35	4731.08 S	166.41 E	4729.34	0.55
12536.00	91.17	180.32	7086.71	4821.07 S	165.86 E	4819.32	0.28
12626.00	90.03	181.79	7085.76	4911.04 S	164.21 E	4909.31	2.07
12715.00	89.66	181.52	7086.00	5000.00 S	161.64 E	4998.29	0.51
12805.00	89.57	182.54	7086.61	5089.94 S	158.45 E	5088.26	1.14
12895.00	89.17	182.77	7087.60	5179.84 S	154.28 E	5178.19	0.51
12984.00	88.46	182.23	7089.44	5268.74 S	150.40 E	5267.12	1.00
13164.00	87.32	181.00	7096.07	5448.54 S	145.33 E	5446.96	0.93
13249.00	87.69	181.01	7099.77	5533.44 S	143.84 E	5531.88	0.44
13294.00	87.69	181.01	7101.58	5578.40 S	143.05 E	5576.84	0.00

**CALCULATION BASED ON MINIMUM CURVATURE METHOD**

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

**VERTICAL SECTION RELATIVE TO WELL HEAD  
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 180.53 DEGREES (TRUE)  
A TOTAL CORRECTION OF 8.23 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 13294.00 FEET  
IS 5580.23 FEET ALONG 178.53 DEGREES (TRUE)**

**Surveys from 13' to 1815' provided by third party  
First Sperry Survey at 1934'.  
Last survey is a projection to bit @ 13294'TD.**