

PCGC - Pressure Case Gamma

1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	11-Apr-14	13-Apr-14	15-Apr-14		
Rig Bit Number	0100	0200	0300		
Bit Size (in)	8.750	6.125	6.125		
Tool Nominal OD (in)	6.750	4.750	4.750		
Log Start Depth (MD, ft)	1,250.00	7,550.00	7,598.00		
Log End Depth (MD, ft)	7,550.00	7,598.00	12,188.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	09-Apr-14 18:15	12-Apr-14 22:00	13-Apr-14 11:24		
Drill/Wipe End Date and Time	11-Apr-14 09:00	12-Apr-14 22:25	14-Apr-14 06:10		
Min Inc (deg) @ Depth (MD, ft)	0.37 @ 4,500.00	92.93 @ 7,550.00	89.14 @ 11,011.00		
Max Inc (deg) @ Depth (MD, ft)	90.00 @ 7,550.00	92.93 @ 7,550.00	91.54 @ 10,630.00		
Bit TFA(in2) / Bit Type	1.34 / PDC	1.24 / PDC	1.24 / PDC		
Flow Rate (gpm)	564.35	300.00	288.36		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Native/Spud Mud	Native/Spud Mud	Native/Spud Mud		
Density (ppg) / Viscosity (spqt)	9.20 / 38.00	10.15 / 40.00	9.85 / 44.00		
Filtrate CL (ppm)	1,100.00	1,300.00	1,200.00		
pH / Fluid Loss (mptm)	9.50 / 4	9.70 / 4	9.40 / 5		
PV (cP) / YP (lbf2)	11 / 13.00	10 / 11.00	13 / 13.00		
% Solids / % Sand	0.5 / 2.00	9.5 / 0.75	8.2 / 0.50		
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / 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 Tool Temp (degF) / S	475.04 / PGM	334.40 / PGM	334.40 / PGM		

Max Tool Temp (degF) / Source	175.21 / PCM	231.42 / PCM	231.42 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Matt Busche	Matt Busche	Matt Busche		
Customer Representative	Terry Bradshaw	Terry Bradshaw	Terry Bradshaw		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	244108	11768602	11768602		
Insert Serial Number	12230081	11680779	11680779		
Date and Time Initialized	09-Apr-14 06:18	12-Apr-14 13:01	12-Apr-14 13:01		
Date and Time Read	11-Apr-14 17:03	01-Jan-70 00:00	15-Apr-14 10:54		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	45.05	41.93	41.76		
Software Version	6.21	6.21	6.21		
Sub Serial Number	244108	11768602	11768602		
Sonde Serial Number	11638587	11833026	11833026		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	24.00	316.32	235.73		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	50.00	46.88	46.71		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	244108	11768602	11768602		
Insert/Sonde Serial Number	11579846	11293433	11293433		

REMARKS

1. All depths are measured depths, referenced to the Driller's pipe tally and are measured from the Kelly Bushing, 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 final survey is a straight line projection to the bit.
5. The following smoothing parameters have been applied to the data:

PGRC (Corrected Gamma Ray):
Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft
Gap Fill: 3.0 ft

ROPA (Average Rate Of Penetration):
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft
Gap Fill: 3.0 ft

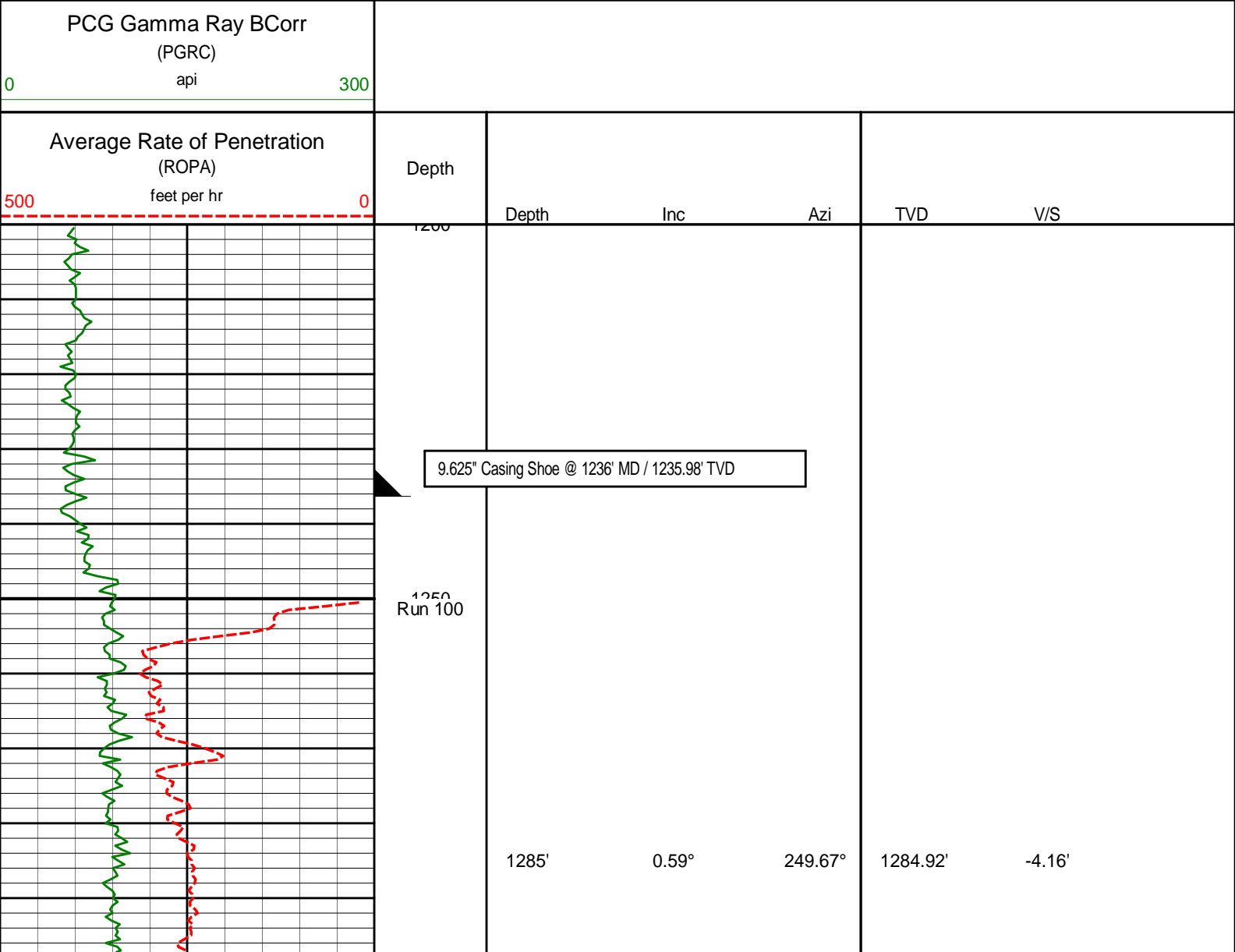
Insite version: 8.0.2

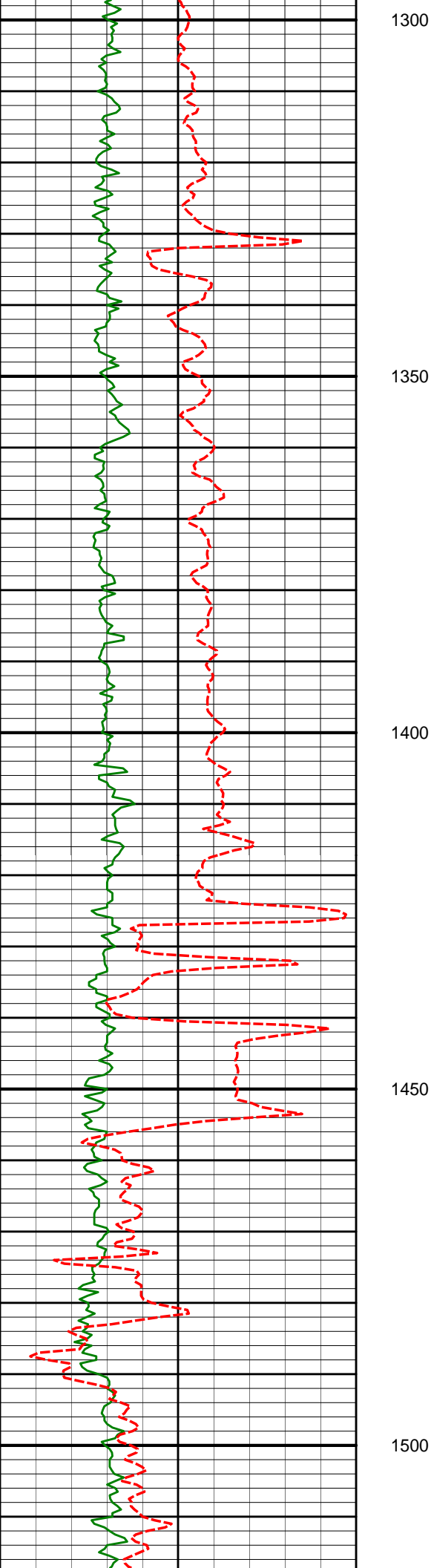
WARRANTY

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HALLIBURTON

MD Main Log 1:240





1380'

0.59°

261.61°

1379.91'

-4.43'

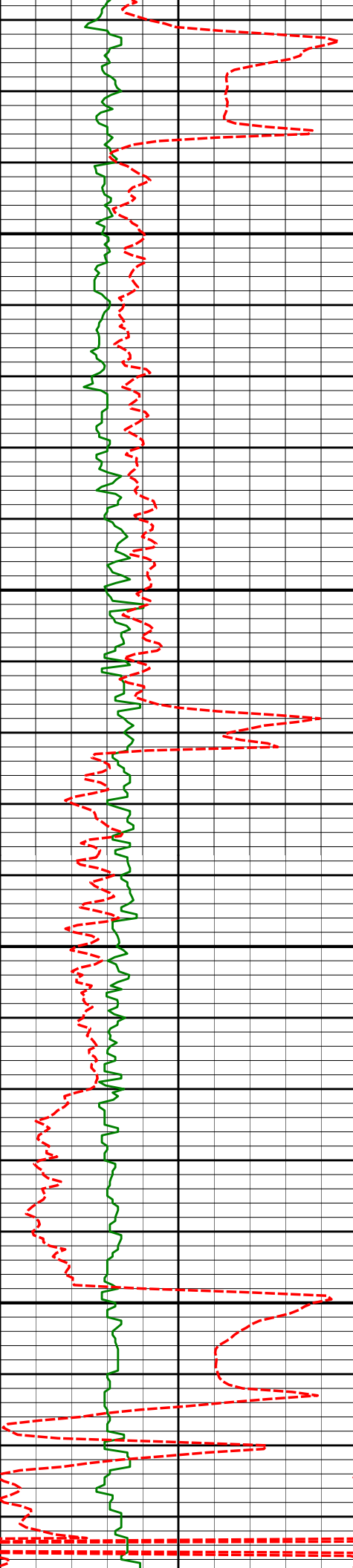
1475'

1.09°

132.93°

1474.91'

-5.11'



1550

1570'

2.94°

138.66°

1569.84'

-7.48'

1600

1650

1664'

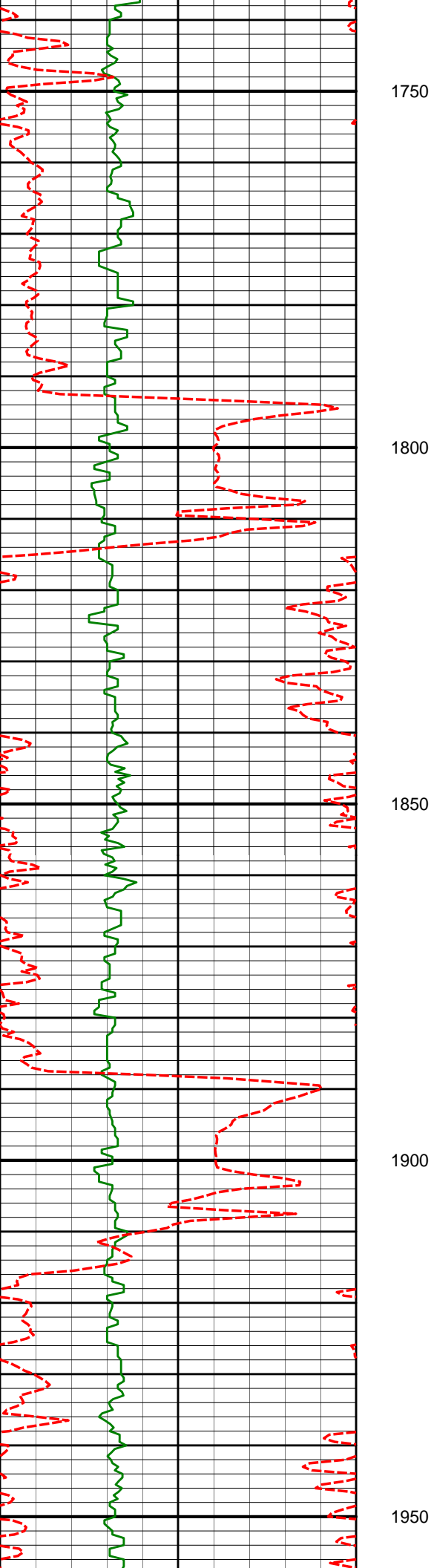
2.68°

139.91°

1663.73'

-10.86'

1700



1750

1759'

4.97°

135.89°

1758.51'

-15.35'

1800

1850

1853'

6.56°

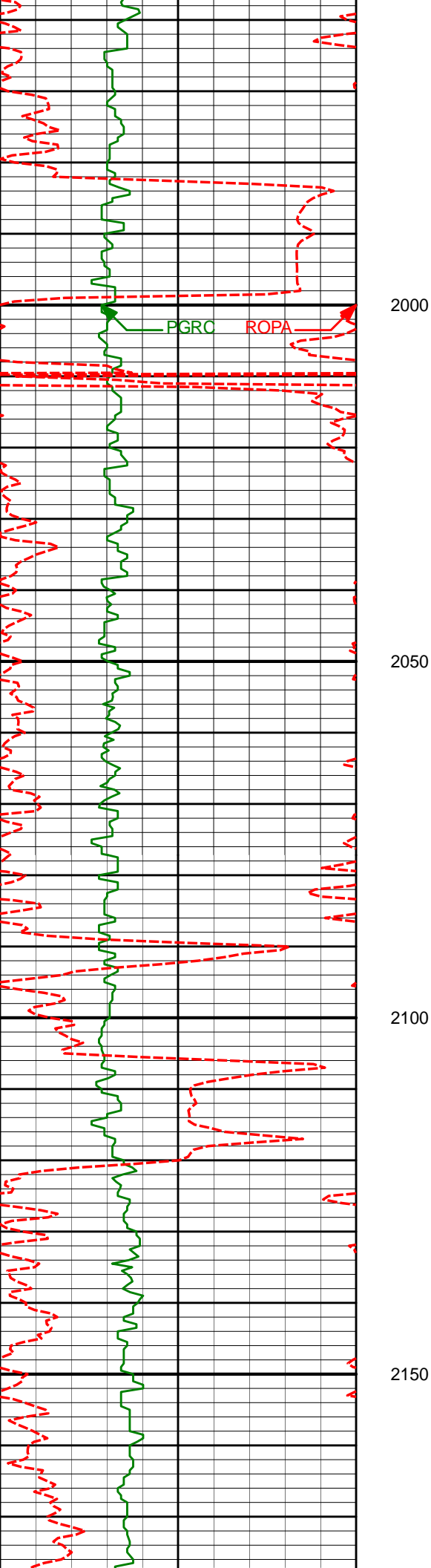
140.61°

1852.03'

-22.20'

1900

1950



2041'

9.64°

141.16°

2038.14'

-42.16'

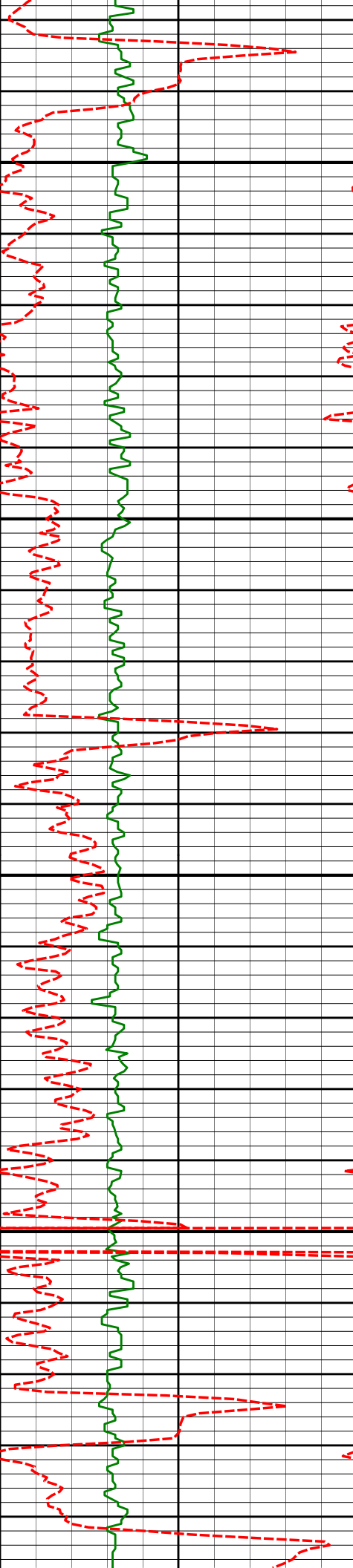
2135'

10.61°

138.43°

2130.67'

-54.37'



2200

2250

2300

2350

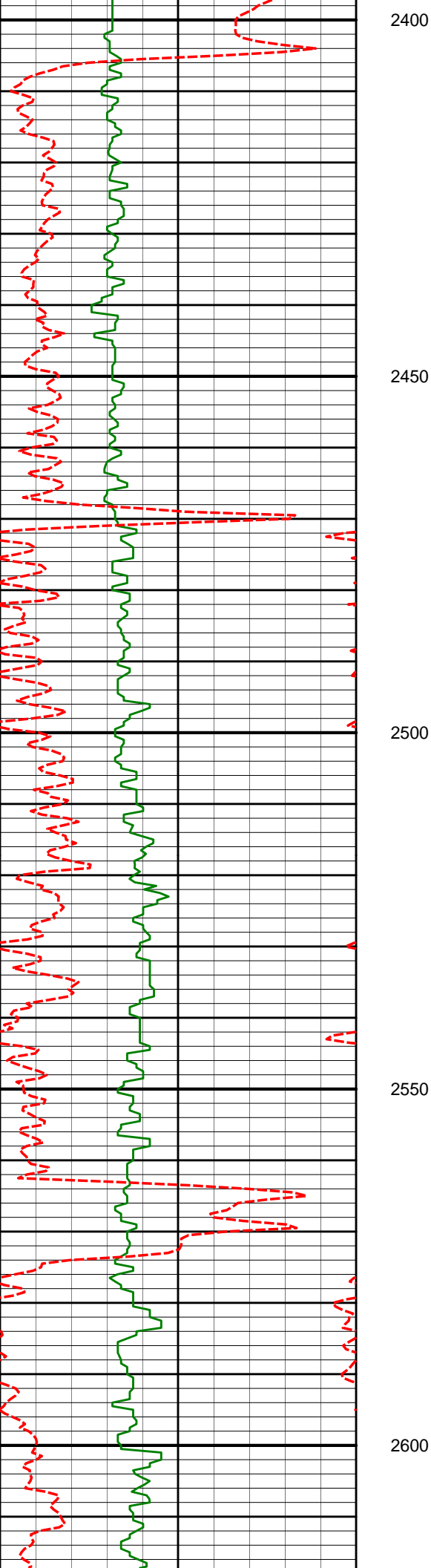
2323'

9.72°

139.28°

2315.72'

-78.55'



2418'

10.23°

137.07°

2409.28'

-90.40'

2512'

9.60°

136.61°

2501.88'

-101.81'

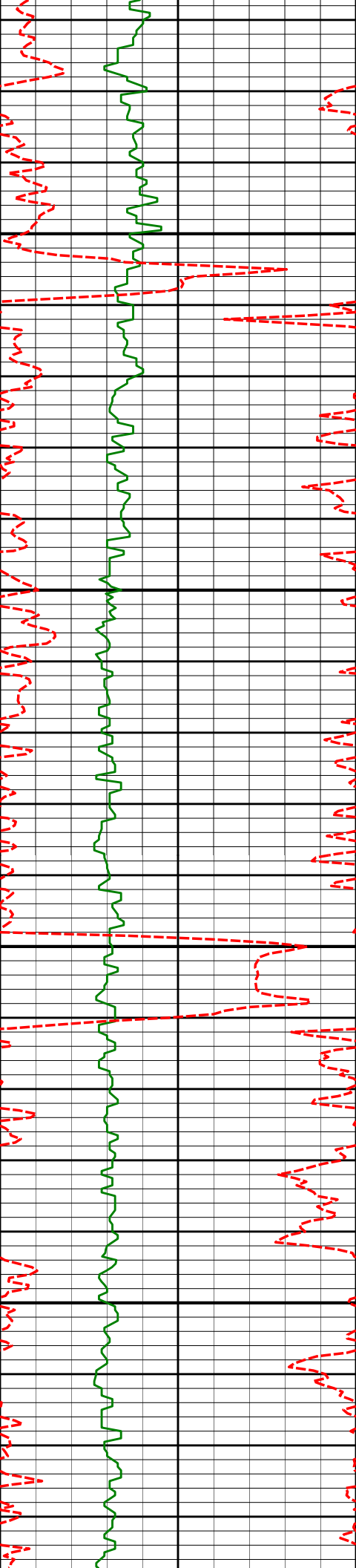
2606'

10.50°

136.73°

2594.43'

-113.33'



2650

2700

2750

2800

2700'

9.94°

135.58°

2686.94'

-124.94'

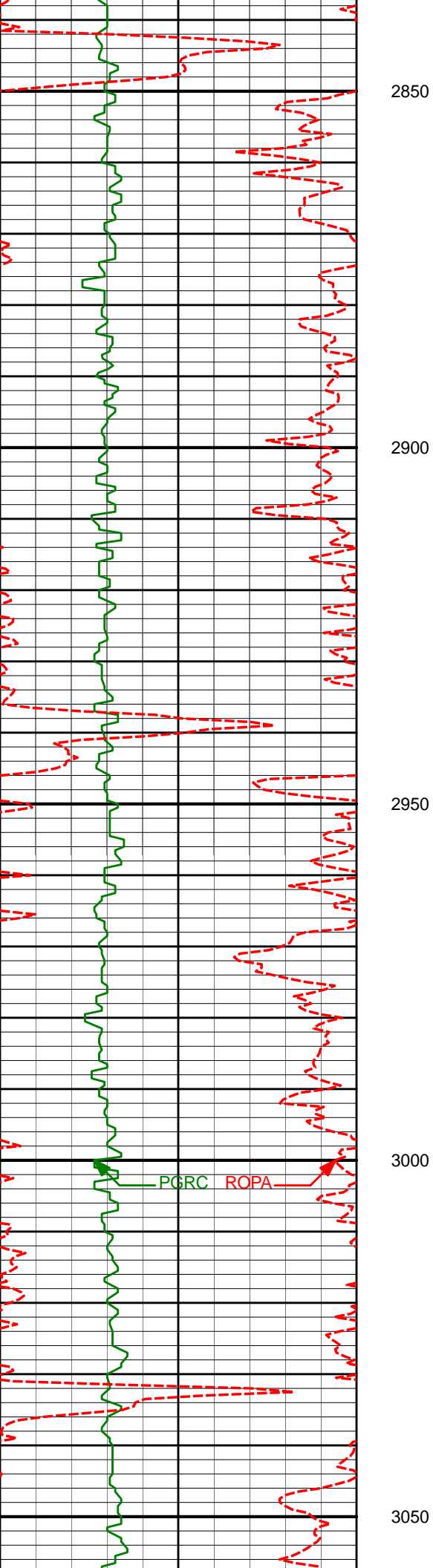
2795'

11.19°

134.13°

2780.33'

-136.77'



2889'

11.29°

134.21°

2872.53'

-149.06'

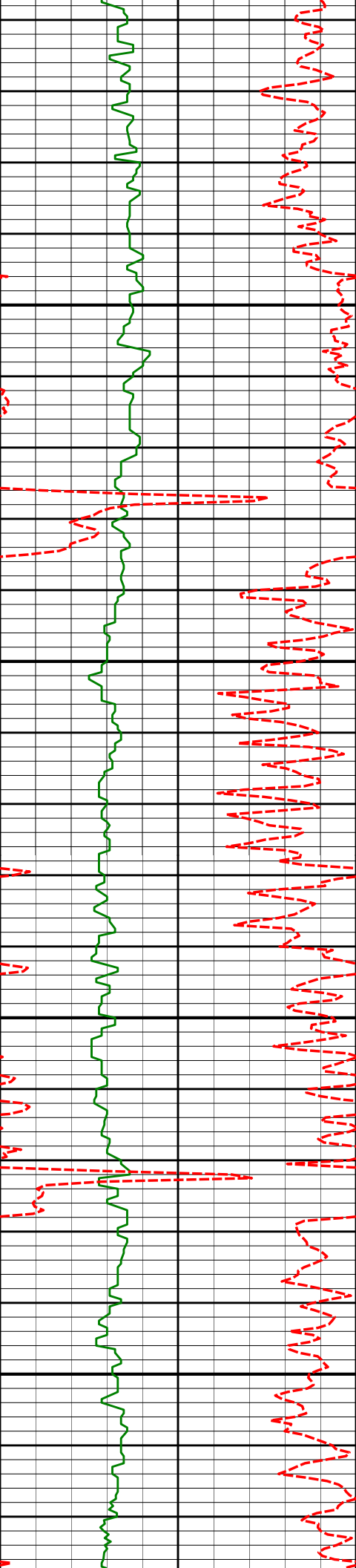
2983'

11.20°

133.88°

2964.72'

-161.32'



3100

3150

3200

3250

3077'

10.79°

133.23°

3057.00'

-173.20'

3171'

9.95°

132.62°

3149.46'

-184.28'

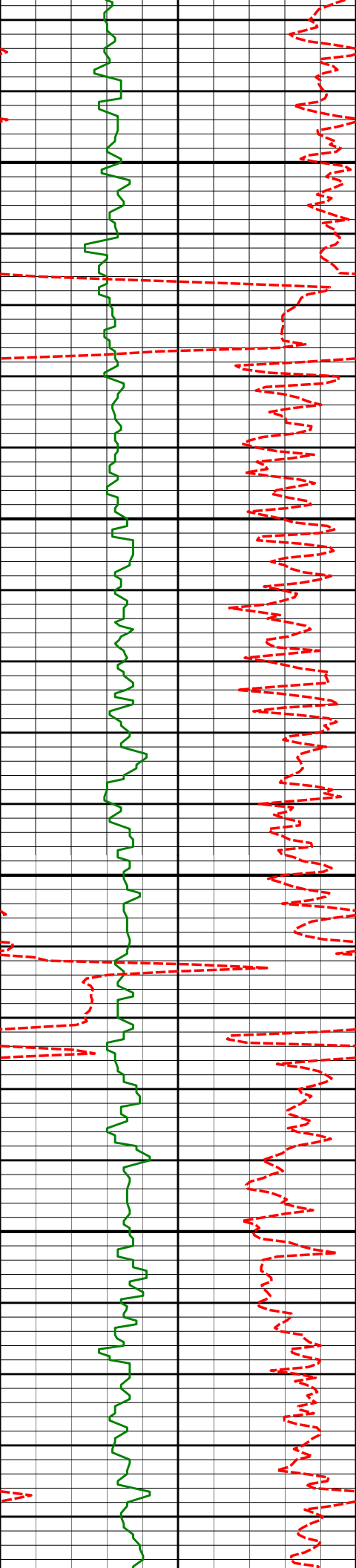
3265'

9.33°

132.31°

3242.13'

-194.48'



3300

3350

3400

3450

3360'

6.74°

131.25°

3336.19'

-202.98'

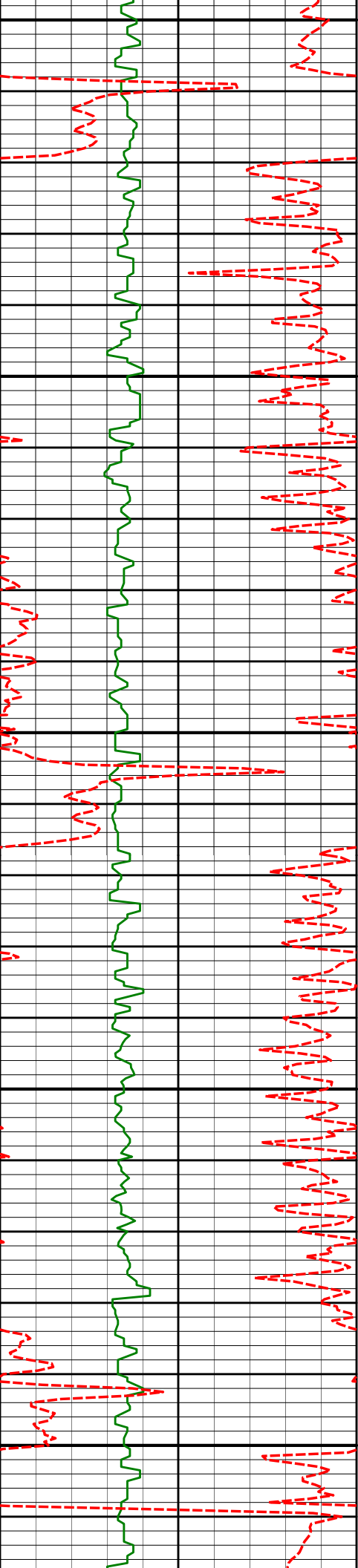
3455'

5.31°

127.39°

3430.67'

-209.05'



3500

3550

3600

3650

3700

3550'

3645'

4.90°

4.33°

127.71°

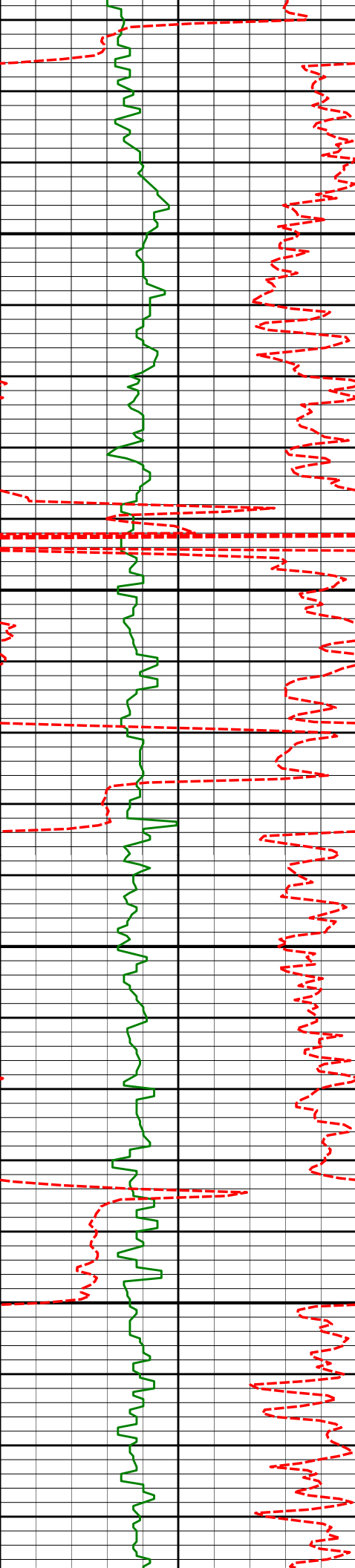
131.46°

3525.29'

3619.98'

-213.96'

-218.60'



3750

3800

3850

3900

3740'

1.92°

128.21°

3714.83'

-221.82'

3835'

0.76°

151.43°

3809.81'

-223.30'

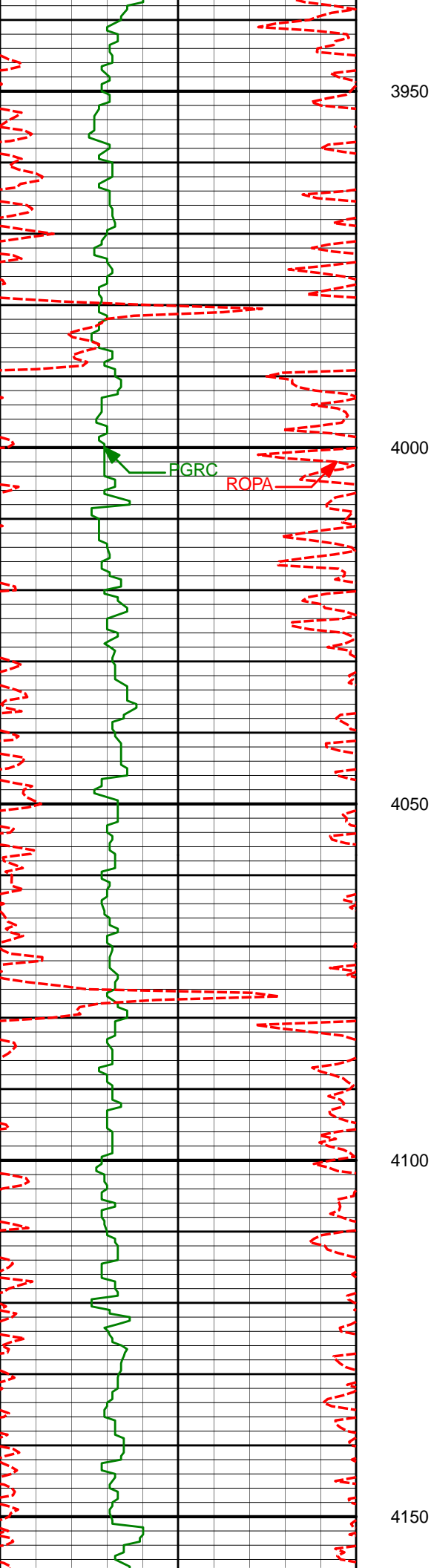
3930'

0.71°

161.90°

3904.80'

-224.39'



4025'

0.73°

159.70°

3999.79'

-225.51'

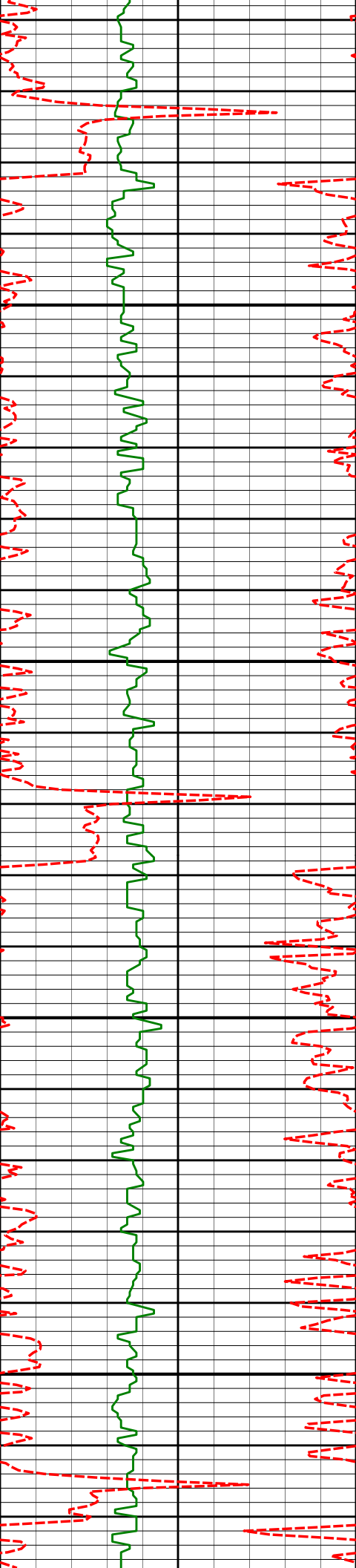
4120'

0.68°

173.01°

4094.78'

-226.62'



4200

4250

4300

4350

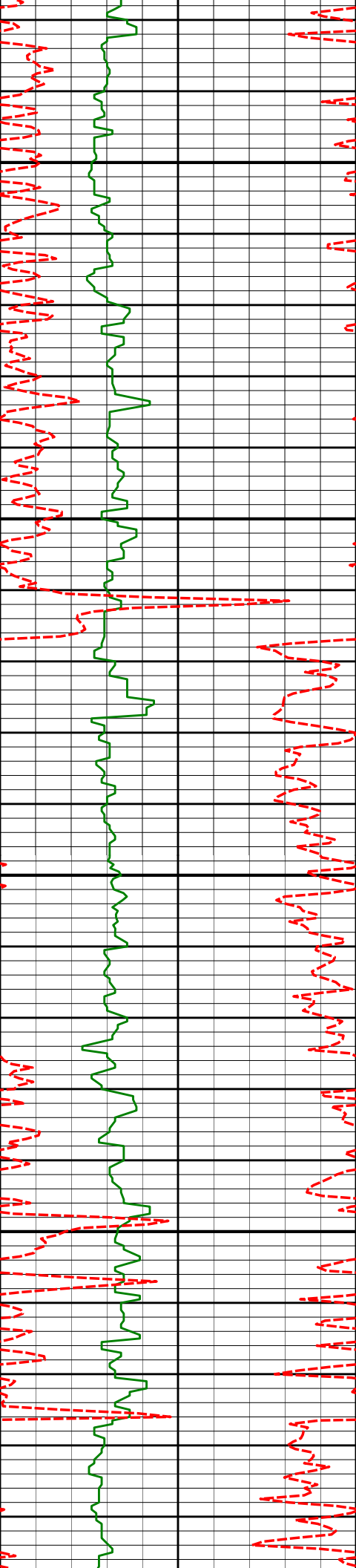
4310'

0.53°

211.20°

4284.77'

-228.50'



4400

4405'

0.46°

201.83°

4379.77'

-229.25'

4450

4500

4500'

0.37°

149.24°

4474.77'

-229.86'

4550

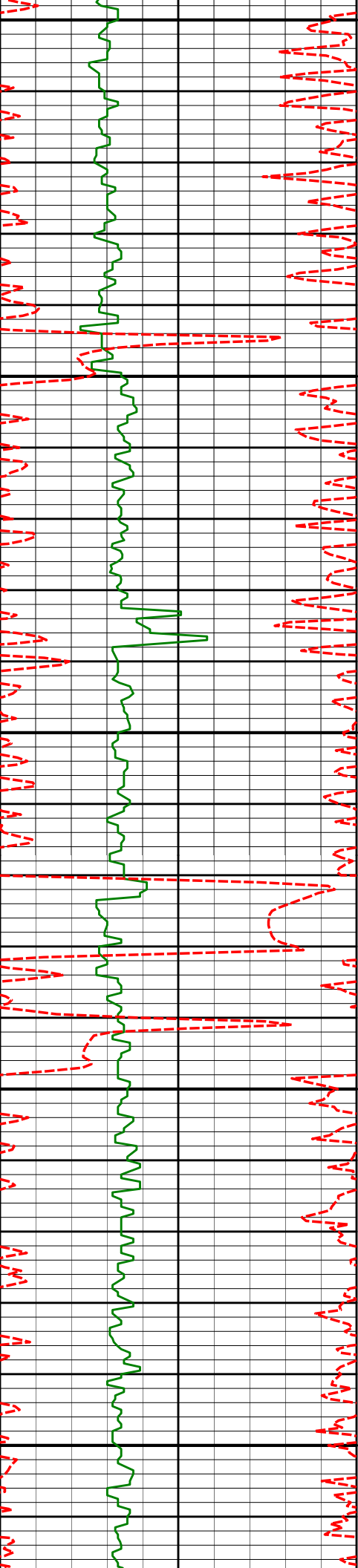
4595'

0.38°

148.55°

4569.77'

-230.38'



4600

4650

4700

4750

4800

4691'

0.57°

150.93°

4665.76'

-231.06'

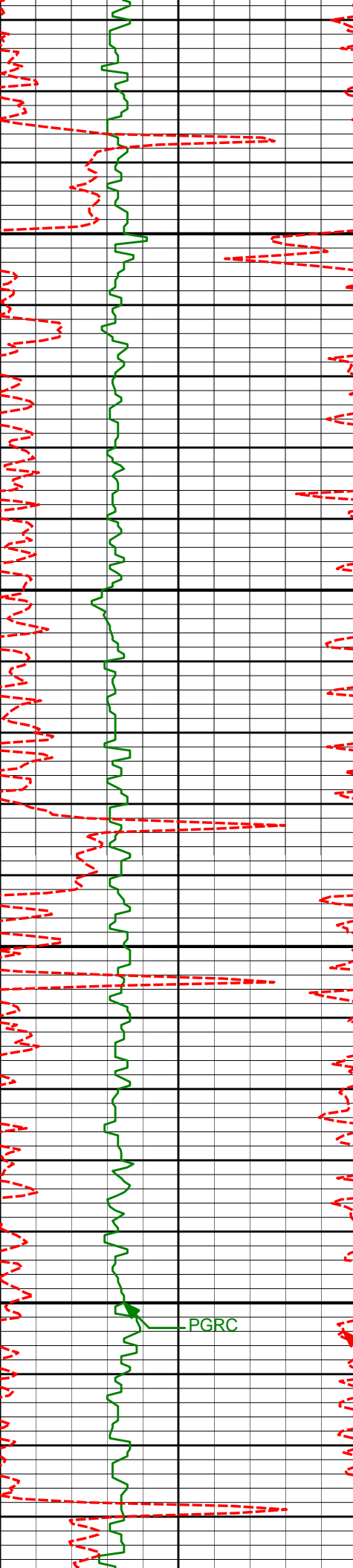
4786'

0.69°

263.78°

4760.76'

-231.54'



4850

4881'

0.68°

246.16°

4855.75'

-231.87'

4900

4950

4976'

0.61°

247.23°

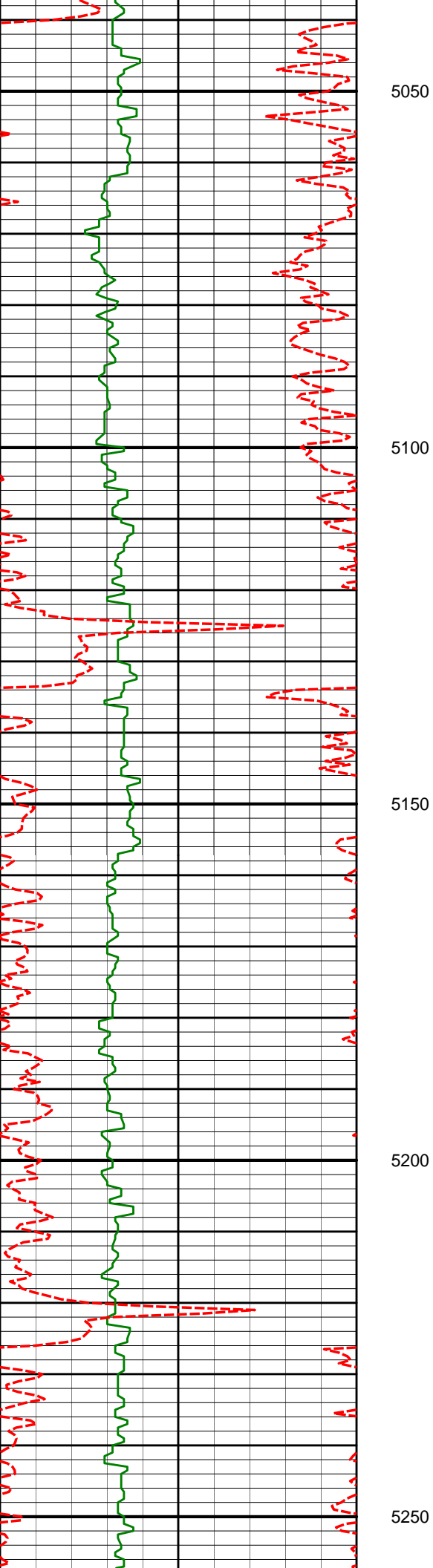
4950.75'

-232.33'

5000

PGRC

ROPA



5071'

0.65°

235.70°

5045.74'

-232.86'

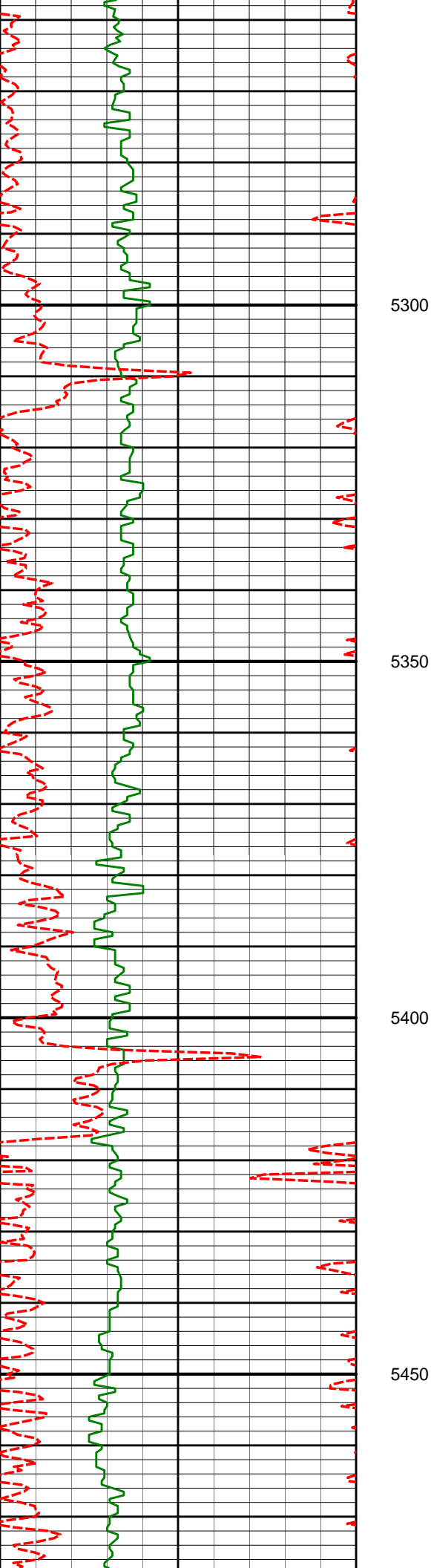
5166'

0.62°

251.68°

5140.74'

-233.36'



5261'

0.54°

220.79°

5235.73'

-233.89'

5300

5350

5356'

0.60°

225.18°

5330.73'

-234.60'

5400

5450

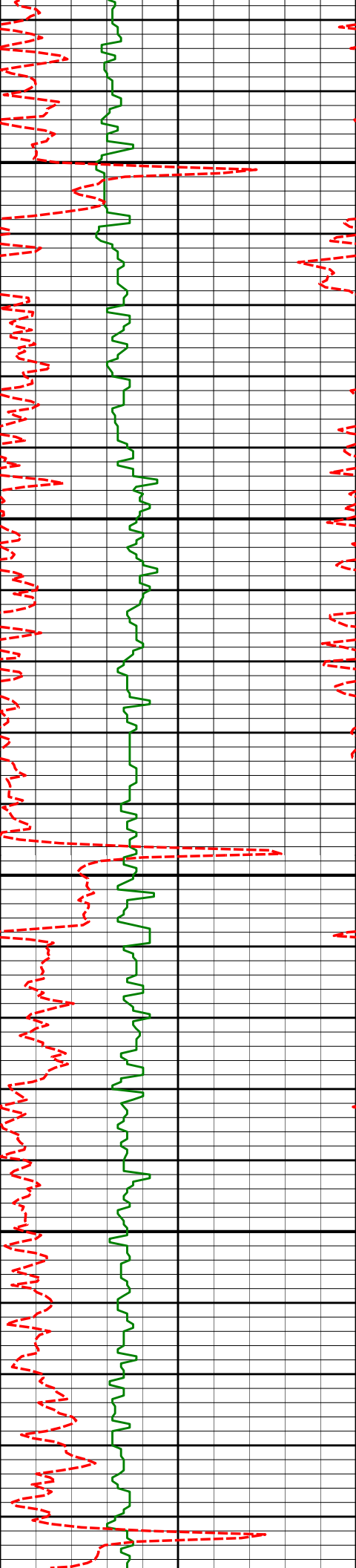
5451'

0.65°

228.83°

5425.72'

-235.33'



5500

5546'

0.63°

240.17°

5520.71'

-235.98'

5550

5600

5640'

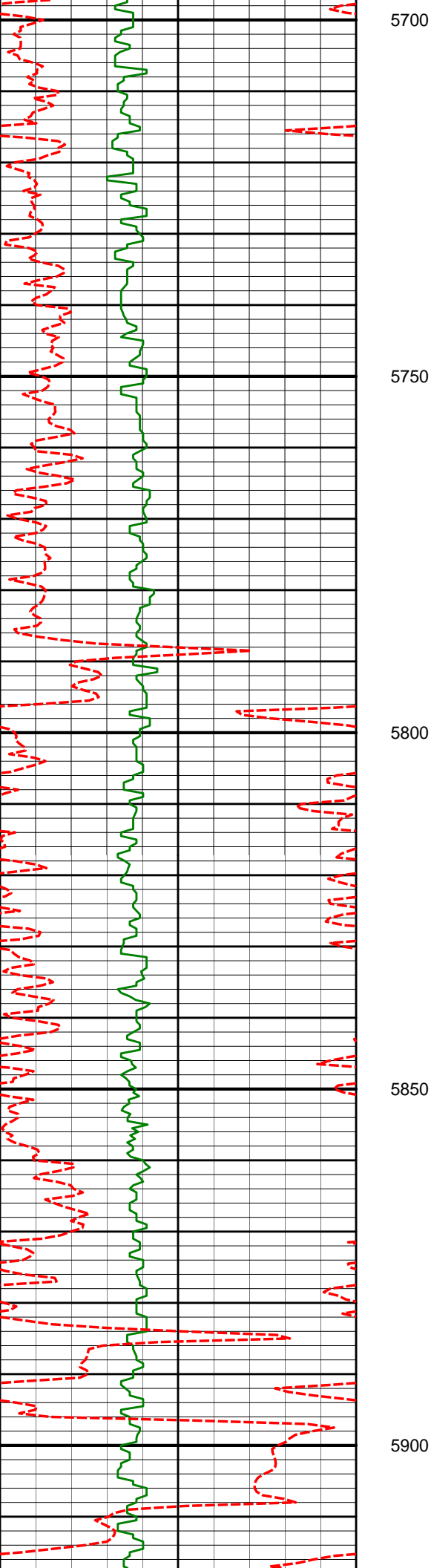
0.43°

241.00°

5614.71'

-236.43'

5650



5735'

0.76°

221.67°

5709.71'

-237.10'

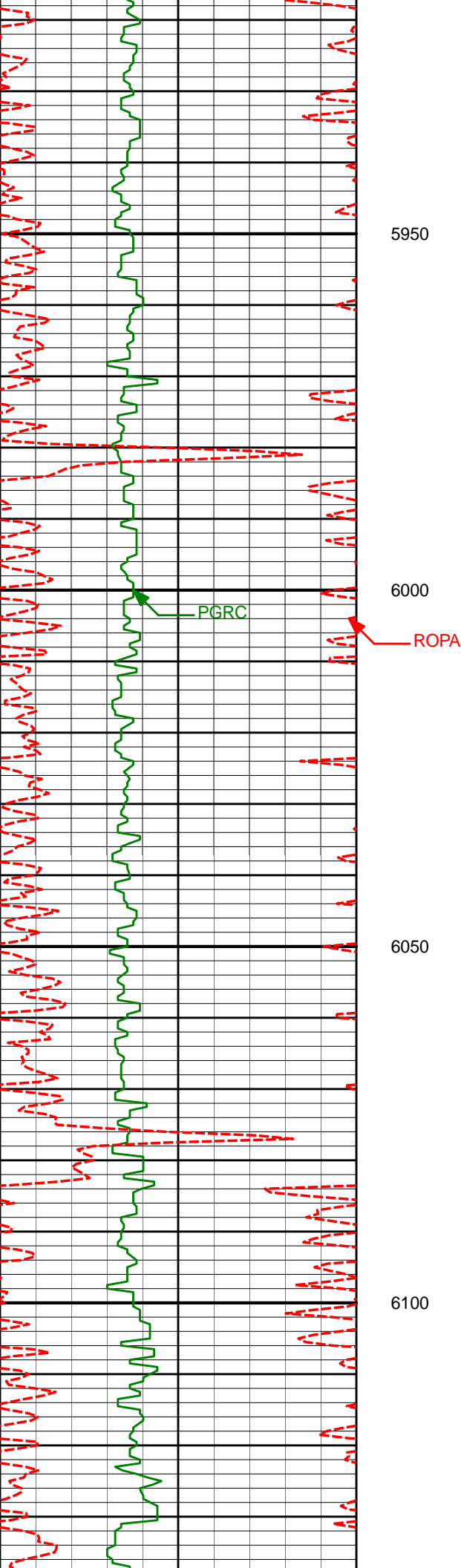
5830'

0.84°

215.13°

5804.70'

-238.17'



5926'

1.67°

306.01°

5900.68'

-237.98'

6021'

1.57°

306.05°

5995.64'

-236.48'

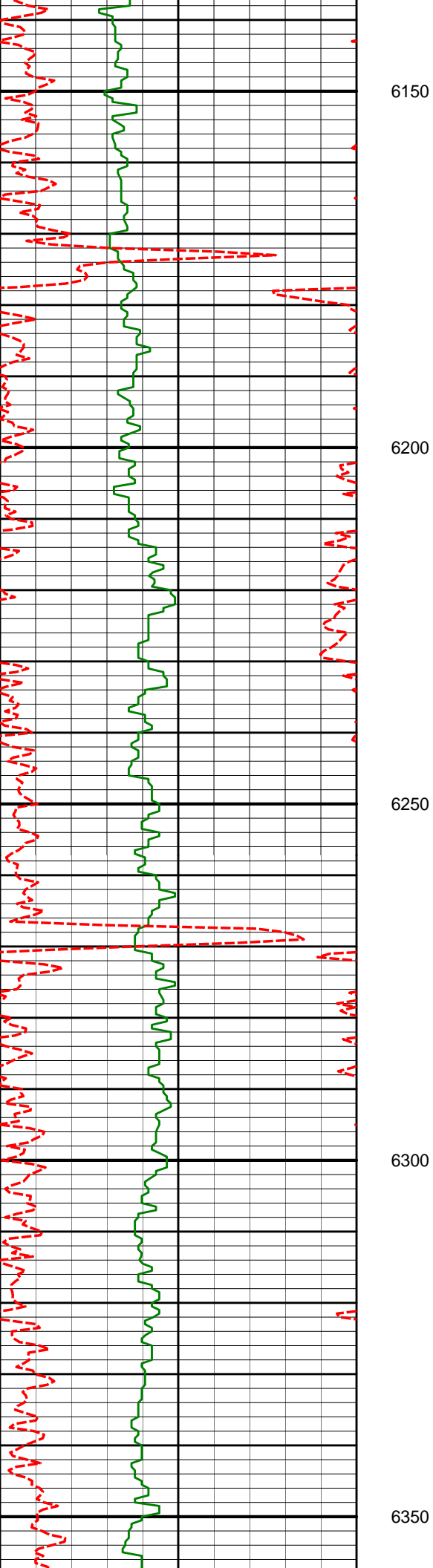
6116'

1.59°

305.02°

6090.60'

-235.03'



6150

6200

6250

6300

6350

6211'

1.34°

292.04°

6185.57'

-233.94'

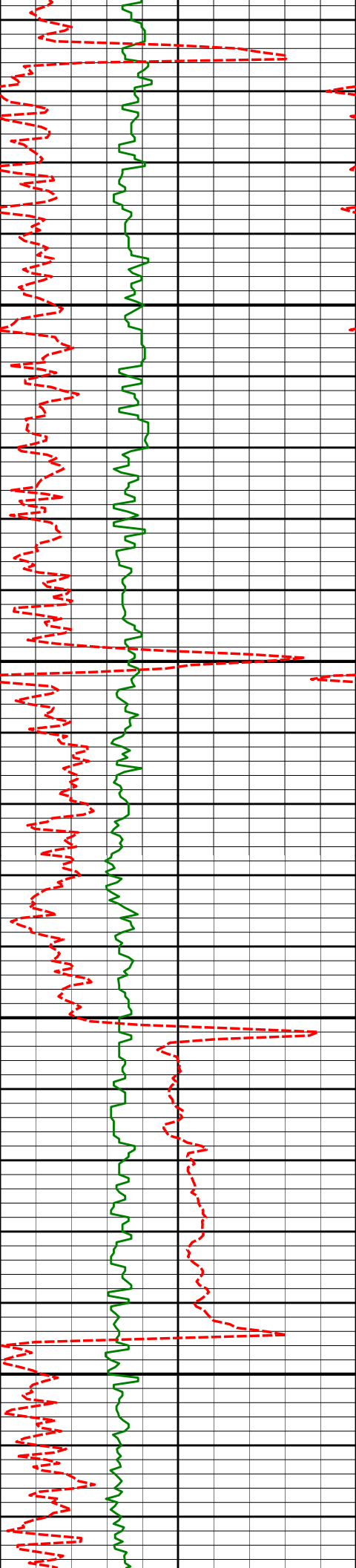
6306'

1.23°

288.63°

6280.55'

-233.27'



6400

6401'

1.18°

259.14°

6375.53'

-233.19'

6450

6500

6496'

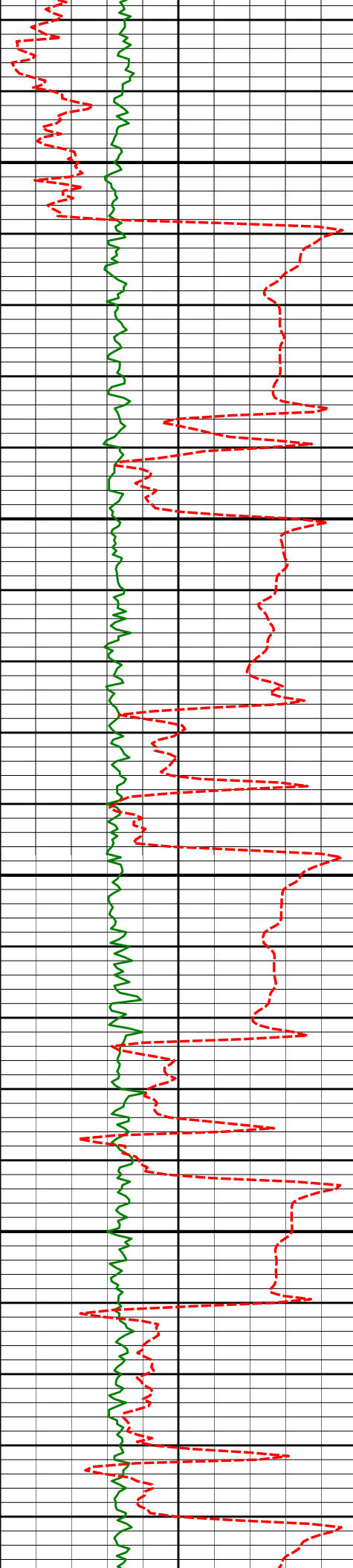
0.86°

230.45°

6470.52'

-233.89'

6550



6600

6650

6700

6750

6592'

0.86°

218.14°

6566.50'

-234.95'

6640'

3.42°

347.16°

6614.48'

-233.85'

6687'

7.84°

350.82°

6661.24'

-229.35'

6735'

11.58°

353.21°

6708.54'

-221.38'

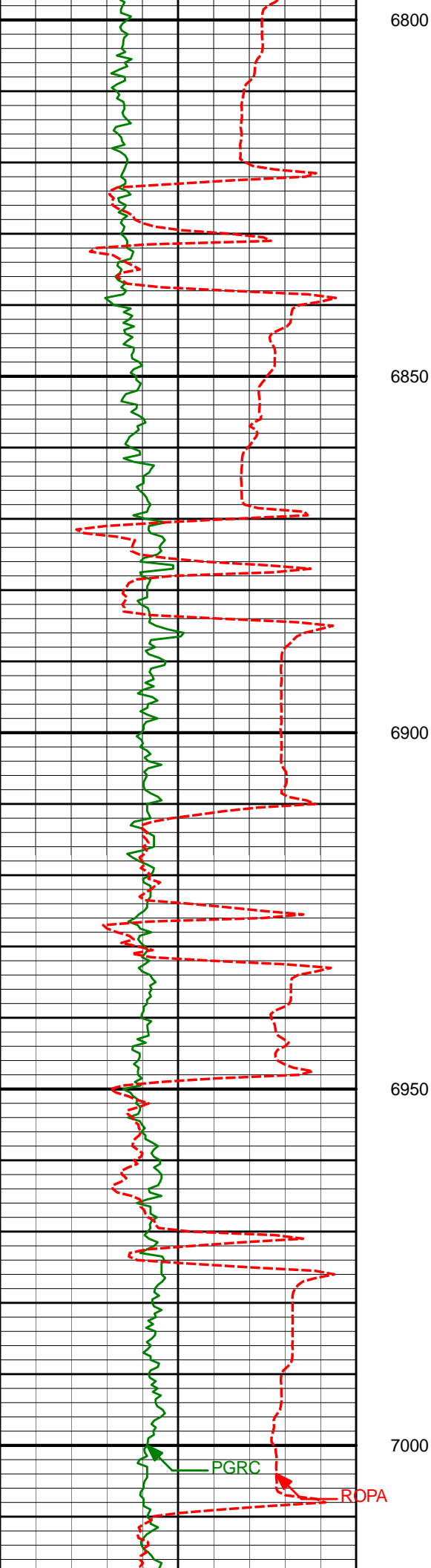
6782'

13.58°

353.81°

6754.41'

-211.25'



6830' 18.59° 354.41° 6800.52' -198.09'

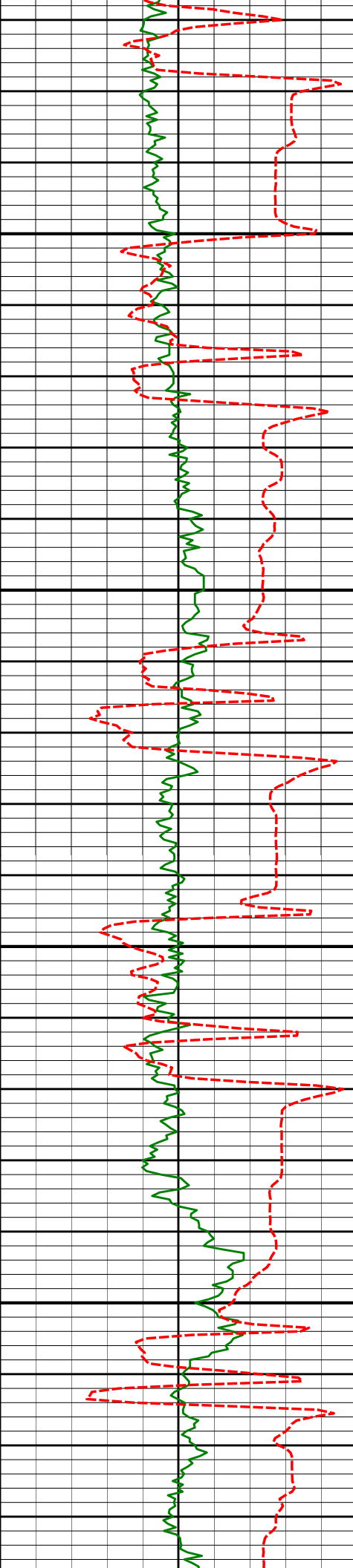
6877' 24.37° 356.66° 6844.24' -180.99'

6925' 27.78° 2.93° 6887.35' -159.94'

6972' 30.87° 3.26° 6928.33' -136.93'

PGRC

ROPA



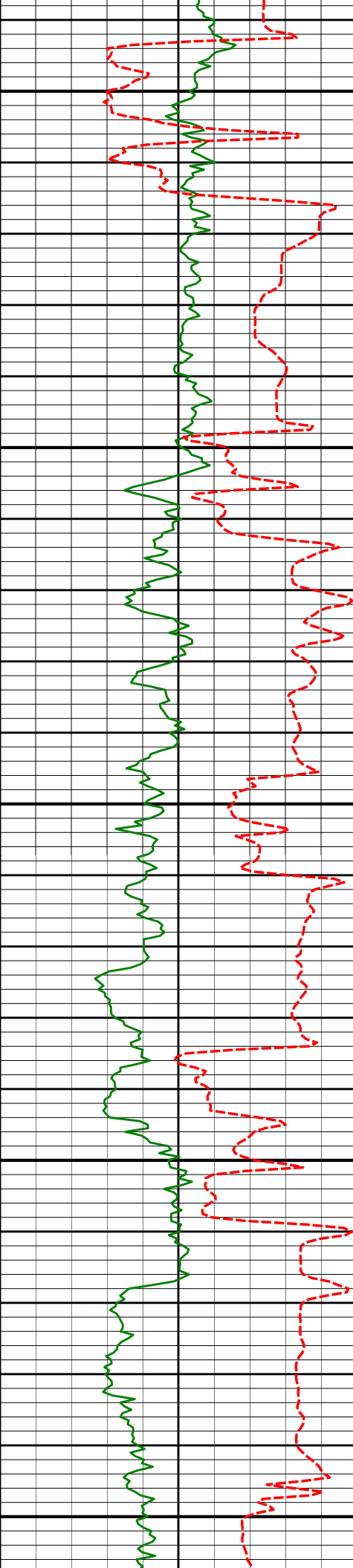
7050

7100

7150

7200

7020'	35.77°	0.01°	6968.43'	-110.58'
7067'	39.96°	1.21°	7005.52'	-81.74'
7115'	44.92°	4.08°	7040.94'	-49.37'
7162'	48.75°	4.79°	7073.09'	-15.13'
7210'	53.55°	8.96°	7103.20'	22.09'



7250

7257'

57.86°

11.37°

7129.67'

60.52'

7300

7305'

63.82°

9.63°

7153.05'

101.96'

7350

7352'

68.98°

6.98°

7171.87'

144.76'

7400

7400'

73.08°

5.38°

7187.47'

190.02'

7450

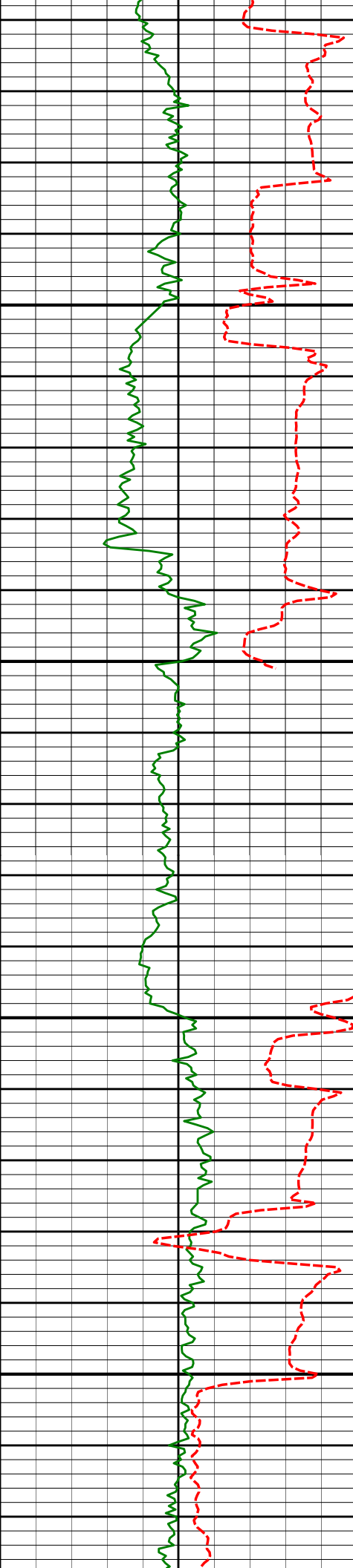
7447'

79.57°

3.99°

7198.57'

235.61'



7500

7503'

85.46°

2.92°

7205.87'

291.09'

7" Casing Shoe @ 7538' MD / 7207.60' TVD

7550
Run 200

7550'

92.93°

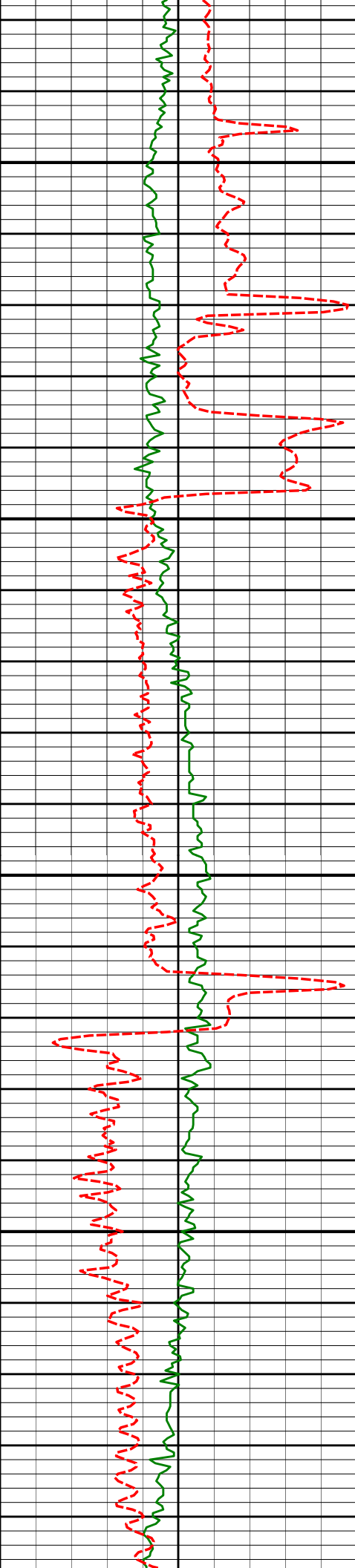
3.50°

7206.53'

338.05'

Run 300
7600

7650



7700

7750

7800

7850

7681'

90.22°

3.01°

7202.92'

468.96'

7776'

89.14°

2.45°

7203.46'

563.95'

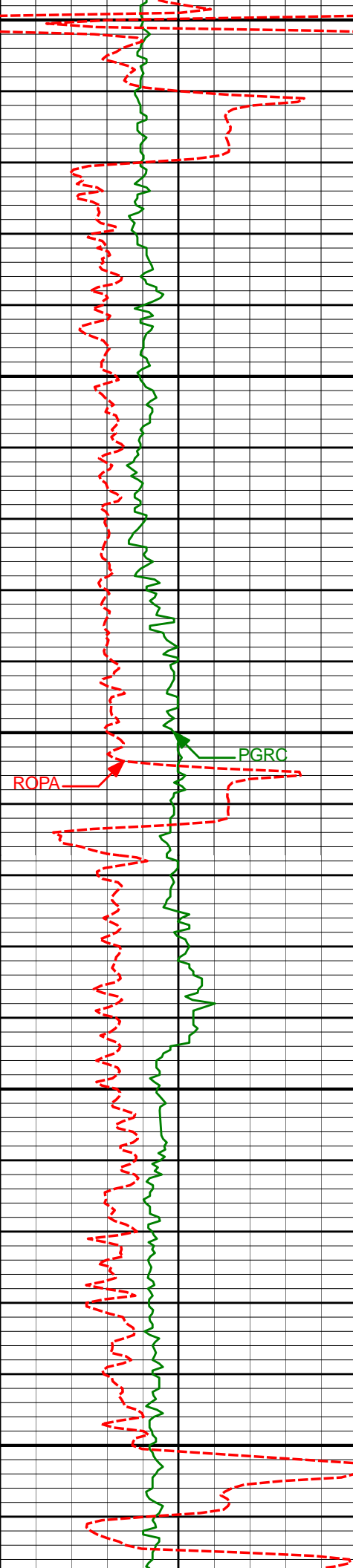
7871'

89.45°

2.87°

7204.62'

658.93'



7900

7950

8000

8050

8100

7966'

89.48°

2.63°

7205.51'

753.92'

8062'

89.72°

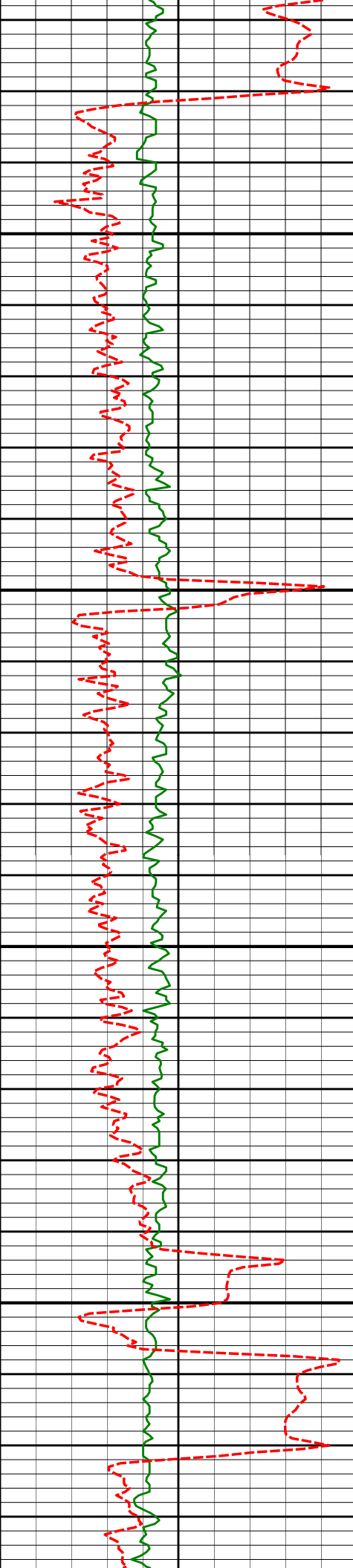
2.94°

7206.18'

849.91'

ROPA

PGRC



8150

8157'

89.66°

1.32°

7206.70'

944.91'

8200

8250

8252'

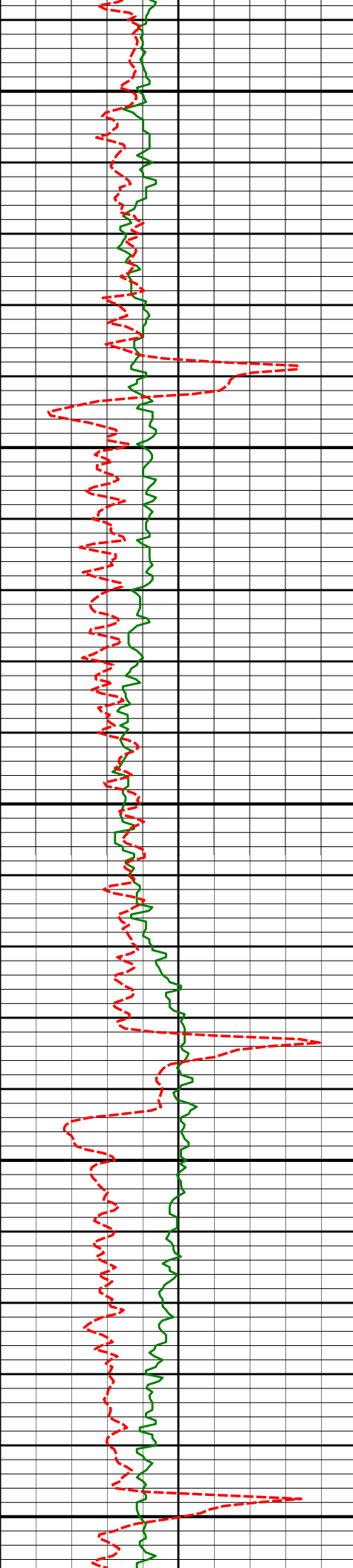
90.43°

2.31°

7206.62'

1039.90'

8300



8350

8347'

89.20°

0.75°

7206.93'

1134.89'

8400

8450

8442'

89.66°

0.72°

7207.87'

1229.86'

8500

8550

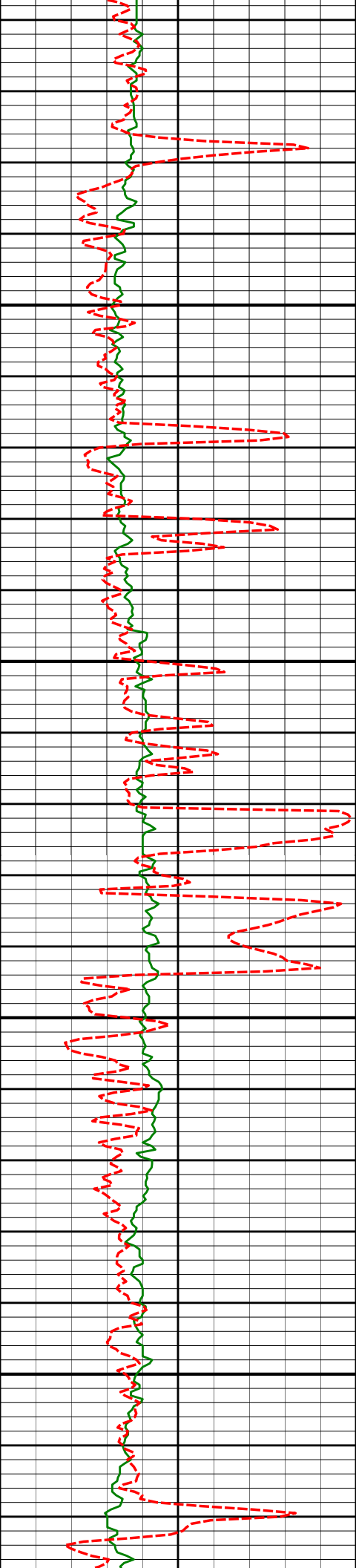
8537'

89.81°

0.69°

7208.31'

1324.84'



8600

8650

8700

8750

8632'

90.25°

0.68°

7208.26'

1419.81'

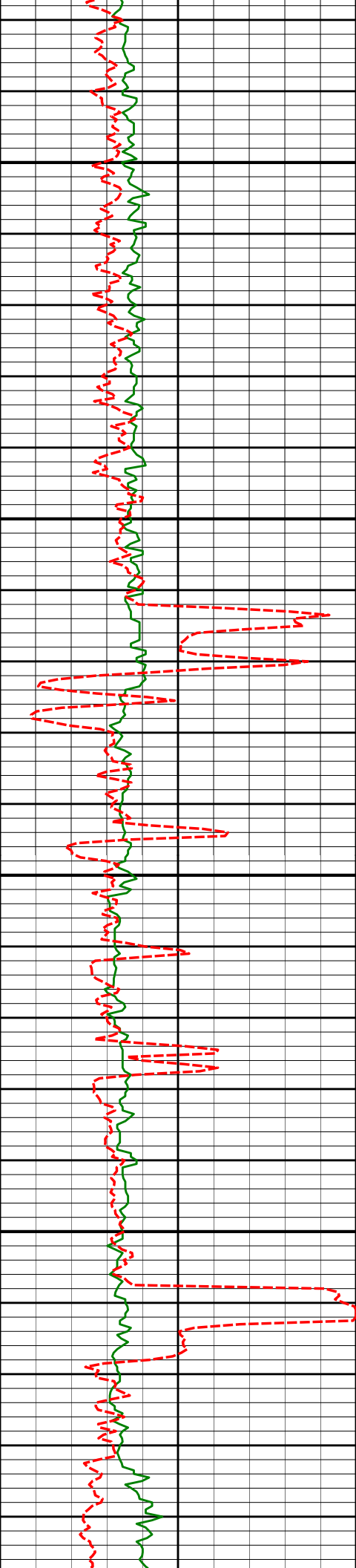
8727'

89.26°

1.19°

7208.67'

1514.79'



8800

8823'

89.60°

0.89°

7209.62'

1610.77'

8850

8900

8918'

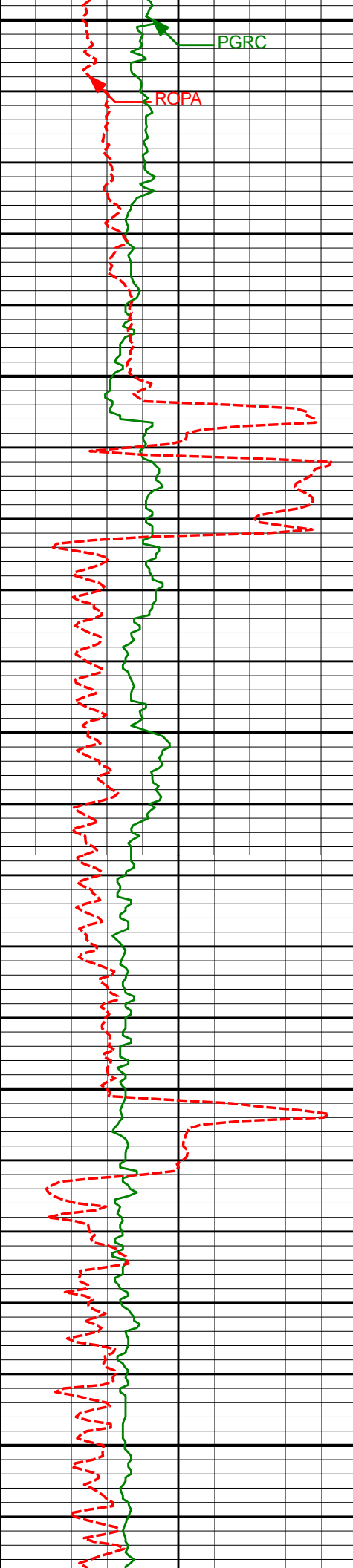
89.66°

0.49°

7210.24'

1705.74'

8950



9000

PGRC

RCIPA

9013'

90.25°

0.51°

7210.31'

1800.71'

9050

9100

9108'

89.23°

0.70°

7210.75'

1895.67'

9150

9200

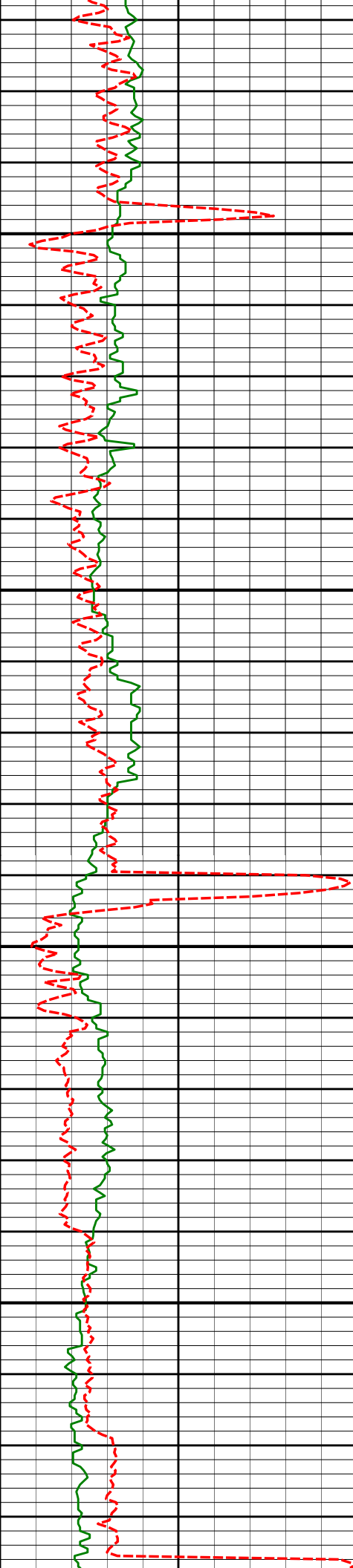
9203'

89.57°

1.05°

7211.75'

1990.65'



9250

9300

9350

9400

9298'

89.91°

0.94°

7212.18'

2085.63'

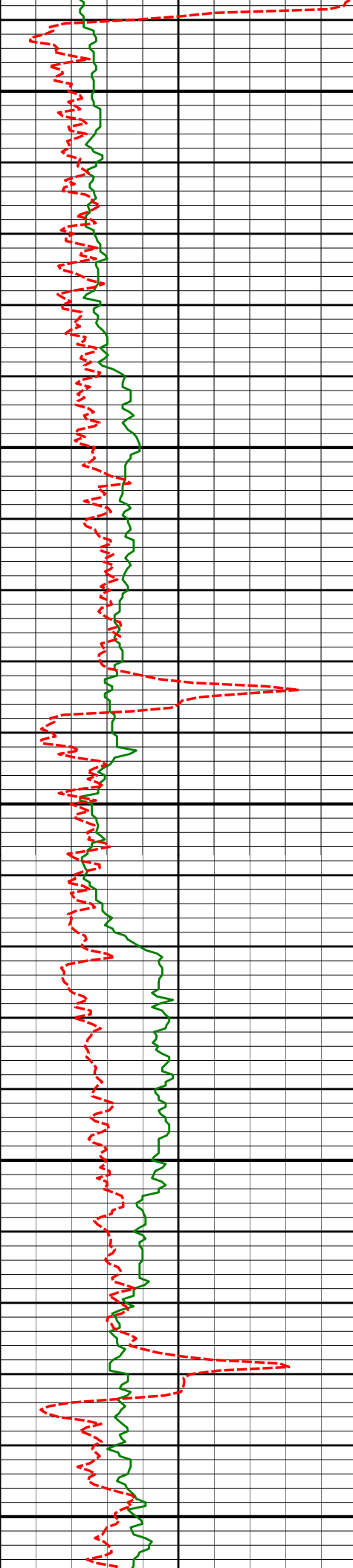
9394'

90.28°

1.40°

7212.03'

2181.62'



9450

9489'

90.34°

1.41°

7211.52'

2276.61'

9500

9550

9584'

90.52°

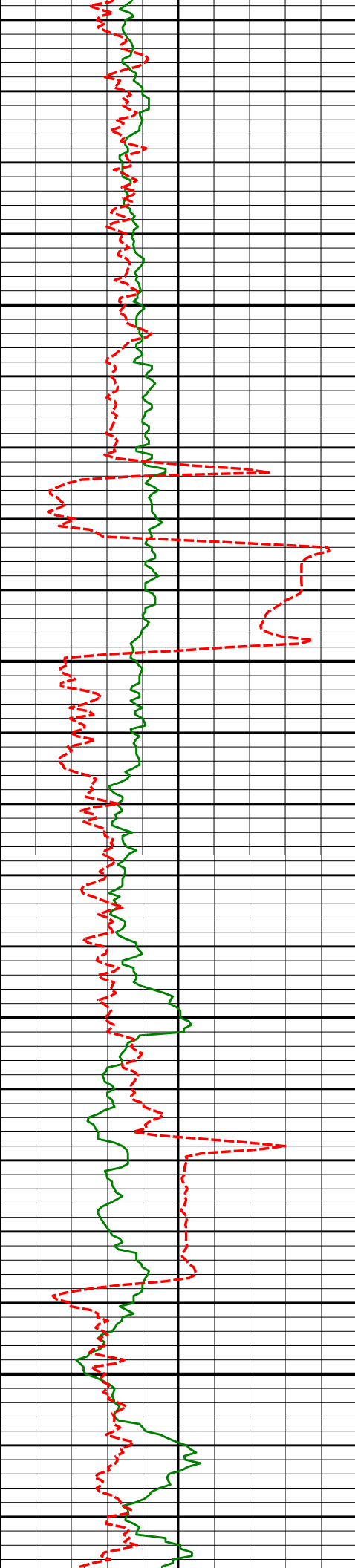
1.30°

7210.80'

2371.60'

9600

9650



9679'

90.71°

1.36°

7209.78'

2466.59'

9700

9750

9774'

89.35°

2.26°

7209.73'

2561.58'

9800

9850

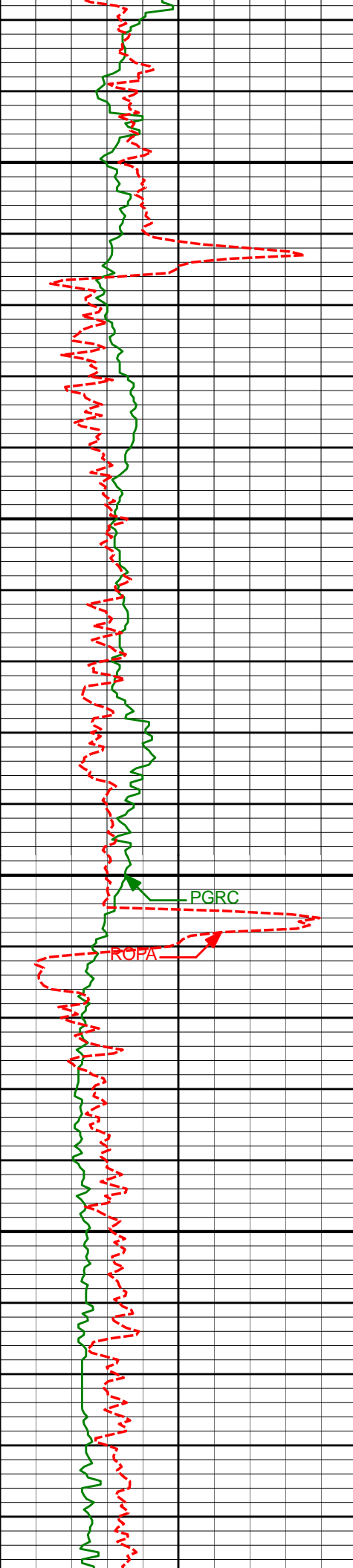
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89.29°

2.12°

7210.85'

2656.58'



9900

9950

10000

10050

9964'

89.20°

2.03°

7212.10'

2751.57'

PGRC

ROPA

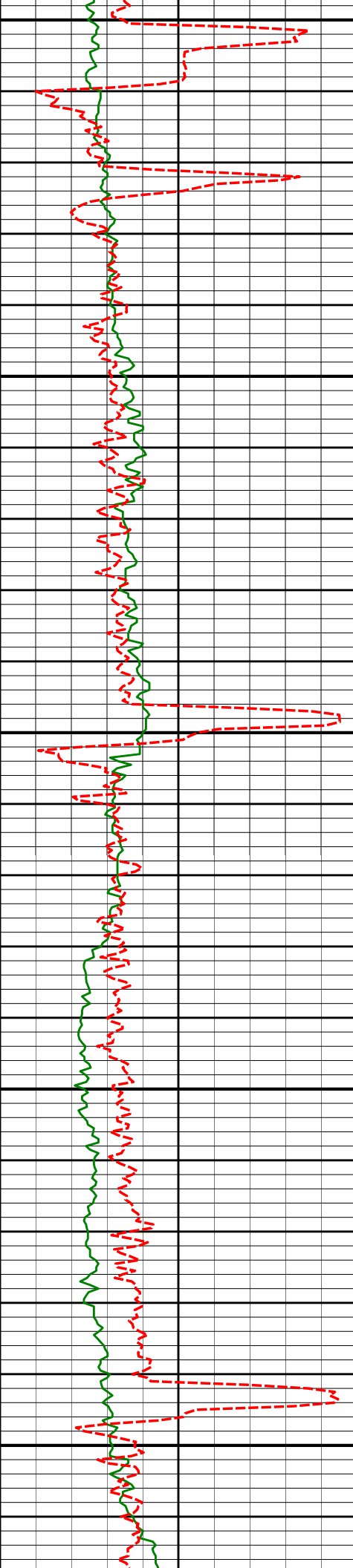
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89.51°

2.18°

7213.17'

2846.56'



10100

10150

10200

10250

10300

10155'

89.29°

2.09°

7214.18'

2942.56'

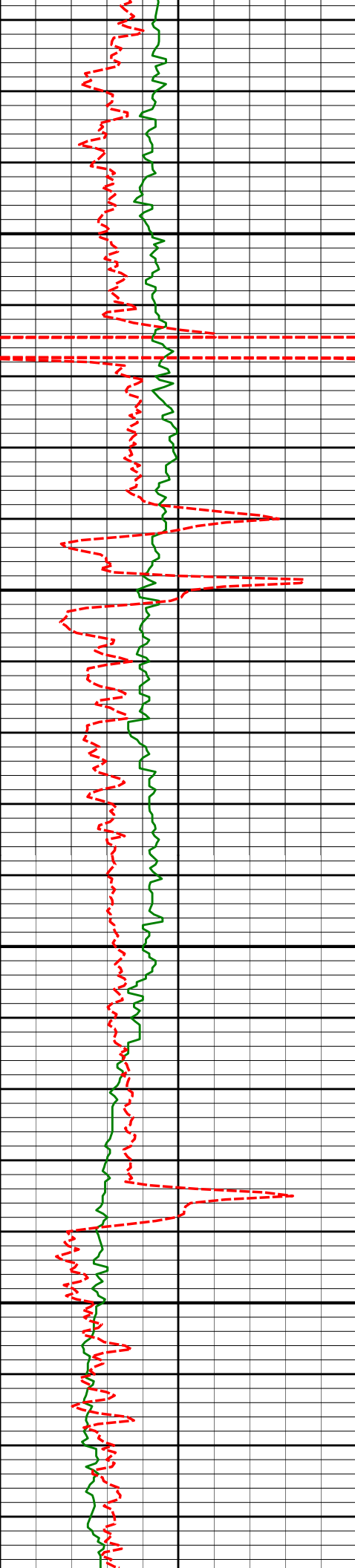
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89.60°

1.97°

7215.10'

3037.55'



10345'

89.72°

1.67°

7215.67'

3132.55'

10350

10400

10440'

90.80°

2.60°

7215.23'

3227.55'

10450

10500

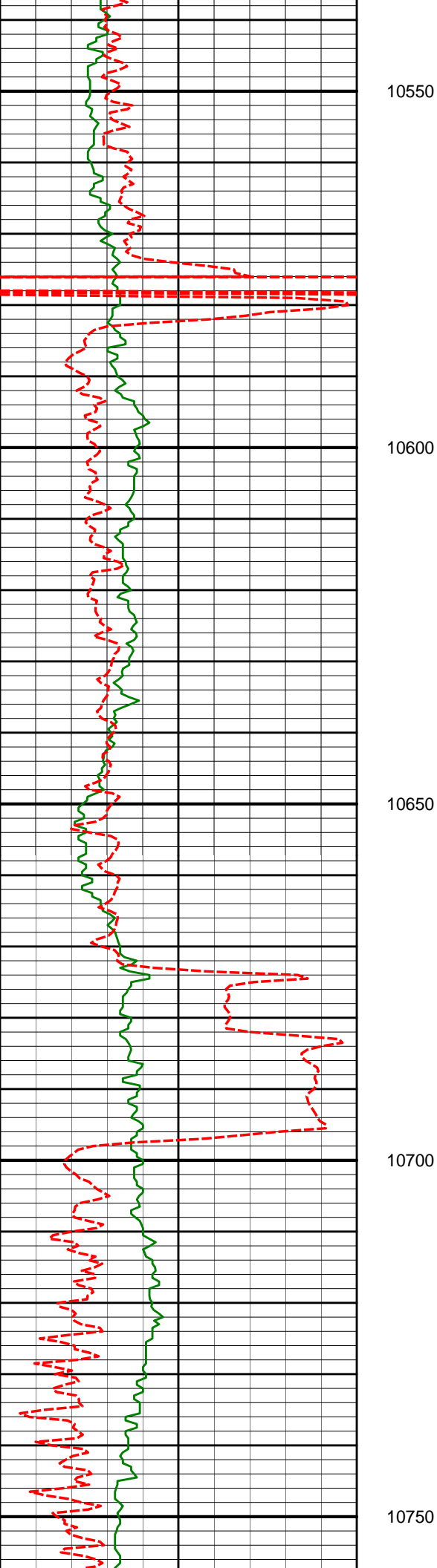
10535'

90.93°

2.21°

7213.80'

3322.53'



10630'

91.54°

2.02°

7211.76'

3417.51'

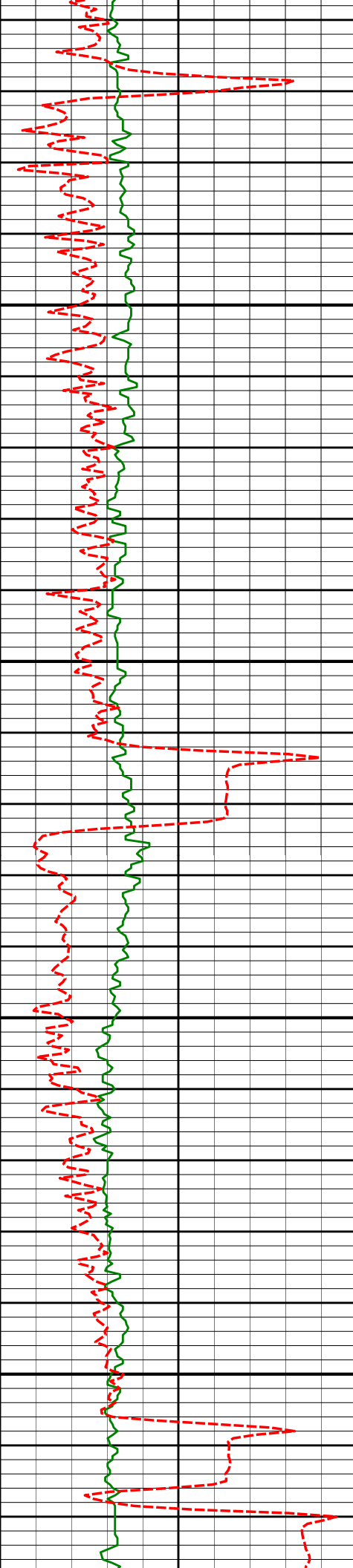
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90.55°

2.91°

7210.02'

3512.49'



10800

10850

10900

10950

10821'

90.56°

2.14°

7209.09'

3608.48'

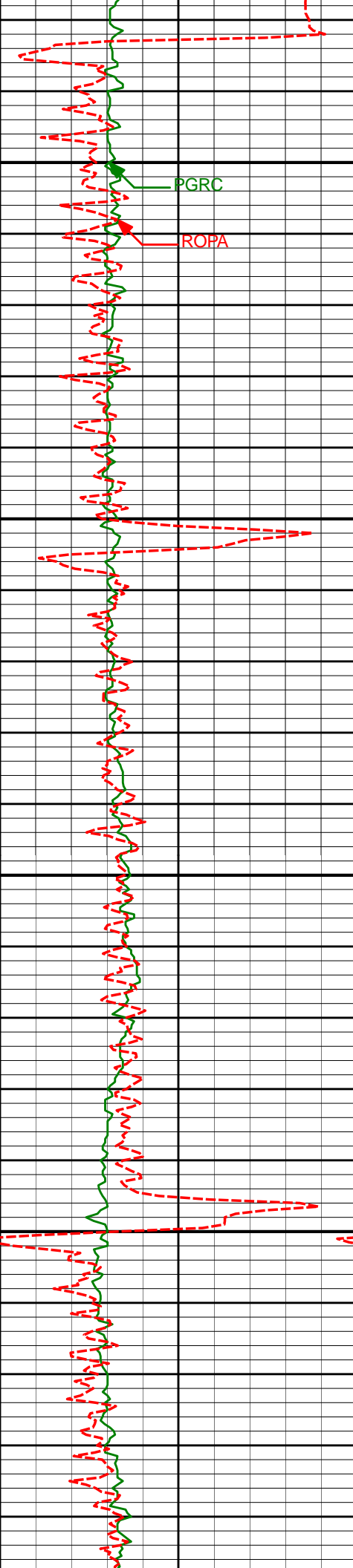
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90.77°

2.15°

7207.99'

3703.48'



11000

11011'

89.14°

3.21°

7208.07'

3798.47'

11050

11100

11106'

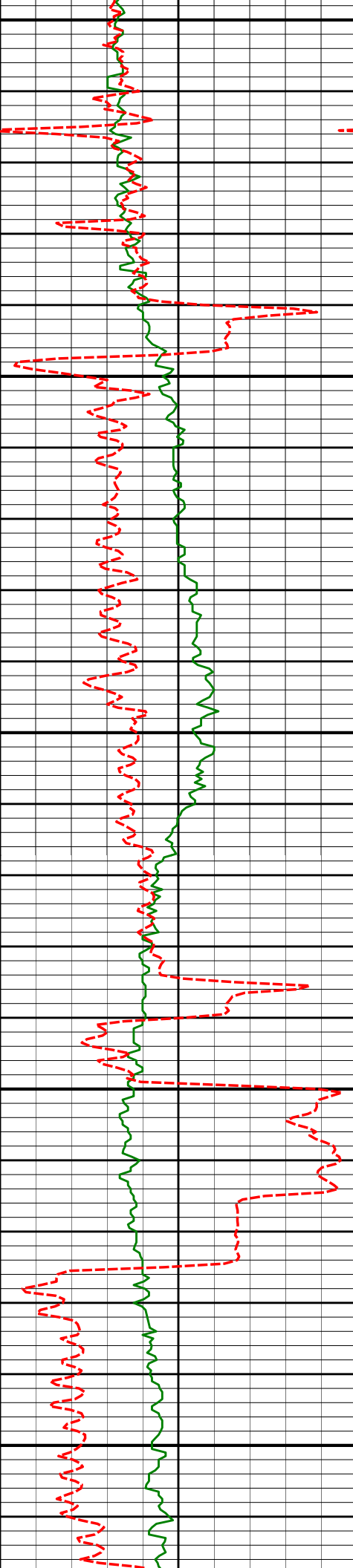
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3.57°

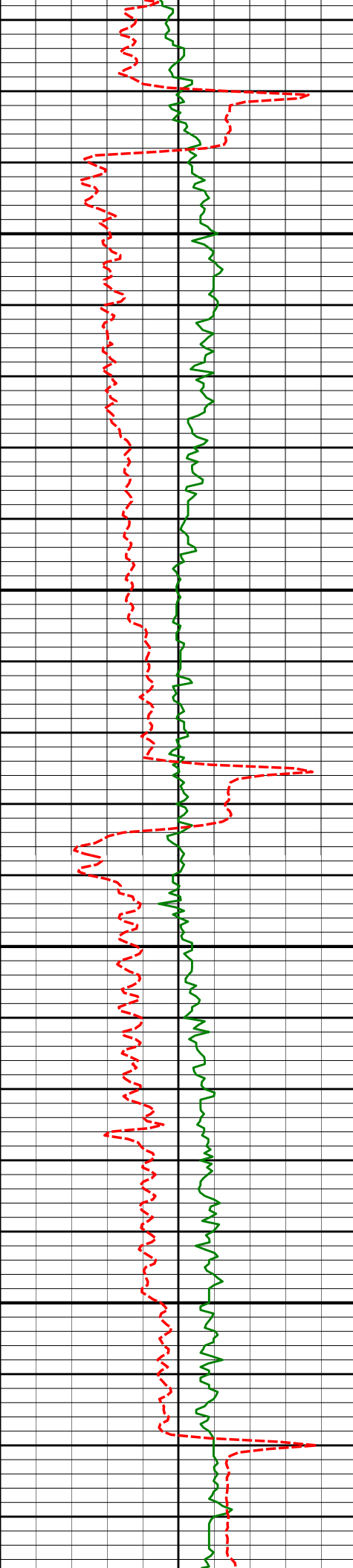
7208.48'

3893.44'

11150



11200	11201'	90.49°	3.23°	7207.77'	3988.41'
11250					
11300	11296'	91.02°	3.32°	7206.52'	4083.38'
11350					
11400	11391'	89.69°	3.90°	7205.93'	4178.34'



11450

11500

11550

11600

11487'

89.51°

3.53°

7206.60'

4274.29'

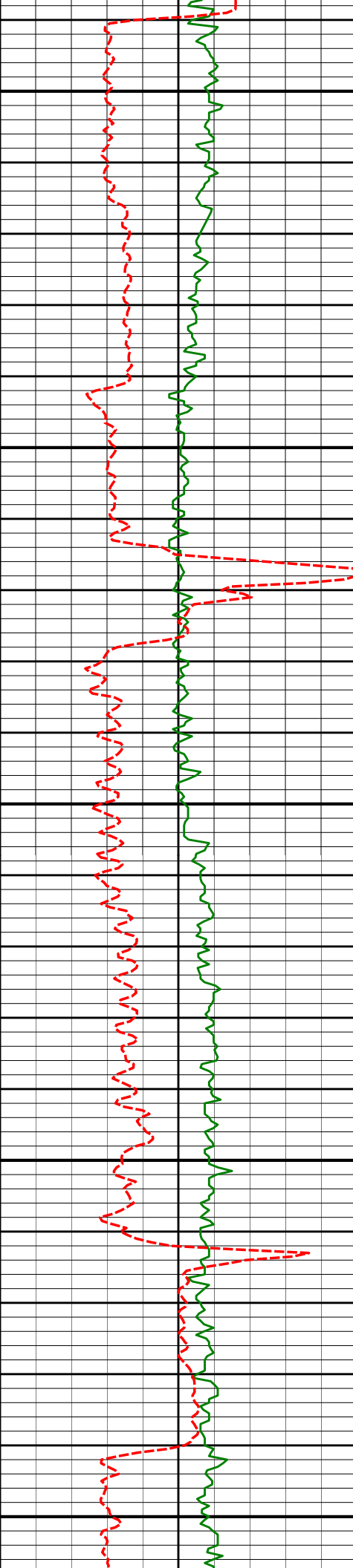
11581'

90.31°

4.36°

7206.75'

4368.24'



11650

11676'

89.66°

2.99°

7206.78'

4463.20'

11700

11750

11771'

90.49°

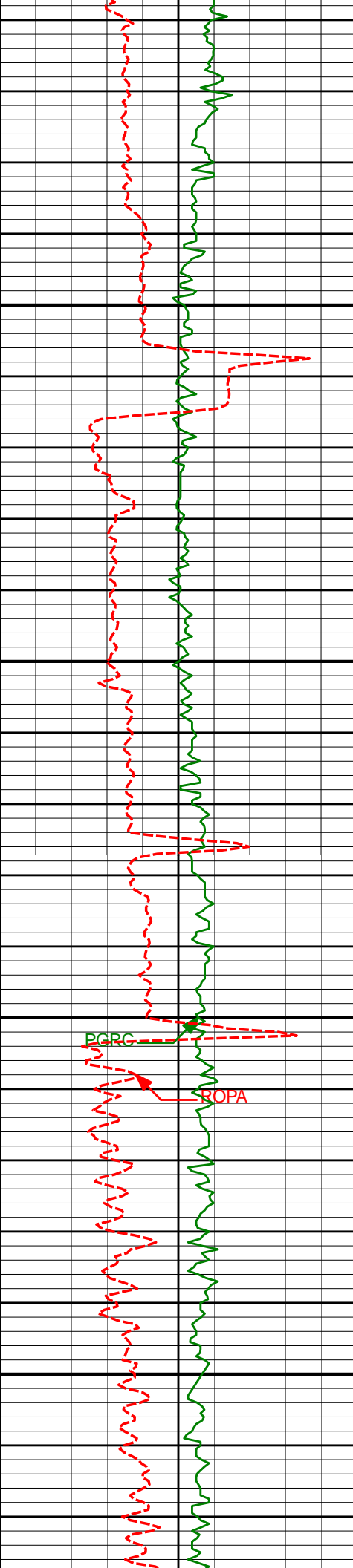
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7206.65'

4558.17'

11800

11850



11900

11950

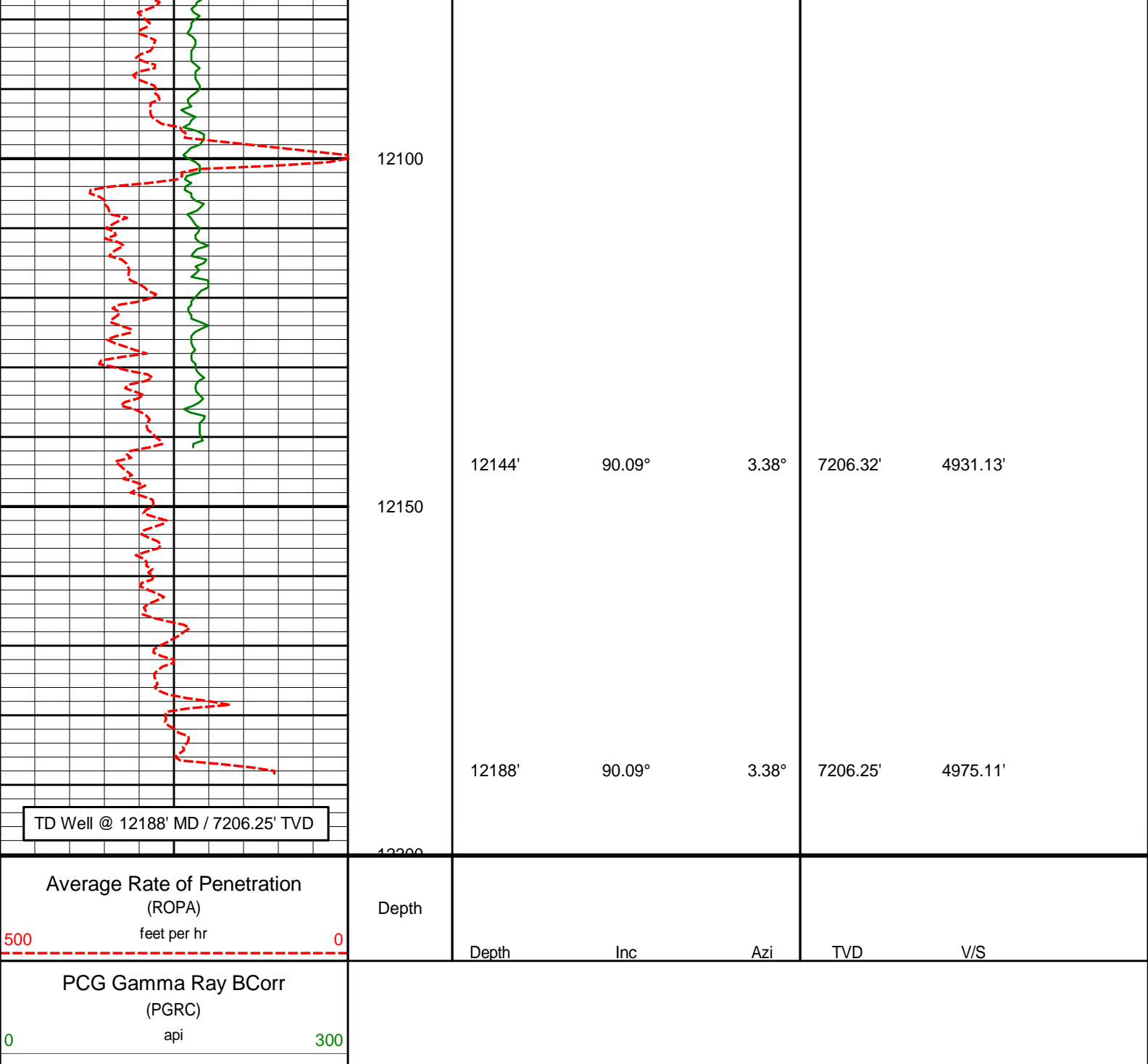
12000

12050

11866'	89.69°	2.21°	7206.50'	4653.16'
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11961'	90.28°	2.85°	7206.53'	4748.15'
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12057'	89.94°	2.84°	7206.35'	4844.14'
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HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corporation
Ferge 29N-14HZ
Wattenberg
Weld Colorado
USA
CA-XX-0901100805

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
1154.00	1.10	273.26	1153.93	3.63 S	8.40 W	-3.93	TIE-IN
1285.00	0.59	249.67	1284.92	3.79 S	10.29 W	-4.16	0.46
1380.00	0.59	261.61	1379.91	4.03 S	11.23 W	-4.43	0.13
1475.00	1.09	132.93	1474.91	4.72 S	11.05 W	-5.11	1.61
1570.00	2.94	138.66	1569.84	7.17 S	8.78 W	-7.48	1.96

1570.00	2.94	138.68	1589.84	7.17 S	0.76 W	-7.48	1.90
1664.00	2.68	139.91	1663.73	10.66 S	5.77 W	-10.86	0.28
1759.00	4.97	135.89	1758.51	15.31 S	1.48 W	-15.35	2.43
1853.00	6.56	140.61	1852.03	22.39 S	4.76 E	-22.20	1.76
2041.00	9.64	141.16	2038.14	42.95 S	21.45 E	-42.16	1.64
2135.00	10.61	138.43	2130.67	55.56 S	32.13 E	-54.37	1.15
2323.00	9.72	139.28	2315.72	80.53 S	53.97 E	-78.55	0.48
2418.00	10.23	137.07	2409.28	92.79 S	64.95 E	-90.40	0.67
2512.00	9.60	136.61	2501.88	104.60 S	76.02 E	-101.81	0.68
2606.00	10.50	136.73	2594.43	116.53 S	87.27 E	-113.33	0.96
2700.00	9.94	135.58	2686.94	128.56 S	98.82 E	-124.94	0.63
2795.00	11.19	134.13	2780.33	140.83 S	111.18 E	-136.77	1.35
2889.00	11.29	134.21	2872.53	153.60 S	124.32 E	-149.06	0.11
2983.00	11.20	133.88	2964.72	166.34 S	137.50 E	-161.32	0.12
3077.00	10.79	133.23	3057.00	178.70 S	150.49 E	-173.20	0.46
3171.00	9.95	132.62	3149.46	190.23 S	162.87 E	-184.28	0.90
3265.00	9.33	132.31	3242.13	200.85 S	174.49 E	-194.48	0.66
3360.00	6.74	131.25	3336.19	209.71 S	184.37 E	-202.98	2.73
3455.00	5.31	127.39	3430.67	216.06 S	192.06 E	-209.05	1.56
3550.00	4.90	127.71	3525.29	221.21 S	198.76 E	-213.96	0.43
3645.00	4.33	131.46	3619.98	226.07 S	204.66 E	-218.60	0.68
3740.00	1.92	128.21	3714.83	229.43 S	208.60 E	-221.82	2.54
3835.00	0.76	151.43	3809.81	230.96 S	210.15 E	-223.30	1.32
3930.00	0.71	161.90	3904.80	232.08 S	210.63 E	-224.39	0.15
4025.00	0.73	159.70	3999.79	233.20 S	211.02 E	-225.51	0.04
4120.00	0.68	173.01	4094.78	234.33 S	211.30 E	-226.62	0.18
4310.00	0.53	211.20	4284.77	236.20 S	210.99 E	-228.50	0.22
4405.00	0.46	201.83	4379.77	236.93 S	210.62 E	-229.25	0.11
4500.00	0.37	149.24	4474.77	237.55 S	210.63 E	-229.86	0.40
4595.00	0.38	148.55	4569.77	238.08 S	210.95 E	-230.38	0.01
4691.00	0.57	150.93	4665.76	238.77 S	211.35 E	-231.06	0.20
4786.00	0.69	263.78	4760.76	239.25 S	211.01 E	-231.54	1.11
4881.00	0.68	246.16	4855.75	239.54 S	209.93 E	-231.87	0.22
4976.00	0.61	247.23	4950.75	239.96 S	208.94 E	-232.33	0.07
5071.00	0.65	235.70	5045.74	240.46 S	208.03 E	-232.86	0.14
5166.00	0.62	251.68	5140.74	240.92 S	207.10 E	-233.36	0.19
5261.00	0.54	220.79	5235.73	241.42 S	206.32 E	-233.89	0.34
5356.00	0.60	225.18	5330.73	242.11 S	205.67 E	-234.60	0.08
5451.00	0.65	228.83	5425.72	242.82 S	204.92 E	-235.33	0.07
5546.00	0.63	240.17	5520.71	243.43 S	204.06 E	-235.98	0.13
5640.00	0.43	241.00	5614.71	243.86 S	203.30 E	-236.43	0.21
5735.00	0.76	221.67	5709.71	244.50 S	202.57 E	-237.10	0.40
5830.00	0.84	215.13	5804.70	245.55 S	201.75 E	-238.17	0.13
5926.00	1.67	306.01	5900.68	245.30 S	200.21 E	-237.98	1.96
6021.00	1.57	306.05	5995.64	243.72 S	198.04 E	-236.48	0.11
6116.00	1.59	305.02	6090.60	242.20 S	195.91 E	-235.03	0.04
6211.00	1.34	292.04	6185.57	241.02 S	193.80 E	-233.94	0.44
6306.00	1.23	288.63	6280.55	240.28 S	191.81 E	-233.27	0.14
6401.00	1.18	259.14	6375.53	240.14 S	189.88 E	-233.19	0.65
6496.00	0.86	230.45	6470.52	240.78 S	188.37 E	-233.89	0.62
6592.00	0.86	218.14	6566.50	241.80 S	187.37 E	-234.95	0.19
6640.00	3.42	347.16	6614.48	240.69 S	186.83 E	-233.85	8.37
6687.00	7.84	350.82	6661.24	236.16 S	186.00 E	-229.35	9.43
6735.00	11.58	353.21	6708.54	228.14 S	184.91 E	-221.38	7.84
6782.00	13.58	353.81	6754.41	217.97 S	183.76 E	-211.25	4.26
6830.00	18.59	354.41	6800.52	204.74 S	182.40 E	-198.09	10.44
6877.00	24.37	356.66	6844.24	187.59 S	181.11 E	-180.99	12.42
6925.00	27.78	2.93	6887.35	166.52 S	181.10 E	-159.94	9.13
6972.00	30.87	3.26	6928.33	143.54 S	182.35 E	-136.93	6.58
7020.00	35.77	0.01	6968.43	117.20 S	183.05 E	-110.58	10.86
7067.00	39.96	1.21	7005.52	88.36 S	183.37 E	-81.74	9.05
7115.00	44.92	4.08	7040.94	56.02 S	184.91 E	-49.37	11.09
7162.00	48.75	4.79	7073.09	21.85 S	187.56 E	-15.13	8.22
7210.00	53.55	8.96	7103.20	15.23 N	192.08 E	22.09	12.07
7257.00	57.86	11.37	7129.67	53.43 N	198.95 E	60.52	10.10
7305.00	63.82	9.63	7153.05	94.63 N	206.57 E	101.96	12.81
7352.00	68.98	6.98	7171.87	137.23 N	212.77 E	144.76	12.13
7400.00	73.08	5.38	7187.47	182.35 N	217.64 E	190.02	9.10
7447.00	79.57	3.99	7198.57	227.84 N	221.36 E	235.61	14.10
7503.00	85.46	2.92	7205.87	283.24 N	224.71 E	291.09	10.69
7550.00	92.93	3.50	7206.53	330.13 N	227.34 E	338.05	15.94
7681.00	90.22	3.01	7202.92	460.85 N	234.77 E	468.96	2.10
7776.00	89.14	2.45	7203.46	555.74 N	239.29 E	563.95	1.28
7871.00	89.45	2.87	7204.62	650.63 N	243.70 E	658.93	0.55
7966.00	89.48	2.63	7205.51	745.52 N	248.26 E	753.92	0.25

8062.00	89.72	2.94	7206.18	841.40 N	252.93 E	849.91	0.41
8157.00	89.66	1.32	7206.70	936.33 N	256.46 E	944.91	1.71
8252.00	90.43	2.31	7206.62	1031.28 N	259.46 E	1039.90	1.32
8347.00	89.20	0.75	7206.93	1126.24 N	262.00 E	1134.89	2.09
8442.00	89.66	0.72	7207.87	1221.23 N	263.22 E	1229.86	0.49
8537.00	89.81	0.69	7208.31	1316.22 N	264.39 E	1324.84	0.16
8632.00	90.25	0.68	7208.26	1411.22 N	265.52 E	1419.81	0.46
8727.00	89.26	1.19	7208.67	1506.20 N	267.07 E	1514.79	1.17
8823.00	89.60	0.89	7209.62	1602.18 N	268.82 E	1610.77	0.47
8918.00	89.66	0.49	7210.24	1697.17 N	269.96 E	1705.74	0.43
9013.00	90.25	0.51	7210.31	1792.17 N	270.79 E	1800.71	0.62
9108.00	89.23	0.70	7210.75	1887.16 N	271.79 E	1895.67	1.09
9203.00	89.57	1.05	7211.75	1982.14 N	273.23 E	1990.65	0.51
9298.00	89.91	0.94	7212.18	2077.13 N	274.88 E	2085.63	0.37
9394.00	90.28	1.40	7212.03	2173.11 N	276.84 E	2181.62	0.62
9489.00	90.34	1.41	7211.52	2268.08 N	279.17 E	2276.61	0.07
9584.00	90.52	1.30	7210.80	2363.05 N	281.42 E	2371.60	0.23
9679.00	90.71	1.36	7209.78	2458.02 N	283.63 E	2466.59	0.21
9774.00	89.35	2.26	7209.73	2552.96 N	286.63 E	2561.58	1.71
9869.00	89.29	2.12	7210.85	2647.89 N	290.26 E	2656.58	0.16
9964.00	89.20	2.03	7212.10	2742.82 N	293.70 E	2751.57	0.13
10059.00	89.51	2.18	7213.17	2837.75 N	297.20 E	2846.56	0.36
10155.00	89.29	2.09	7214.18	2933.68 N	300.77 E	2942.56	0.25
10250.00	89.60	1.97	7215.10	3028.61 N	304.13 E	3037.55	0.35
10345.00	89.72	1.67	7215.67	3123.56 N	307.15 E	3132.55	0.34
10440.00	90.80	2.60	7215.23	3218.49 N	310.69 E	3227.55	1.50
10535.00	90.93	2.21	7213.80	3313.40 N	314.68 E	3322.53	0.43
10630.00	91.54	2.02	7211.76	3408.31 N	318.18 E	3417.51	0.68
10725.00	90.55	2.91	7210.02	3503.21 N	322.26 E	3512.49	1.40
10821.00	90.56	2.14	7209.09	3599.11 N	326.48 E	3608.48	0.80
10916.00	90.77	2.15	7207.99	3694.03 N	330.04 E	3703.48	0.23
11011.00	89.14	3.21	7208.07	3788.93 N	334.49 E	3798.47	2.05
11106.00	90.37	3.57	7208.48	3883.76 N	340.10 E	3893.44	1.35
11201.00	90.49	3.23	7207.77	3978.59 N	345.73 E	3988.41	0.37
11296.00	91.02	3.32	7206.52	4073.42 N	351.16 E	4083.38	0.56
11391.00	89.69	3.90	7205.93	4168.23 N	357.15 E	4178.34	1.52
11487.00	89.51	3.53	7206.60	4264.02 N	363.37 E	4274.29	0.44
11581.00	90.31	4.36	7206.75	4357.80 N	369.84 E	4368.24	1.23
11676.00	89.66	2.99	7206.78	4452.60 N	375.93 E	4463.20	1.60
11771.00	90.49	3.78	7206.65	4547.43 N	381.54 E	4558.17	1.21
11866.00	89.69	2.21	7206.50	4642.30 N	386.51 E	4653.16	1.85
11961.00	90.28	2.85	7206.53	4737.21 N	390.70 E	4748.15	0.91
12057.00	89.94	2.84	7206.35	4833.09 N	395.47 E	4844.14	0.35
12144.00	90.09	3.38	7206.32	4919.96 N	400.19 E	4931.13	0.64
12188.00	90.09	3.38	7206.25	4963.88 N	402.78 E	4975.11	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 2.05 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.51 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 12188.00 FEET
IS 4980.20 FEET ALONG 4.64 DEGREES (TRUE)

All directional surveys tied on to the last gyro survey at 1154' MD. Final survey is a straight-line projection to the bit.