



WELL INFORMATION					
MWD Run Number	100	200	300		
Date run completed	09-Mar-15	15-Mar-15	21-Mar-15		
Rig Bit Number	0100	0200	0300		
Bit Size (in)	13.500	8.750	3.125		
Tool Nominal OD (in)	6.750	6.750	4.750		
Log Start Depth (MD, ft)	100.00	1,855.00	6,312.00		
Log End Depth (MD, ft)	1,855.00	6,312.00	12,751.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	08-Mar-15 16:37	09-Mar-15 21:26	17-Mar-15 16:14		
Drill/Wipe End Date and Time	09-Mar-15 00:52	10-Mar-15 22:40	20-Mar-15 08:40		
Min Inc (deg) @ Depth (MD, ft)	0.32 @ 175.00	0.37 @ 5,119.00	87.28 @ 12,293.00		
Max Inc (deg) @ Depth (MD, ft)	15.63 @ 1,798.00	87.10 @ 6,261.00	91.81 @ 10,919.00		
Bit TFA(in2) / Bit Type	0.90 / PDC	0.56 / PDC	0.86 / PDC		
Flow Rate (gpm)	640.21	498.91	254.55		
Max AV (fpm) / CV (fpm) @ MWD	0.0 / 0.0	NA / NA	NA / NA		
Fluid Type	Native/Spud Mud	Polymer	Polymer		
Density (ppg) / Viscosity (spqt)	8.50 / 28.00	10.10 / 41.00	10.60 / 38.00		
Filtrate CL (ppm)	1,200.00	1,300.00	1,600.00		
pH / Fluid Loss (mptm)	8.50 / 0	9.50 / 0	9.10 / 0		
PV (cP) / YP (lhf2)	2 / 1.00	12 / 10.00	10 / 11.00		
% Solids / % Sand	1.2 / 0.10	12.8 / 1.0	8.0 / 0.12		
% Oil / Oil:Water Ratio	NA / NA	NA / NA	NA / NA		
Rm @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Rmf @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Rmc @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Max Tool Temp (degF) / S	111.04 / PDM	171.00 / PDM	200.41 / PDM		

Max Tool Temp (degF) / Source	111.24 / PCM	171.20 / PCM	223.41 / PCM		
Rm @ Max Tool Temp (degF)	NA @ 111.24	NA @ 171.20	NA @ 223.41		
Lead MWD Engineer	Scott Trowbridge	Scott Trowbridge	Scott Trowbridge		
Customer Representative	Kennith Wilkerson	Kennith Wilkerson	Kennith Wilkerson		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	11303516	11303516	12396733		
Insert Serial Number	11620319	11680708	11620319		
Date and Time Initialized	08-Mar-15 15:15	09-Mar-15 14:26	16-Mar-15 07:23		
Date and Time Read	09-Mar-15 08:13	01-Jan-70 00:00	21-Mar-15 10:41		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	54.81	48.75	41.61		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11303516	11303516	12396733		
Sonde Serial Number	11638470	11833221	11638470		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	173.96	177.05	356.21		

Gamma Ray Sensor Information

Tool Type		PCG	PCG		
Distance From Bit (ft)		43.65	36.51		
Recorded Sample Period (sec)		10	10		
Software Version		8.15	8.15		
Sub Serial Number		11303516	12396733		
Insert/Sonde Serial Number		11293325	11680921		

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. Critical annular velocities are calculated using the "Power Law" for water based fluids and the "Bingham Plastic" model for oil and synthetic based fluids.

4. All data is stored unless otherwise specified.

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

PCG Gamma Ray BCorr (PGRC)
Interval Resolution: .5
Interval Distance: .6
Gap Fill: 3

Average Rate of Penetration (ROPA)
Interval Resolution: .5
Interval Distance: 1.2
Gap Fill: 3

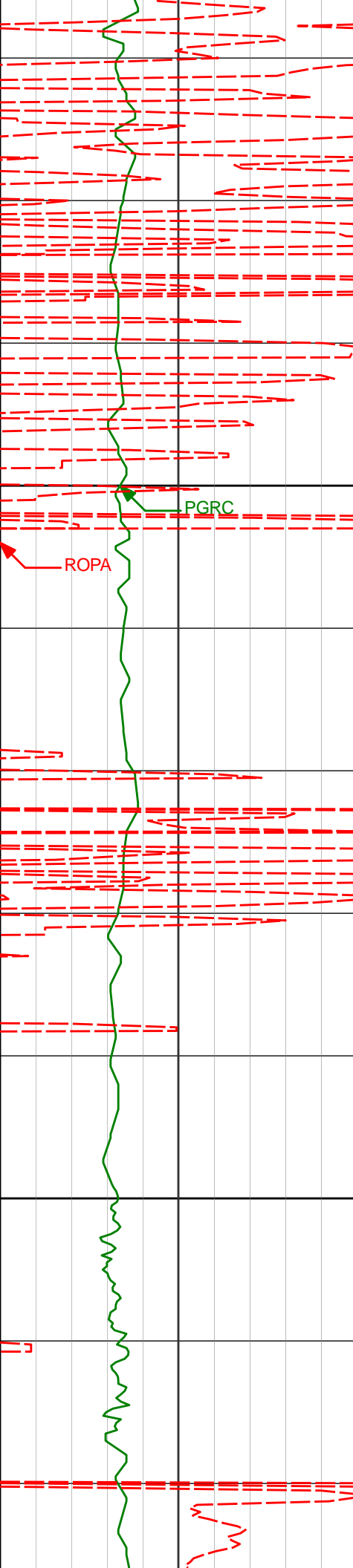
WARRANTY

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HALLIBURTON
Sperry Drilling Services

MD Main Log 1:240

PCG GR XHi-Range RT BCor PGXRC-T api0300								
Avg Rate of Penetration ROPA feet per hr5000		Depth TVD ft	Depth	Inc	Azi	TVD	V.S.	DLS
								
			1914'	14.04°	189.84°	1887.20'	-244.33'	1.51°



2000

2006'

13.23°

188.34°

1976.60'

-265.66'

0.96°

ROPA

PGRC

2100

2097'

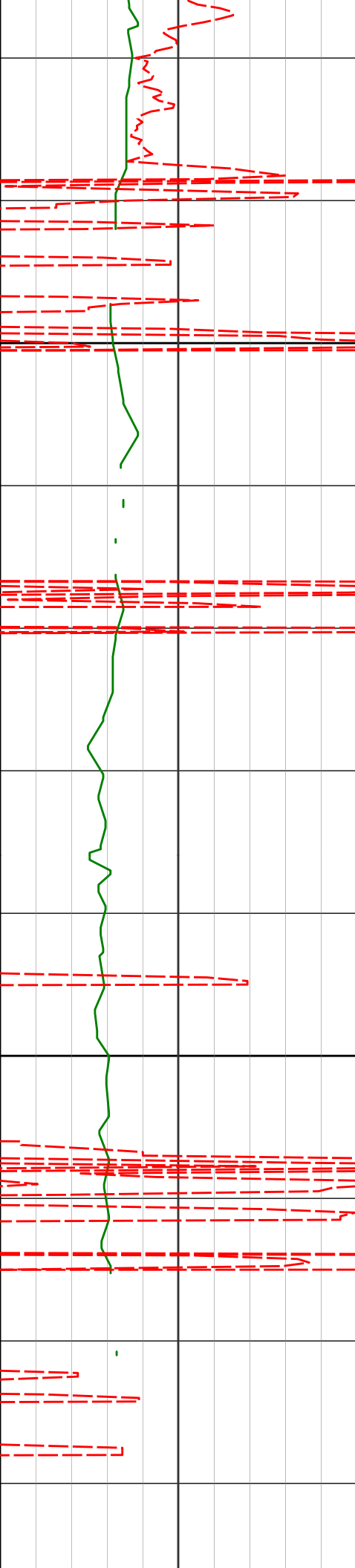
11.72°

185.70°

2065.45'

-285.11'

1.77°



2189'

13.85°

203.74°

2155.20'

-304.37'

4.89°

2200

2280'

12.78°

201.18°

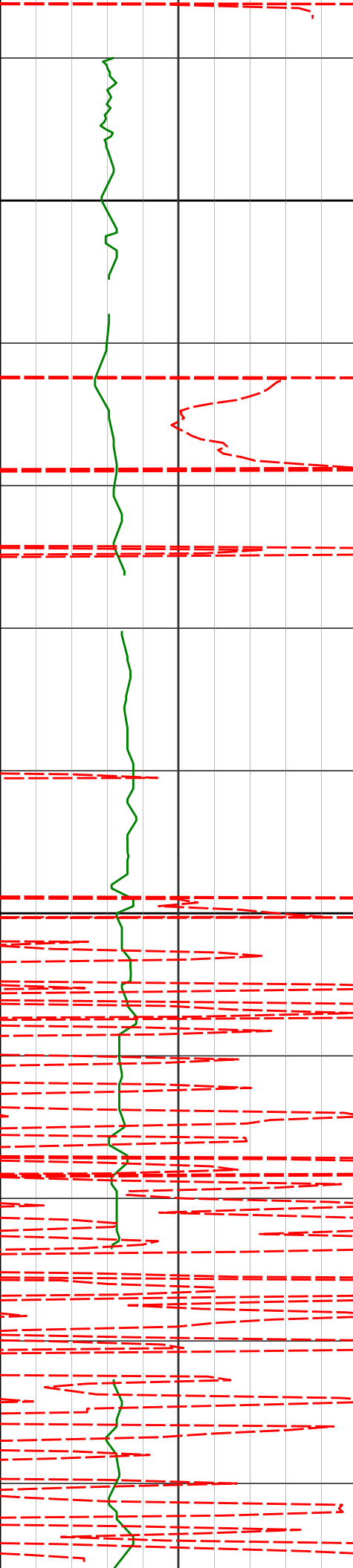
2243.76'

-323.55'

1.34°

2300

2400'



2400

2463'

13.13°

210.54°

2422.35'

-359.65'

2.34°

2500

2555'

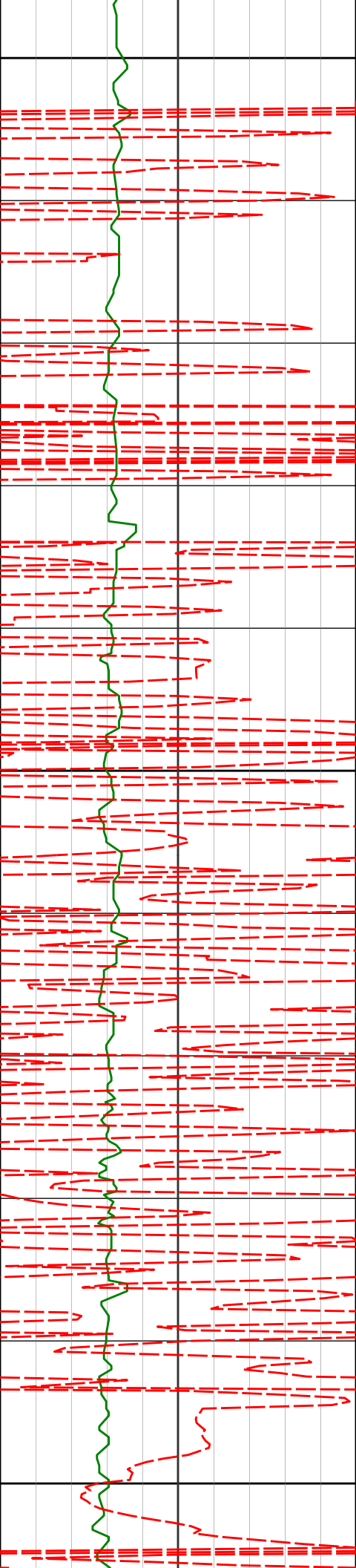
11.65°

209.38°

2512.20'

-376.52'

1.63°



2600

2646'

11.03°

207.65°

2601.43'

-392.05'

0.78°

2700

2738'

10.32°

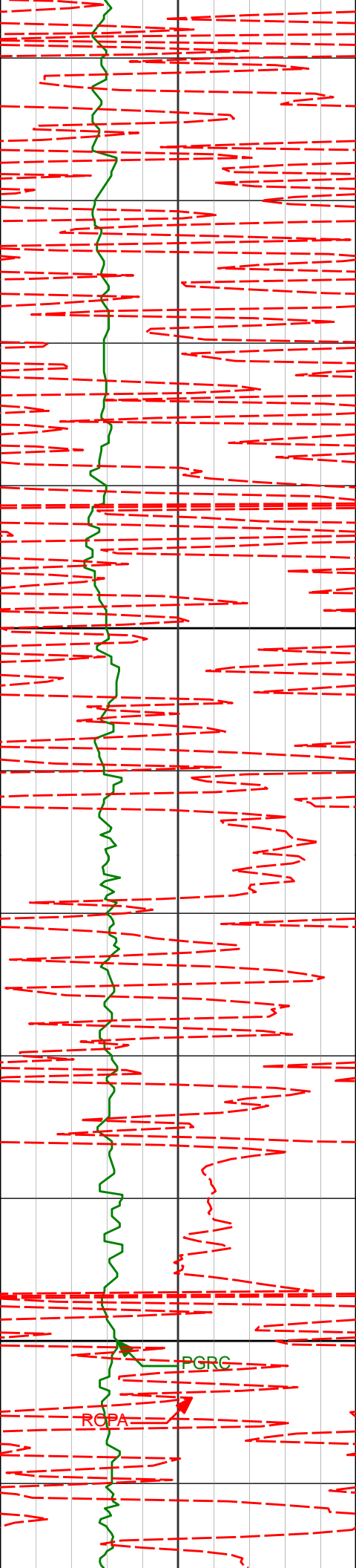
208.21°

2691.83'

-406.93'

0.78°

2800



2830'

10.82°

198.16°

2782.28'

-422.25'

2.07°

2900

2922'

10.40°

199.40°

2872.71'

-438.16'

0.52°

3000

ROPA

PGRC

3013'

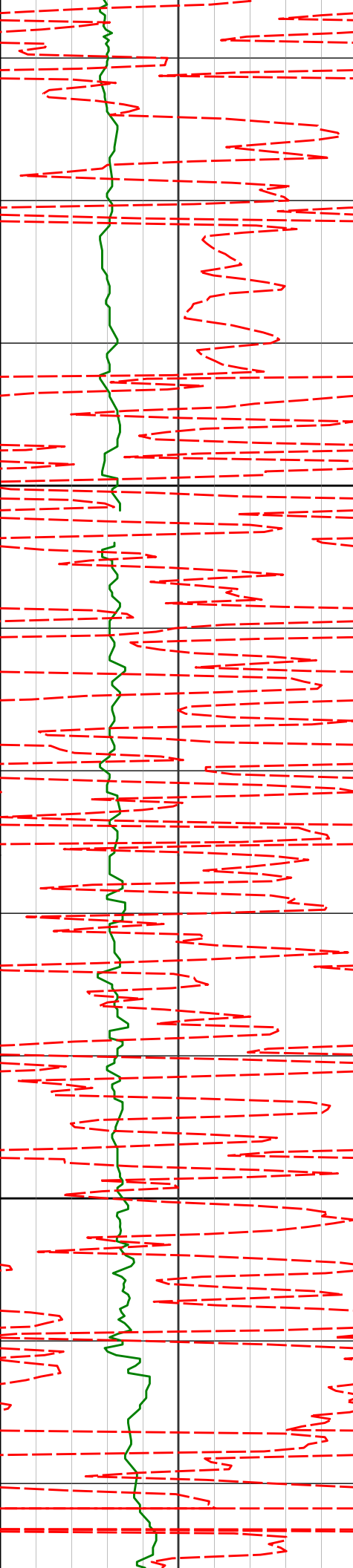
12.30°

196.23°

2961.92'

-455.09'

2.20°



3100

3104'

13.91°

191.18°

3050.55'

-475.02'

2.17°

3200

3196'

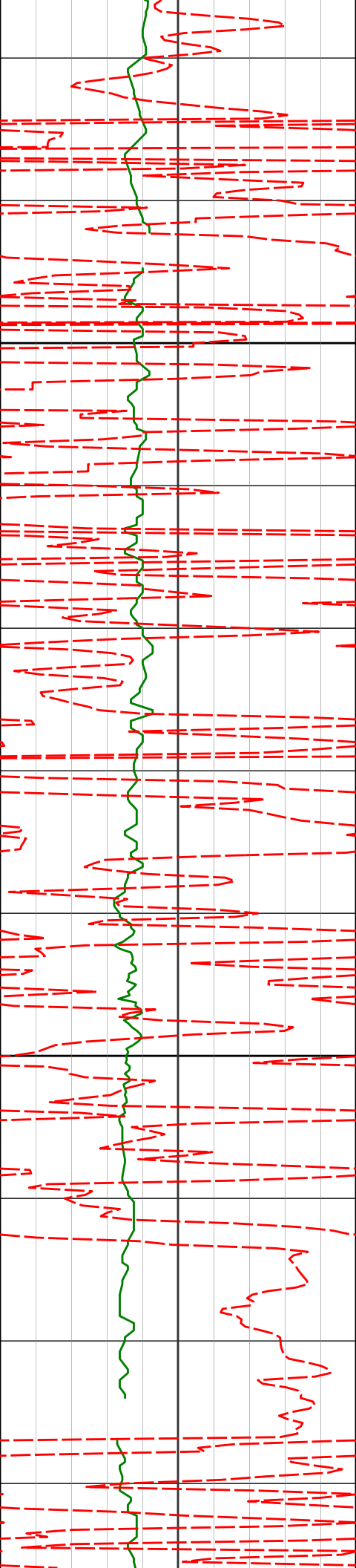
12.11°

192.28°

3140.19'

-495.20'

1.97°



3287'

11.77°

180.89°

3229.23'

-513.76'

2.61°

3300

3378'

10.54°

178.84°

3318.51'

-531.36'

1.42°

3400

3470'

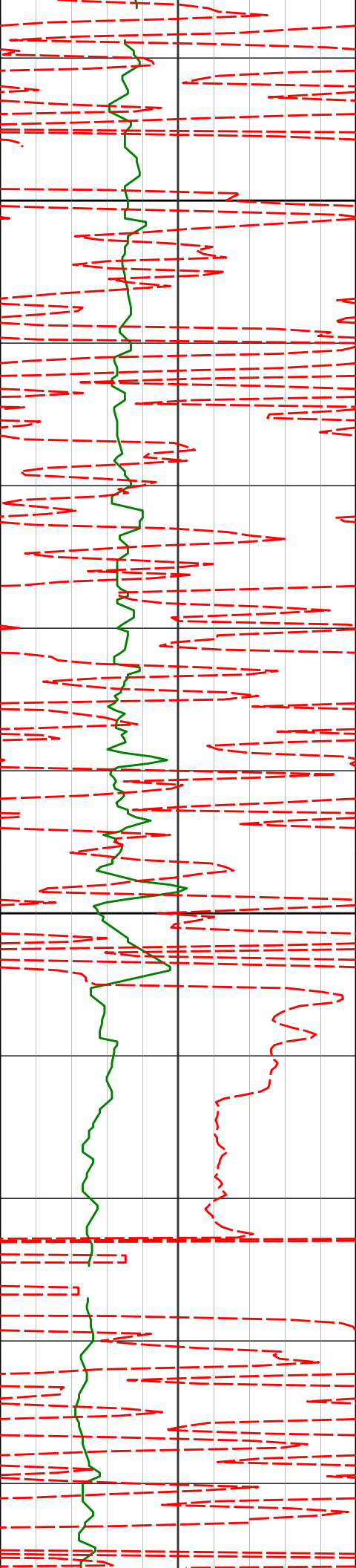
11.79°

180.12°

3408.77'

-549.17'

1.39°



3500

3562'

11.63°

178.18°

3498.86'

-567.84'

0.46°

3600

3653'

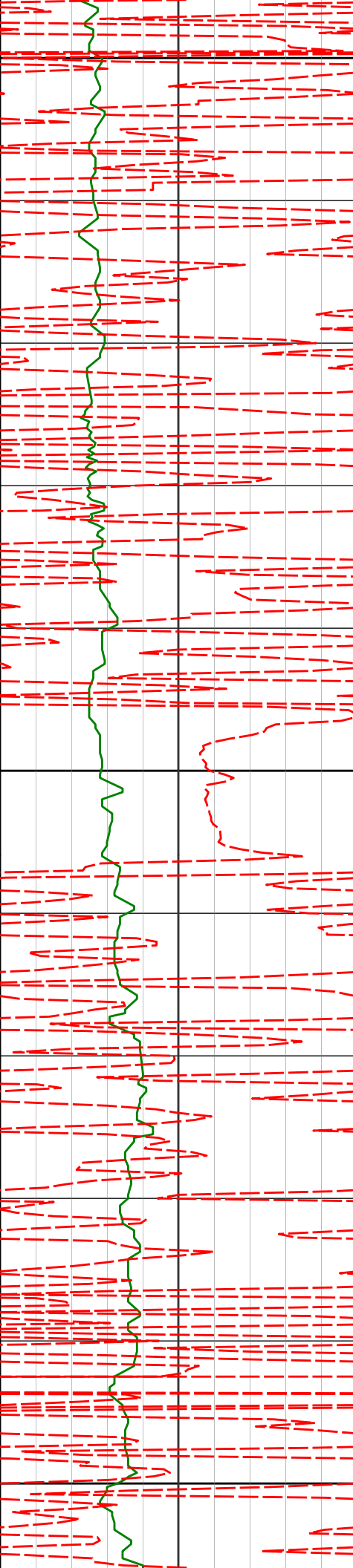
14.36°

188.44°

3587.53'

-588.14'

3.92°



3700

3745'

14.80°

185.99°

3676.57'

-611.04'

0.82°

3800

3837'

15.40°

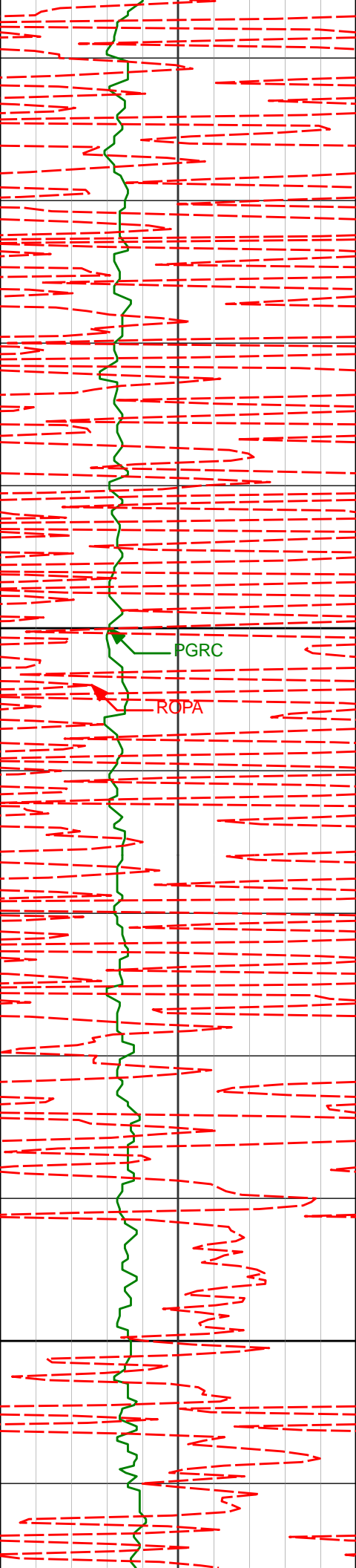
191.53°

3765.39'

-634.61'

1.70°

3900



4000

PGRC

ROPA

4019'

12.90°

189.47°

3941.86'

-678.15'

1.40°

4100

4111'

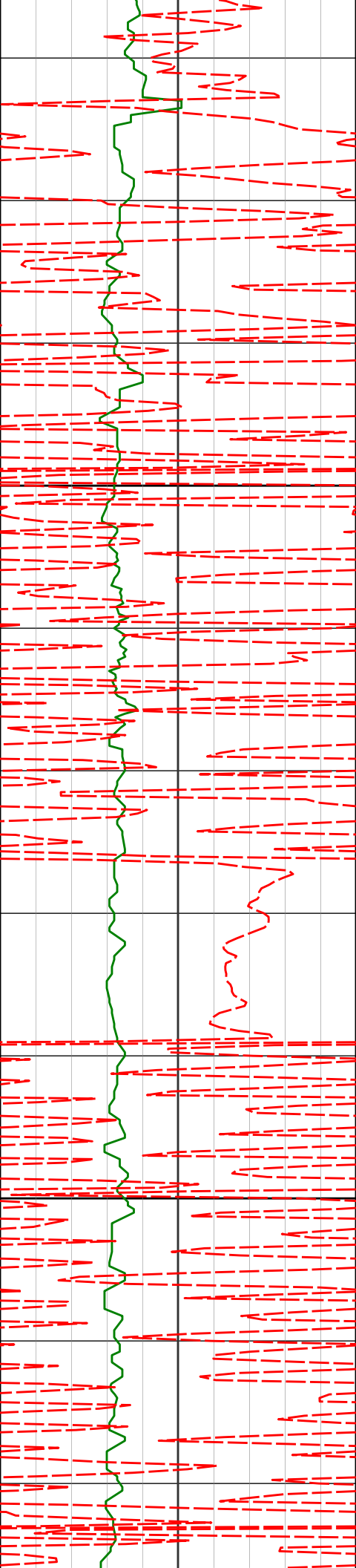
11.18°

186.86°

4031.83'

-697.07'

1.96°



4200

4202'

10.46°

184.36°

4121.21'

-714.02'

0.94°

4300

4293'

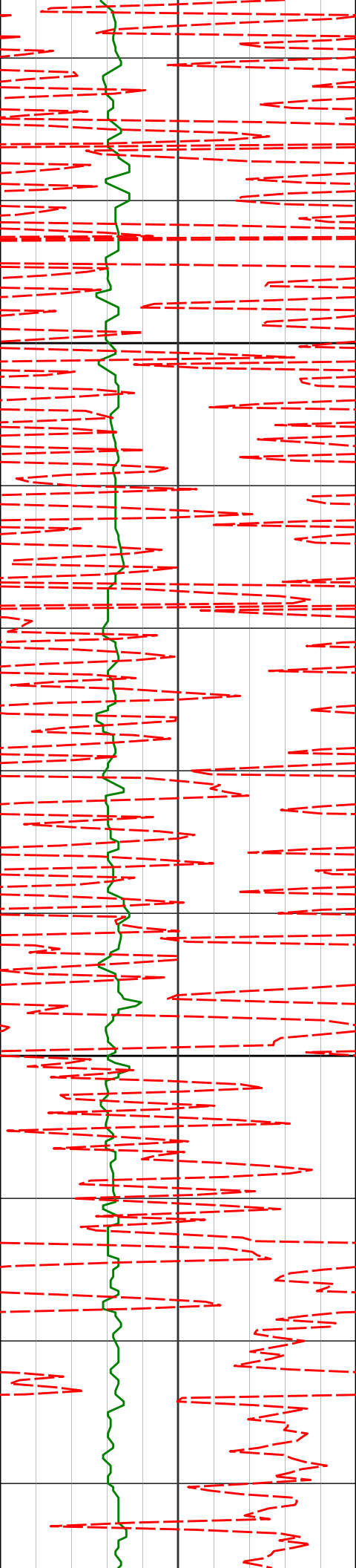
12.31°

193.11°

4210.43'

-731.64'

2.78°



4400

4477'

10.52°

189.92°

4390.78'

-767.13'

1.03°

4500

4568'

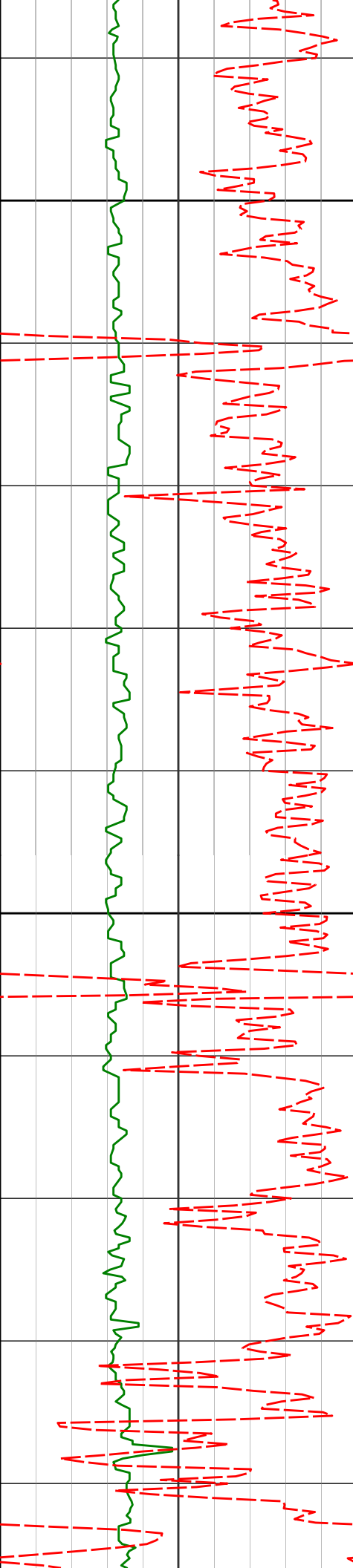
9.89°

190.04°

4480.34'

-782.94'

0.69°



4600

4700

4660'

8.37°

187.45°

4571.17'

-797.31'

1.71°

4751'

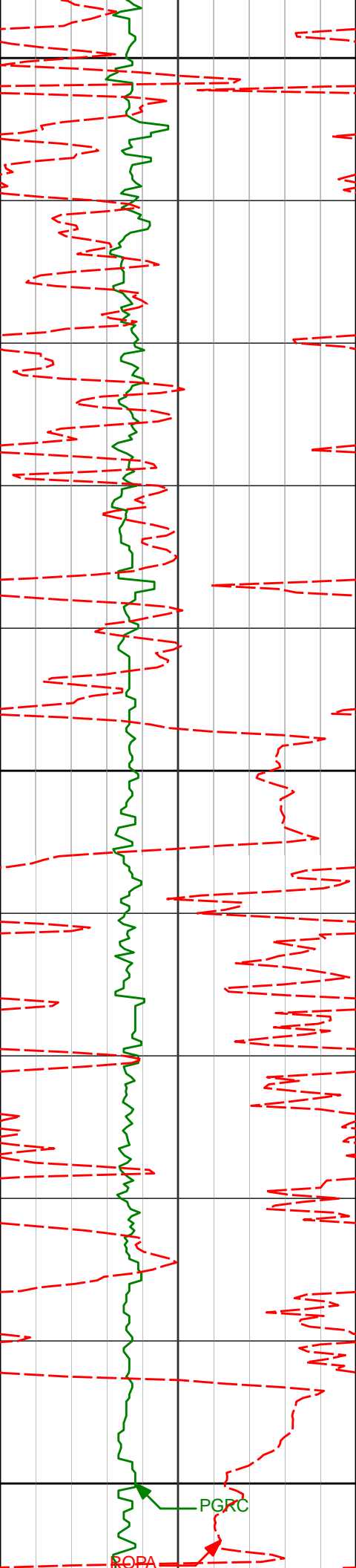
7.45°

188.87°

4661.31'

-809.66'

1.03°



4800

4843'

7.17°

193.21°

4752.56'

-821.09'

0.67°

4900

4936'

4.97°

190.58°

4845.03'

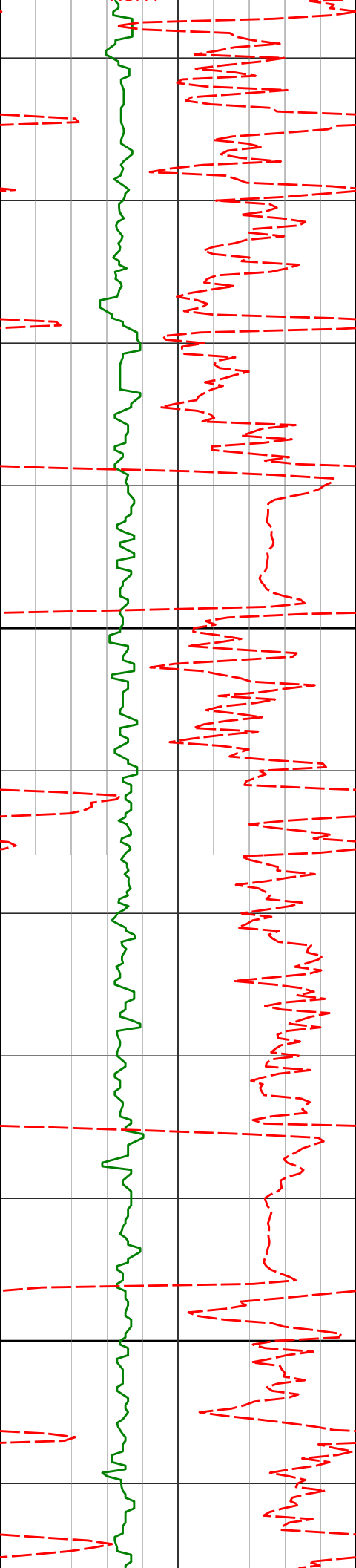
-830.66'

2.38°

5000

PGRC

ROPA



5100

5200

5028'

5119'

5211'

2.10°

0.37°

1.74°

194.84°

224.08°

14.61°

4936.85'

5027.82'

5119.81'

-836.18'

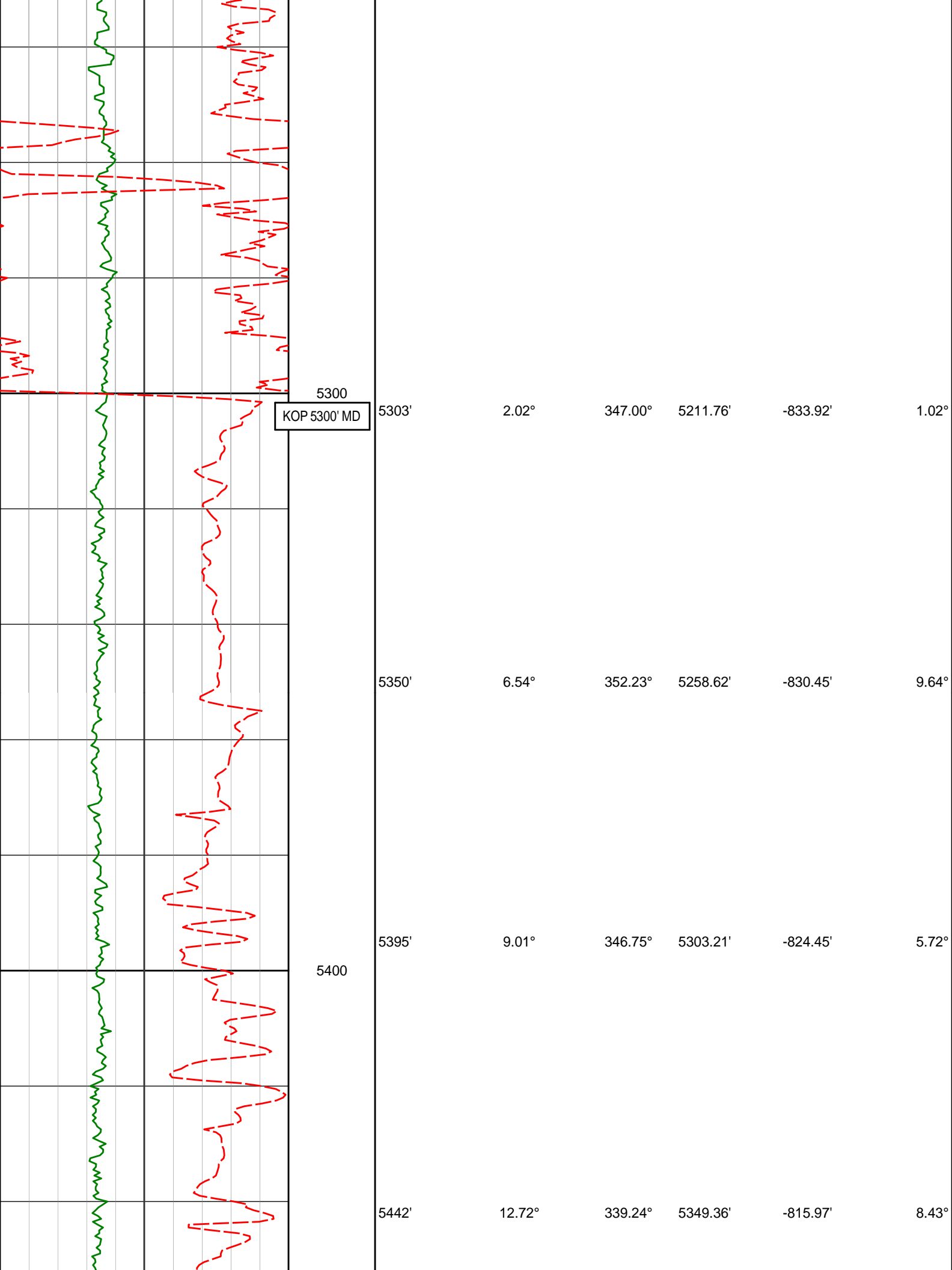
-837.99'

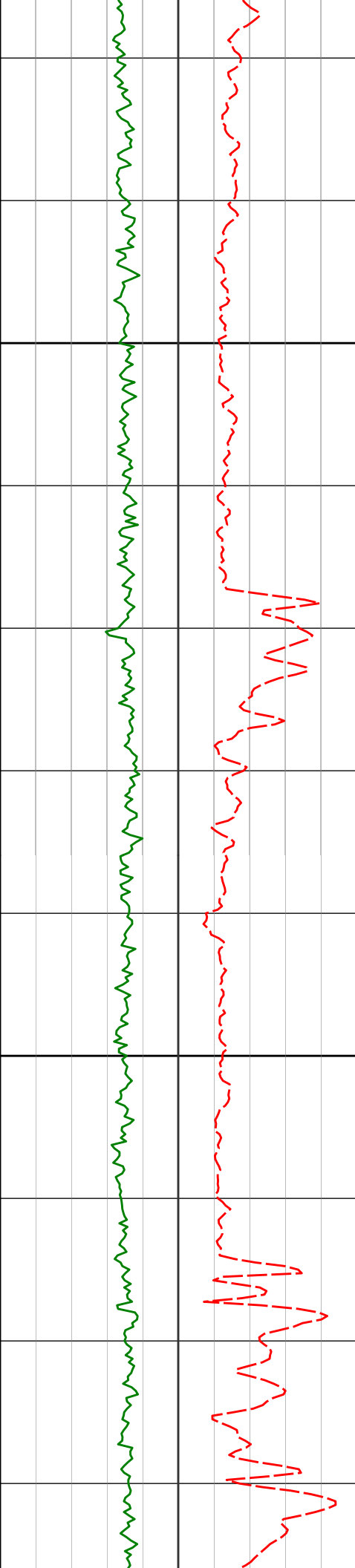
-836.85'

3.13°

1.96°

2.25°





5500

5487'

16.00°

342.04°

5392.95'

-805.36'

7.45°

5534'

19.58°

347.33°

5437.69'

-791.43'

8.35°

5579'

23.00°

350.82°

5479.62'

-775.33'

8.10°

5600

5626'

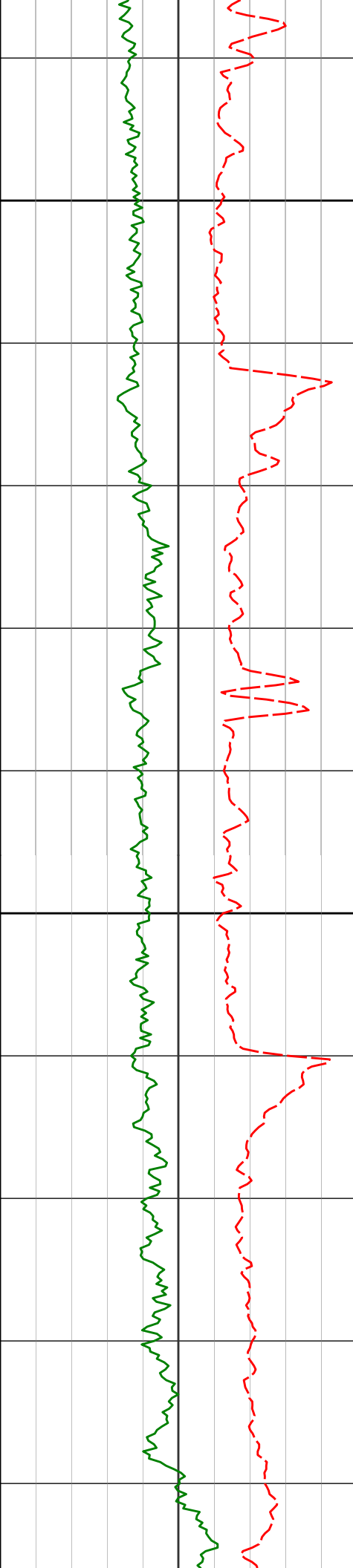
26.77°

353.21°

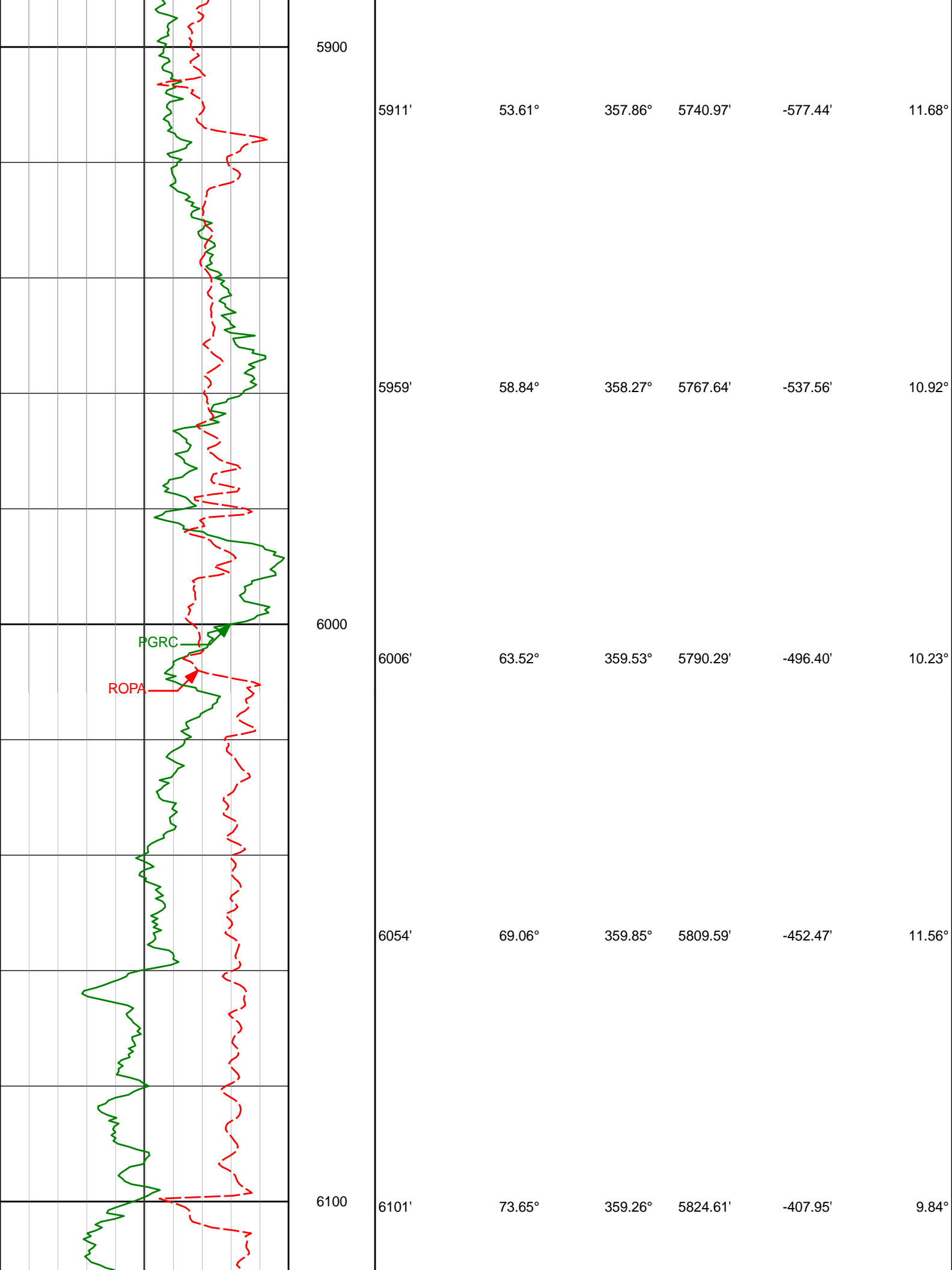
5522.25'

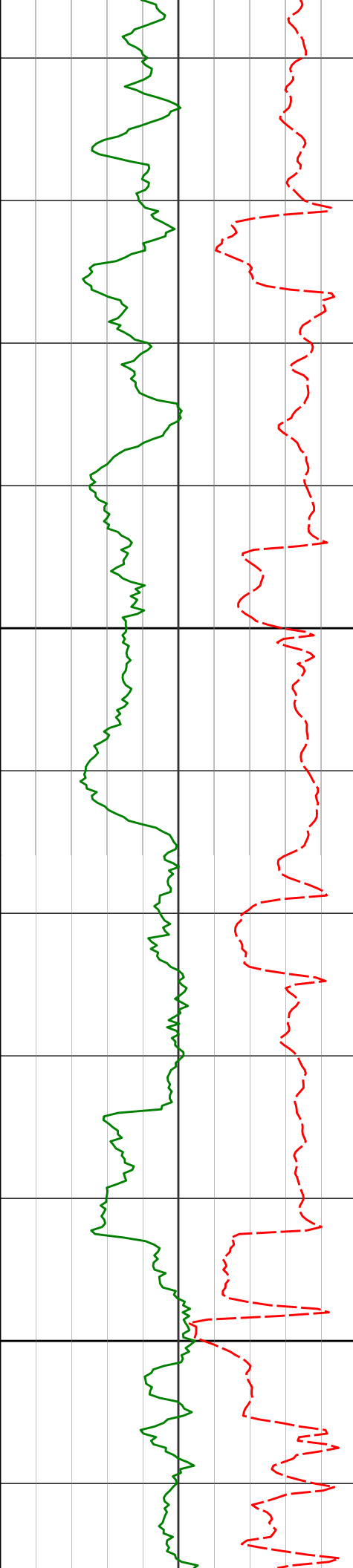
-755.69'

8.30°



5700	5674'	30.02°	351.34°	5564.47'	-733.01'	7.02°
	5721'	35.46°	353.27°	5603.99'	-707.76'	11.78°
	5769'	38.41°	355.73°	5642.35'	-679.01'	6.87°
	5816'	43.40°	357.11°	5677.86'	-648.27'	10.79°
	5864'	48.17°	356.92°	5711.33'	-613.89'	9.94°
5800						





6200


6300

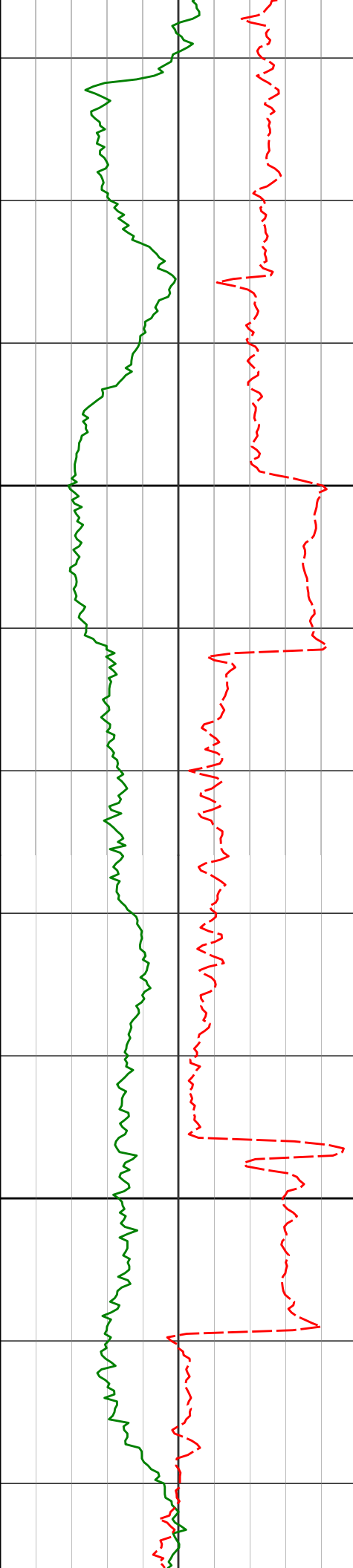
R300

6149'	77.30°	359.31°	5836.64'	-361.50'	7.60°
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6196'	81.46°	0.24°	5845.30'	-315.32'	9.06°
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6261'	87.10°	1.44°	5851.78'	-250.72'	8.87°
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 Casing Shoe @ 6297' MD



6400

6500

6358'

91.02°

1.11°

5853.37'

-153.84'

4.06°

6453'

90.31°

2.56°

5852.27'

-58.99'

1.70°

6547'

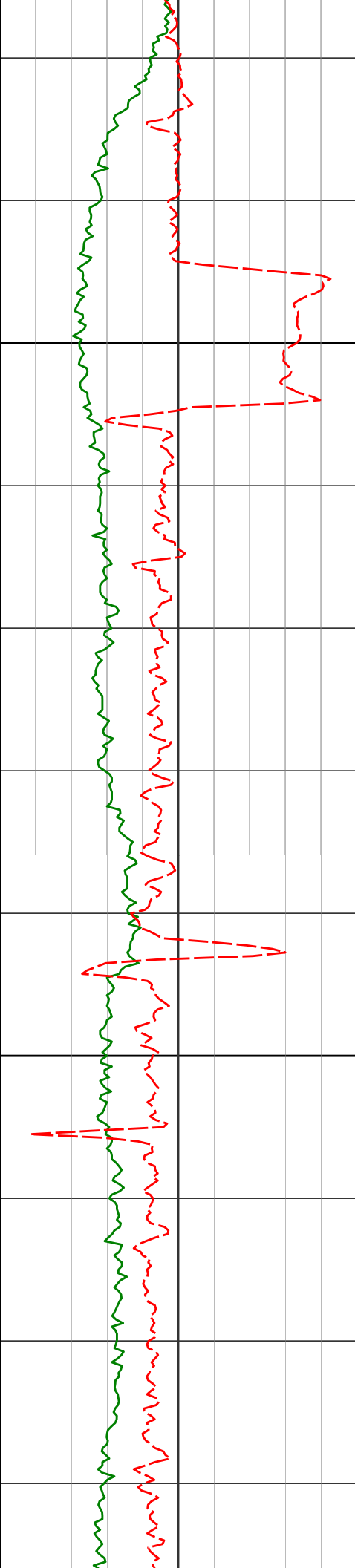
88.89°

3.81°

5852.93'

34.72'

2.01°



6600

6642'

88.87°

6.02°

5854.78'

129.14'

2.33°

6700

6737'

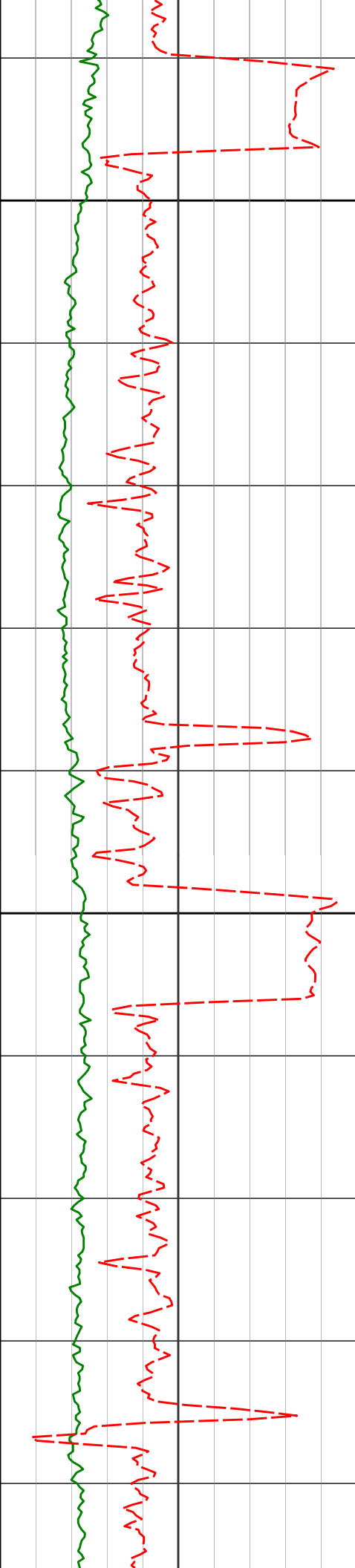
89.68°

5.79°

5855.98'

223.39'

0.89°



6800

6832'

90.36°

7.25°

5855.95'

317.52'

1.70°

6900

6927'

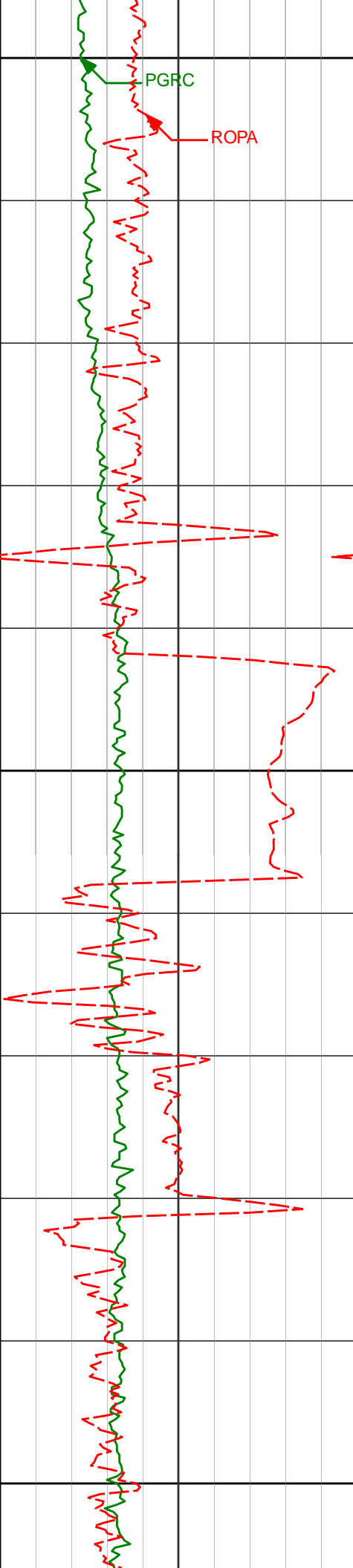
89.96°

6.82°

5855.69'

411.52'

0.62°



7000

PGRC

ROPA

7022'

90.61°

3.72°

5855.21'

505.89'

3.33°

7100

7117'

89.89°

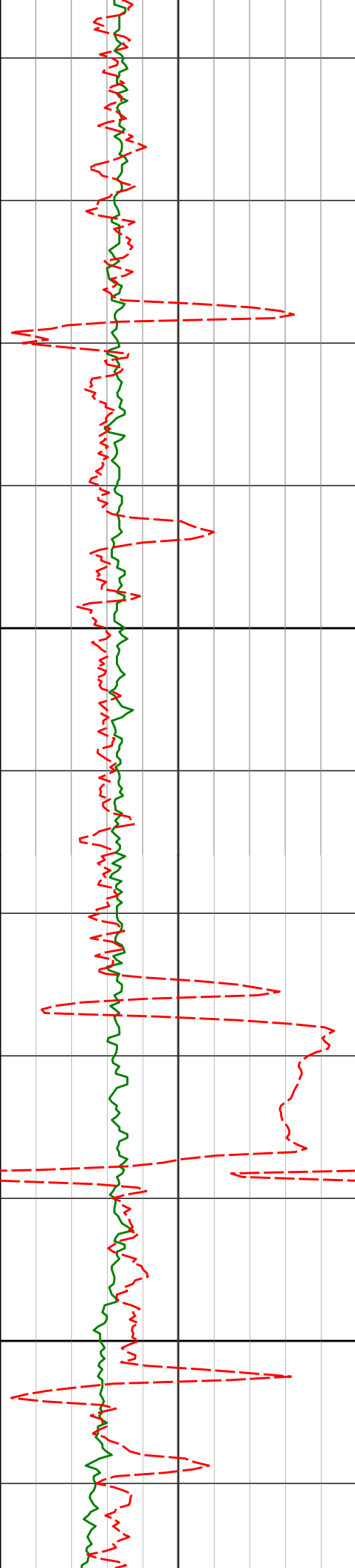
5.72°

5854.80'

600.37'

2.24°

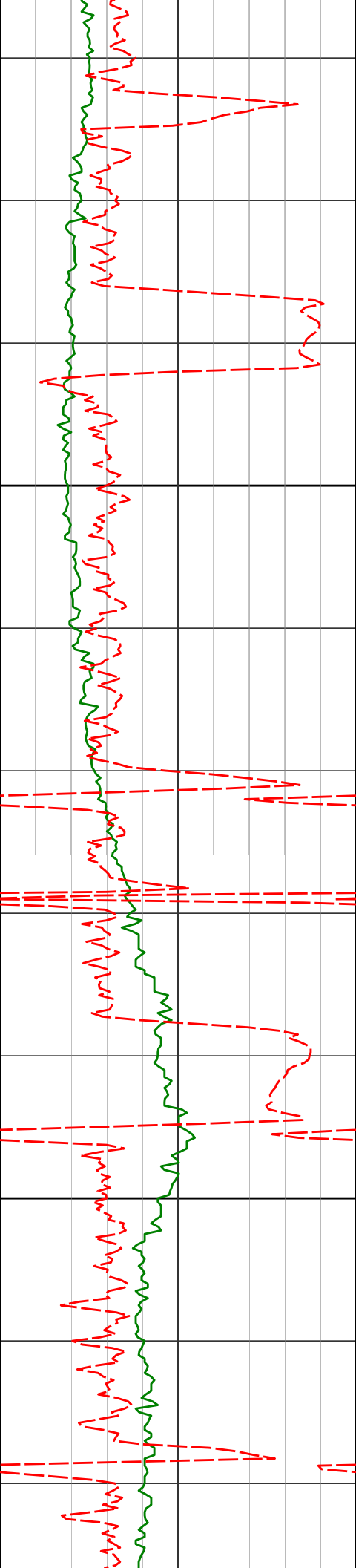
7200



7300

7400

7212	90.30	4.63	5854.64	694.73	1.01
7307'	90.06°	0.41°	5854.34'	789.51'	4.68°
7402'	88.58°	0.19°	5855.47'	884.46'	1.58°



7500

7600

7497'

88.85°

0.52°

5857.60'

979.40'

0.45°

7592'

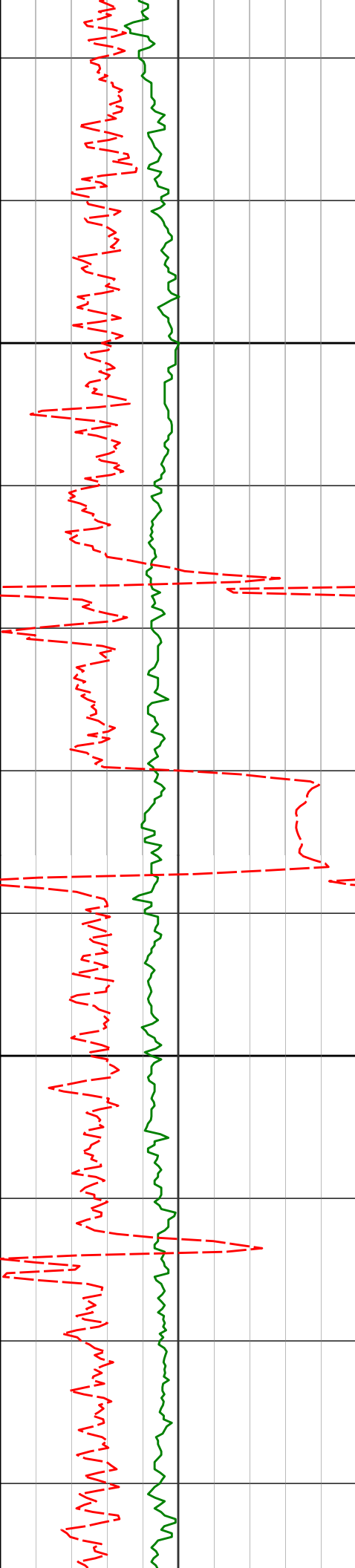
88.12°

359.99°

5860.11'

1074.33'

0.95°



7700

7800

7686'

89.19°

359.90°

5862.32'

1168.28'

1.14°

7782'

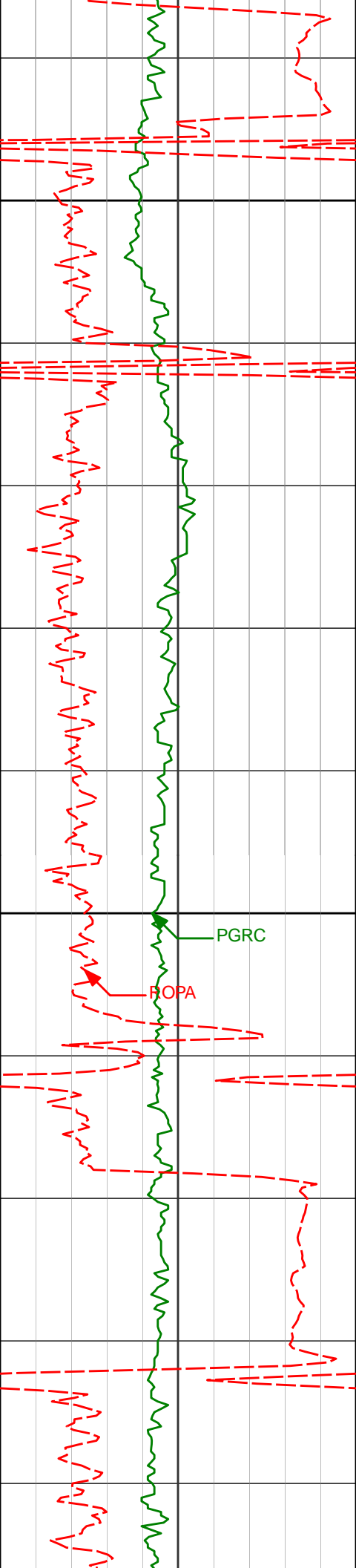
89.03°

358.56°

5863.81'

1264.27'

1.41°



7900

8000

7876'

89.15°

357.99°

5865.30'

1358.25'

0.62°

7971'

89.01°

357.72°

5866.83'

1453.23'

0.32°

8066'

88.99°

0.51°

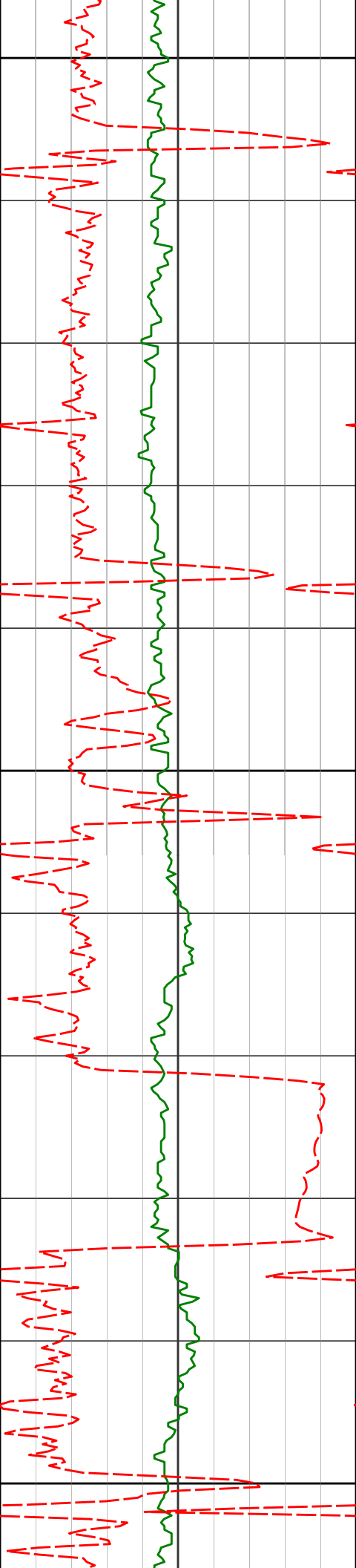
5868.49'

1548.20'

2.94°

PGRC

ROPA



8100

8160'

90.62°

1.72°

5868.81'

1642.11'

2.16°

8200

8255'

88.91°

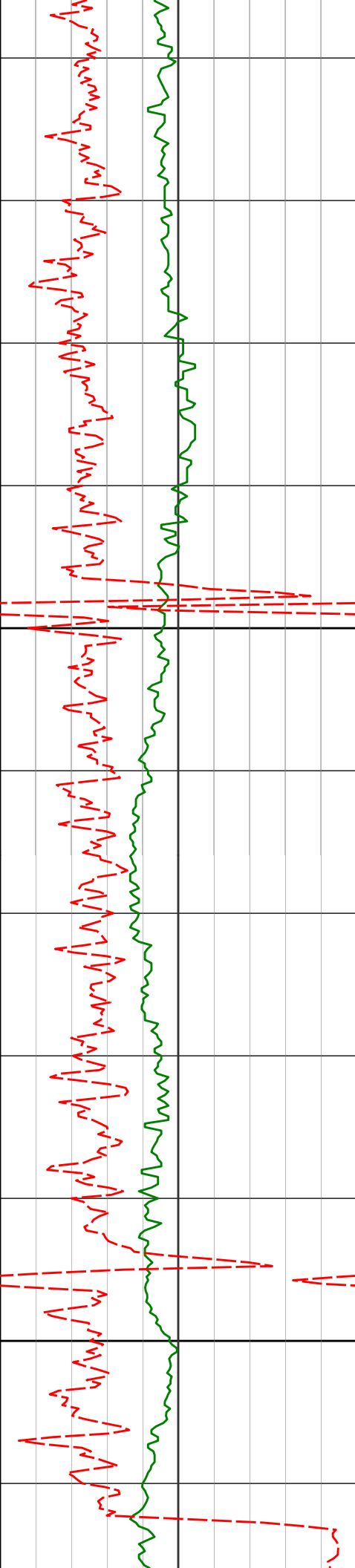
359.80°

5869.20'

1737.05'

2.71°

8300



8400

8500

8349'

89.81°

1.72°

5870.25'

1830.98'

2.26°

8444'

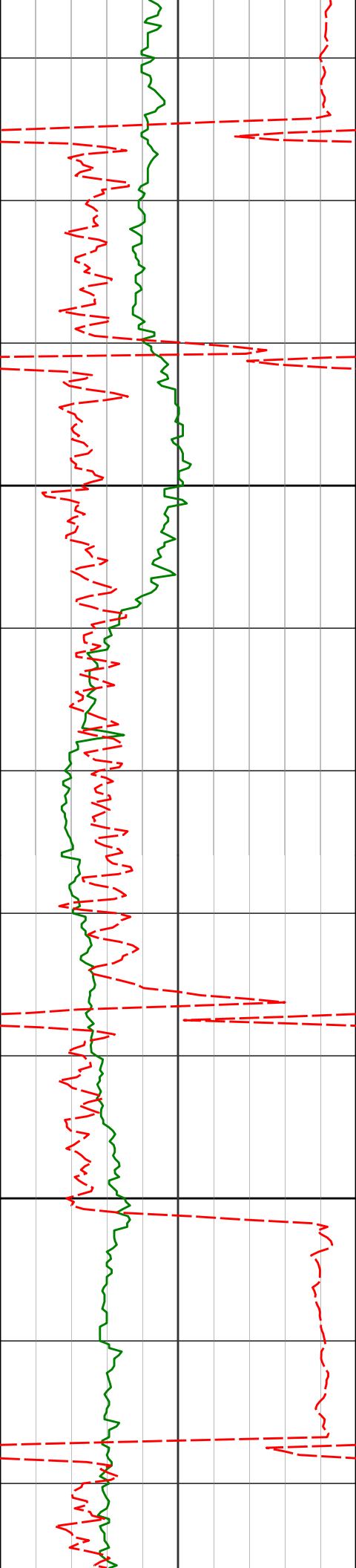
89.84°

359.73°

5870.54'

1925.92'

2.10°



8600

8700

8536'

90.00°

0.53°

5870.67'

2017.89'

0.89°

8627'

90.22°

359.89°

5870.49'

2108.86'

0.74°

8718'

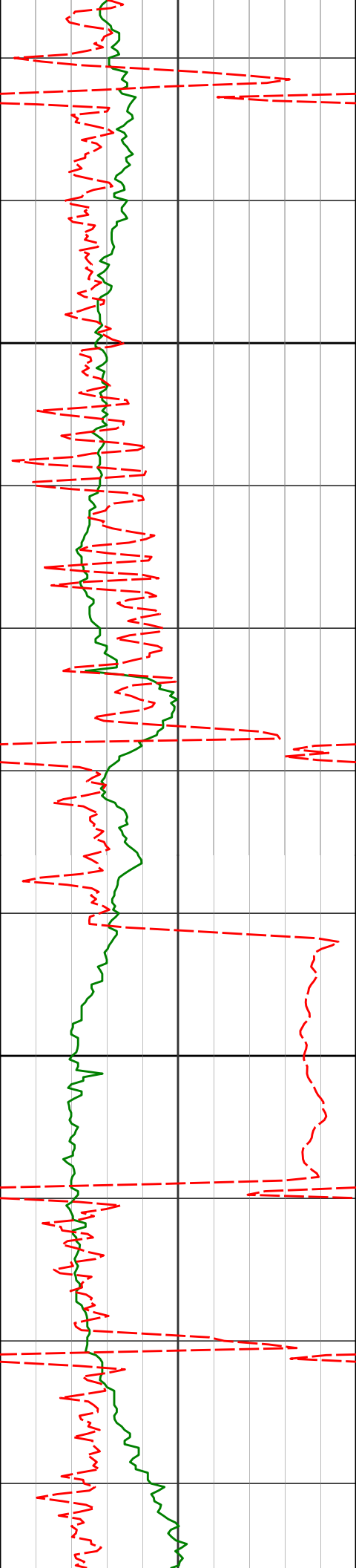
89.80°

359.94°

5870.47'

2199.84'

0.46°



8800

8810'

90.25°

0.08°

5870.43'

2291.81'

0.51°

8900

8900'

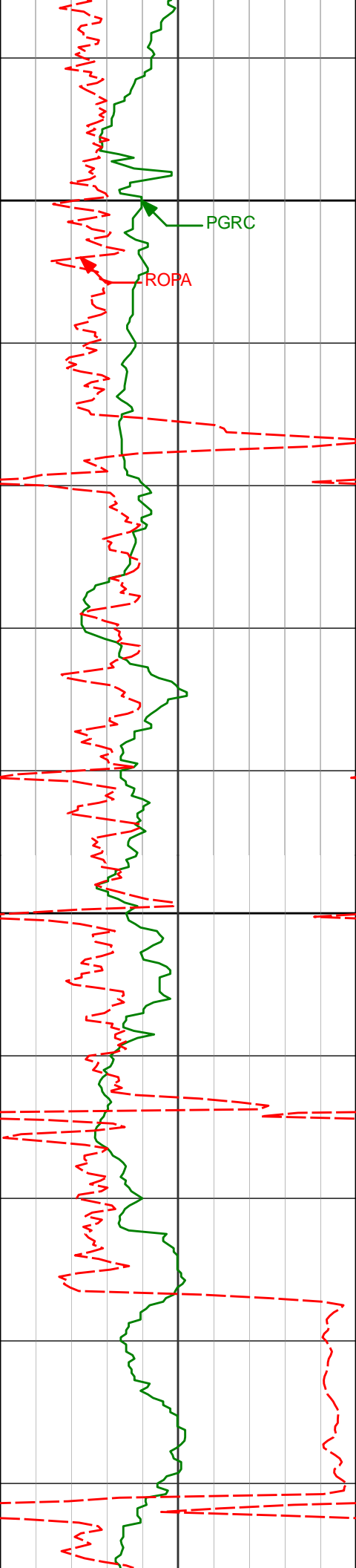
88.40°

0.31°

5871.49'

2381.78'

2.07°



9000

9100

8992'

88.11°

0.41°

5874.30'

2473.70'

0.33°

9083'

90.25°

0.11°

5875.60'

2564.65'

2.37°

9175'

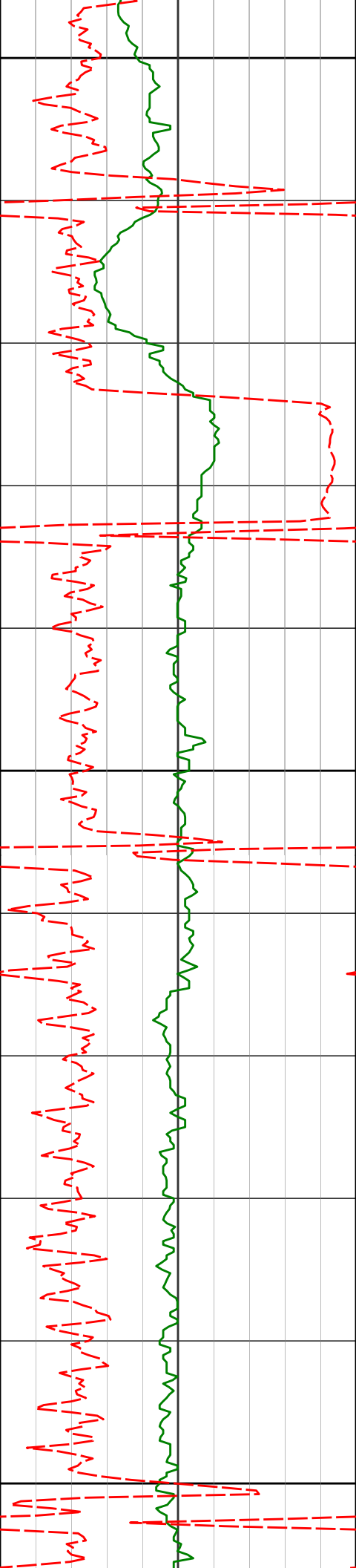
89.72°

359.51°

5875.62'

2656.63'

0.87°



9200

9266'

88.42°

357.56°

5877.10'

2747.61'

2.58°

9300

9358'

88.42°

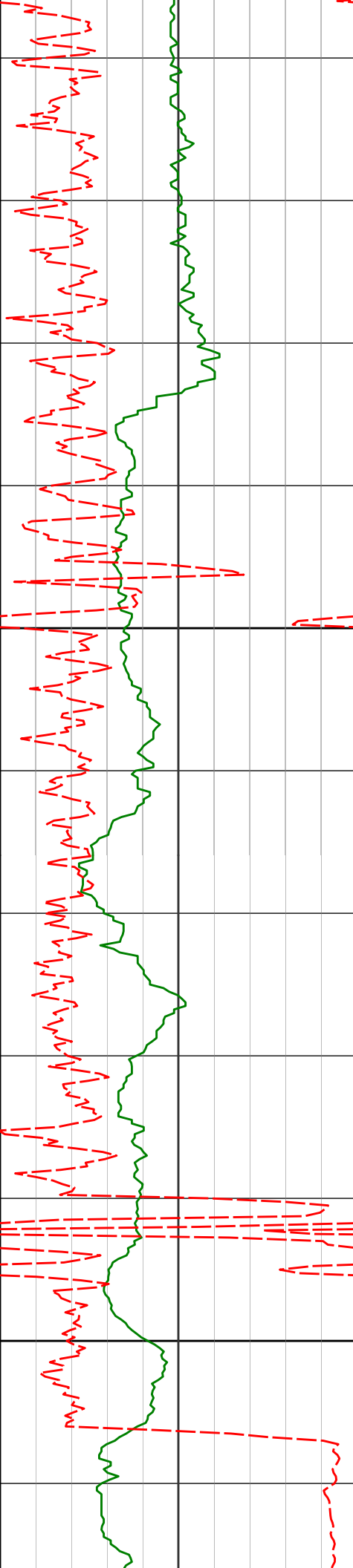
357.38°

5879.64'

2839.56'

0.20°

9400

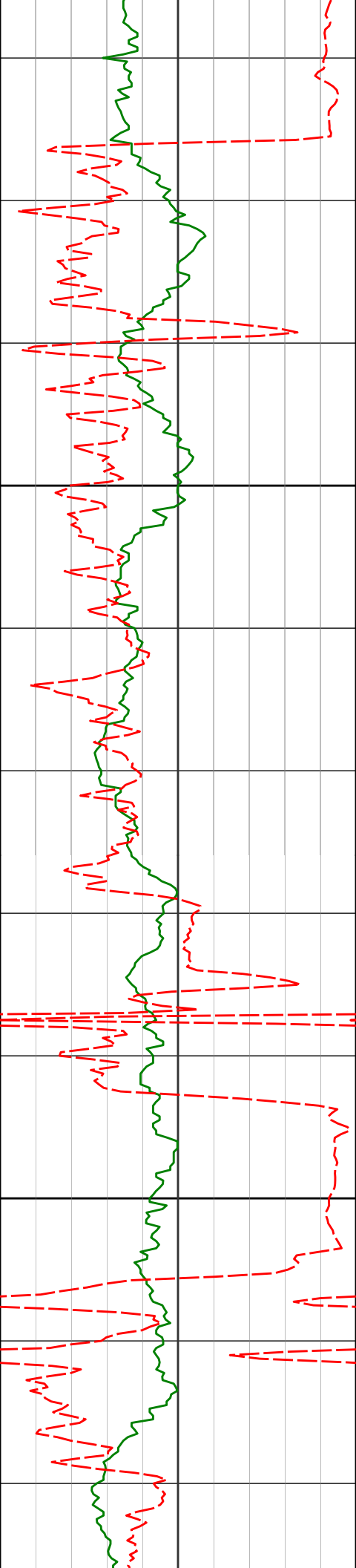


9450'	88.70°	357.33°	5881.95'	2931.50'	0.31°
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9500

9542'	90.46°	357.00°	5882.62'	3023.46'	1.95°
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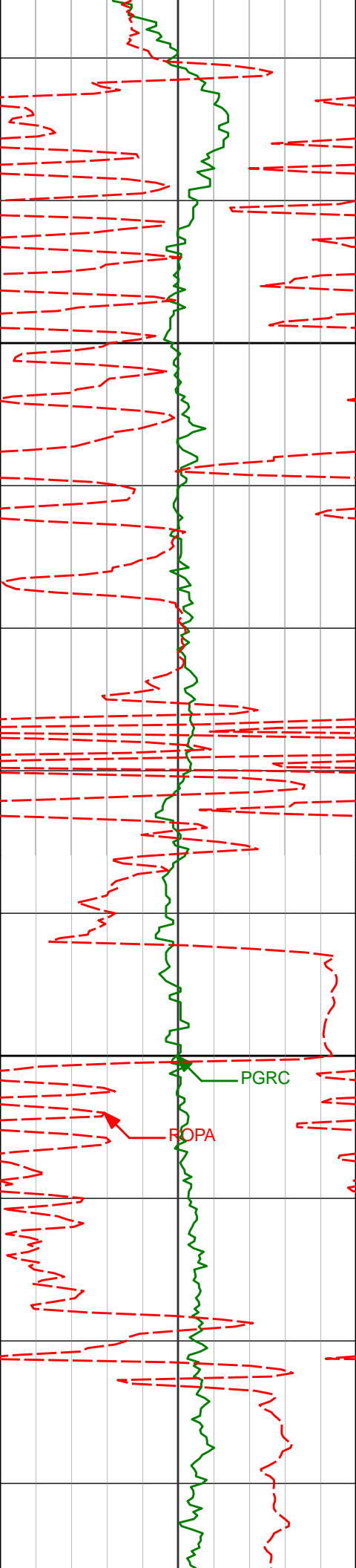
9600



9700

9800

9633'	90.19°	358.54°	5882.11'	3114.44'	1.72°
9726'	89.88°	360.00°	5882.05'	3207.43'	1.60°
9816'	88.92°	0.70°	5882.99'	3297.39'	1.32°



9900

9909'

90.12°

1.03°

5883.77'

3390.32'

1.34°

10000

10001'

89.01°

0.80°

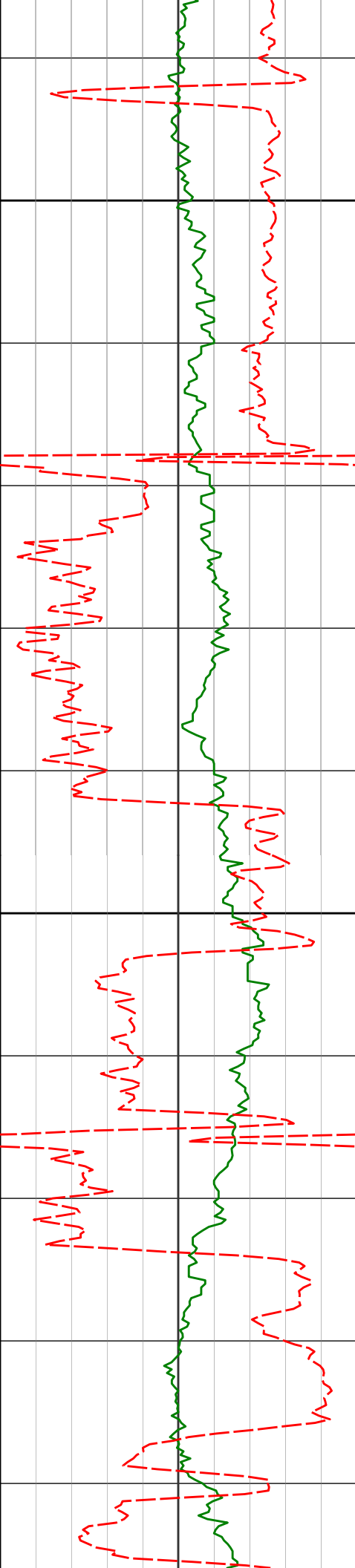
5884.47'

3482.25'

1.23°

PGRC

ROPA



10100

10200

10093'

89.62°

1.30°

5885.57'

3574.17'

0.86°

10184'

89.82°

1.08°

5886.01'

3665.09'

0.33°

10276'

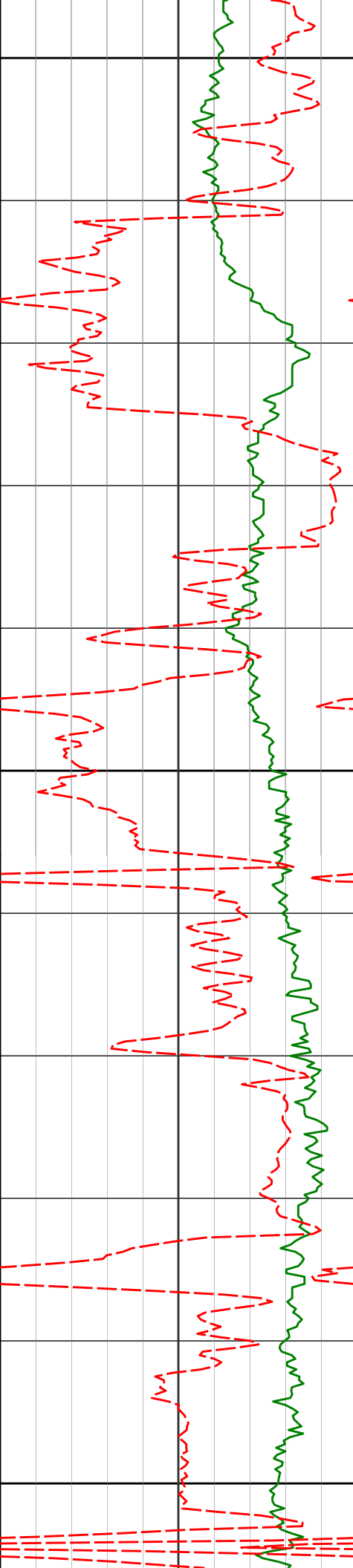
90.39°

1.04°

5885.85'

3757.01'

0.62°



10300

10369'

90.30°

0.86°

5885.29'

3849.94'

0.22°

10400

10460'

89.30°

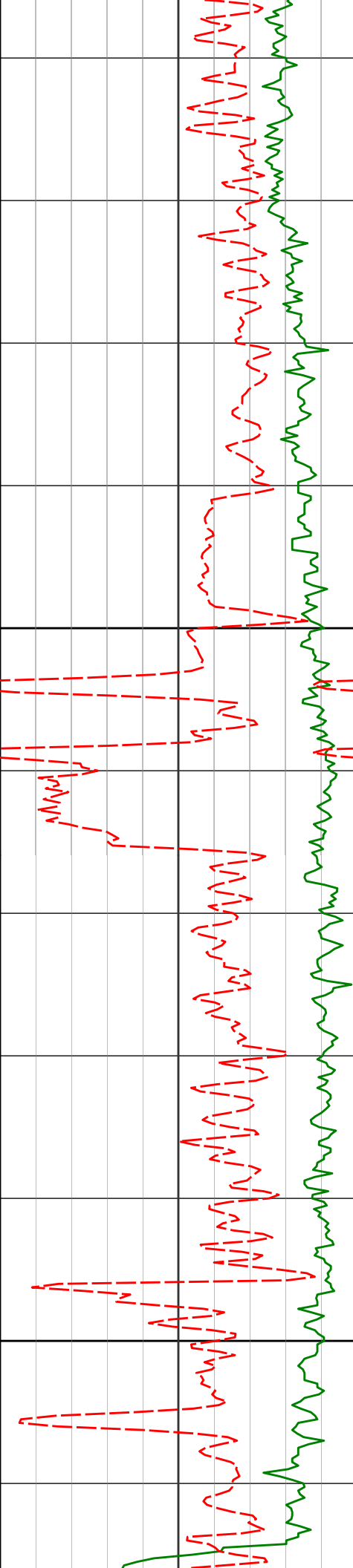
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5885.60'

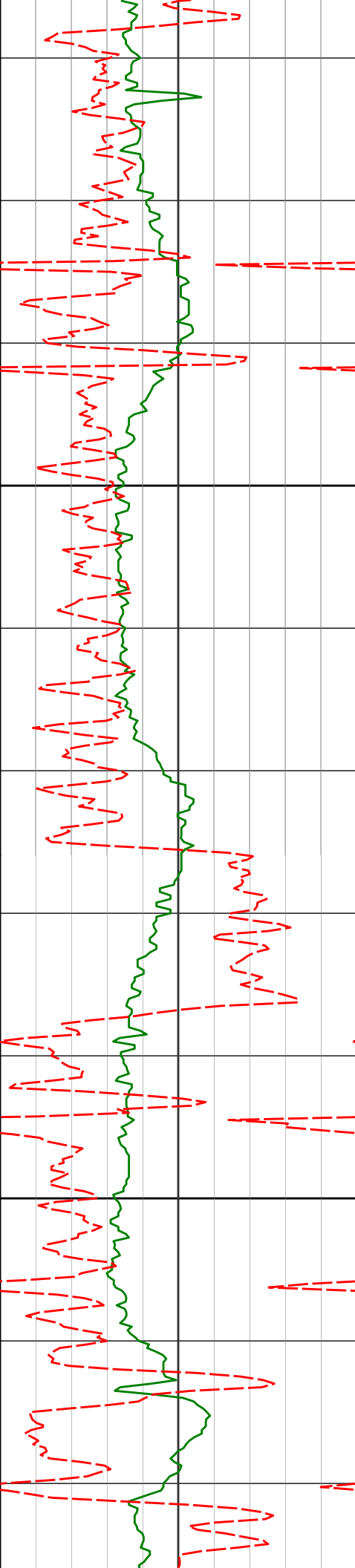
3940.91'

2.00°

10500



10552'	88.73°	359.40°	5887.19'	4032.89'	0.62°
10600					
10644'	88.98°	359.02°	5889.02'	4124.87'	0.49°
10700					



10800

10900

10736'

89.13°

358.66°

5890.54'

4216.86'

0.42°

10827'

90.09°

358.84°

5891.16'

4307.85'

1.07°

10919'

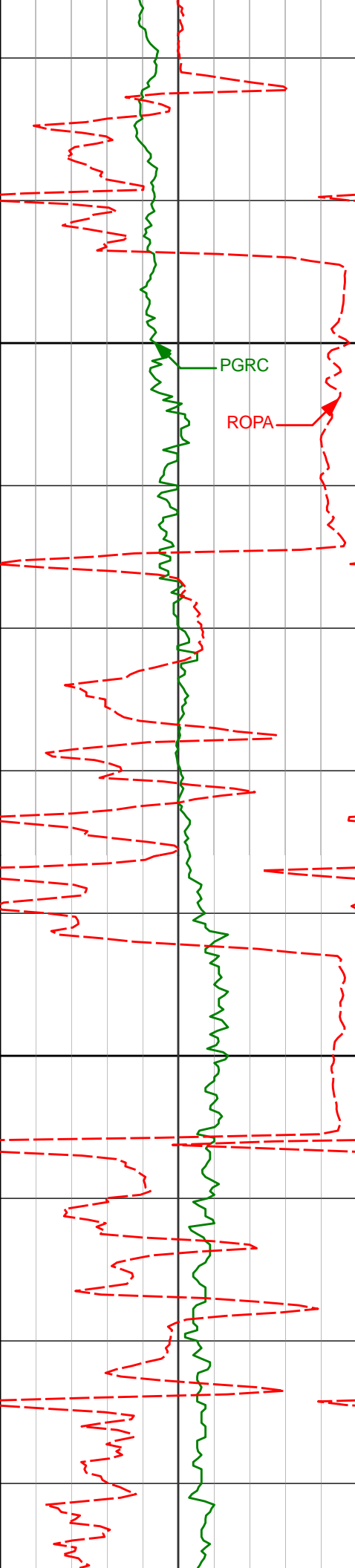
91.81°

358.69°

5889.64'

4399.84'

1.88°



11000

PGRC

ROPA

11010'

90.96°

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5887.44'

4490.81'

1.00°

11100

11102'

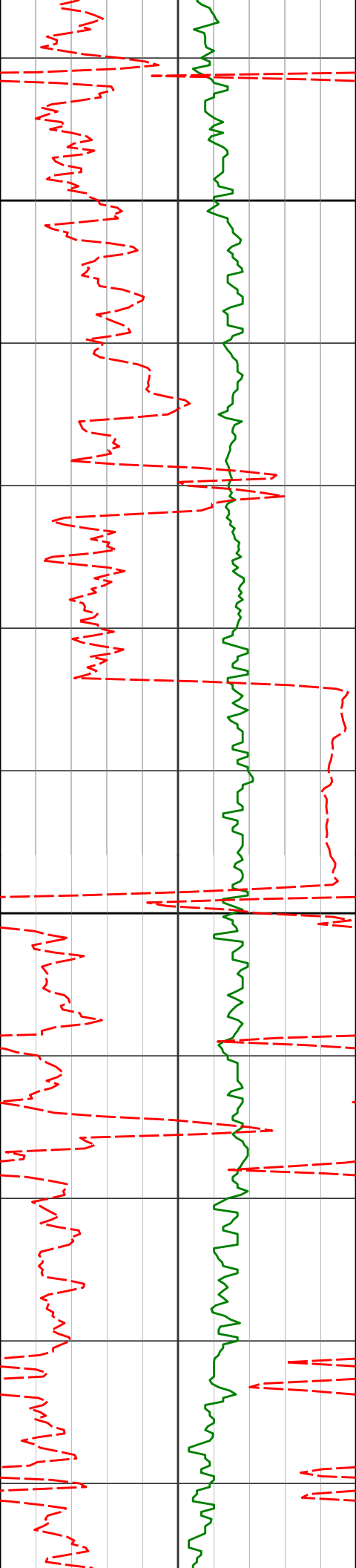
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358.67°

5887.79'

4582.80'

2.59°



11200

11300

11194'

90.05°

1.64°

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4674.75'

3.59°

11285'

88.09°

0.76°

5890.35'

4765.65'

2.36°

11377'

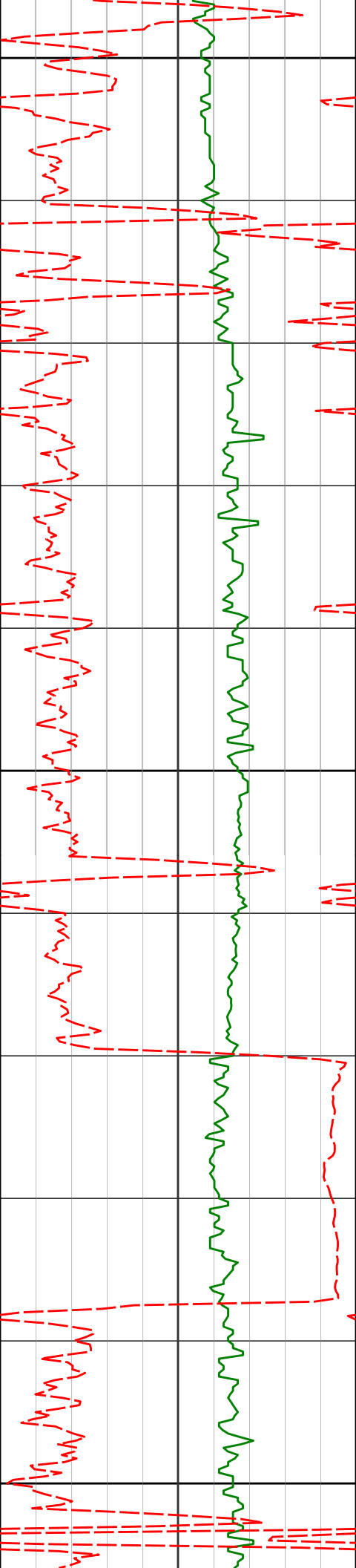
87.83°

0.70°

5893.63'

4857.54'

0.29°



11400

11468'

89.03°

2.21°

5896.12'

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2.12°

11500

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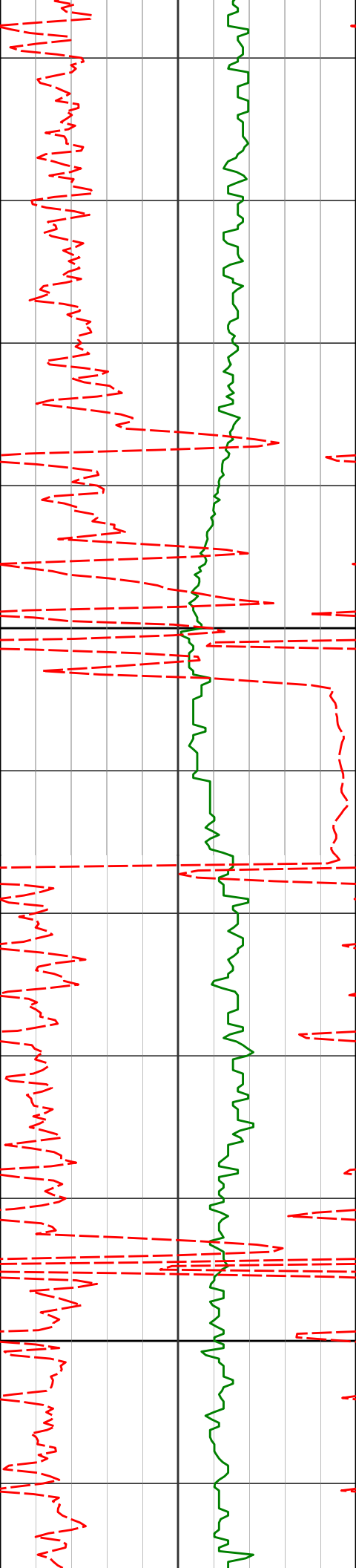
359.38°

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5041.29'

3.29°

11600



11700

11800

11652'

87.65°

357.41°

5902.19'

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2.18°

11743'

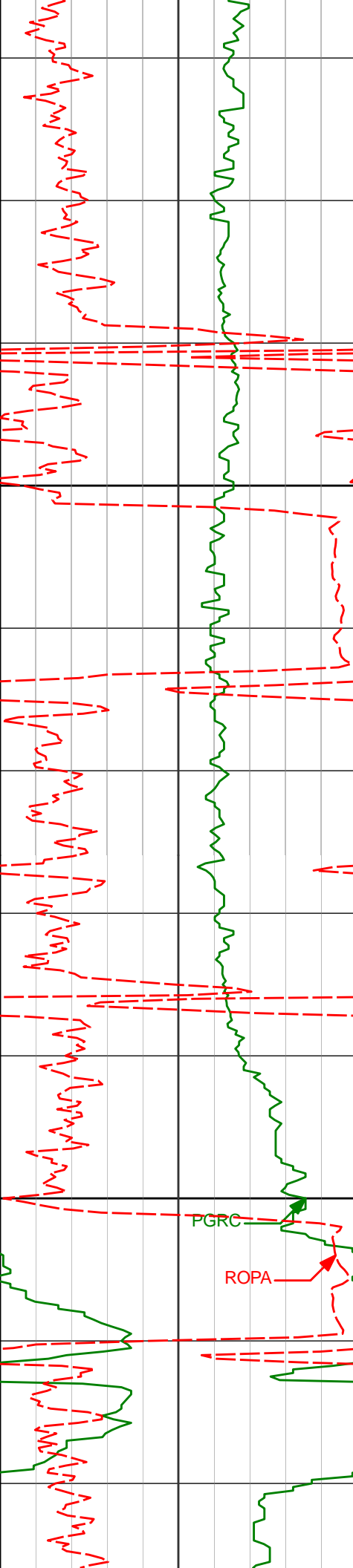
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358.31°

5903.37'

5223.19'

3.66°



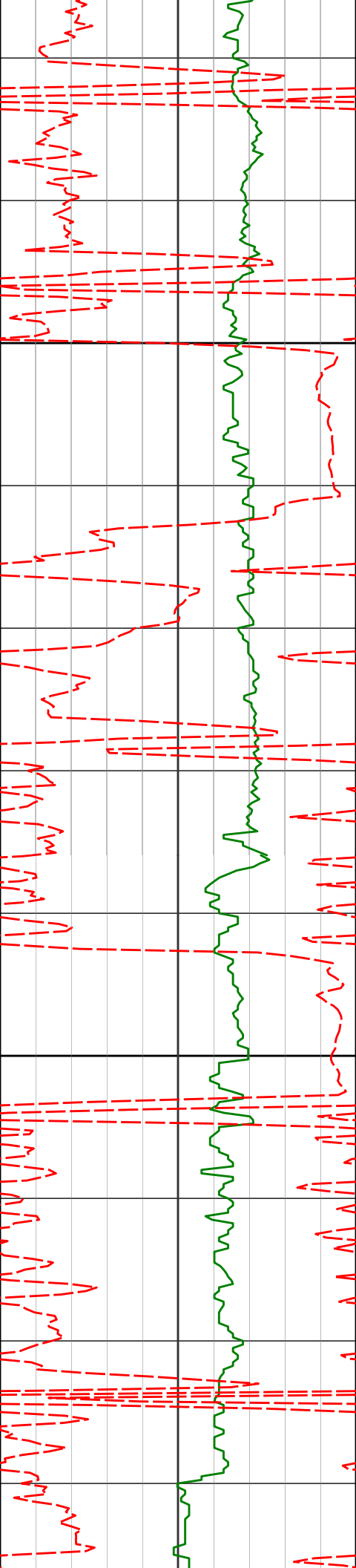
11900

12000

PGRC

ROPA

11835'	91.17°	358.01°	5901.75'	5315.17'	0.47°
11926'	88.88°	358.21°	5901.71'	5406.15'	2.53°
12018'	88.47°	359.82°	5903.83'	5498.13'	1.81°



12100

12110'

88.68°

359.48°

5906.12'

5590.09'

0.43°

12200

12201'

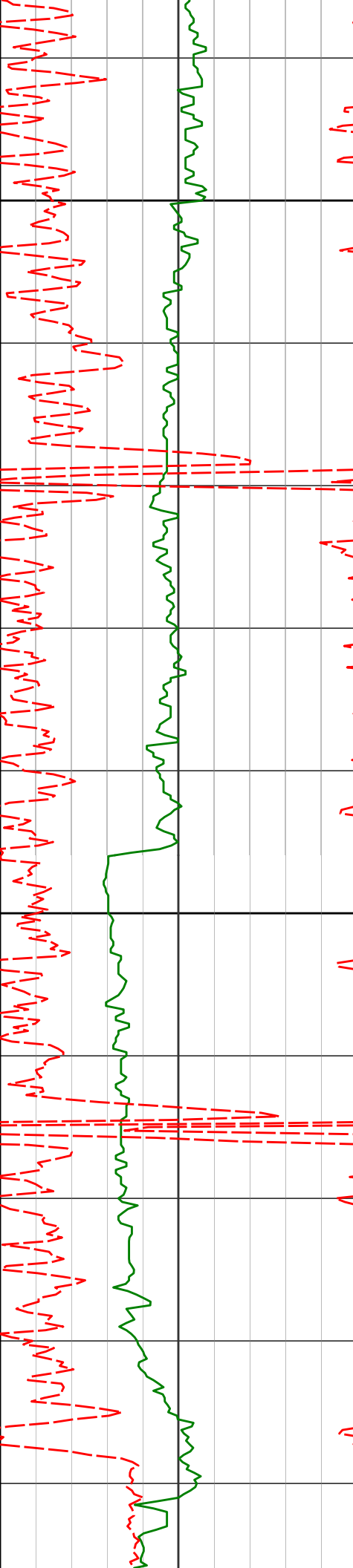
87.35°

1.27°

5909.27'

5680.99'

2.45°



12300

12400

12293'

87.28°

0.18°

5913.58'

5772.83'

1.19°

12385'

87.46°

0.04°

5917.80'

5864.71'

0.25°

12476'

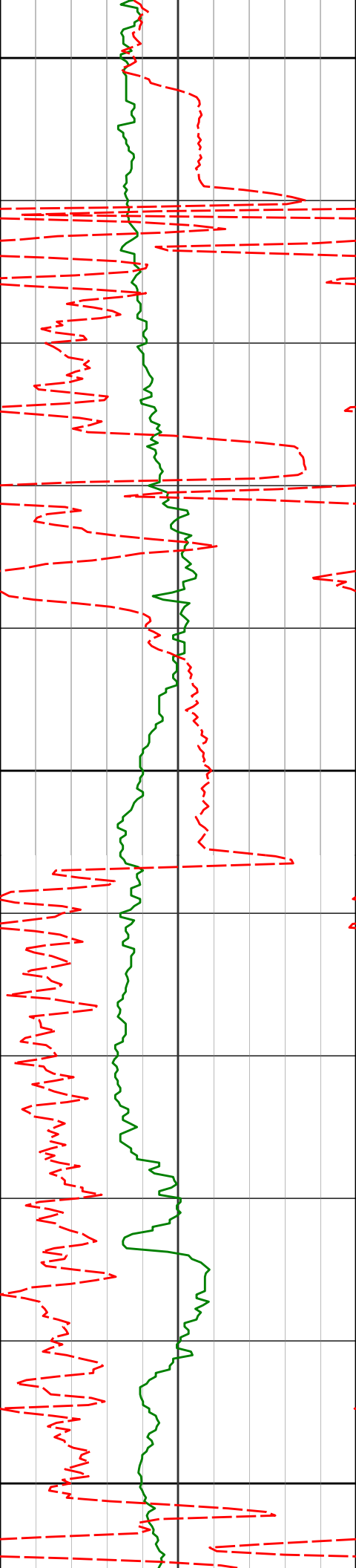
87.90°

359.79°

5921.49'

5955.61'

0.56°



12500

12568'

89.09°

0.63°

5923.90'

6047.55'

1.58°

12600

12659'

90.34°

0.72°

5924.36'

6138.49'

1.38°

12700

12707'

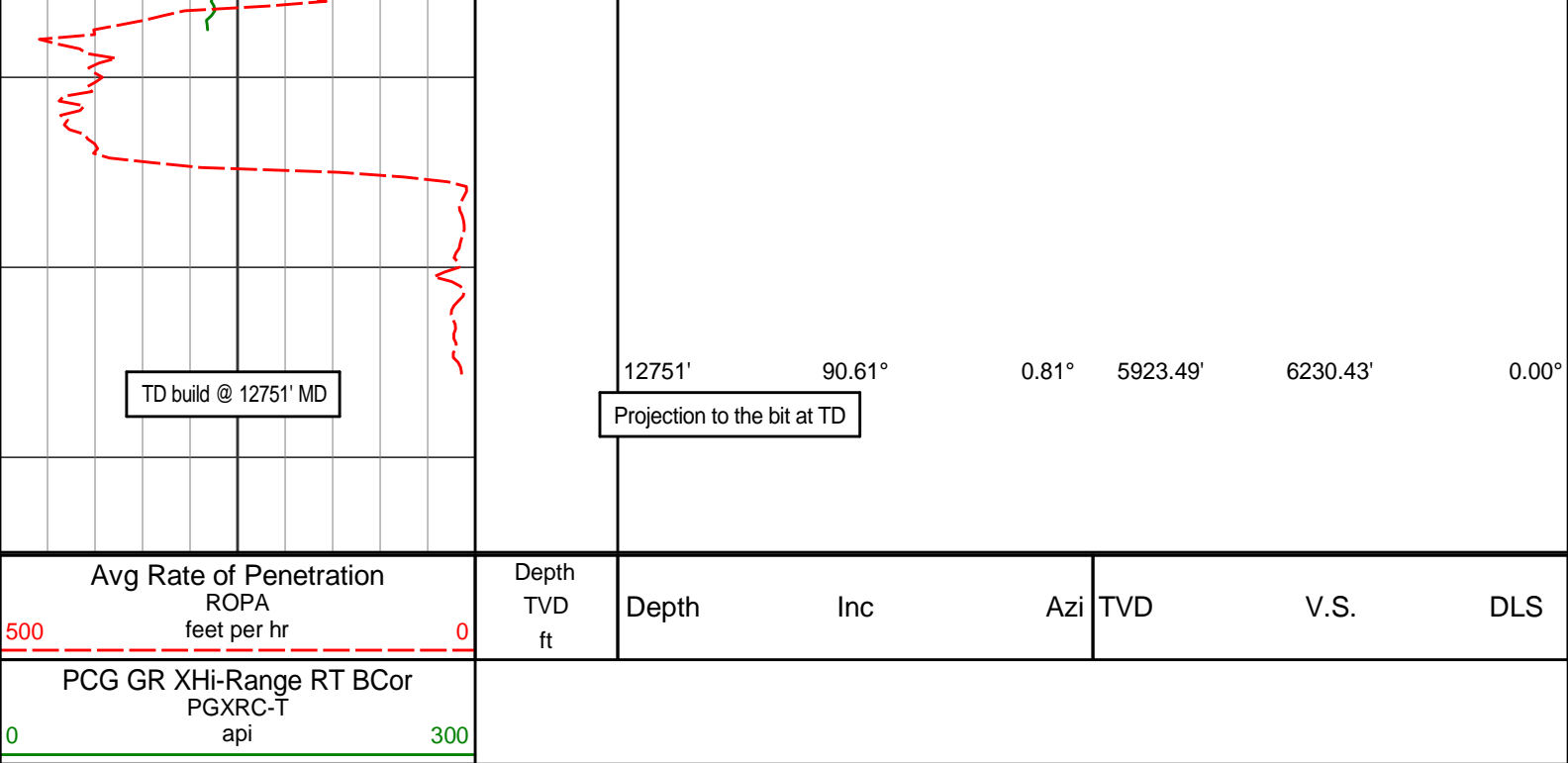
90.61°

0.81°

5923.96'

6186.46'

0.59°



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Whiting Oil and Gas
Razor 11H-0215A
Redtail
Weld Colorado
USA
CA-XX-0902159458
Surveys are Sag, IFR and MS corrected

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
175.00	0.32	69.04	175.00	0.17 N	0.46 E	0.16	0.18
359.00	0.46	63.77	358.99	0.69 N	1.60 E	0.65	0.08
450.00	0.42	108.68	449.99	0.74 N	2.24 E	0.69	0.37
542.00	0.34	146.59	541.99	0.40 N	2.71 E	0.34	0.28
634.00	2.32	177.36	633.96	1.68 S	2.95 E	-1.75	2.21
726.00	4.81	179.61	725.78	7.40 S	3.06 E	-7.47	2.71
818.00	6.82	175.92	817.30	16.71 S	3.48 E	-16.78	2.22
1002.00	9.10	169.04	999.52	41.90 S	7.02 E	-42.04	1.34
1094.00	9.91	170.19	1090.25	56.84 S	9.75 E	-57.04	0.90
1186.00	10.52	171.96	1180.80	72.96 S	12.28 E	-73.21	0.75
1277.00	11.04	177.61	1270.19	89.89 S	13.80 E	-90.17	1.29
1369.00	12.56	182.92	1360.25	108.68 S	13.66 E	-108.96	2.03
1460.00	13.98	189.04	1448.82	129.42 S	11.43 E	-129.64	2.19
1552.00	14.77	191.33	1537.94	151.89 S	7.38 E	-152.02	1.06
1643.00	15.56	194.52	1625.77	175.08 S	2.04 E	-175.09	1.26
1798.00	15.63	192.69	1775.07	215.58 S	7.76 W	-215.36	0.32
1914.00	14.04	189.84	1887.20	244.69 S	13.60 W	-244.33	1.51
2006.00	13.23	188.34	1976.60	266.10 S	17.03 W	-265.66	0.96
2097.00	11.72	185.70	2065.45	285.60 S	19.46 W	-285.11	1.77
2189.00	13.85	203.74	2155.20	304.99 S	24.83 W	-304.37	4.89
2280.00	12.78	201.18	2243.76	324.35 S	32.85 W	-323.55	1.34
2372.00	12.27	201.67	2333.57	342.92 S	40.13 W	-341.96	0.57
2463.00	13.13	210.54	2422.35	360.81 S	48.96 W	-359.65	2.34
2555.00	11.65	209.38	2512.20	377.91 S	58.83 W	-376.52	1.63
2646.00	11.03	207.65	2601.43	393.62 S	67.37 W	-392.05	0.78
2738.00	10.32	208.21	2691.83	408.68 S	75.35 W	-406.93	0.78
2830.00	10.82	198.16	2782.28	424.15 S	81.94 W	-422.25	2.07

2922.00	10.40	199.40	2872.71	440.19 S	87.39 W	-438.16	0.52
3013.00	12.30	196.23	2961.92	457.24 S	92.83 W	-455.09	2.20
3104.00	13.91	191.18	3050.55	477.28 S	97.66 W	-475.02	2.17
3196.00	12.11	192.28	3140.19	497.56 S	101.85 W	-495.20	1.97
3287.00	11.77	180.89	3229.23	516.17 S	104.03 W	-513.76	2.61
3378.00	10.54	178.84	3318.51	533.77 S	104.00 W	-531.36	1.42
3470.00	11.79	180.12	3408.77	551.59 S	103.85 W	-549.17	1.39
3562.00	11.63	178.18	3498.86	570.25 S	103.58 W	-567.84	0.46
3653.00	14.36	188.44	3587.53	590.59 S	104.94 W	-588.14	3.92
3745.00	14.80	185.99	3676.57	613.56 S	107.85 W	-611.04	0.82
3837.00	15.40	191.53	3765.39	637.22 S	111.51 W	-634.61	1.70
4019.00	12.90	189.47	3941.86	680.94 S	119.69 W	-678.15	1.40
4111.00	11.18	186.86	4031.83	699.93 S	122.44 W	-697.07	1.96
4202.00	10.46	184.36	4121.21	716.93 S	124.12 W	-714.02	0.94
4293.00	12.31	193.11	4210.43	734.61 S	126.95 W	-731.64	2.78
4477.00	10.52	189.92	4390.78	770.27 S	134.30 W	-767.13	1.03
4568.00	9.89	190.04	4480.34	786.14 S	137.09 W	-782.94	0.69
4660.00	8.37	187.45	4571.17	800.56 S	139.34 W	-797.31	1.71
4751.00	7.45	188.87	4661.31	812.96 S	141.10 W	-809.66	1.03
4843.00	7.17	193.21	4752.56	824.44 S	143.34 W	-821.09	0.67
4936.00	4.97	190.58	4845.03	834.05 S	145.40 W	-830.66	2.38
5028.00	2.10	194.84	4936.85	839.60 S	146.57 W	-836.18	3.13
5119.00	0.37	224.08	5027.82	841.43 S	147.20 W	-837.99	1.96
5211.00	1.74	14.61	5119.81	840.29 S	147.05 W	-836.85	2.25
5303.00	2.02	347.00	5211.76	837.36 S	147.06 W	-833.92	1.02
5350.00	6.54	352.23	5258.62	833.89 S	147.61 W	-830.45	9.64
5395.00	9.01	346.75	5303.21	827.92 S	148.77 W	-824.45	5.72
5442.00	12.72	339.24	5349.36	819.50 S	151.45 W	-815.97	8.43
5487.00	16.00	342.04	5392.95	808.97 S	155.12 W	-805.36	7.45
5534.00	19.58	347.33	5437.69	795.11 S	158.84 W	-791.43	8.35
5579.00	23.00	350.82	5479.62	779.07 S	161.90 W	-775.33	8.10
5626.00	26.77	353.21	5522.25	759.49 S	164.62 W	-755.69	8.30
5674.00	30.02	351.34	5564.47	736.88 S	167.70 W	-733.01	7.02
5721.00	35.46	353.27	5603.99	711.70 S	171.07 W	-707.76	11.78
5769.00	38.41	355.73	5642.35	682.99 S	173.82 W	-679.01	6.87
5816.00	43.40	357.11	5677.86	652.29 S	175.72 W	-648.27	10.79
5864.00	48.17	356.92	5711.33	617.94 S	177.51 W	-613.89	9.94
5911.00	53.61	357.86	5740.97	581.52 S	179.16 W	-577.44	11.68
5959.00	58.84	358.27	5767.64	541.66 S	180.50 W	-537.56	10.92
6006.00	63.52	359.53	5790.29	500.50 S	181.28 W	-496.40	10.23
6054.00	69.06	359.85	5809.59	456.57 S	181.52 W	-452.47	11.56
6101.00	73.65	359.26	5824.61	412.05 S	181.87 W	-407.95	9.84
6149.00	77.30	359.31	5836.64	365.60 S	182.45 W	-361.50	7.60
6196.00	81.46	0.24	5845.30	319.42 S	182.63 W	-315.32	9.06
6261.00	87.10	1.44	5851.78	254.77 S	181.67 W	-250.72	8.87
6358.00	91.02	1.11	5853.37	157.83 S	179.52 W	-153.84	4.06
6453.00	90.31	2.56	5852.27	62.89 S	176.48 W	-58.99	1.70
6547.00	88.89	3.81	5852.93	30.96 N	171.25 W	34.72	2.01
6642.00	88.87	6.02	5854.78	125.59 N	163.12 W	129.14	2.33
6737.00	89.68	5.79	5855.98	220.08 N	153.34 W	223.39	0.89
6832.00	90.36	7.25	5855.95	314.46 N	142.56 W	317.52	1.70
6927.00	89.96	6.82	5855.69	408.74 N	130.92 W	411.52	0.62
7022.00	90.61	3.72	5855.21	503.33 N	122.20 W	505.89	3.33
7117.00	89.89	5.72	5854.80	598.00 N	114.38 W	600.37	2.24
7212.00	90.30	4.85	5854.64	692.59 N	105.63 W	694.75	1.01
7307.00	90.06	0.41	5854.34	787.47 N	101.27 W	789.51	4.68
7402.00	88.58	0.19	5855.47	882.46 N	100.77 W	884.46	1.58
7497.00	88.85	0.52	5857.60	977.43 N	100.19 W	979.40	0.45
7592.00	88.12	359.99	5860.11	1072.40 N	99.76 W	1074.33	0.95
7686.00	89.19	359.90	5862.32	1166.37 N	99.85 W	1168.28	1.14
7782.00	89.03	358.56	5863.81	1262.35 N	101.14 W	1264.27	1.41
7876.00	89.15	357.99	5865.30	1356.29 N	103.97 W	1358.25	0.62
7971.00	89.01	357.72	5866.83	1451.21 N	107.53 W	1453.23	0.32
8066.00	88.99	0.51	5868.49	1546.18 N	109.00 W	1548.20	2.94
8160.00	90.62	1.72	5868.81	1640.15 N	107.17 W	1642.11	2.16
8255.00	88.91	359.80	5869.20	1735.14 N	105.91 W	1737.05	2.71
8349.00	89.81	1.72	5870.25	1829.12 N	104.66 W	1830.98	2.26
8444.00	89.84	359.73	5870.54	1924.11 N	103.46 W	1925.92	2.10
8536.00	90.00	0.53	5870.67	2016.10 N	103.25 W	2017.89	0.89
8627.00	90.22	359.89	5870.49	2107.10 N	102.92 W	2108.86	0.74
8718.00	89.80	359.94	5870.47	2198.10 N	103.05 W	2199.84	0.46
8810.00	90.25	0.08	5870.43	2290.10 N	103.03 W	2291.81	0.51
8900.00	88.40	0.31	5871.49	2380.09 N	102.73 W	2381.78	2.07
8992.00	88.11	0.41	5874.30	2472.05 N	102.15 W	2473.70	0.33
9083.00	88.25	0.44	5875.68	2562.83 N	101.74 W	2564.65	0.33

9083.00	90.23	0.11	5875.60	2563.03 N	101.74 W	2564.63	2.37
9175.00	89.72	359.51	5875.62	2655.03 N	102.04 W	2656.63	0.87
9266.00	88.42	357.56	5877.10	2745.98 N	104.37 W	2747.61	2.58
9358.00	88.42	357.38	5879.64	2837.86 N	108.43 W	2839.56	0.20
9450.00	88.70	357.33	5881.95	2929.73 N	112.67 W	2931.50	0.31
9542.00	90.46	357.00	5882.62	3021.61 N	117.22 W	3023.46	1.95
9633.00	90.19	358.54	5882.11	3112.54 N	120.76 W	3114.44	1.72
9726.00	89.88	360.00	5882.05	3205.53 N	121.95 W	3207.43	1.60
9816.00	88.92	0.70	5882.99	3295.52 N	121.40 W	3297.39	1.32
9909.00	90.12	1.03	5883.77	3388.50 N	119.99 W	3390.32	1.34
10001.00	89.01	0.80	5884.47	3480.49 N	118.53 W	3482.25	1.23
10093.00	89.62	1.30	5885.57	3572.47 N	116.84 W	3574.17	0.86
10184.00	89.82	1.08	5886.01	3663.44 N	114.95 W	3665.09	0.33
10276.00	90.39	1.04	5885.85	3755.43 N	113.25 W	3757.01	0.62
10369.00	90.30	0.86	5885.29	3848.41 N	111.71 W	3849.94	0.22
10460.00	89.30	359.34	5885.60	3939.41 N	111.55 W	3940.91	2.00
10552.00	88.73	359.40	5887.19	4031.39 N	112.56 W	4032.89	0.62
10644.00	88.98	359.02	5889.02	4123.36 N	113.83 W	4124.87	0.49
10736.00	89.13	358.66	5890.54	4215.33 N	115.69 W	4216.86	0.42
10827.00	90.09	358.84	5891.16	4306.31 N	117.67 W	4307.85	1.07
10919.00	91.81	358.69	5889.64	4398.27 N	119.66 W	4399.84	1.88
11010.00	90.96	358.37	5887.44	4489.21 N	121.99 W	4490.81	1.00
11102.00	88.60	358.67	5887.79	4581.17 N	124.37 W	4582.80	2.59
11194.00	90.05	1.64	5888.87	4673.15 N	124.12 W	4674.75	3.59
11285.00	88.09	0.76	5890.35	4764.12 N	122.21 W	4765.65	2.36
11377.00	87.83	0.70	5893.63	4856.05 N	121.04 W	4857.54	0.29
11468.00	89.03	2.21	5896.12	4946.98 N	118.73 W	4948.40	2.12
11561.00	87.87	359.38	5898.63	5039.93 N	117.44 W	5041.29	3.29
11652.00	87.65	357.41	5902.19	5130.82 N	119.99 W	5132.22	2.18
11743.00	90.86	358.31	5903.37	5221.74 N	123.38 W	5223.19	3.66
11835.00	91.17	358.01	5901.75	5313.67 N	126.34 W	5315.17	0.47
11926.00	88.88	358.21	5901.71	5404.62 N	129.34 W	5406.15	2.53
12018.00	88.47	359.82	5903.83	5496.58 N	130.92 W	5498.13	1.81
12110.00	88.68	359.48	5906.12	5588.55 N	131.48 W	5590.09	0.43
12201.00	87.35	1.27	5909.27	5679.48 N	130.89 W	5680.99	2.45
12293.00	87.28	0.18	5913.58	5771.37 N	129.72 W	5772.83	1.19
12385.00	87.46	0.04	5917.80	5863.28 N	129.55 W	5864.71	0.25
12476.00	87.90	359.79	5921.49	5954.20 N	129.68 W	5955.61	0.56
12568.00	89.09	0.63	5923.90	6046.17 N	129.35 W	6047.55	1.58
12659.00	90.34	0.72	5924.36	6137.16 N	128.27 W	6138.49	1.38
12707.00	90.61	0.81	5923.96	6185.15 N	127.63 W	6186.46	0.59
12751.00	90.61	0.81	5923.49	6229.14 N	127.01 W	6230.43	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 358.74 DEGREES (TRUE)
A TOTAL CORRECTION OF 7.46 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 12751.00 FEET
IS 6230.44 FEET ALONG 358.83 DEGREES (TRUE)**

**Tie onto surface at 0' MD
Final survey is a projection to the bit at TD**