



**1 : 240 / 1 : 240**

[illegible]

## WELL INFORMATION

<b>MWD Run Number</b>	100	200	300		
<b>Date run completed</b>	21-Dec-14	09-Feb-15	12-Feb-15		
<b>Rig Bit Number</b>	0100	0200	0300		
<b>Bit Size (in)</b>	8.750	6.125	6.125		
<b>Tool Nominal OD (in)</b>	6.750	4.760	4.760		
<b>Log Start Depth (MD, ft)</b>	1,059.00	7,799.00	15,045.00		
<b>Log End Depth (MD, ft)</b>	7,799.00	15,045.00	17,665.00		
<b>Drill or Wipe</b>	Drill	Drill	Drill		
<b>Drill/Wipe Start Date and Time</b>	18-Dec-14 14:25	06-Feb-15 11:36	10-Feb-15 12:15		
<b>Drill/Wipe End Date and Time</b>	20-Dec-14 20:00	09-Feb-15 08:00	11-Feb-15 14:45		
<b>Min Inc (deg) @ Depth (MD, ft)</b>	0.07 @ 1,944.00	87.81 @ 14,024.00	84.26 @ 15,047.00		
<b>Max Inc (deg) @ Depth (MD, ft)</b>	89.37 @ 7,799.00	91.73 @ 13,852.00	91.66 @ 15,560.00		
<b>Bit TFA(in2) / Bit Type</b>	1.84 / PDC	1.24 / PDC	1.24 / PDC		
<b>Flow Rate (gpm)</b>	626.73	303.56	288.62		
<b>Max AV (fpm) / CV (fpm) @ MWD</b>	N/A / N/A	N/A / N/A	N/A / N/A		
<b>Fluid Type</b>	Polymer	Mineral Oil Bas	Mineral Oil Bas		
<b>Density (ppg) / Viscosity (spqt)</b>	8.70 / 39.00	9.60 / 58.00	9.50 / 57.00		
<b>Filtrate CL (ppm)</b>	1,200.00	580,000.00	255,511.00		
<b>pH / Fluid Loss (mptm)</b>	8.80 / 0	N/A / N/A	N/A / N/A		
<b>PV (cP) / YP (lbf2)</b>	2 / 3.00	18 / 11.00	19 / 10.00		
<b>% Solids / % Sand</b>	2.00 / 0.30	8.7 / 0.02	8.70 / 0.02		
<b>% Oil / Oil:Water Ratio</b>	N/A / N/A	63.5 / 71:29	62.5 / 70:30		
<b>Rm @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A		
<b>Rmf @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A		
<b>Rmc @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A		
<b>Max Temp (degF) / RPM</b>	177.84 / RPM	222.54 / RPM	247.70 / RPM		

Max Tool Temp (degF) / Source	177.64 / PCM	239.54 / PCM	247.78 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 177.64	N/A @ 239.54	N/A @ 247.78		
Lead MWD Engineer	Clay Wass	Clay Wass	Clay Wass		
Customer Representative	Dalton King	Dalton King	Dalton King		

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	11404299	12310746	12310746		
Insert Serial Number	11055831	11680725	11055831		
Date and Time Initialized	16-Dec-14 17:10	03-Feb-15 17:52	09-Feb-15 11:18		
Date and Time Read	21-Dec-14 06:26	10-Feb-15 00:18	12-Feb-15 10:05		
ECMB SW Version	N/A	N/A	N/A		

### Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	44.13	43.00	43.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11404299	12310746	12310746		
Sonde Serial Number	11297590	11297491	11297516		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	51.89	337.21	208.80		

### Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	49.08	45.71	45.50		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11404299	12310746	12310746		
Insert/Sonde Serial Number	11293276	11293376	11680902		

## REMARKS

1. All depths are true vertical 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" model for water based fluids and the "Bingham Plastic" model for oil and synthetic based fluids.
4. all data presented is recorded data unless otherwise specified.
5. The following smoothing parameters have been applied to the data:
 

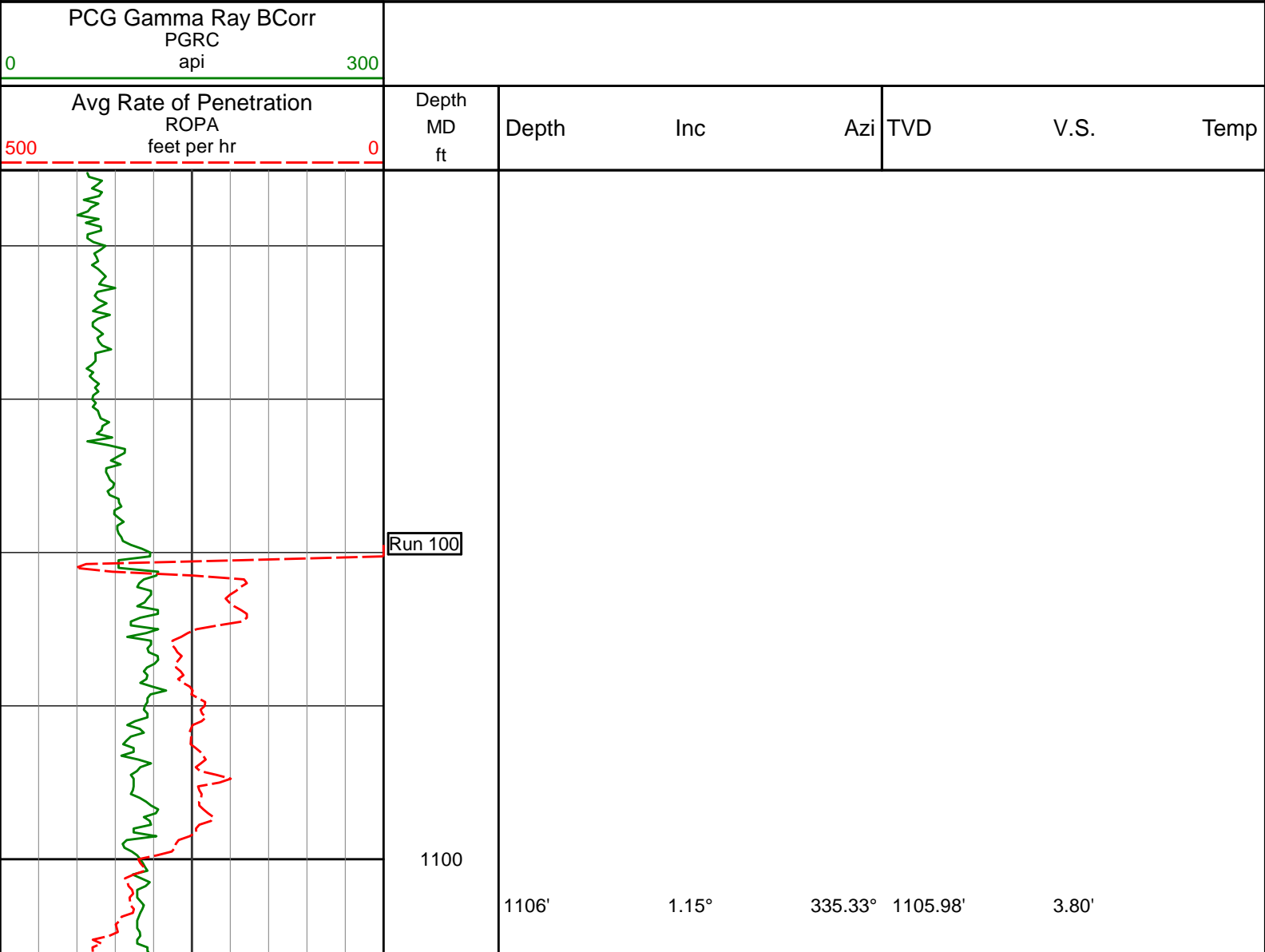
PGRC (Corrected Gamma Ray):  
     Interval Resolution: 0.5 ft  
     Interval Distance: 0.6 ft  
     Gap Fill: 3.0 ft  
  
 ROPA (Average Rate of Penetration):  
     Interval Resolution: 0.5 ft  
     Interval Distance: 1.2 ft  
     Gap Fill: 3.0 ft

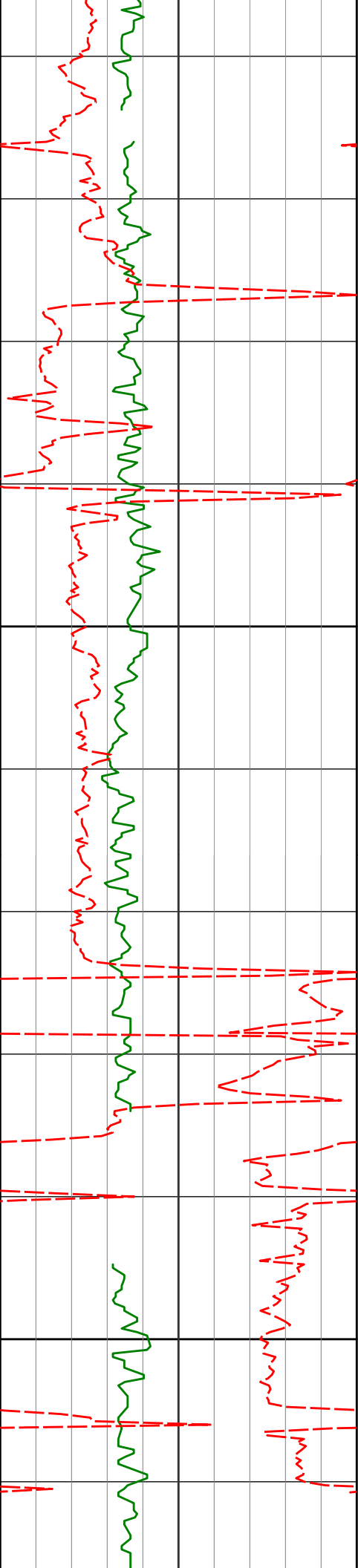
Insite version: 8.1.10

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MD Detail 1:240 Scale





1200

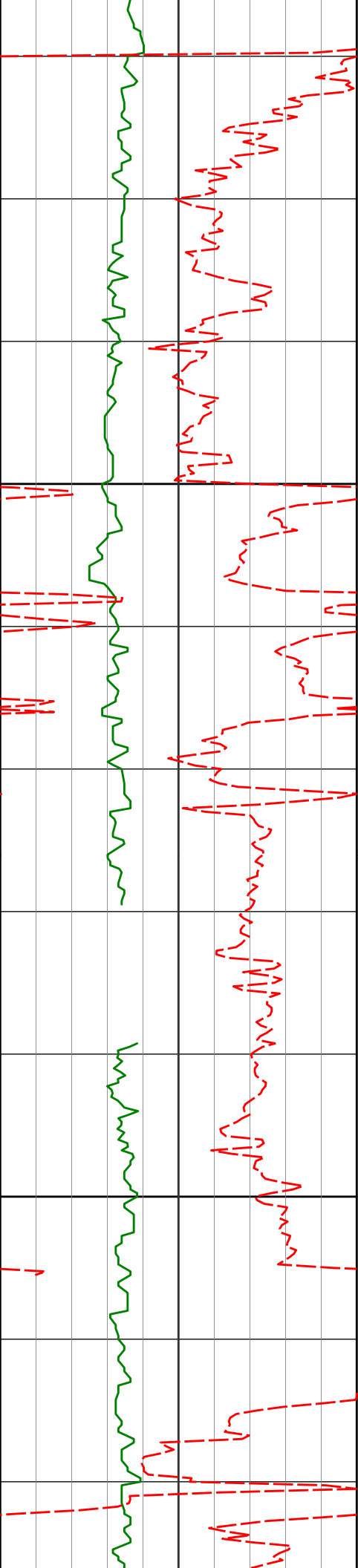
1300

1295'

0.60°

319.12° 1294.95'

6.27'



1400

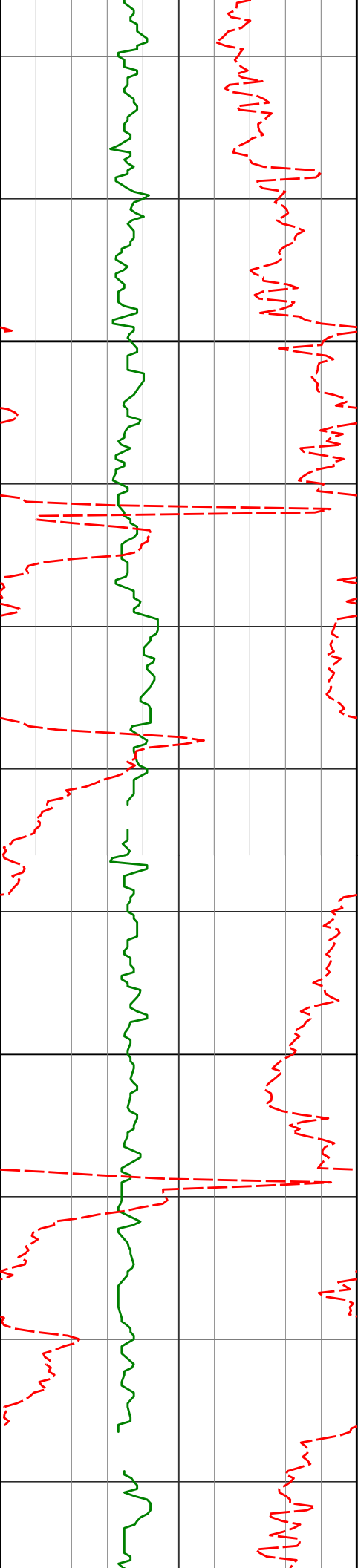
1487'

0.90°

282.41° 1486.94'

7.36'

1500



1579'

0.89°

106.61° 1578.94'

7.31'

1600

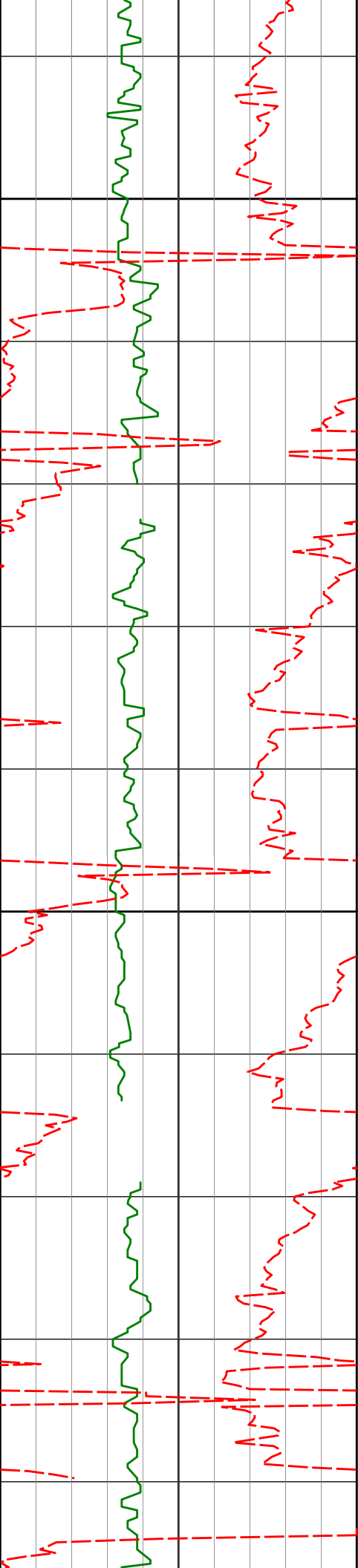
1700

1761'

0.33°

11.71° 1760.93'

7.42'



1800

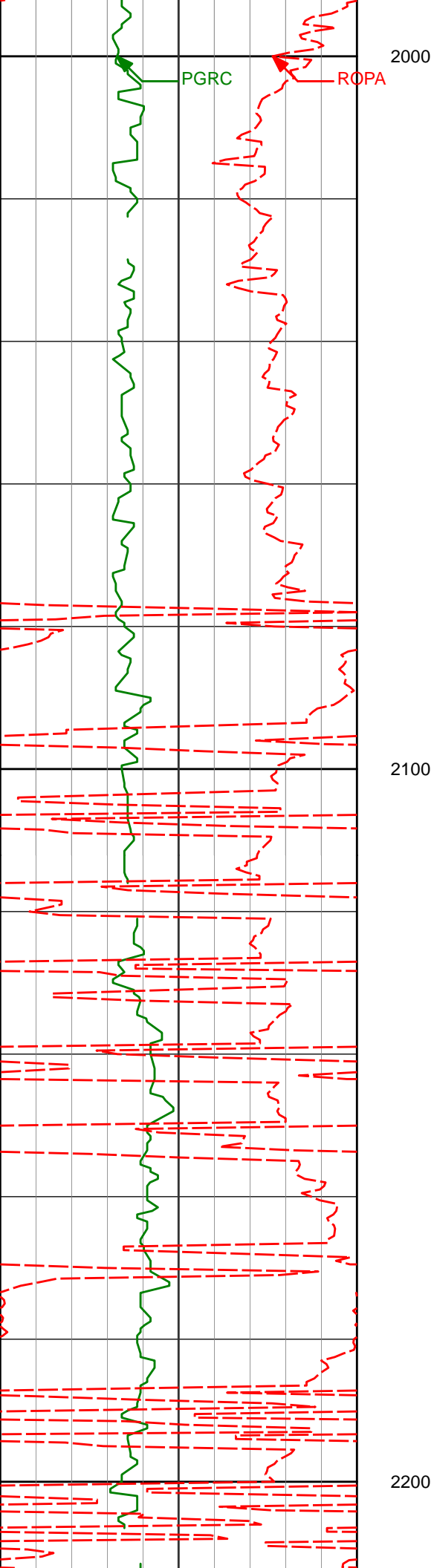
1900

1944'

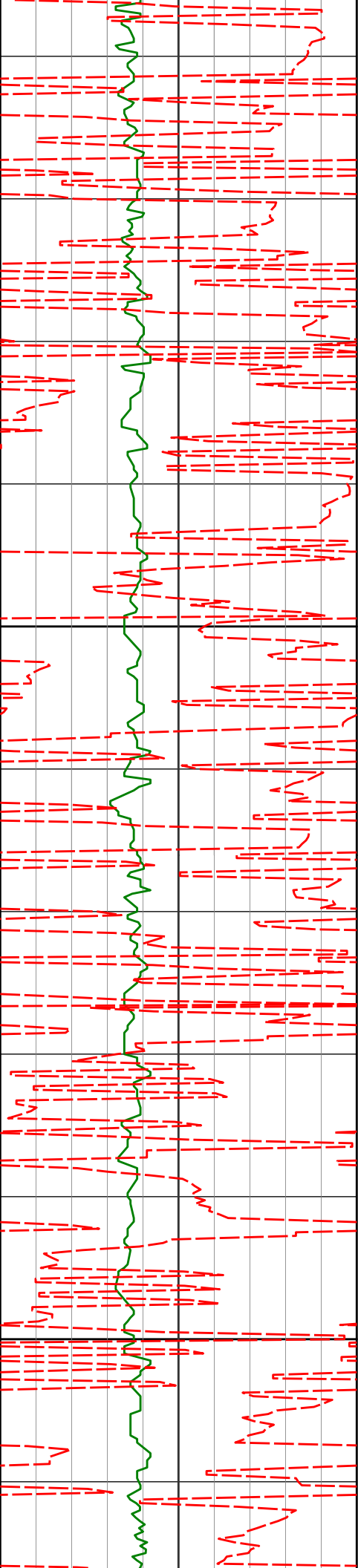
0.07°

204.73° 1943.93'

7.83'







2300

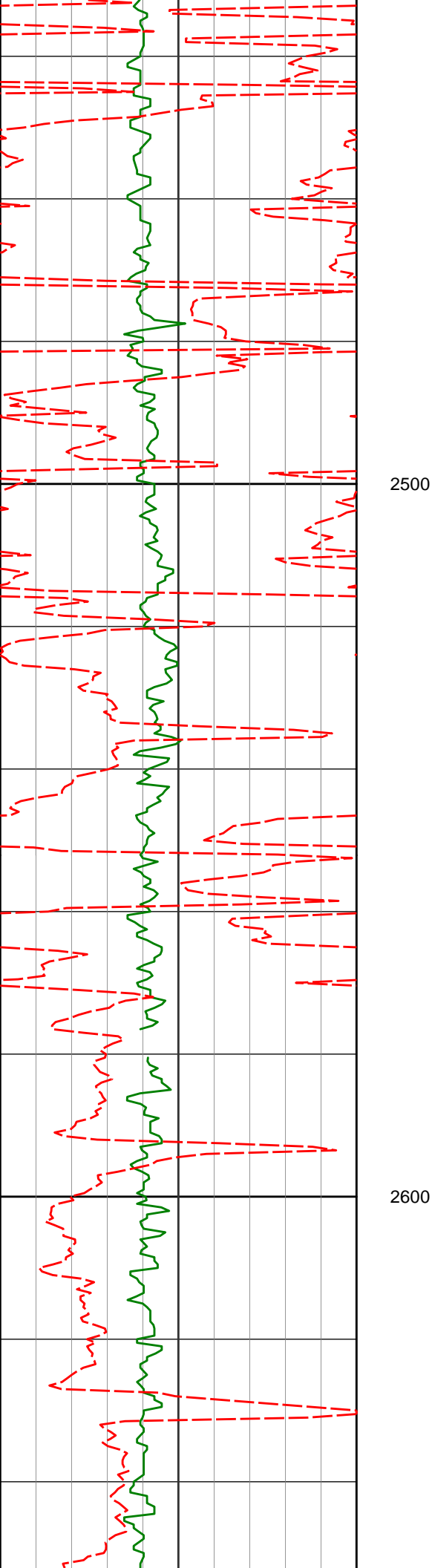
2310'

0.70°

255.07° 2309.92'

8.69'

2400

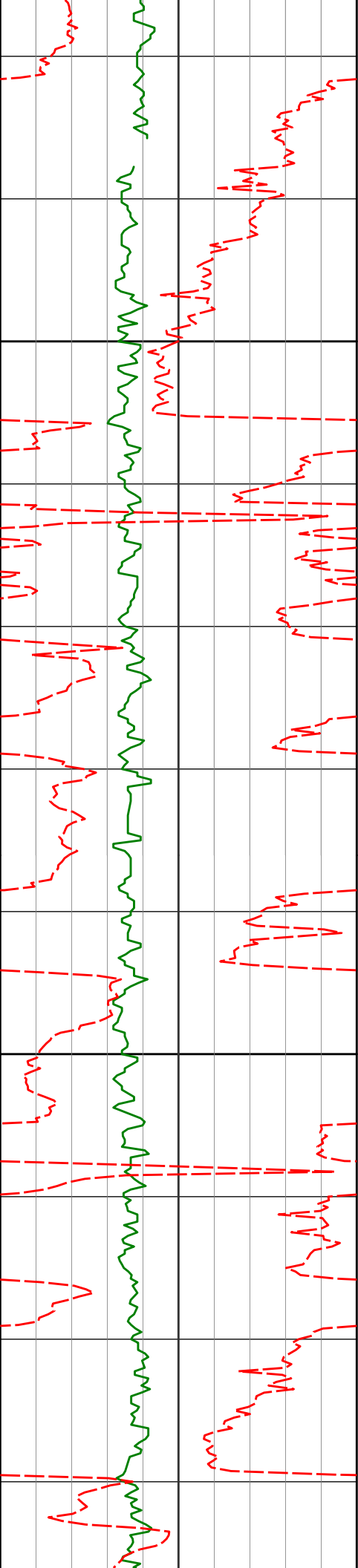


2494'

1.23°

271.94° 2493.89'

8.47'



2700

2800

2677'

0.31°

305.26° 2676.88'

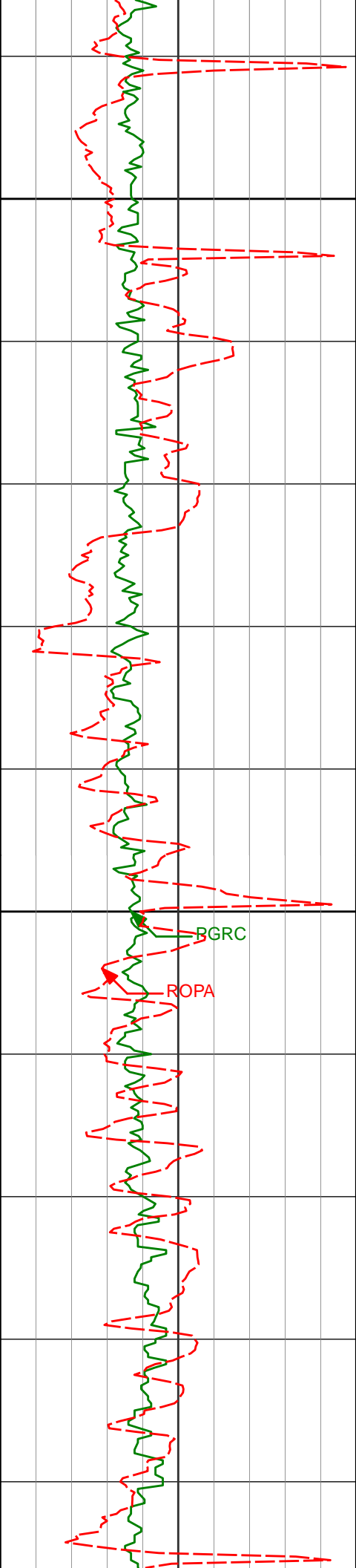
8.82'

2860'

0.44°

320.47° 2859.87'

9.65'



2900

3000

BGRC

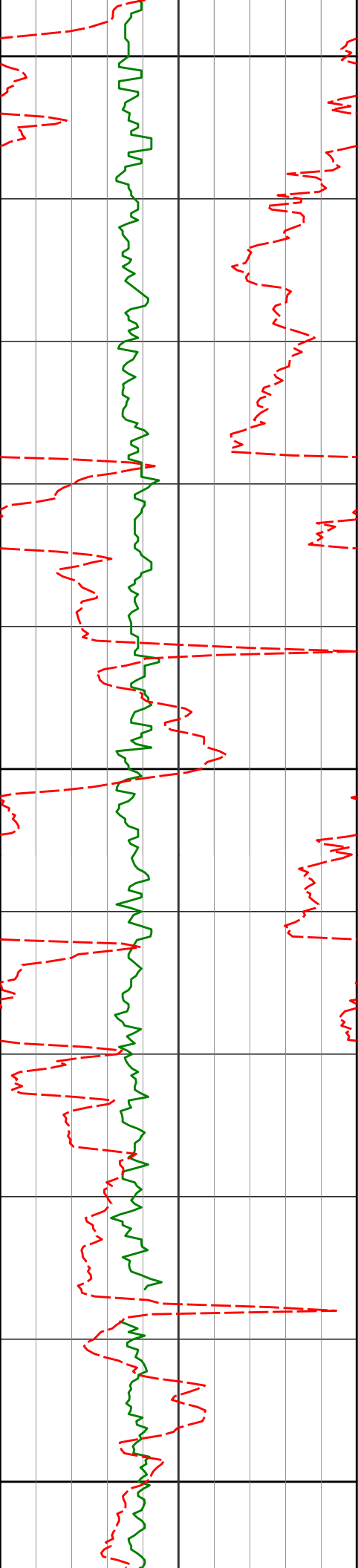
ROPA

3044'

0.45°

297.24° 3043.87'

10.52'



3100

3200

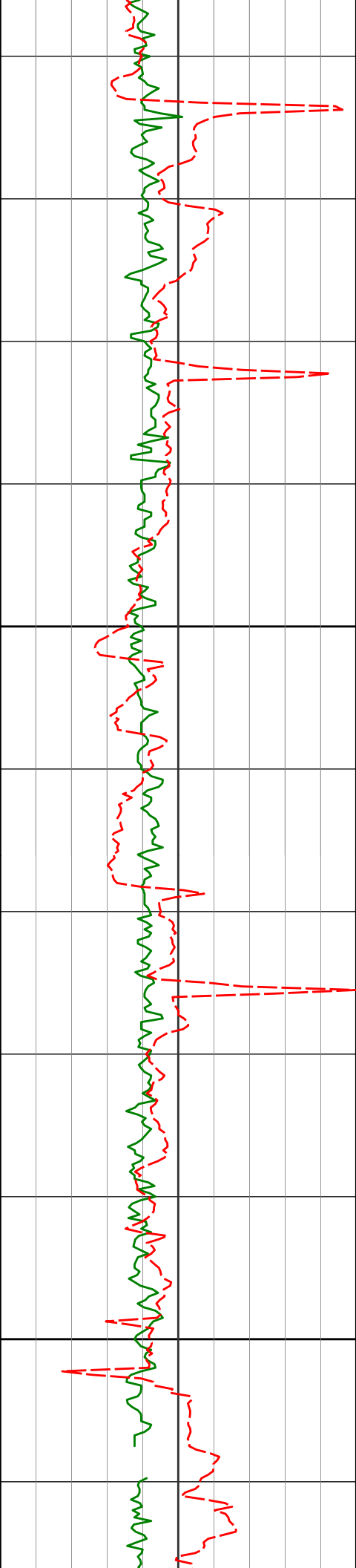
3300

3227'

0.56°

0.34° 3226.86'

11.75'



3400

3404'

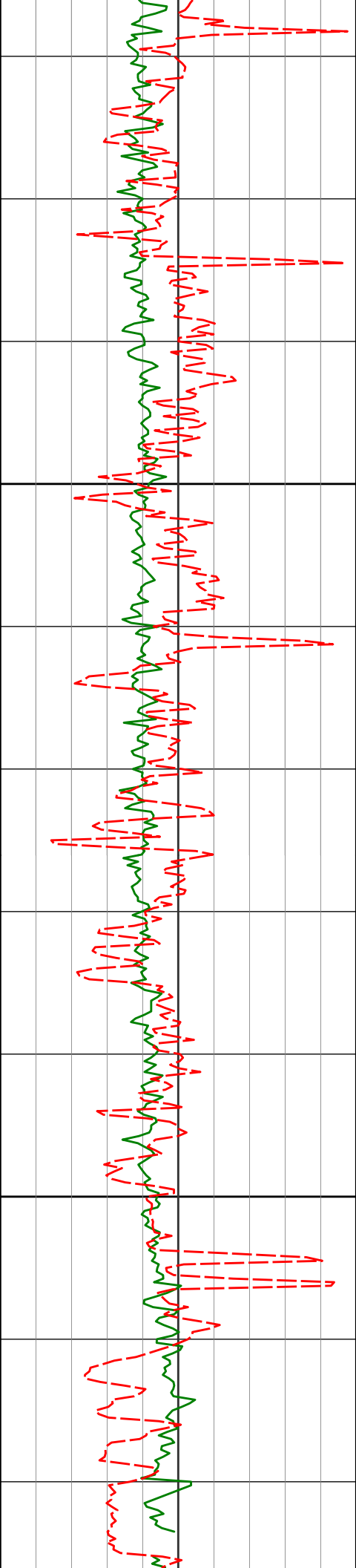
0.96°

345.29°

3403.84'

14.05'

3500



3575'

1.25°

350.43° 3574.81'

17.27'

3600

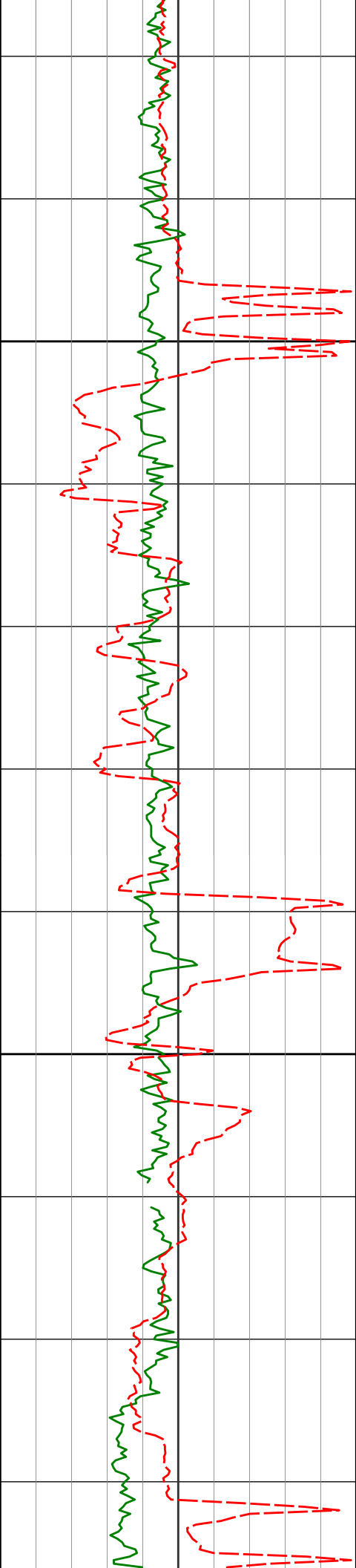
3700

3746'

0.95°

350.87° 3745.78'

20.51'



3800

3900

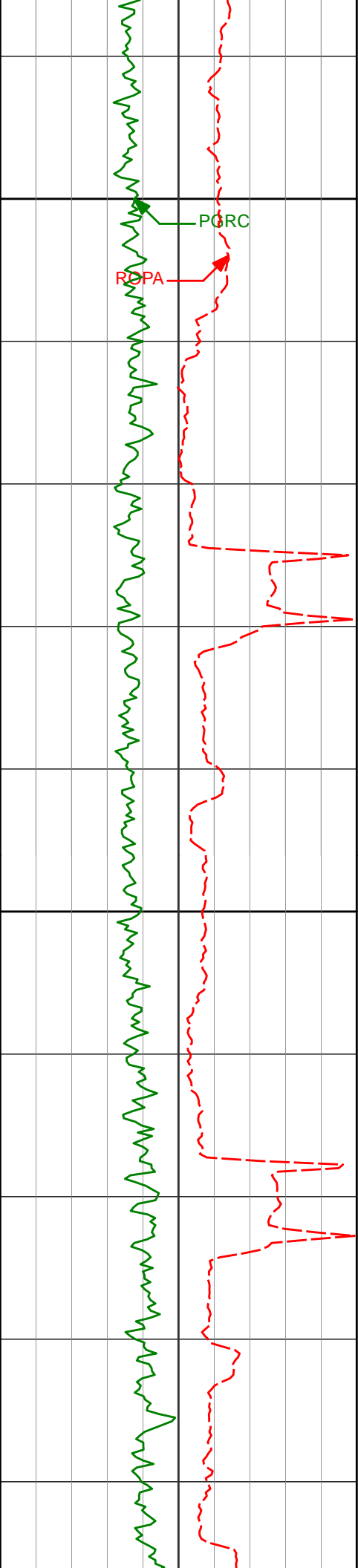
3917'

1.30°

337.93° 3916.75'

23.71'





4000

4100

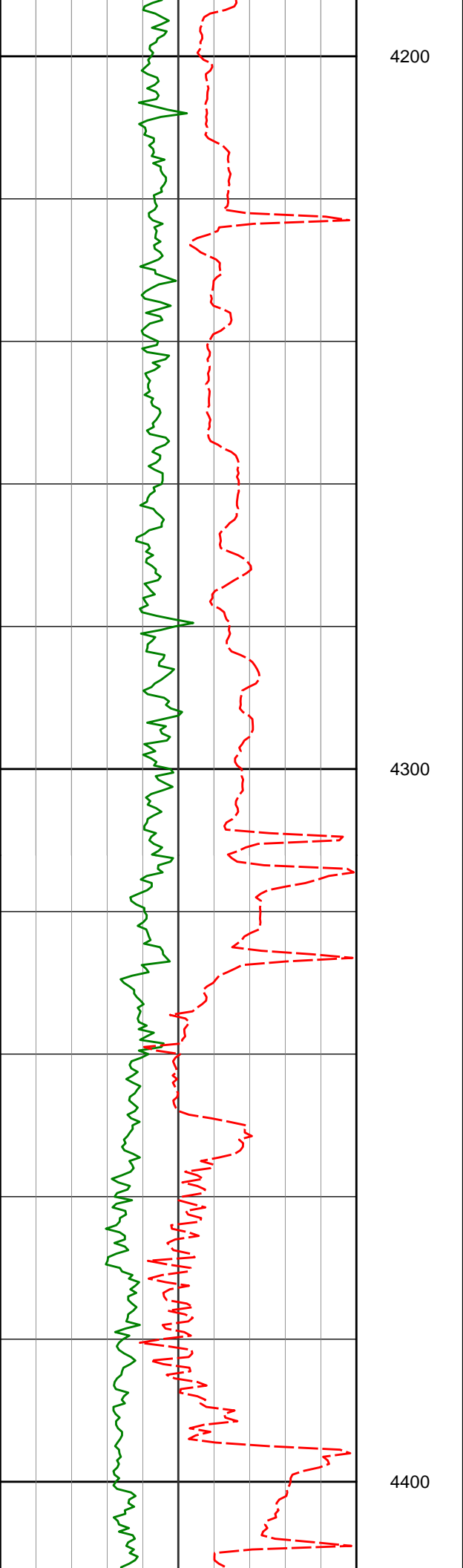
4089'

2.00°

326.84°

4088.68'

28.03'



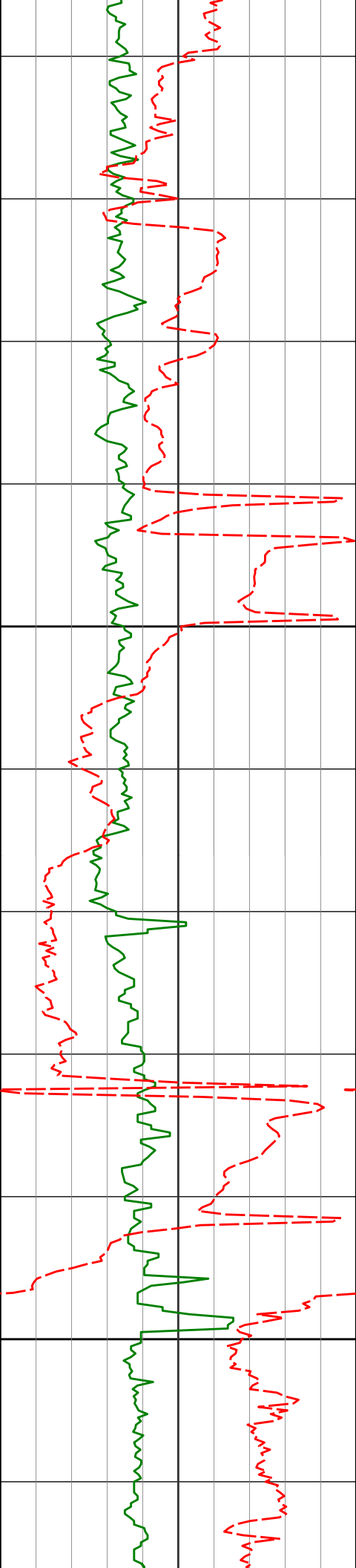
4260'

2.79°

316.46°

4259.53'

33.55'



4500

4600

4431'

5.15°

304.81° 4430.11'

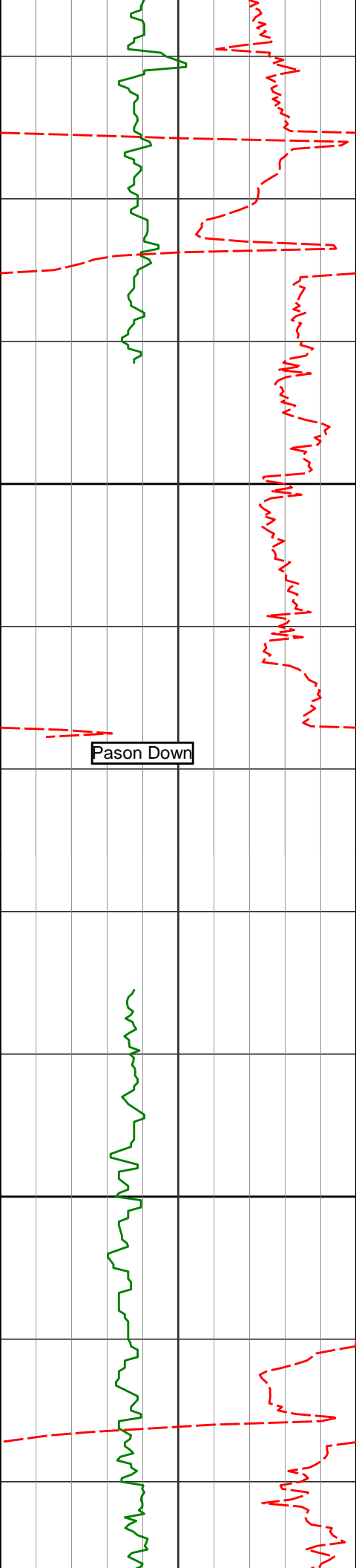
40.96'

4601'

8.50°

308.21° 4598.88'

53.10'



4700

Pason Down

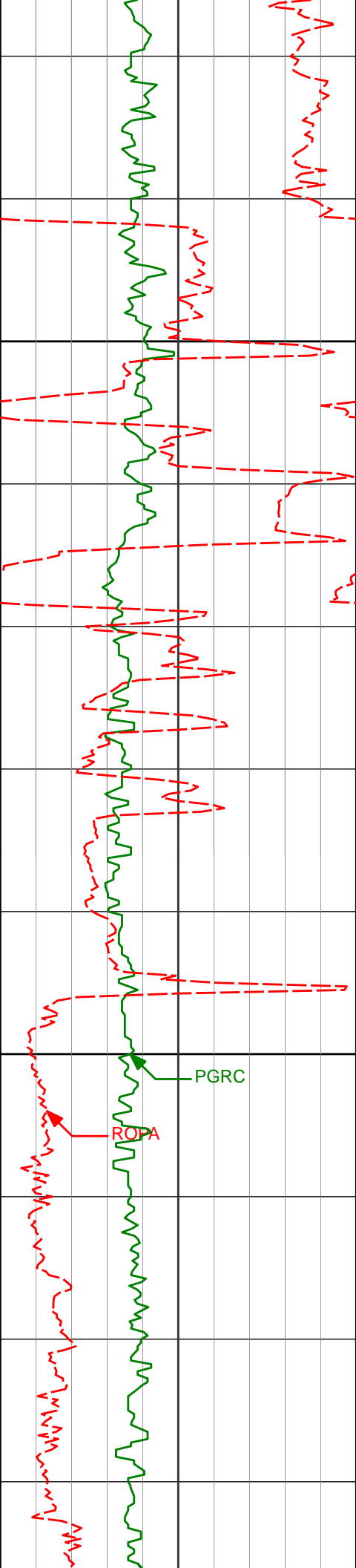
4800

4772'

9.84°

308.63° 4767.69'

70.05'



4900

4943'

10.59°

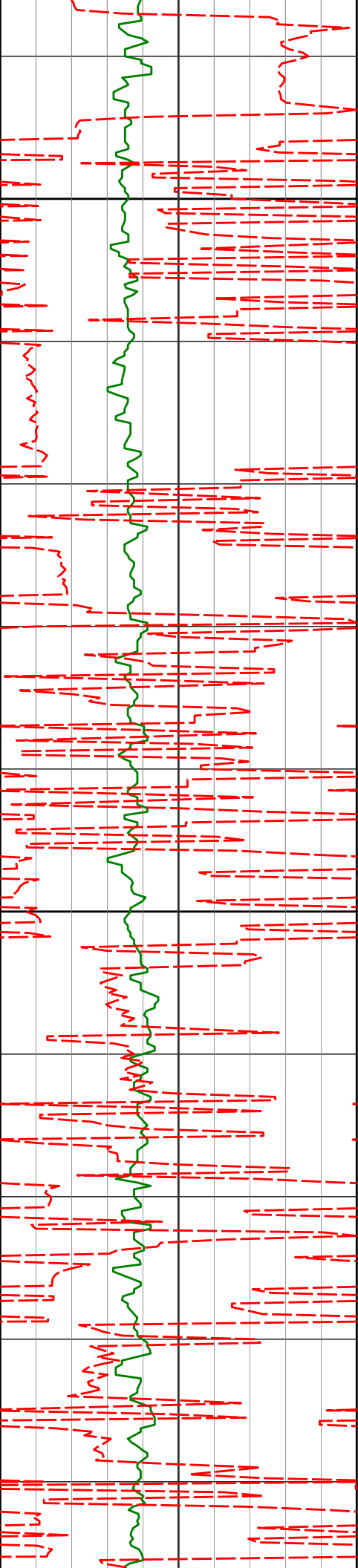
308.94° 4935.98'

89.07'

5000

PGRC

ROPA



5100

5114'

11.22°

310.98° 5103.89'

109.87'

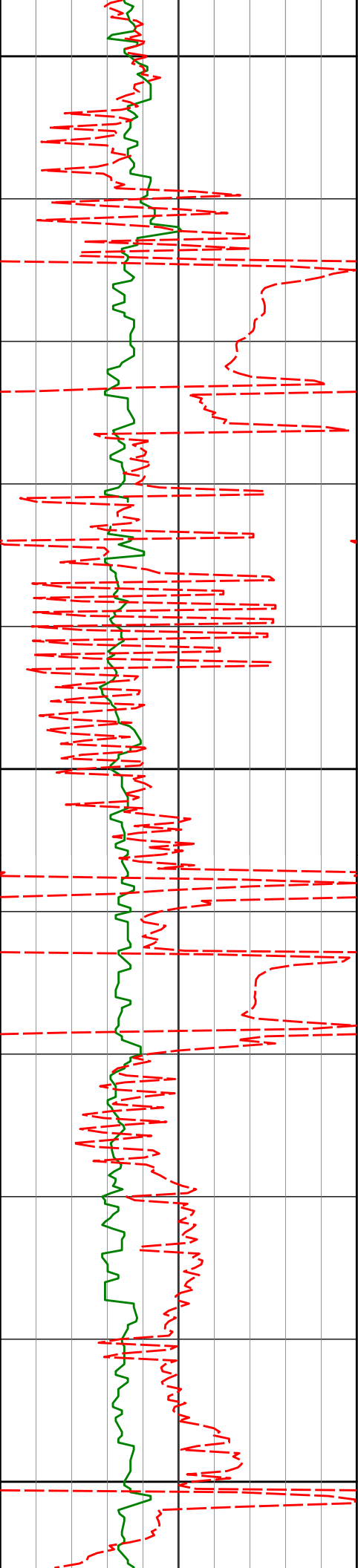
5200

5285'

9.08°

312.82° 5272.20'

129.97'



5300

5400

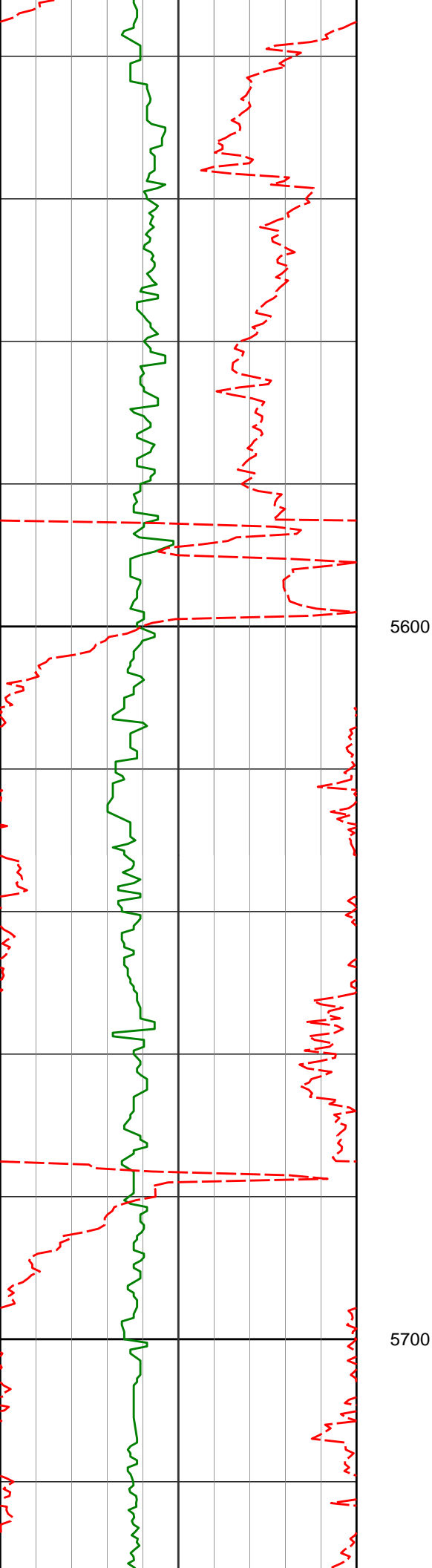
5500

5456'

11.16°

313.69° 5440.53'

150.59'



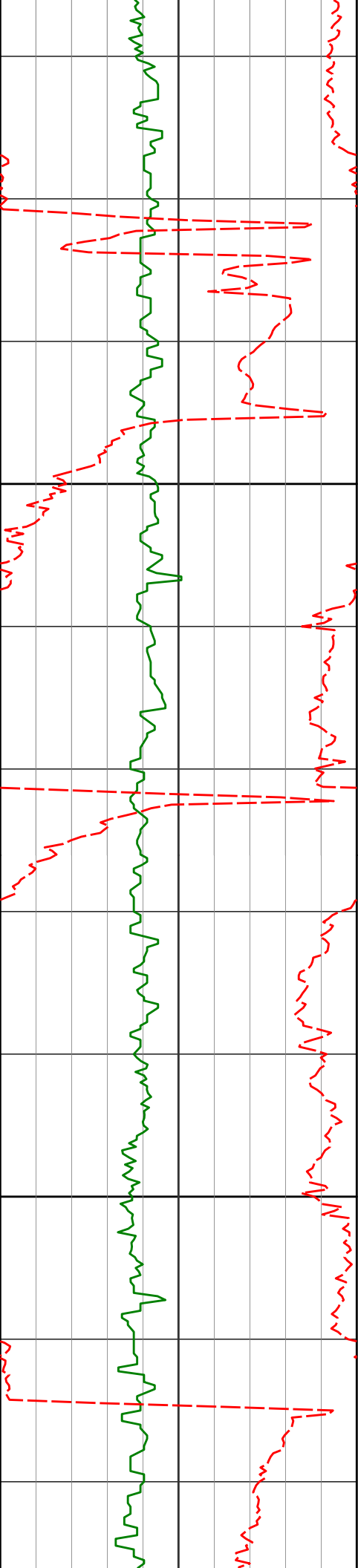
5627'

8.12°

312.75° 5609.10'

170.24'





5800

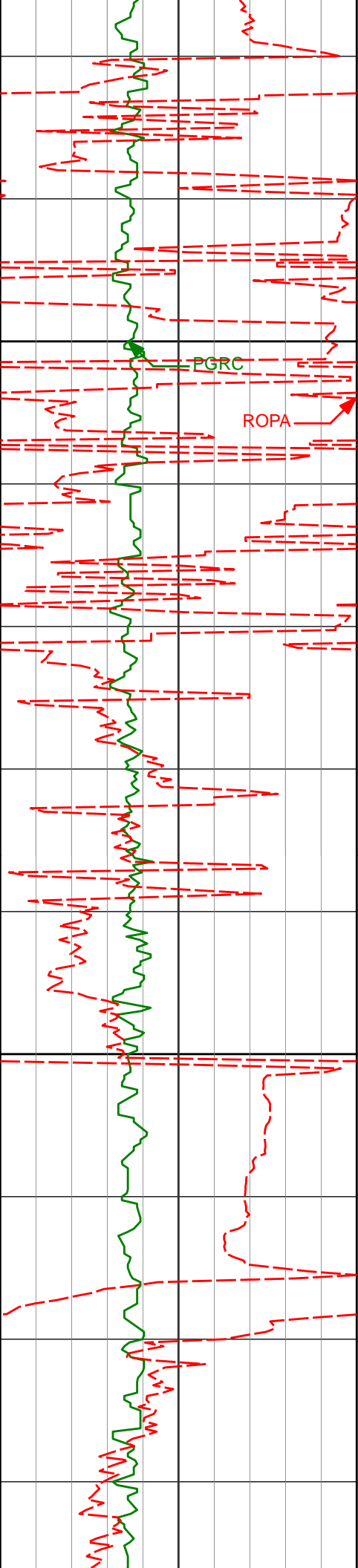
5900

5798'

7.98°

305.84° 5778.42'

185.40'



5970'

9.58°

302.74° 5948.40'

200.14'

6000

PGRC

ROPA

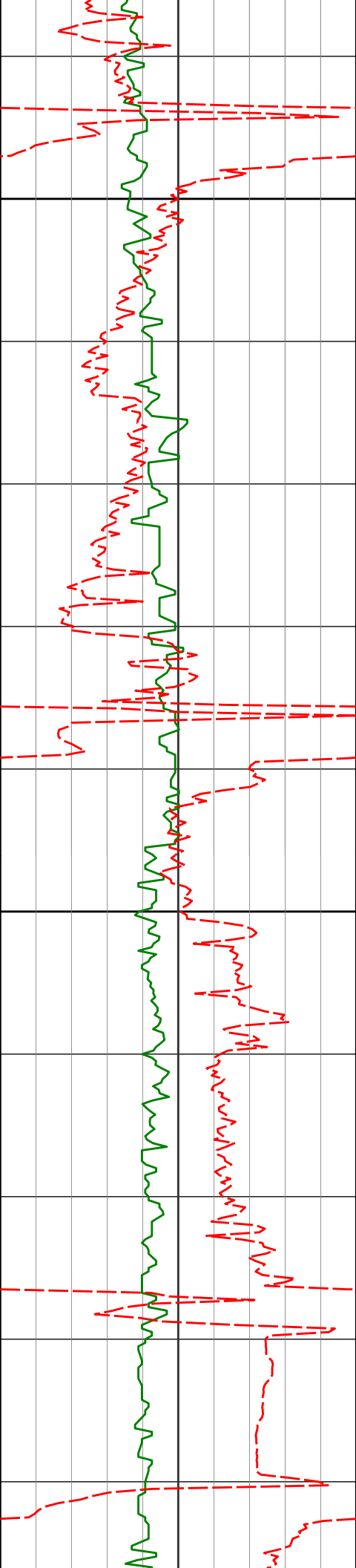
6100

6141'

10.26°

297.20° 6116.84'

214.82'



6200

6300

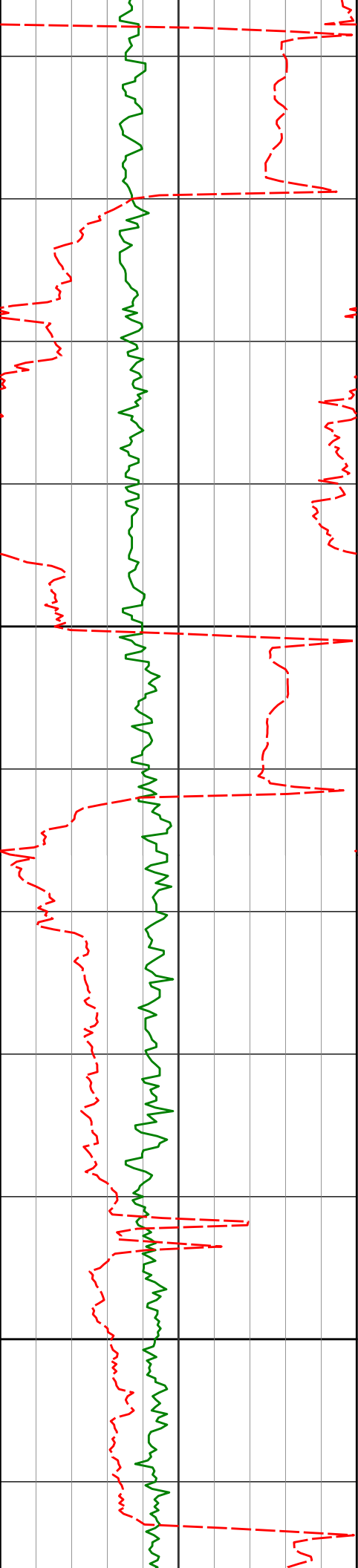
6310'

6.53°

292.35° 6284.01'

225.37'





6700

6800

6651'

6.23°

333.52°

6623.02'

247.53'

6737'

4.79°

1.99°

6708.63'

255.30'

6780'

4.34°

3.44°

6751.50'

258.72'

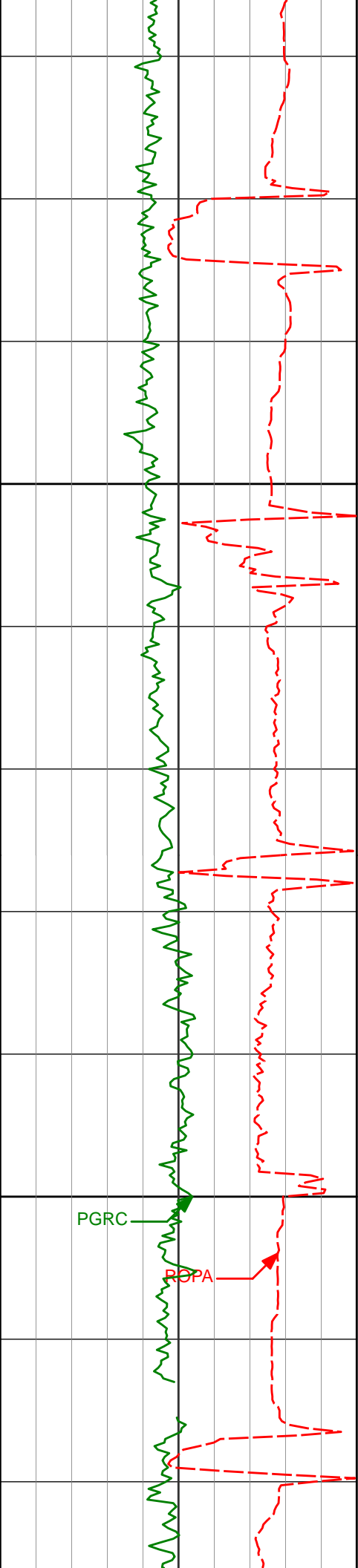
6823'

3.98°

357.79°

6794.38'

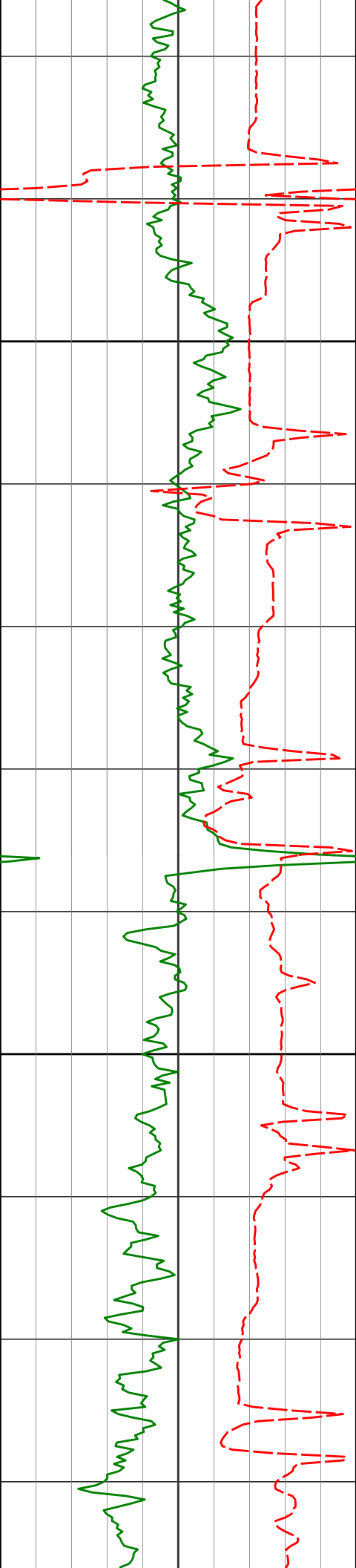
261.83'



6900

7000

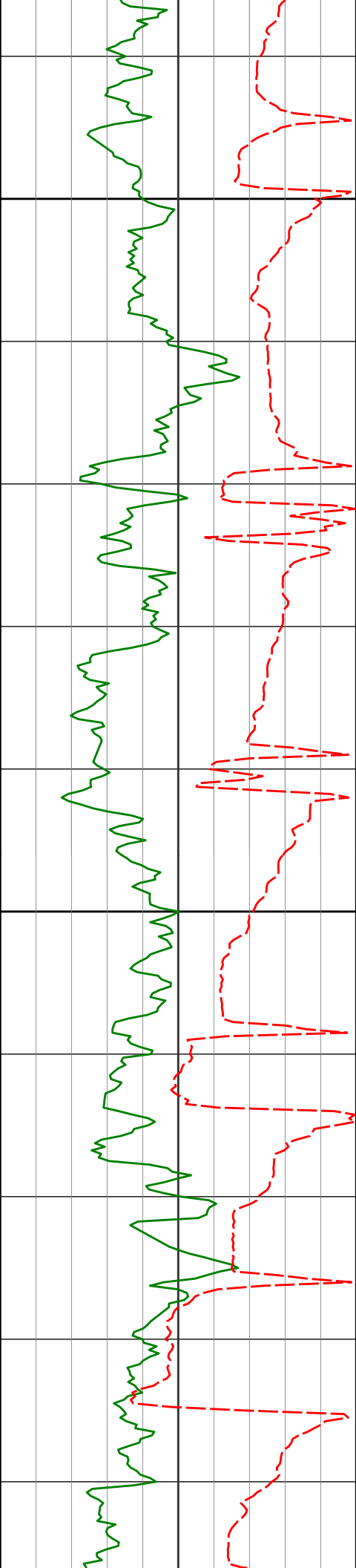
6866'	7.29°	350.39°	6837.17'	266.01'
6908'	10.55°	350.80°	6878.66'	272.44'
6951'	14.66°	355.48°	6920.61'	281.75'
6993'	19.91°	357.04°	6960.70'	294.20'
7036'	24.00°	359.89°	7000.58'	310.27'



7100

7200

7078'	28.18°	3.34°	7038.29'	328.72'
7121'	30.37°	5.33°	7075.80'	349.68'
7164'	32.49°	2.51°	7112.49'	372.04'
7207'	35.91°	0.55°	7148.05'	396.20'
7249'	40.39°	358.84°	7181.07'	422.13'



7300

7292' 44.10° 358.25° 7212.90' 451.03'

7334' 47.18° 358.59° 7242.26' 481.04'

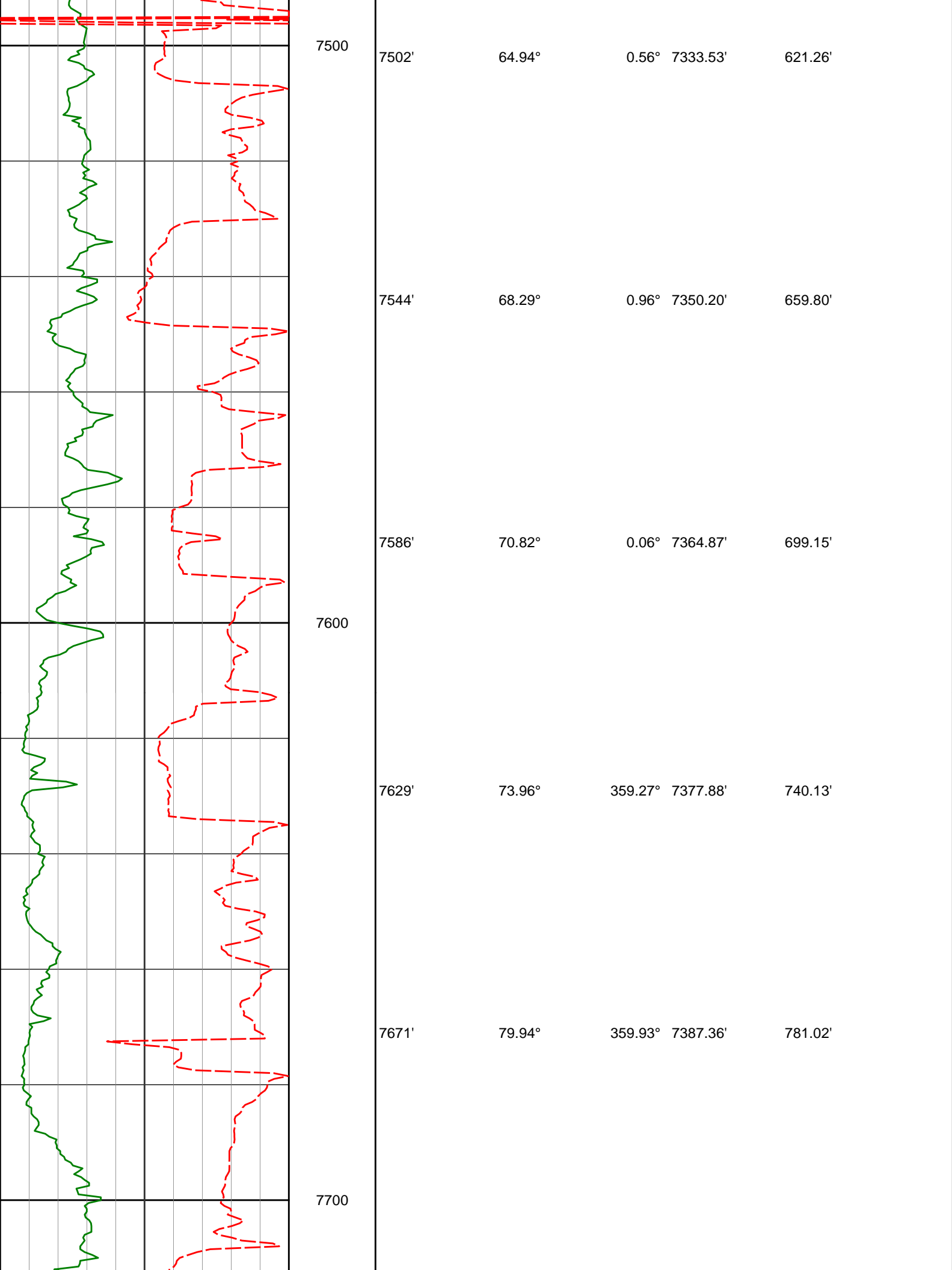
7376' 52.63° 358.46° 7269.30' 513.15'

7400

7418' 57.59° 359.30° 7293.31' 547.58'

7460' 61.48° 359.39° 7314.60' 583.77'







7714' 84.32° 359.87° 7393.24' 823.61'

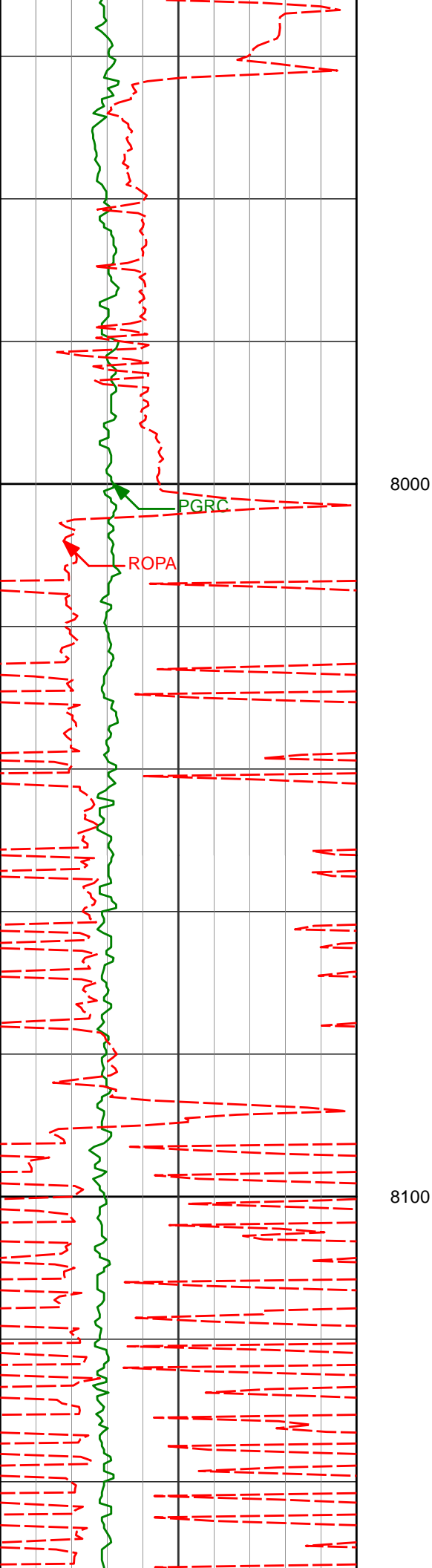
7753' 84.91° 0.49° 7396.90' 862.43'

Casing set @ 7789' MD

Run 200  
7800

7872' 90.52° 0.23° 7401.65' 981.29'

7900

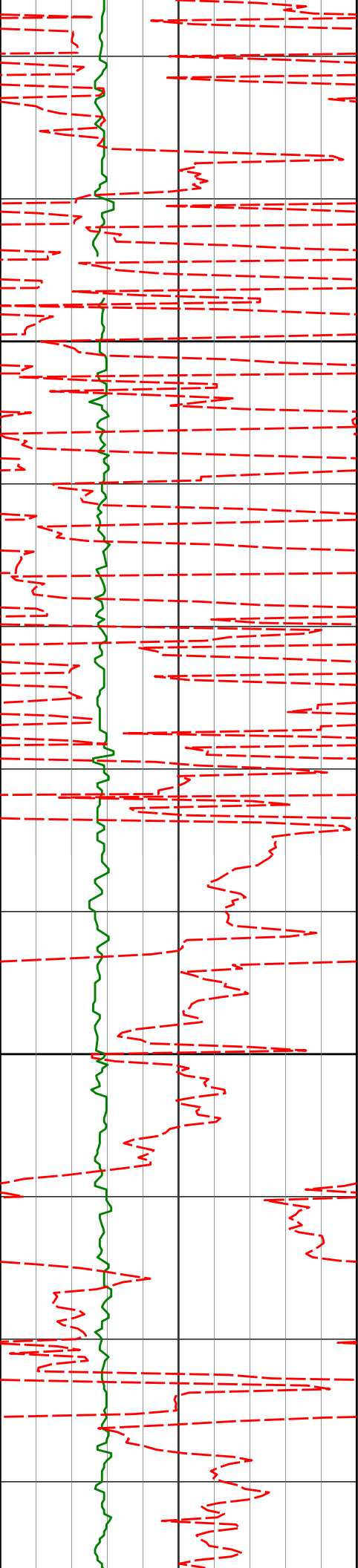


8044'

90.46°

359.98° 7400.18'

1153.28'



8200

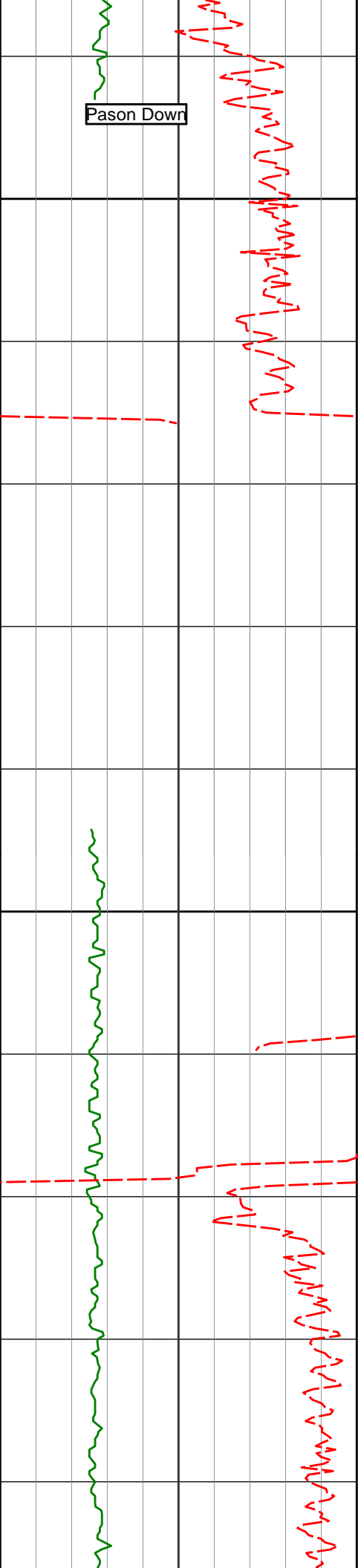
8215'

90.49°

358.79° 7398.76'

1324.26'

8300



8386'

90.83°

0.57° 7396.79'

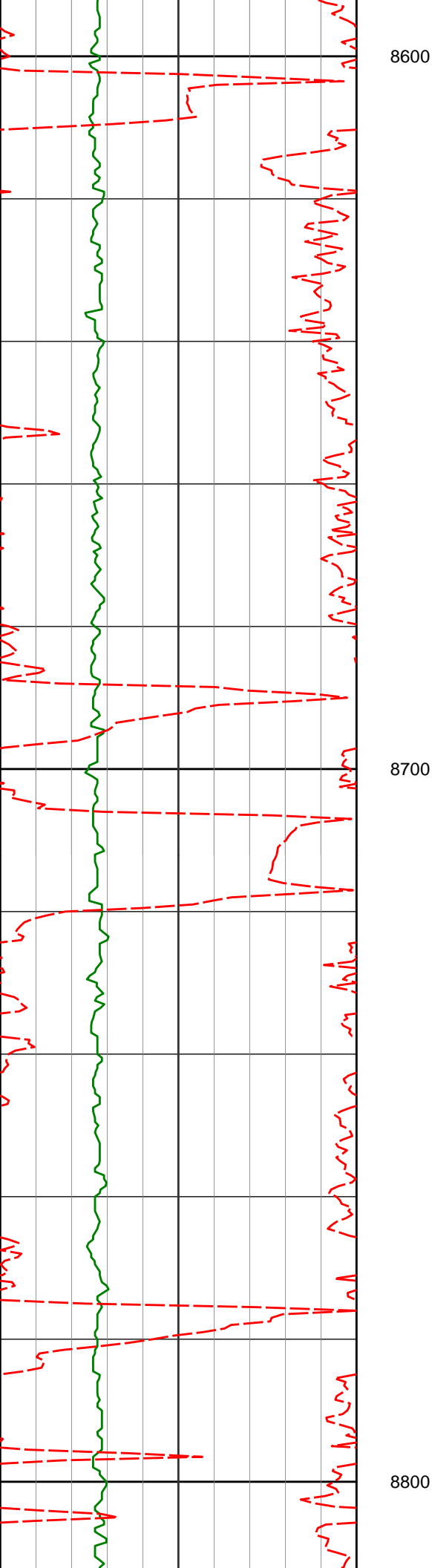
1495.24'

8557'

89.97°

0.32° 7395.59'

1666.23'

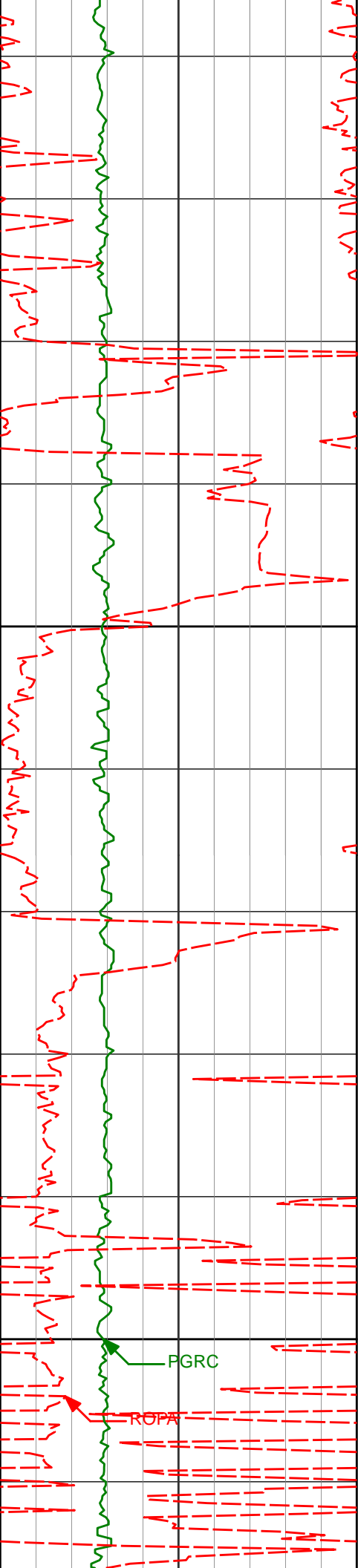


8728'

89.11°

359.43° 7396.97'

1837.22'



8900

8899'

89.63°

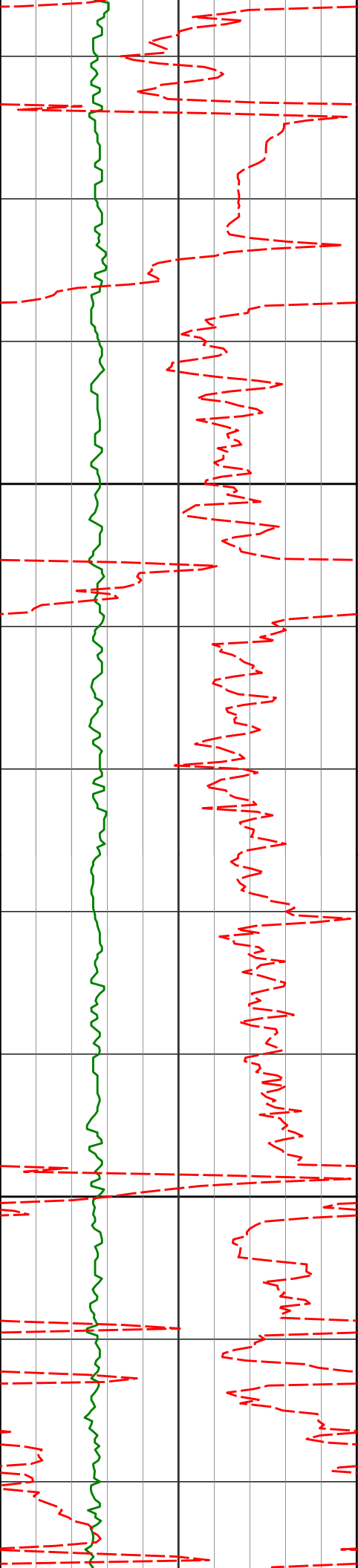
0.20° 7398.85'

2008.21'

9000

PGRC

ROPA



9068'

90.15°

1.84° 7399.17'

2177.17'

9100

9200

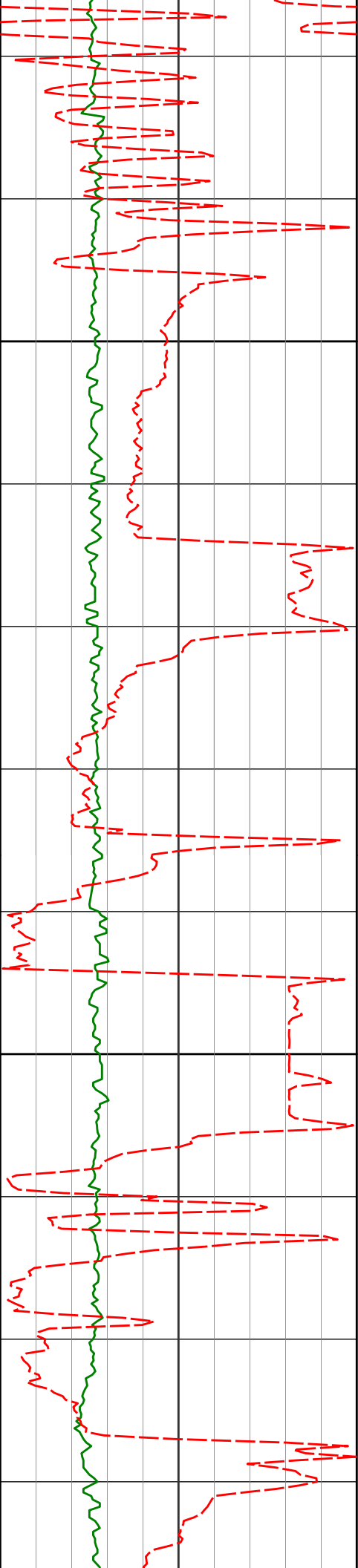
9239'

90.56°

0.44° 7398.11'

2348.13'





9300

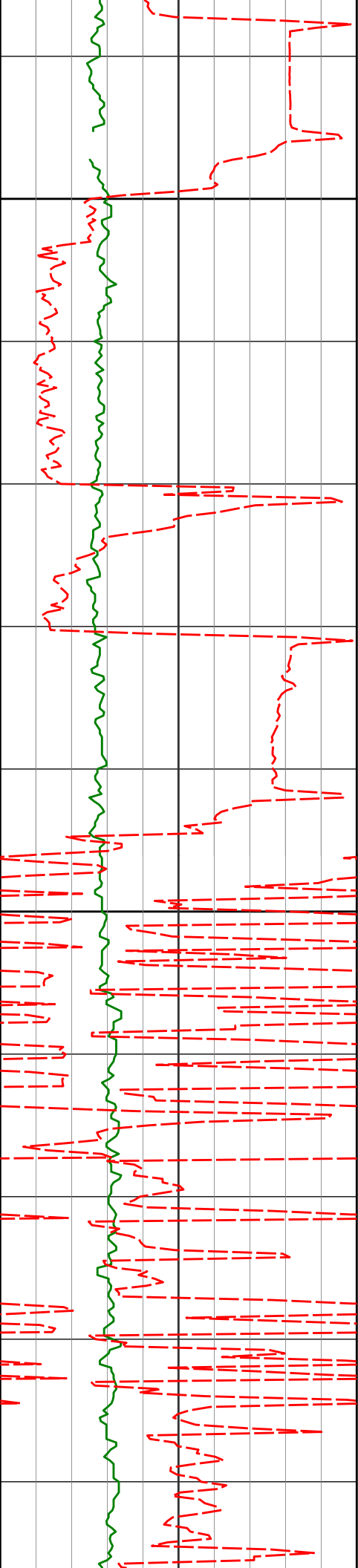
9400

9411'

90.06°

357.67° 7397.18'

2520.09'



9500

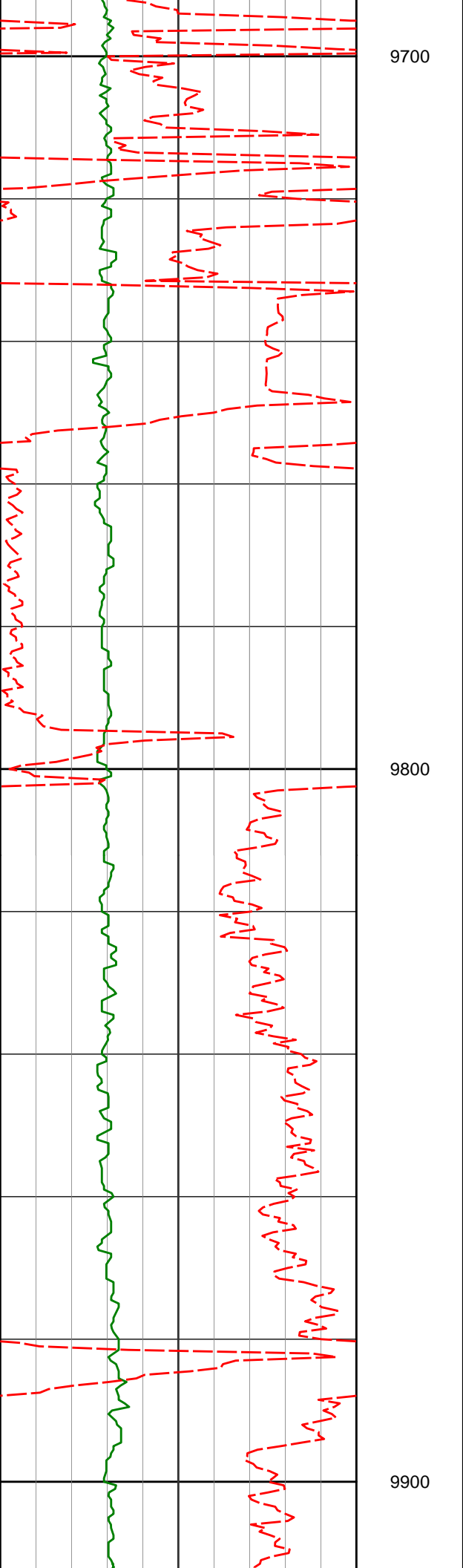
9581'

9600

89.17°

359.25° 7398.32'

2690.02'

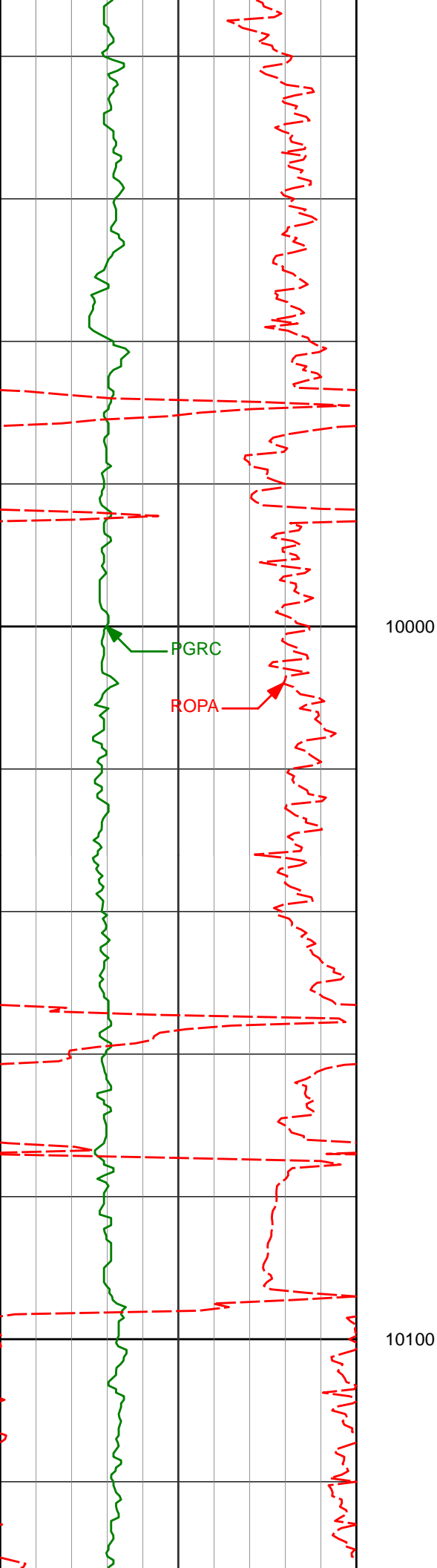


9752'

89.17°

0.02° 7400.80'

2861.00'



9923'

90.49°

0.21° 7401.31'

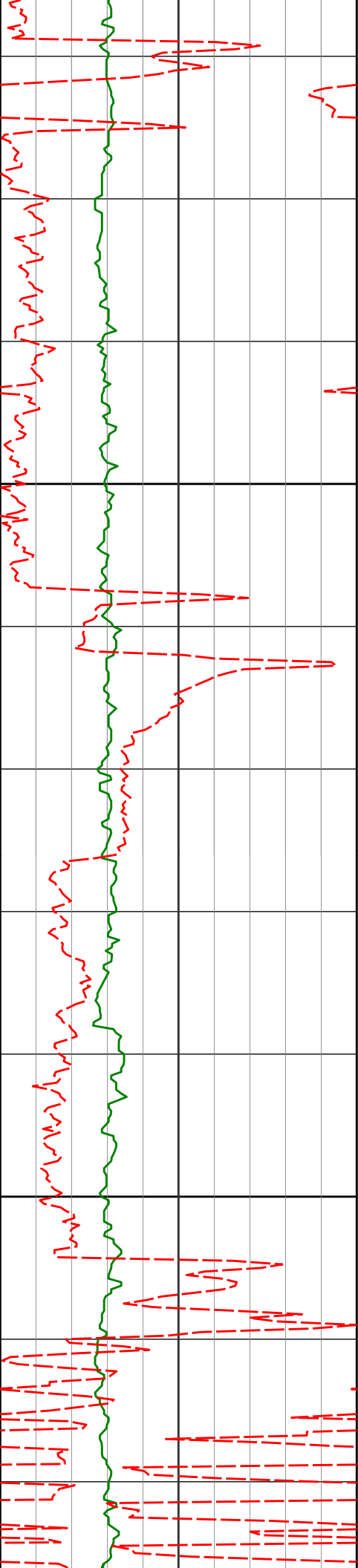
3031.99'

10095'

90.03°

0.80° 7400.53'

3203.98'



10200

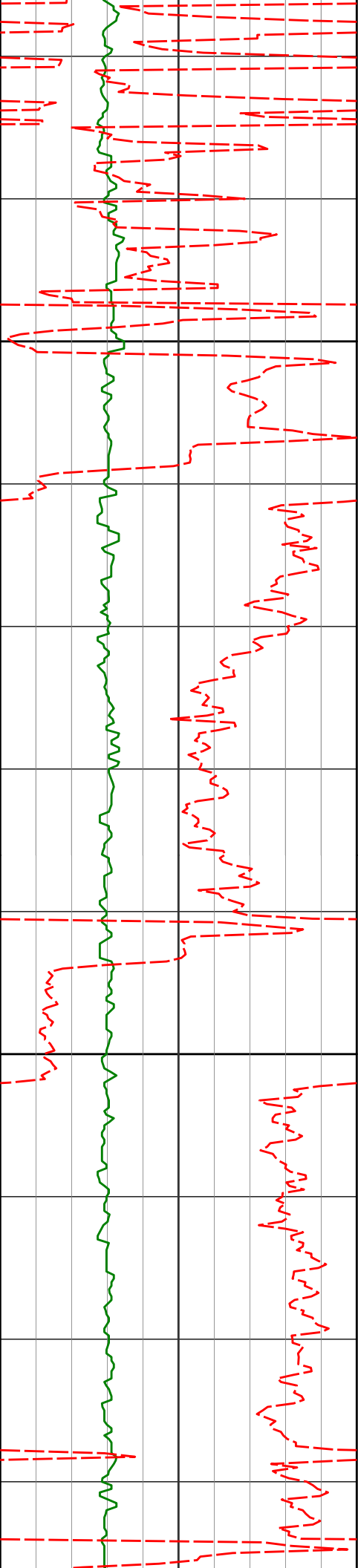
10266'

90.15°

0.82° 7400.26'

3374.96'

10300



10400

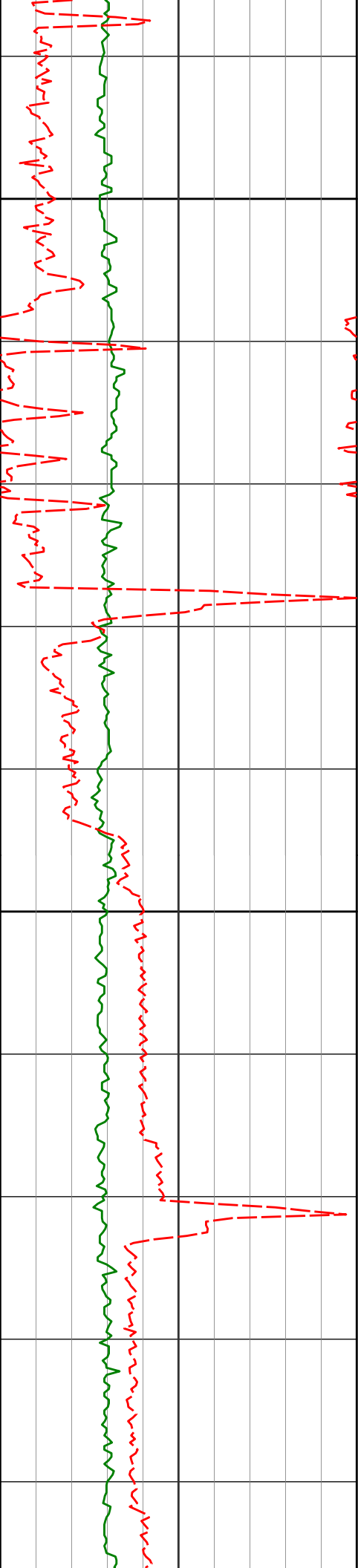
10437'

90.55°

1.06° 7399.21'

3545.93'

10500



10600

10608'

90.68°

0.32° 7397.38'

3716.91'

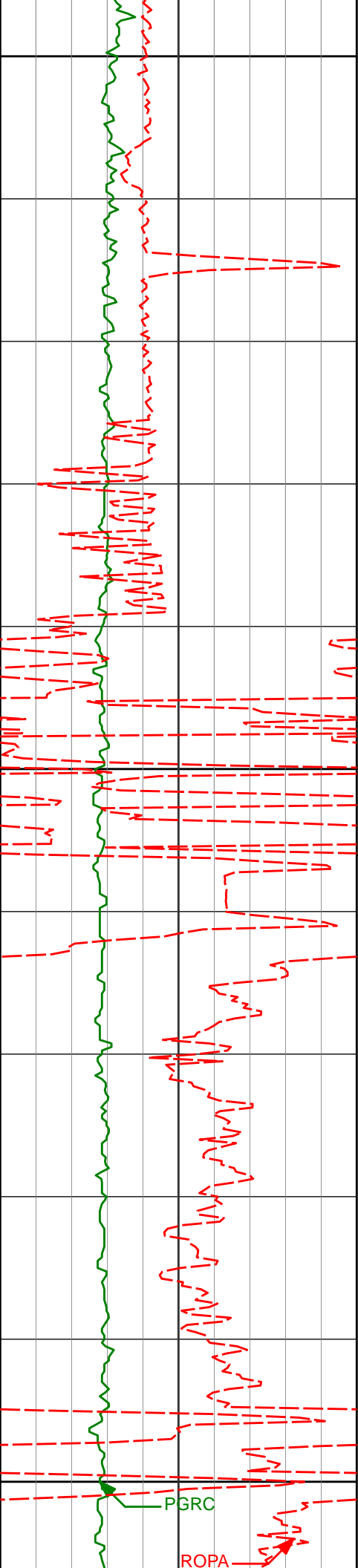
10700

10779'

90.71°

359.82° 7395.31'

3887.90'



10800

10900

10950'

90.06°

0.60° 7394.16'

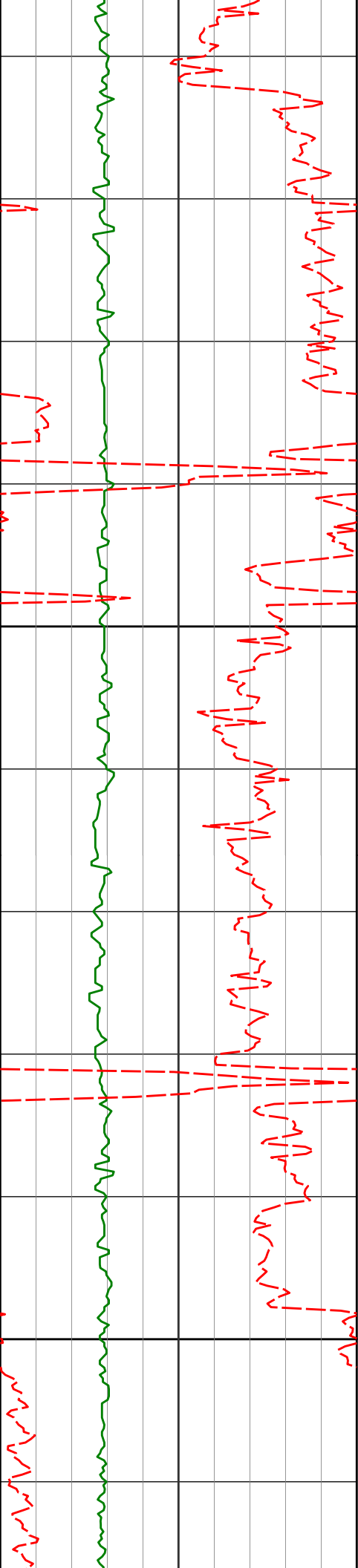
4058.89'

11000

PGRC

ROPA





11100

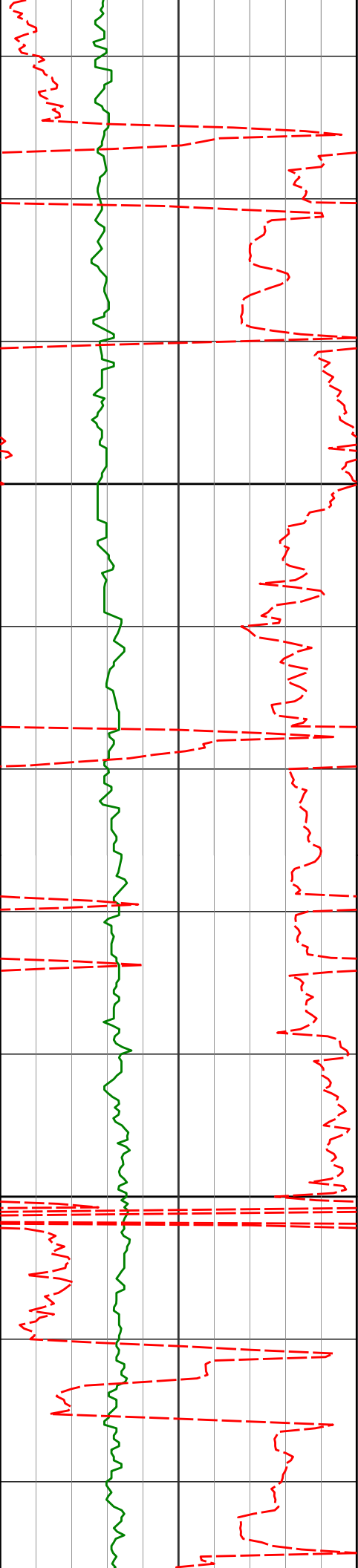
11120'

90.52°

0.02° 7393.30'

4228.88'

11200



11300

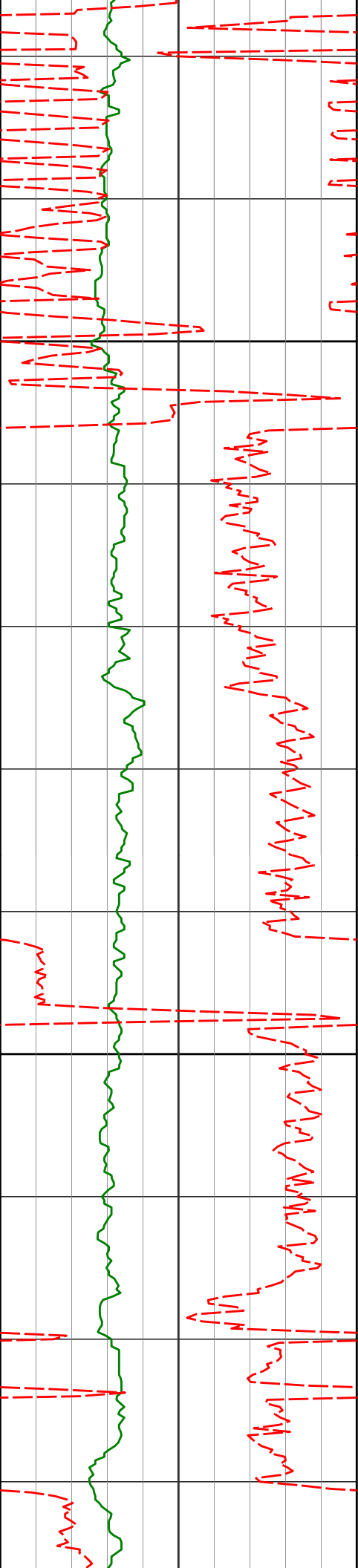
11400

11292'

89.85°

0.46° 7392.74'

4400.88'



11463'

89.32°

1.79° 7393.98'

4571.83'

11500

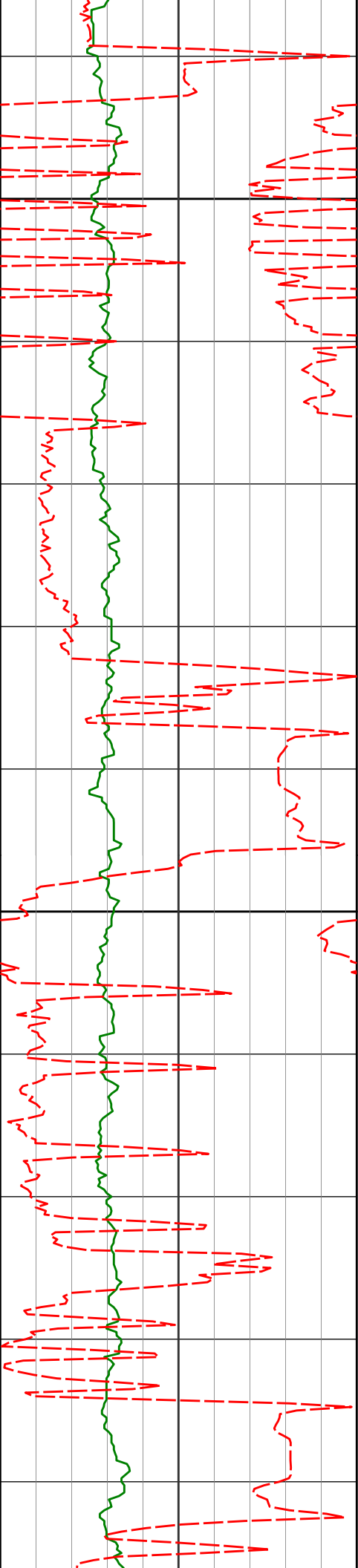
11600

11634'

90.19°

1.02° 7394.71'

4742.77'



11700

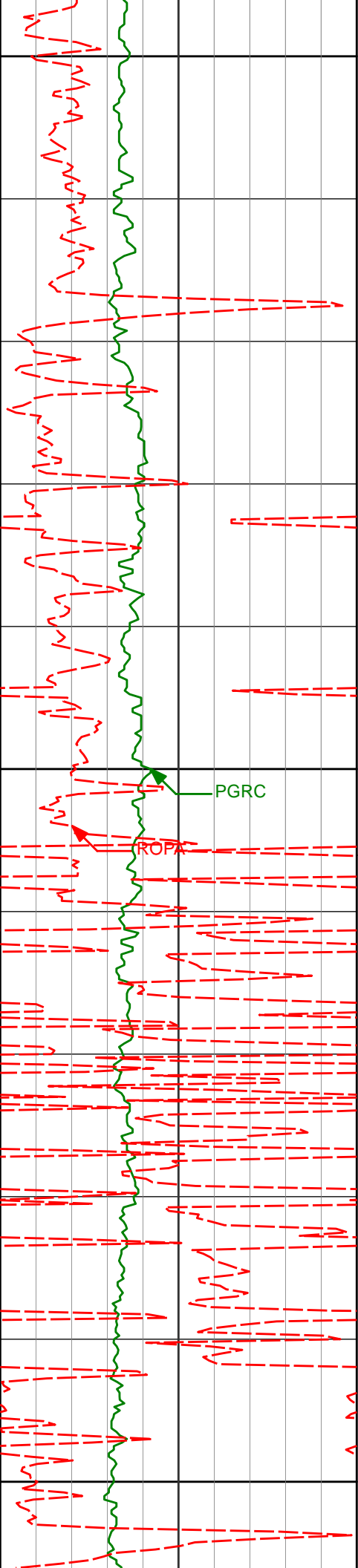
11800

11805'

90.25°

0.44° 7394.05'

4913.76'



11900

11975'

89.17°

0.39° 7394.91'

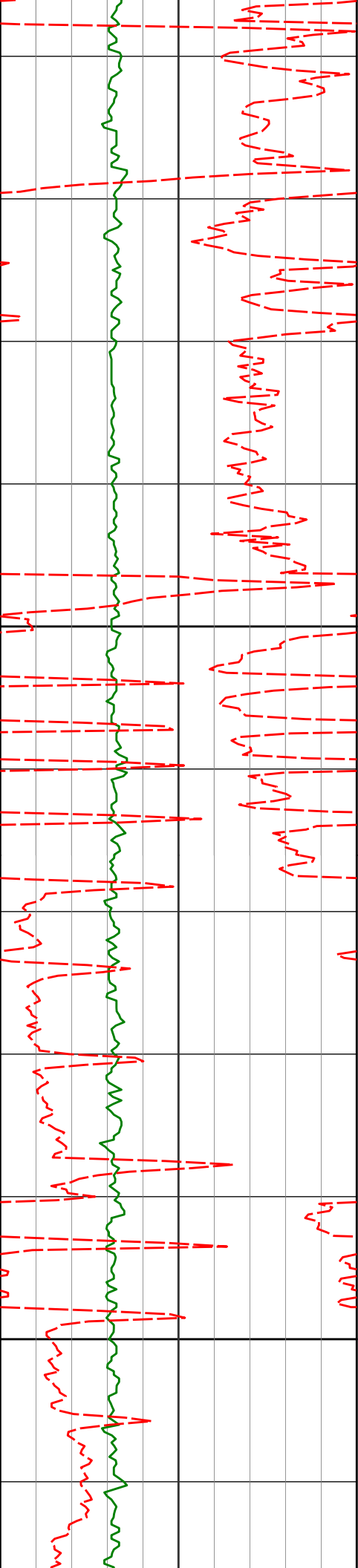
5083.75'

12000

PGRC

ROPA

12100



12200

12300

12147'

90.56°

0.49° 7395.32'

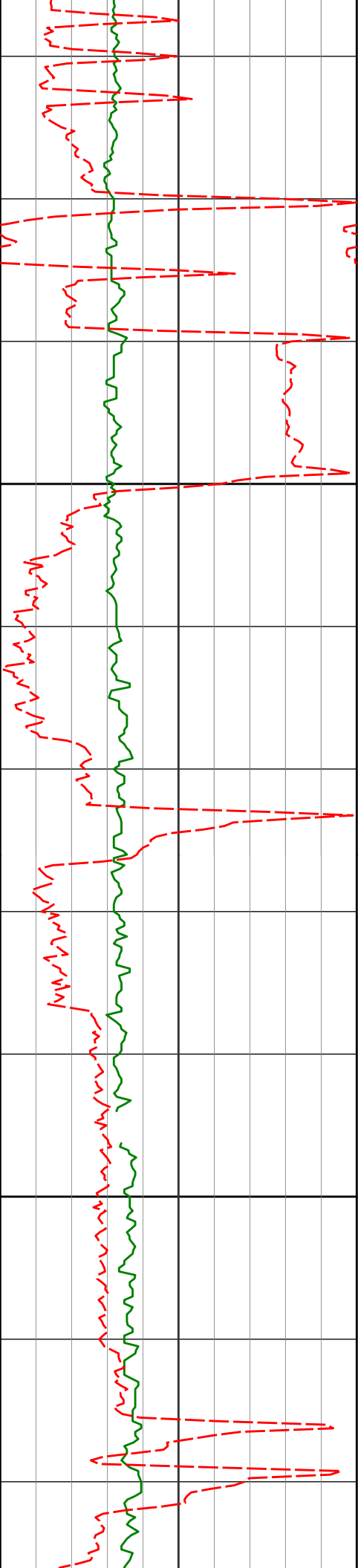
5255.74'

12318'

89.97°

359.24° 7394.53'

5426.73'



12400

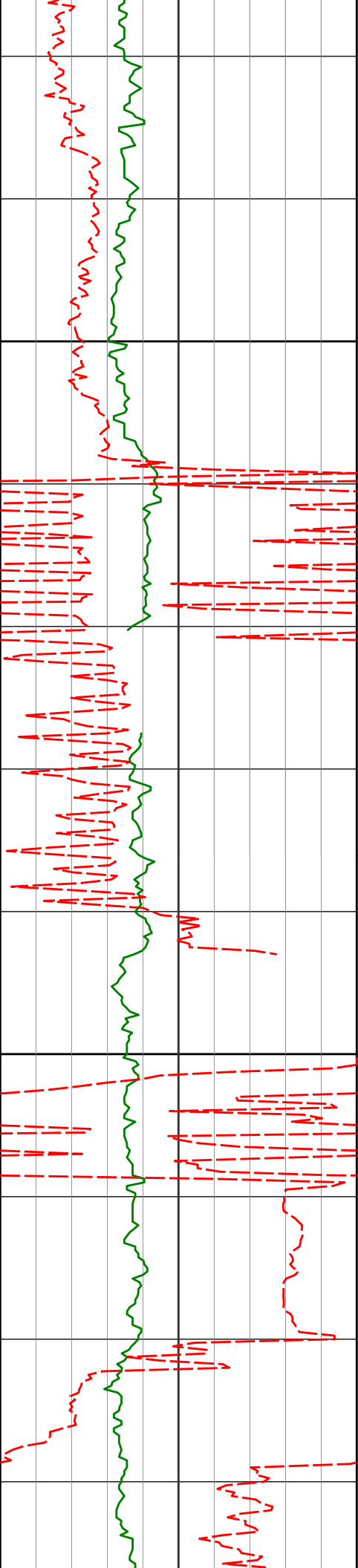
12488'

90.68°

358.68° 7393.56'

5596.70'

12500



12600

12658'

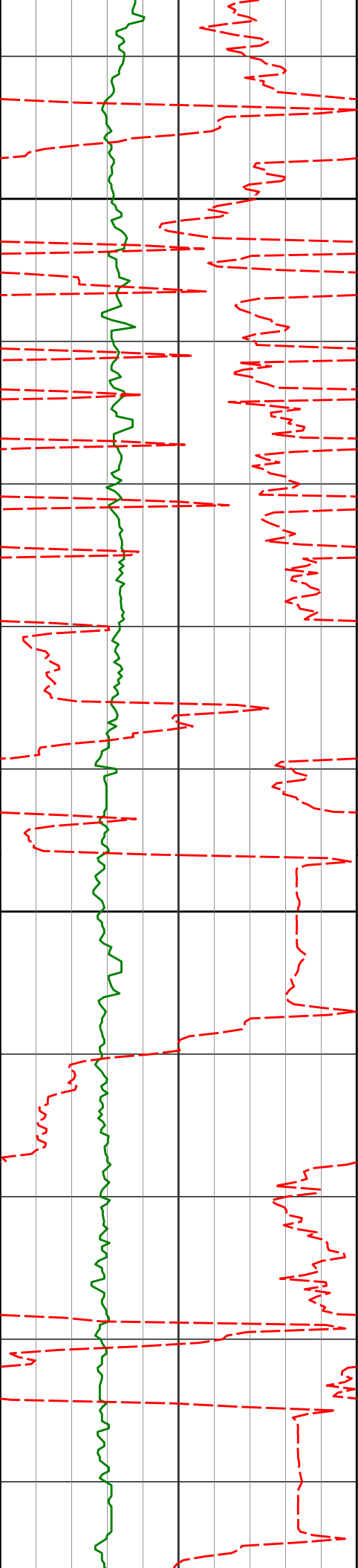
90.22°

357.29° 7392.23'

5766.59'

12700





12800

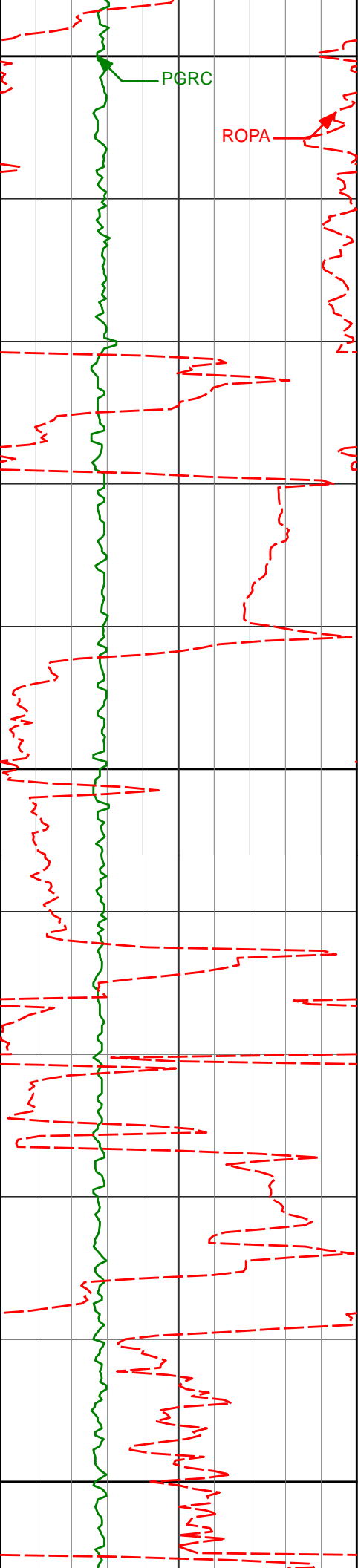
12828'

91.66°

356.95° 7389.44'

5936.35'

12900



13000

12999'

90.86°

359.37° 7385.68'

6107.21'

PGRC

ROPA

13100

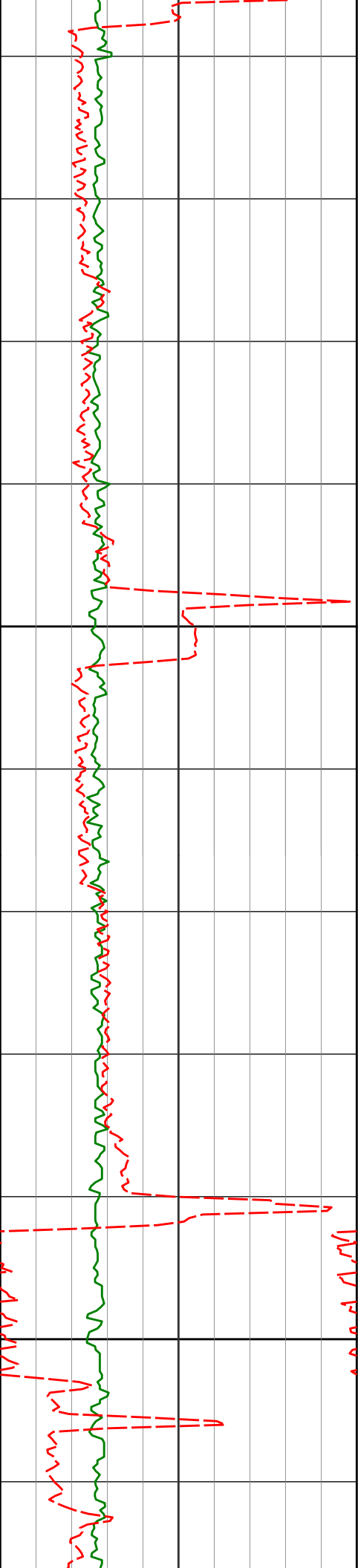
13170'

89.42°

1.62° 7385.26'

6278.19'

13200



13300

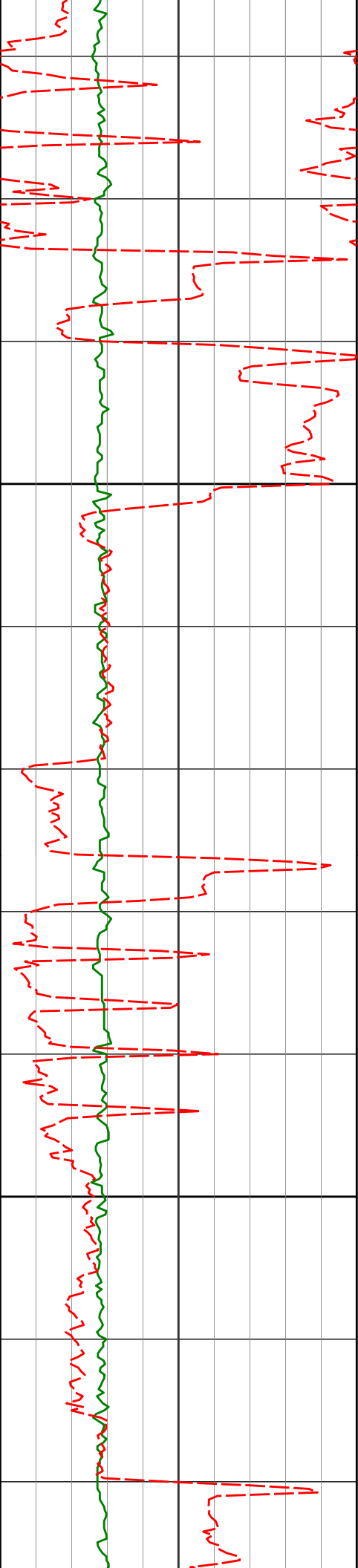
13339'

89.54°

0.27° 7386.80'

6447.15'

13400



13500

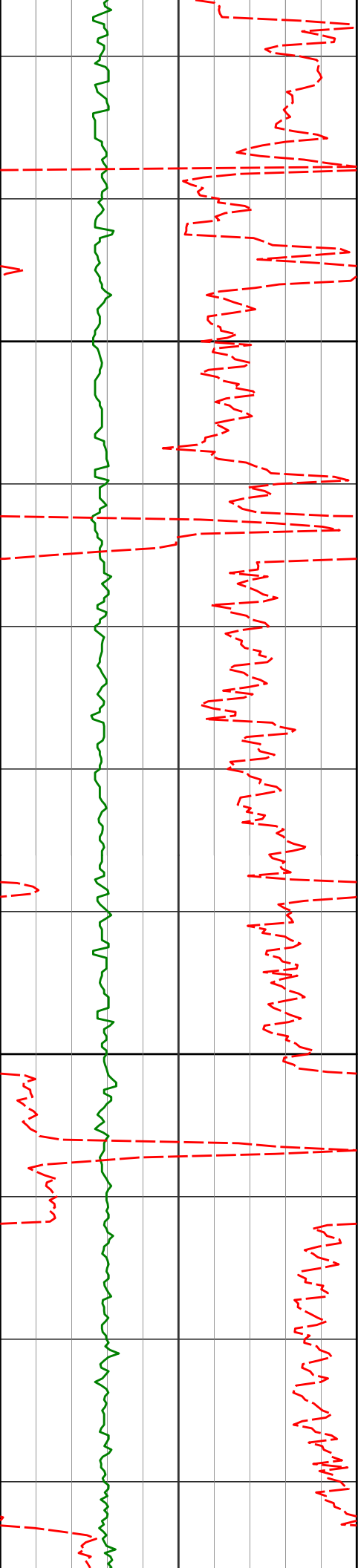
13510'

89.69°

359.48° 7387.94'

6618.15'

13600



13700

13800

13681'

90.74°

1.25° 7387.30'

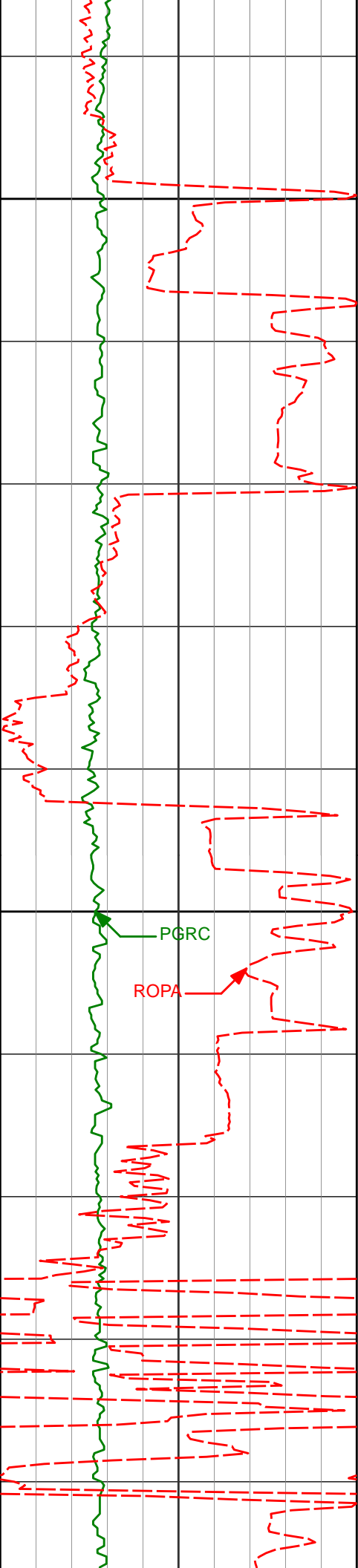
6789.13'

13852'

91.73°

0.64° 7383.62'

6960.06'



13900

14000

PGRC

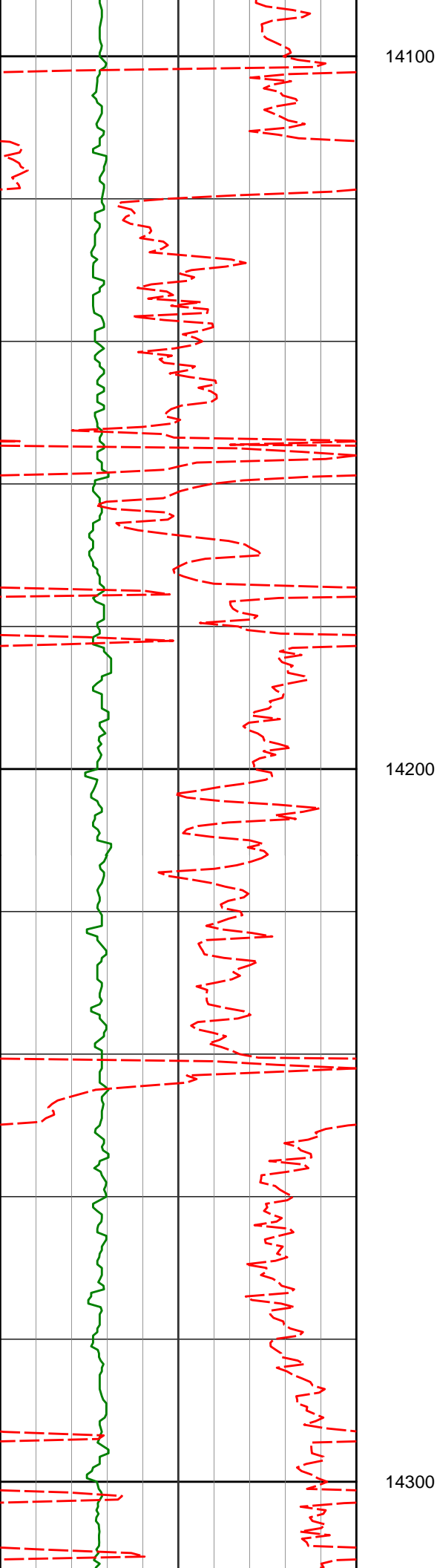
ROPA

14024'

87.81°

358.65° 7384.31'

7132.02'

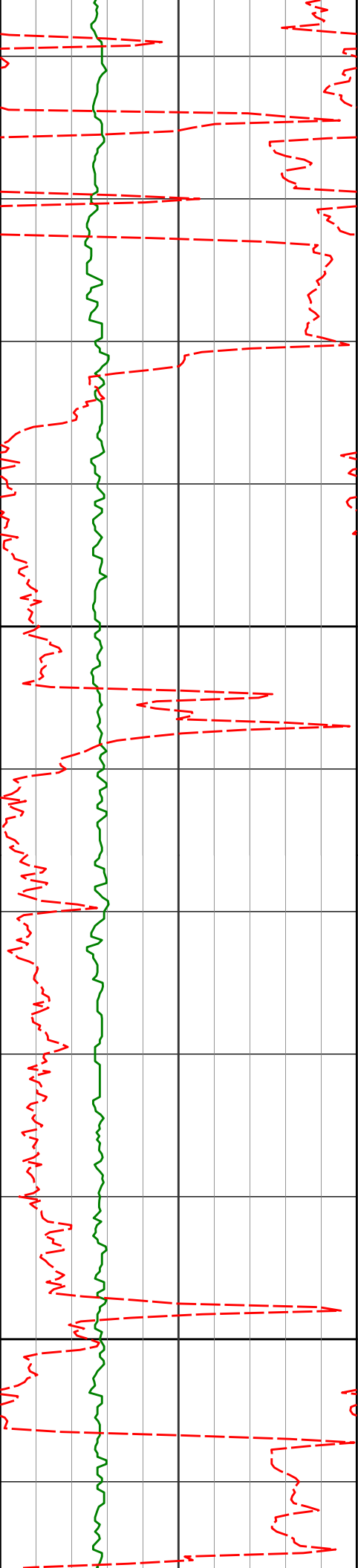


14195'

90.31°

0.39° 7387.11'

7302.97'



14366'

88.74°

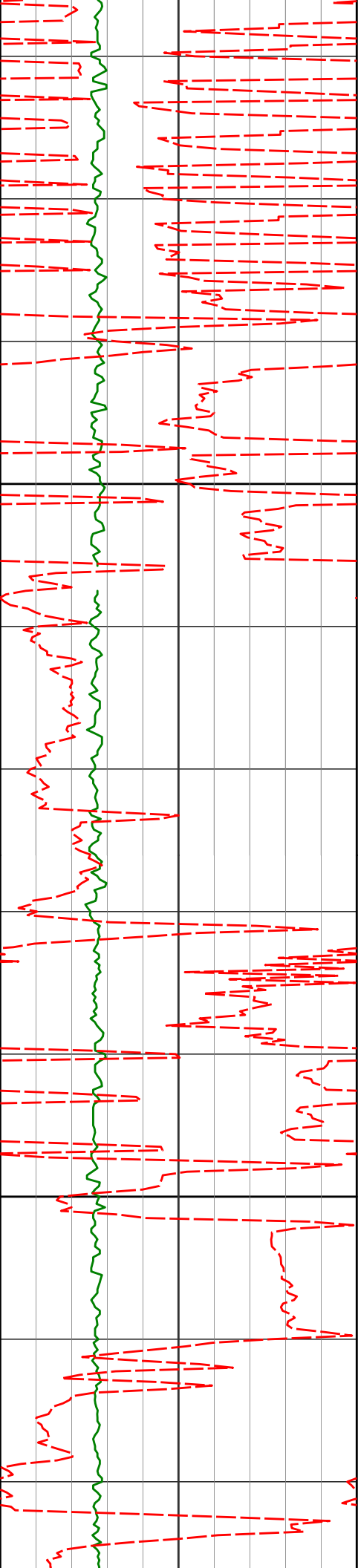
359.57° 7388.53'

7473.96'

14400

14500





14534'

91.05°

0.06° 7388.84'

7641.95'

14600

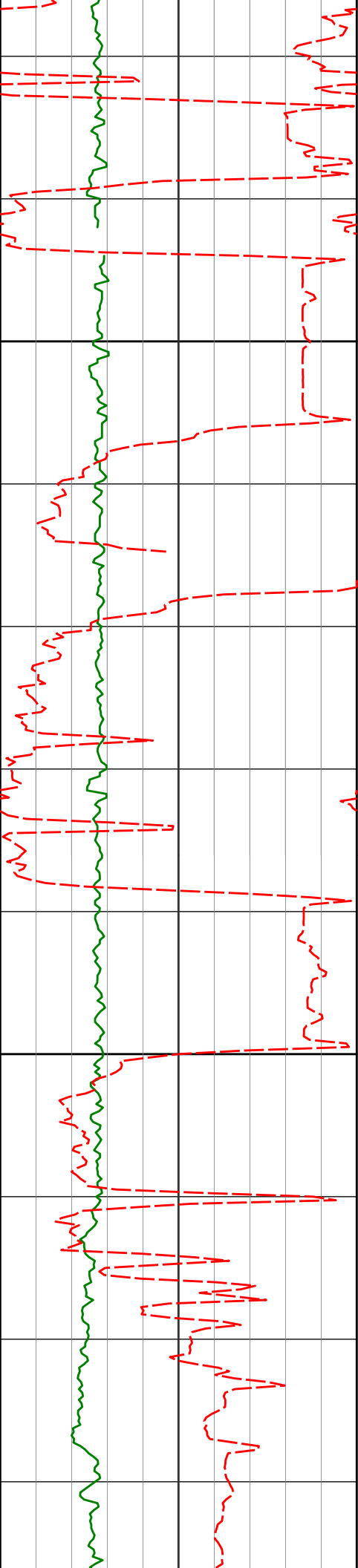
14700

14706'

88.55°

358.49° 7389.44'

7813.91'



14800

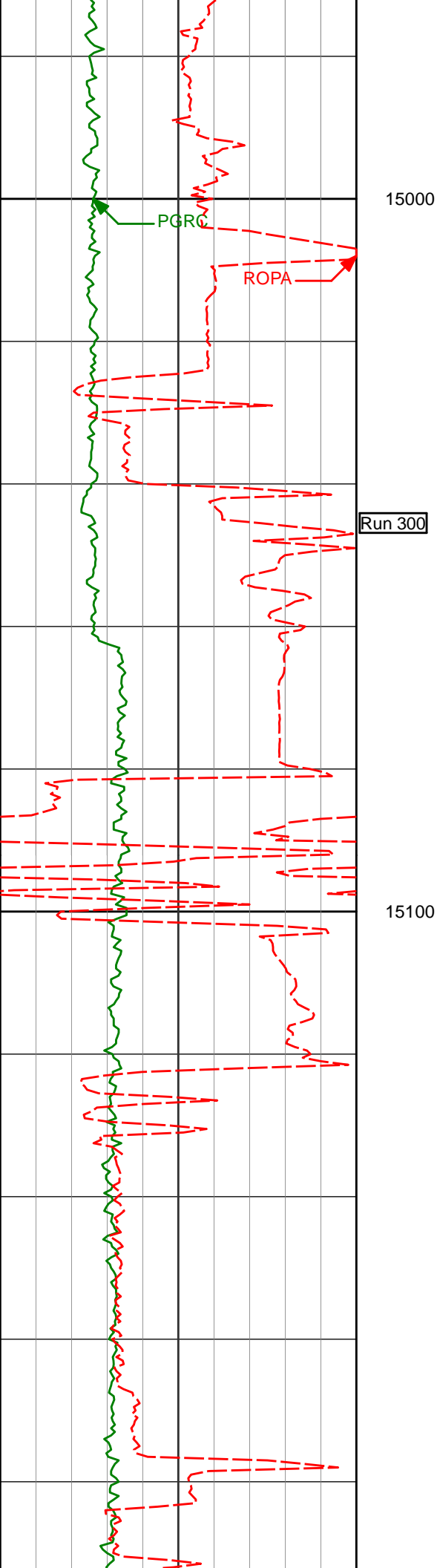
14900

14877'

90.00°

359.72° 7391.60'

7984.87'

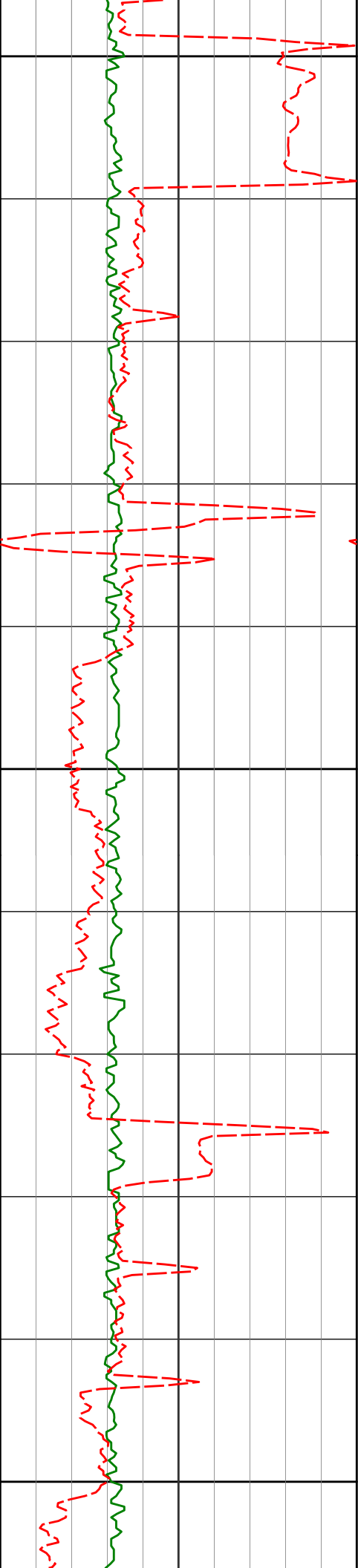


15047'

84.26°

356.70° 7400.11'

8154.49'



15200

15219'

90.12°

356.83° 7408.54'

8325.94'

15300

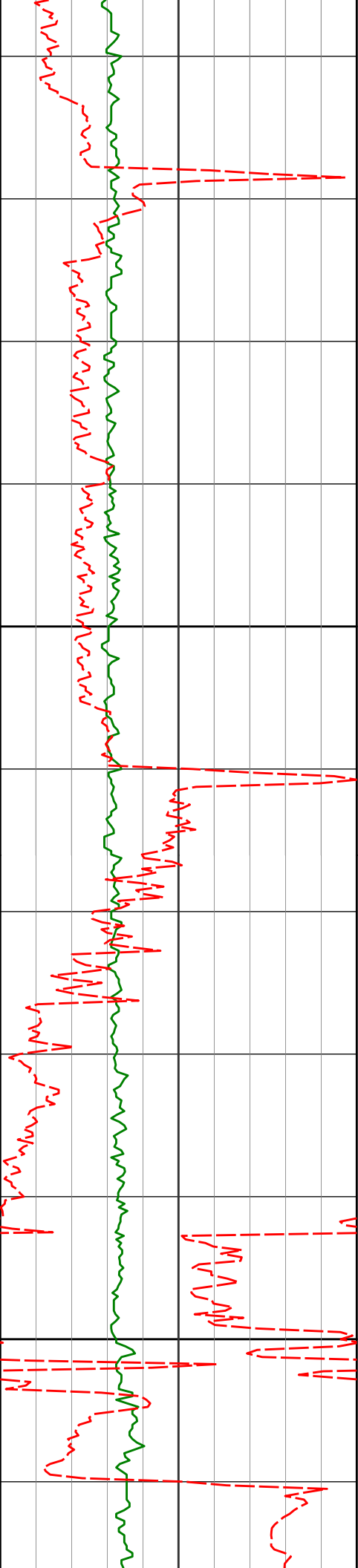
15389'

90.86°

356.31° 7407.09'

8495.64'

15400



15500

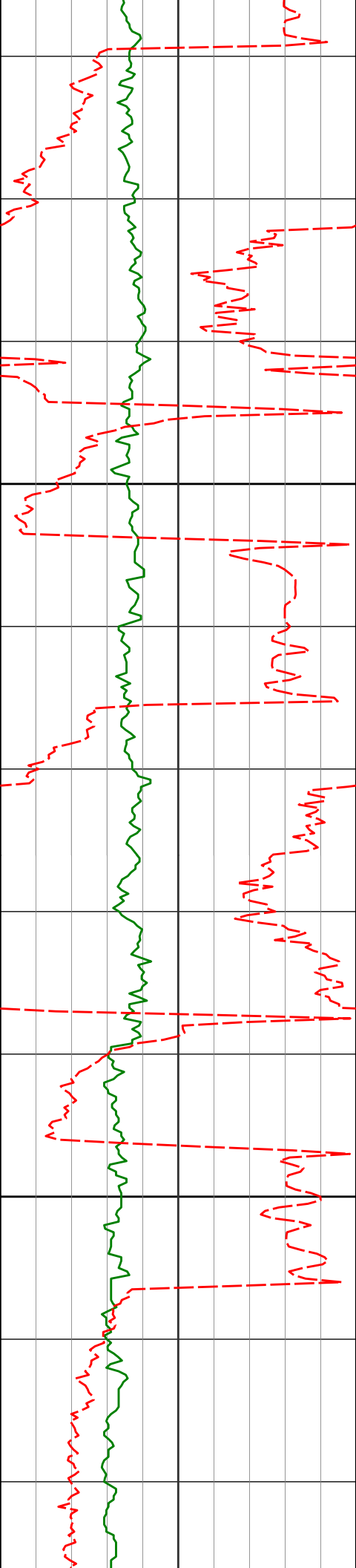
15560'

91.66°

355.13° 7403.33'

8666.12'

15600



15700

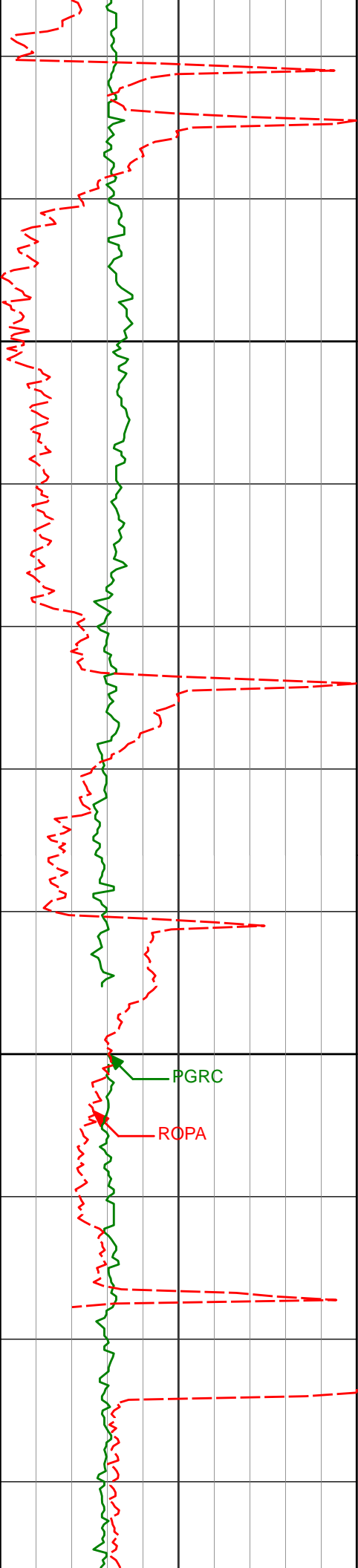
15731'

90.09°

356.65° 7400.72'

8836.66'

15800



15900

15902'

90.89°

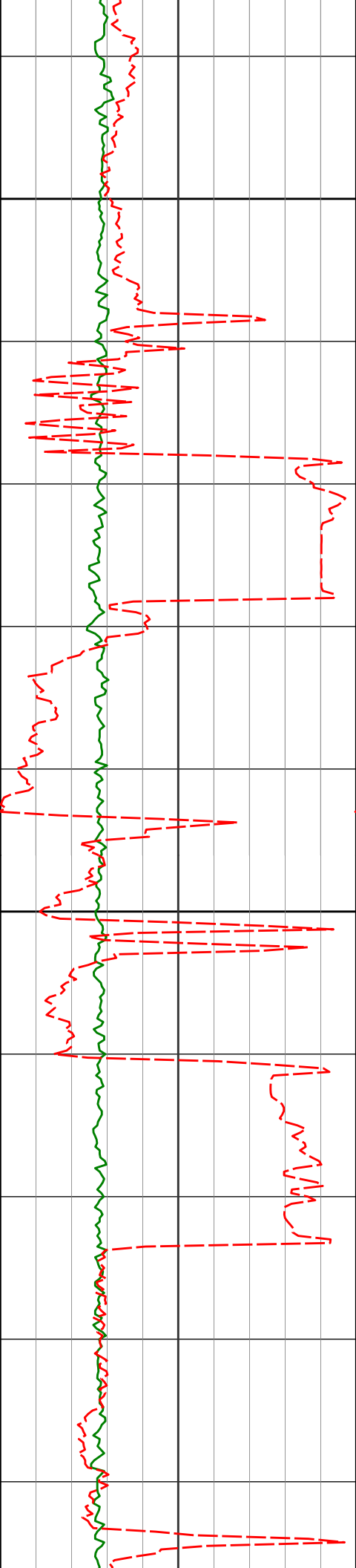
357.74° 7399.25'

9007.45'

16000

PGRC

ROPA

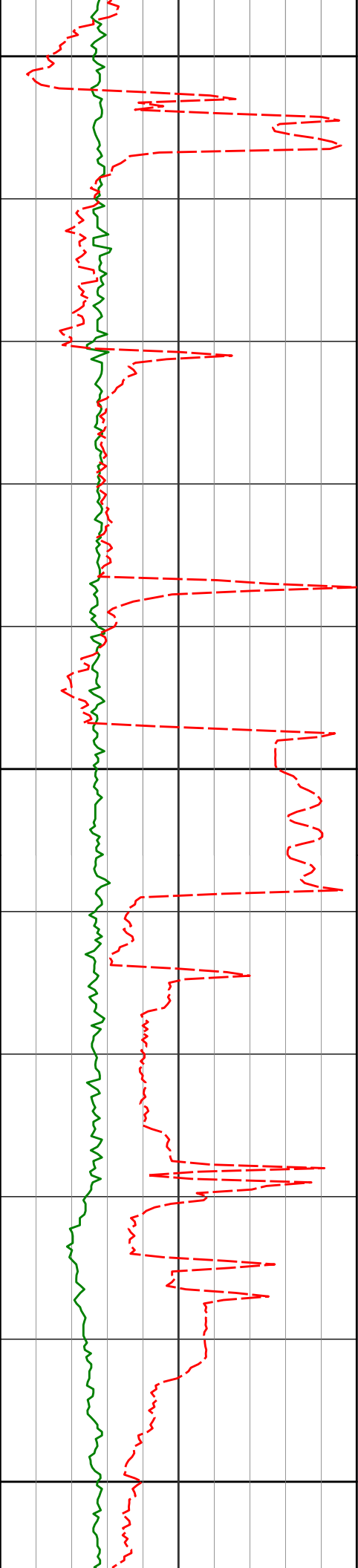


16100

16200

16073'	91.02°	355.85°	7396.40'	9178.16'
16243'	90.40°	357.81°	7394.30'	9347.88'





16300

16400

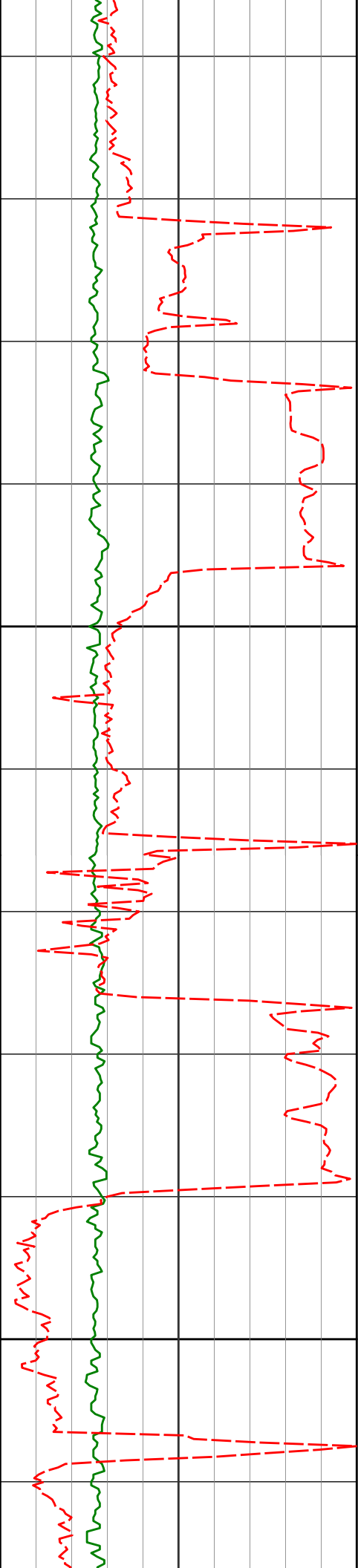
16500

16415'

90.18°

358.21° 7393.43'

9519.78'



16586'

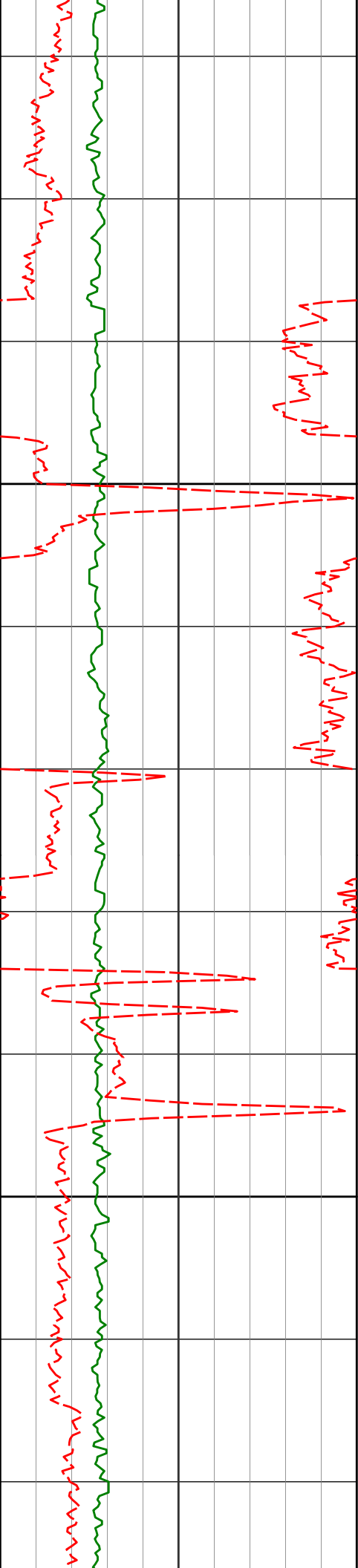
90.28°

357.69° 7392.74'

9690.67'

16600

16700



16757'

90.09°

358.75° 7392.19'

9861.59'

16800

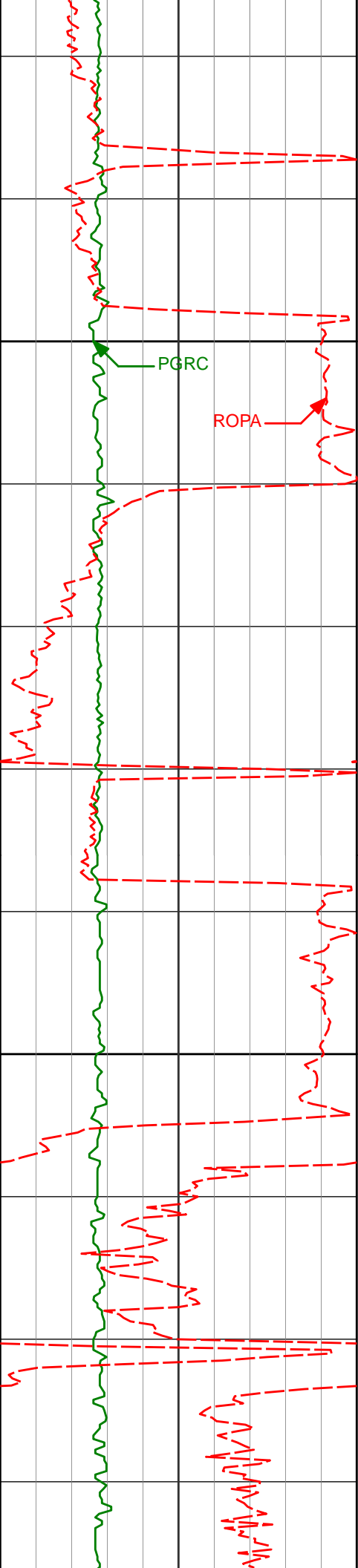
16900

16927'

90.71°

357.56° 7391.00'

10031.50'



17000

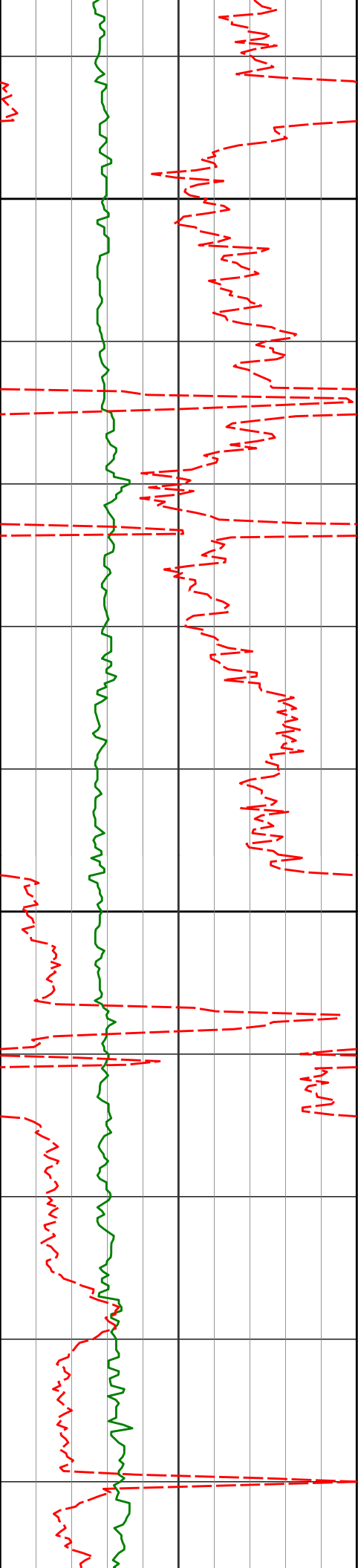
17100

17099'

88.58°

359.02° 7392.07'

10203.41'



17200

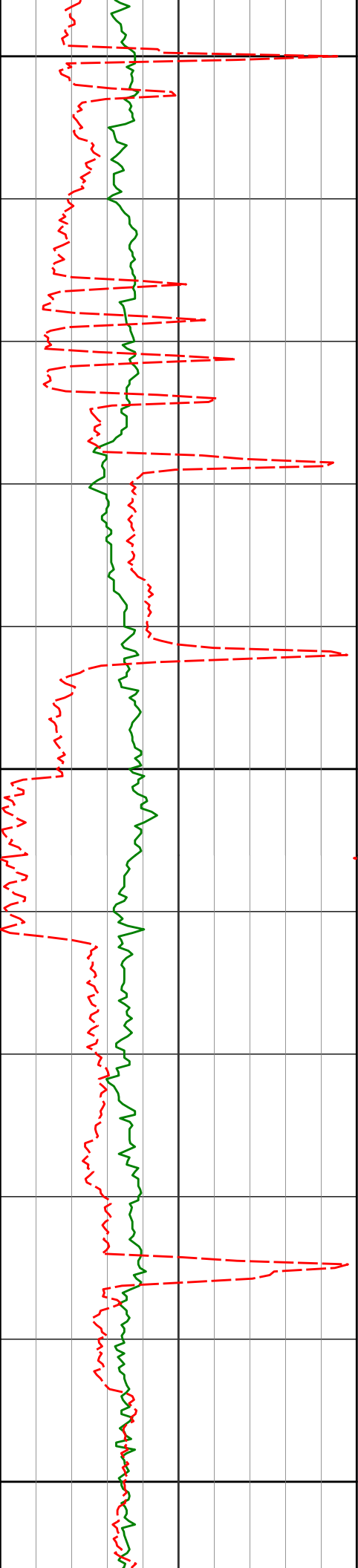
17269'

88.98°

358.99° 7395.69'

10373.35'

17300



17400

17439'

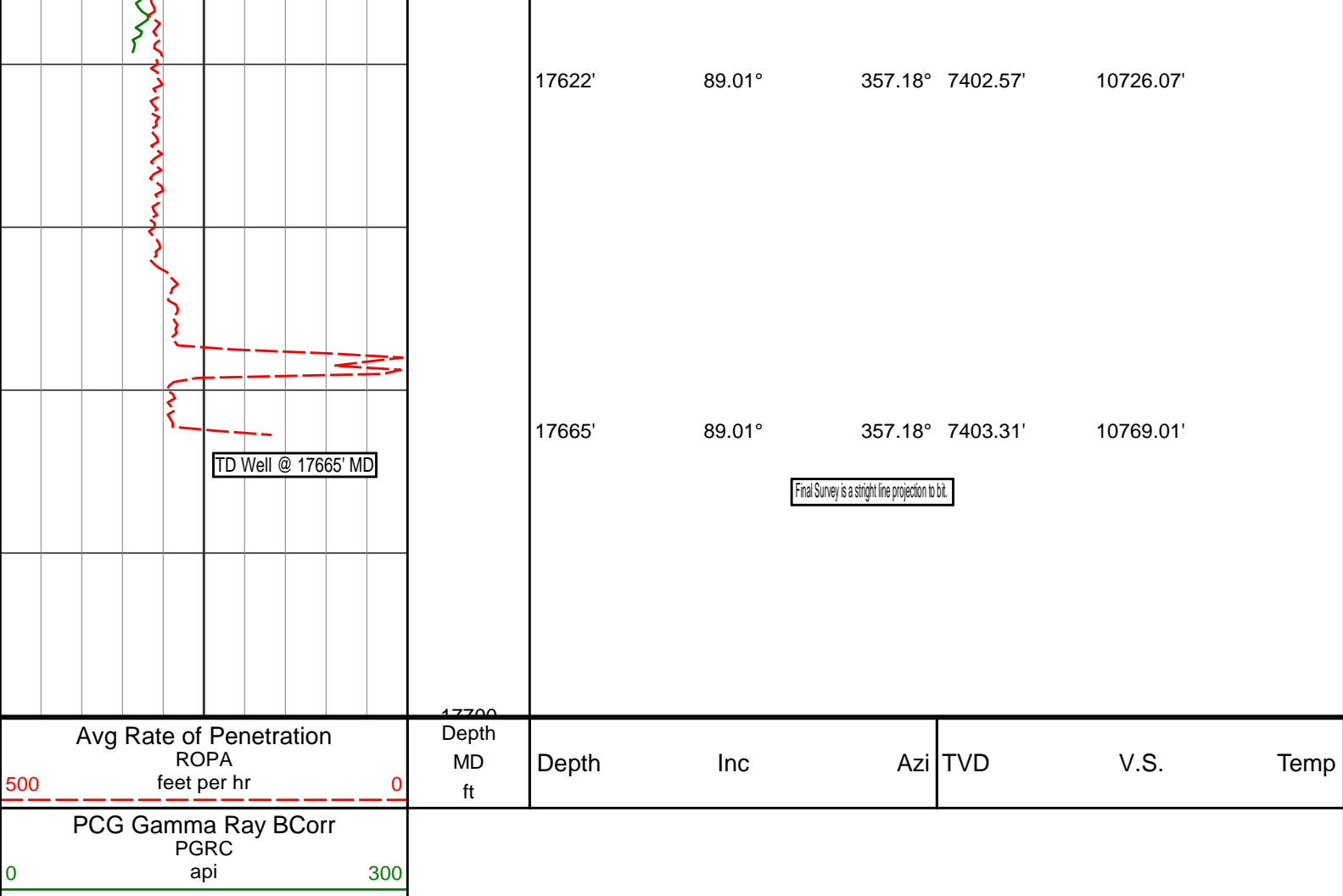
88.77°

358.03° 7399.02'

10543.26'

17500

17600



## HALLIBURTON

### DIRECTIONAL SURVEY REPORT

APC  
Gee 2C-12HZ  
Wattenburg  
Weld Colorado  
USA  
CA-XX-0901850478

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
979.00	0.44	334.59	978.99	2.20 N	0.76 W	2.20	TIE-IN
1106.00	1.15	335.33	1105.98	3.80 N	1.50 W	3.80	0.56
1295.00	0.60	319.12	1294.95	6.27 N	2.94 W	6.27	0.32
1487.00	0.90	282.41	1486.94	7.35 N	5.07 W	7.36	0.29
1579.00	0.89	106.61	1578.94	7.31 N	5.09 W	7.31	1.94
1761.00	0.33	11.71	1760.93	7.41 N	3.63 W	7.42	0.54
1944.00	0.07	204.73	1943.93	7.83 N	3.57 W	7.83	0.22
2127.00	0.39	356.07	2126.92	8.35 N	3.66 W	8.35	0.25
2310.00	0.70	255.07	2309.92	8.68 N	4.78 W	8.69	0.47
2494.00	1.23	271.94	2493.89	8.46 N	7.84 W	8.47	0.32
2677.00	0.31	305.26	2676.88	8.81 N	10.21 W	8.82	0.54
2860.00	0.44	320.47	2859.87	9.64 N	11.06 W	9.65	0.09
3044.00	0.45	297.24	3043.87	10.52 N	12.15 W	10.52	0.10
3227.00	0.56	0.34	3226.86	11.74 N	12.79 W	11.75	0.29
3404.00	0.96	345.29	3403.84	14.04 N	13.16 W	14.05	0.25
3575.00	1.25	350.43	3574.81	17.26 N	13.83 W	17.27	0.18
3746.00	0.95	350.87	3745.78	20.50 N	14.37 W	20.51	0.18
3917.00	1.30	337.93	3916.75	23.70 N	15.32 W	23.71	0.25

4089.00	2.00	326.84	4088.68	28.02 N	17.70 W	28.03	0.45
4260.00	2.79	316.46	4259.53	33.53 N	22.20 W	33.55	0.53
4431.00	5.15	304.81	4430.11	40.93 N	31.37 W	40.96	1.45
4601.00	8.50	308.21	4598.88	53.06 N	47.51 W	53.10	1.98
4772.00	9.84	308.63	4767.69	70.00 N	68.85 W	70.05	0.78
4943.00	10.59	308.94	4935.98	89.00 N	92.49 W	89.07	0.44
5114.00	11.22	310.98	5103.89	109.79 N	117.27 W	109.87	0.43
5285.00	9.08	312.82	5272.20	129.87 N	139.73 W	129.97	1.27
5456.00	11.16	313.69	5440.53	150.48 N	161.59 W	150.59	1.22
5627.00	8.12	312.75	5609.10	170.11 N	182.43 W	170.24	1.78
5798.00	7.98	305.84	5778.42	185.26 N	200.92 W	185.40	0.57
5970.00	9.58	302.74	5948.40	199.99 N	222.64 W	200.14	0.97
6141.00	10.26	297.20	6116.84	214.65 N	248.16 W	214.82	0.68
6310.00	6.53	292.35	6284.01	225.18 N	270.44 W	225.37	2.24
6480.00	6.16	303.70	6452.97	233.92 N	286.97 W	234.12	0.77
6651.00	6.23	333.52	6623.02	247.32 N	298.74 W	247.53	1.86
6737.00	4.79	1.99	6708.63	255.09 N	300.70 W	255.30	3.54
6780.00	4.34	3.44	6751.50	258.51 N	300.54 W	258.72	1.08
6823.00	3.98	357.79	6794.38	261.62 N	300.50 W	261.83	1.27
6866.00	7.29	350.39	6837.17	265.80 N	301.01 W	266.01	7.87
6908.00	10.55	350.80	6878.66	272.23 N	302.07 W	272.44	7.76
6951.00	14.66	355.48	6920.61	281.54 N	303.13 W	281.75	9.84
6993.00	19.91	357.04	6960.70	293.99 N	303.92 W	294.20	12.55
7036.00	24.00	359.89	7000.58	310.05 N	304.31 W	310.27	9.83
7078.00	28.18	3.34	7038.29	328.51 N	303.75 W	328.72	10.58
7121.00	30.37	5.33	7075.80	349.47 N	302.15 W	349.68	5.57
7164.00	32.49	2.51	7112.49	371.83 N	300.64 W	372.04	6.00
7207.00	35.91	0.55	7148.05	395.99 N	300.01 W	396.20	8.36
7249.00	40.39	358.84	7181.07	421.92 N	300.17 W	422.13	10.96
7292.00	44.10	358.25	7212.90	450.82 N	300.91 W	451.03	8.68
7334.00	47.18	358.59	7242.26	480.83 N	301.73 W	481.04	7.36
7376.00	52.63	358.46	7269.30	512.94 N	302.56 W	513.15	12.98
7418.00	57.59	359.30	7293.31	547.37 N	303.22 W	547.58	11.92
7460.00	61.48	359.39	7314.60	583.56 N	303.64 W	583.77	9.26
7502.00	64.94	0.56	7333.53	621.05 N	303.65 W	621.26	8.61
7544.00	68.29	0.96	7350.20	659.59 N	303.14 W	659.80	8.02
7586.00	70.82	0.06	7364.87	698.94 N	302.79 W	699.15	6.35
7629.00	73.96	359.27	7377.88	739.92 N	303.03 W	740.13	7.51
7671.00	79.94	359.93	7387.36	780.81 N	303.31 W	781.02	14.32
7714.00	84.32	359.87	7393.24	823.40 N	303.39 W	823.61	10.19
7753.00	84.91	0.49	7396.90	862.22 N	303.26 W	862.43	2.19
7872.00	90.52	0.23	7401.65	981.08 N	302.52 W	981.29	4.72
8044.00	90.46	359.98	7400.18	1153.07 N	302.20 W	1153.28	0.15
8215.00	90.49	358.79	7398.76	1324.05 N	304.04 W	1324.26	0.70
8386.00	90.83	0.57	7396.79	1495.03 N	304.99 W	1495.24	1.06
8557.00	89.97	0.32	7395.59	1666.02 N	303.67 W	1666.23	0.52
8728.00	89.11	359.43	7396.97	1837.01 N	304.04 W	1837.22	0.72
8899.00	89.63	0.20	7398.85	2008.00 N	304.59 W	2008.21	0.54
9068.00	90.15	1.84	7399.17	2176.96 N	301.58 W	2177.17	1.02
9239.00	90.56	0.44	7398.11	2347.92 N	298.18 W	2348.13	0.85
9411.00	90.06	357.67	7397.18	2519.88 N	301.02 W	2520.09	1.64
9581.00	89.17	359.25	7398.32	2689.81 N	305.59 W	2690.02	1.07
9752.00	89.17	0.02	7400.80	2860.78 N	306.68 W	2861.00	0.45
9923.00	90.49	0.21	7401.31	3031.78 N	306.33 W	3031.99	0.78
10095.00	90.03	0.80	7400.53	3203.77 N	304.82 W	3203.98	0.43
10266.00	90.15	0.82	7400.26	3374.75 N	302.40 W	3374.96	0.07
10437.00	90.55	1.06	7399.21	3545.73 N	299.59 W	3545.93	0.27
10608.00	90.68	0.32	7397.38	3716.70 N	297.53 W	3716.91	0.44
10779.00	90.71	359.82	7395.31	3887.69 N	297.33 W	3887.90	0.29
10950.00	90.06	0.60	7394.16	4058.68 N	296.70 W	4058.89	0.59
11120.00	90.52	0.02	7393.30	4228.68 N	295.78 W	4228.88	0.44
11292.00	89.85	0.46	7392.74	4400.67 N	295.06 W	4400.88	0.47
11463.00	89.32	1.79	7393.98	4571.63 N	291.70 W	4571.83	0.84
11634.00	90.19	1.02	7394.71	4742.57 N	287.51 W	4742.77	0.68
11805.00	90.25	0.44	7394.05	4913.56 N	285.33 W	4913.76	0.34
11975.00	89.17	0.39	7394.91	5083.55 N	284.10 W	5083.75	0.64
12147.00	90.56	0.49	7395.32	5255.54 N	282.78 W	5255.74	0.81
12318.00	89.97	359.24	7394.53	5426.53 N	283.18 W	5426.73	0.81
12488.00	90.68	358.68	7393.56	5596.50 N	286.27 W	5596.70	0.53
12658.00	90.22	357.29	7392.23	5766.39 N	292.24 W	5766.59	0.86
12828.00	91.66	356.95	7389.44	5936.14 N	300.78 W	5936.35	0.87
13000.00	92.83	358.87	7385.88	6123.02 N	308.87 W	6123.24	1.12



12999.00	90.86	359.37	7385.68	6107.00 N	306.27 W	6107.21	1.49
13170.00	89.42	1.62	7385.26	6277.98 N	304.80 W	6278.19	1.56
13339.00	89.54	0.27	7386.80	6446.94 N	302.01 W	6447.15	0.80
13510.00	89.69	359.48	7387.94	6617.94 N	302.38 W	6618.15	0.47
13681.00	90.74	1.25	7387.30	6788.92 N	301.29 W	6789.13	1.20
13852.00	91.73	0.64	7383.62	6959.86 N	298.47 W	6960.06	0.68
14024.00	87.81	358.65	7384.31	7131.81 N	299.54 W	7132.02	2.56
14195.00	90.31	0.39	7387.11	7302.76 N	300.97 W	7302.97	1.78
14366.00	88.74	359.57	7388.53	7473.75 N	301.03 W	7473.96	1.04
14534.00	91.05	0.06	7388.84	7641.74 N	301.57 W	7641.95	1.41
14706.00	88.55	358.49	7389.44	7813.70 N	303.75 W	7813.91	1.72
14877.00	90.00	359.72	7391.60	7984.66 N	306.42 W	7984.87	1.11
15047.00	84.26	356.70	7400.11	8154.27 N	311.71 W	8154.49	3.81
15219.00	90.12	356.83	7408.54	8325.72 N	321.40 W	8325.94	3.41
15389.00	90.86	356.31	7407.09	8495.41 N	331.57 W	8495.64	0.53
15560.00	91.66	355.13	7403.33	8665.88 N	344.33 W	8666.12	0.83
15731.00	90.09	356.65	7400.72	8836.41 N	356.58 W	8836.66	1.28
15902.00	90.89	357.74	7399.25	9007.20 N	364.95 W	9007.45	0.79
16073.00	91.02	355.85	7396.40	9177.90 N	374.51 W	9178.16	1.11
16243.00	90.40	357.81	7394.30	9347.62 N	383.91 W	9347.88	1.21
16415.00	90.18	358.21	7393.43	9519.51 N	389.88 W	9519.78	0.27
16586.00	90.28	357.69	7392.74	9690.40 N	396.00 W	9690.67	0.31
16757.00	90.09	358.75	7392.19	9861.31 N	401.31 W	9861.59	0.63
16927.00	90.71	357.56	7391.00	10031.22 N	406.78 W	10031.50	0.79
17099.00	88.58	359.02	7392.07	10203.12 N	411.91 W	10203.41	1.50
17269.00	88.98	358.99	7395.69	10373.06 N	414.86 W	10373.35	0.24
17439.00	88.77	358.03	7399.02	10542.97 N	419.28 W	10543.26	0.58
17622.00	89.01	357.18	7402.57	10725.77 N	426.93 W	10726.07	0.48
17665.00	89.01	357.18	7403.31	10768.71 N	429.05 W	10769.01	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 359.96 DEGREES (TRUE)  
A TOTAL CORRECTION OF 8.52 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 17665.00 FEET  
IS 10777.25 FEET ALONG 357.72 DEGREES (TRUE)**

**Directional surveys tied onto Gyro's @ 979' MD. Final survey is a straight line projection to bit.**