



1:240 / 1:240

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	25-Dec-14	31-Jan-15	03-Feb-15		
Rig Bit Number	0100	200	0300		
Bit Size (in)	8.750	6.125	6.125		
Tool Nominal OD (in)	6.875	4.750	4.760		
Log Start Depth (MD, ft)	1,077.00	7,752.00	12,518.00		
Log End Depth (MD, ft)	7,752.00	12,518.00	16,842.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	22-Dec-14 22:58	30-Jan-15 05:50	01-Feb-15 10:18		
Drill/Wipe End Date and Time	24-Dec-14 22:13	31-Jan-15 12:15	03-Feb-15 01:58		
Min Inc (deg) @ Depth (MD, ft)	0.26 @ 6,310.00	87.90 @ 12,218.00	88.86 @ 13,499.00		
Max Inc (deg) @ Depth (MD, ft)	89.26 @ 7,752.00	90.62 @ 8,971.00	91.45 @ 13,157.00		
Bit TFA(in2) / Bit Type	2.03 / PDC	1.24 / N/A	1.53 / PDC		
Flow Rate (gpm)	631.42	302.14	303.10		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	340.6 / N/A	N/A / N/A		
Fluid Type	Native/Spud Mud	Diesel Mud Base	Mineral Oil Bas		
Density (ppg) / Viscosity (spqt)	9.50 / 43.00	9.80 / 64.00	9.70 / 64.00		
Filtrate CL (ppm)	1,400.00	56,000.00	N/A		
pH / Fluid Loss (mptm)	8.90 / 0	N/A / N/A	N/A / N/A		
PV (cP) / YP (lbf2)	10 / 11.00	20 / 13.00	17 / 12.00		
% Solids / % Sand	9.5 / N/A	12.00 / 0.02	12.00 / 0.02		
% Oil / Oil:Water Ratio	N/A / N/A	59.00 / 67:33	61.00 / 71:29		
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 Temp (in) Temp (degF)	173.75 / 353M	222.75 / 423M	247.75 / 476M		

Max Tool Temp (degF) / Source	172.78 / PCM	228.74 / PCM	247.78 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 172.78	N/A @ 228.74	N/A @ 247.78		
Lead MWD Engineer	Clay Wass	Clay Wass	Clay Wass		
Customer Representative	Scott Hancock	Scott Hancock	Scott Hancock		

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	11400838	11680725	11055831		
Date and Time Initialized	21-Dec-14 12:59	28-Jan-15 11:54	31-Jan-15 16:20		
Date and Time Read	25-Dec-14 04:38	01-Jan-70 00:00	03-Feb-15 18:19		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	45.00	43.00	43.00		
Software Version	6.21	6.33	6.21		
Sub Serial Number	11404299	12310746	12310746		
Sonde Serial Number	12174339	11297491	11297516		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	237.50	22.16	295.09		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	48.31	45.78	45.81		
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	11680971	11293376	11680902		

REMARKS

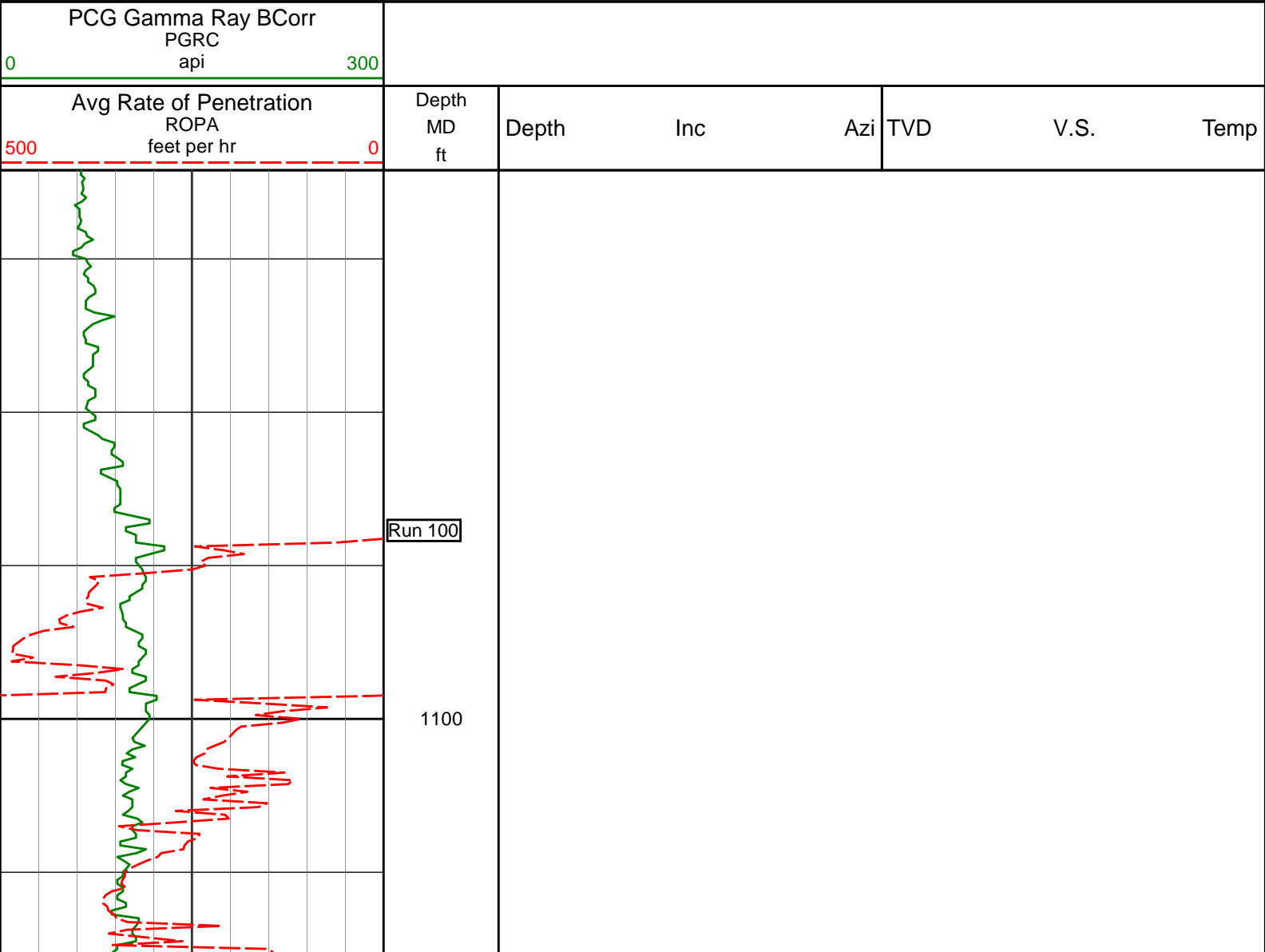
1. All depths are true vertical depths, referenced to the Driller's pipe tally and are measured from the Drill Floor, unless otherwise specified.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annular velocities are calculated using the "Power Law" model for water 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

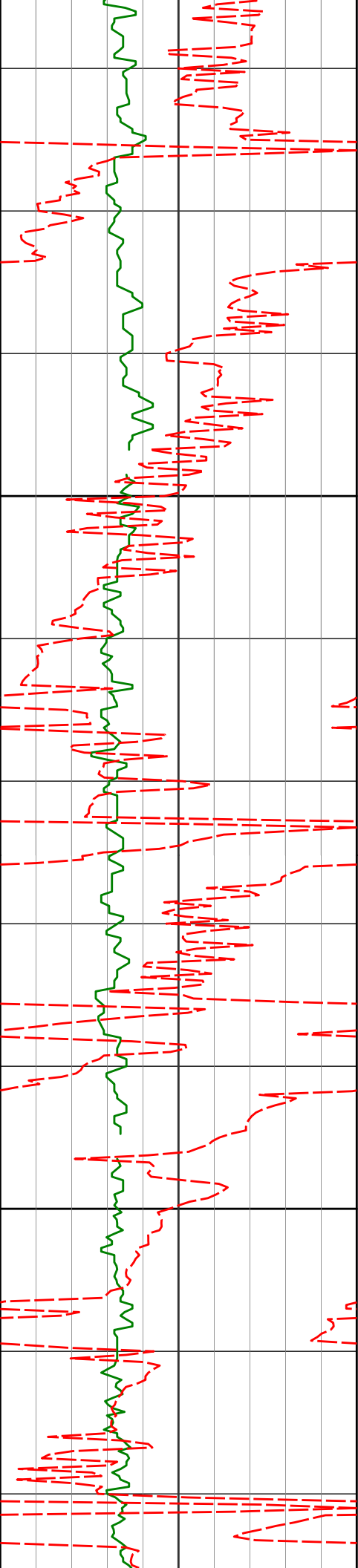
Insite version: 8.1.10

WARRANTY

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MD Detail 1:240 Scale





1200

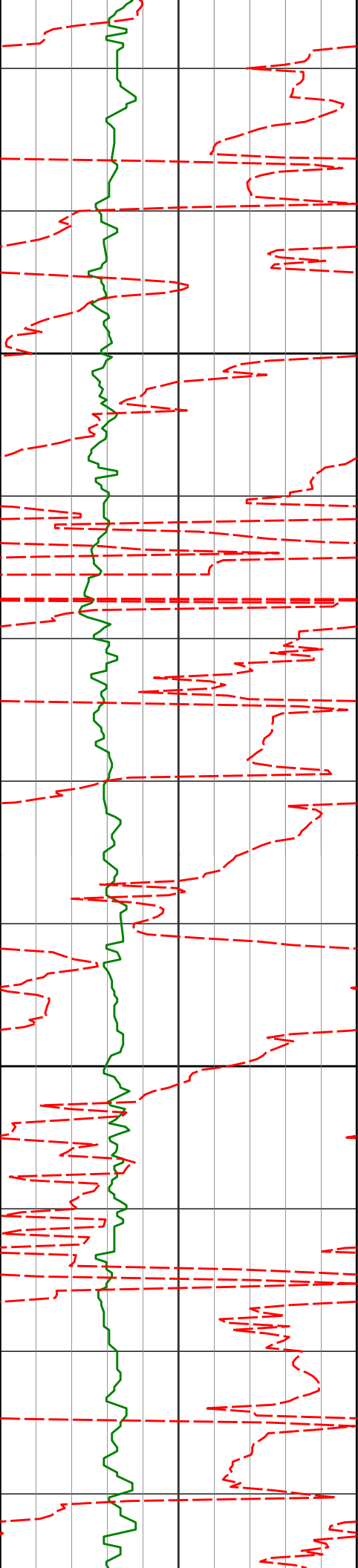
1200'

1.11°

272.94° 1199.88'

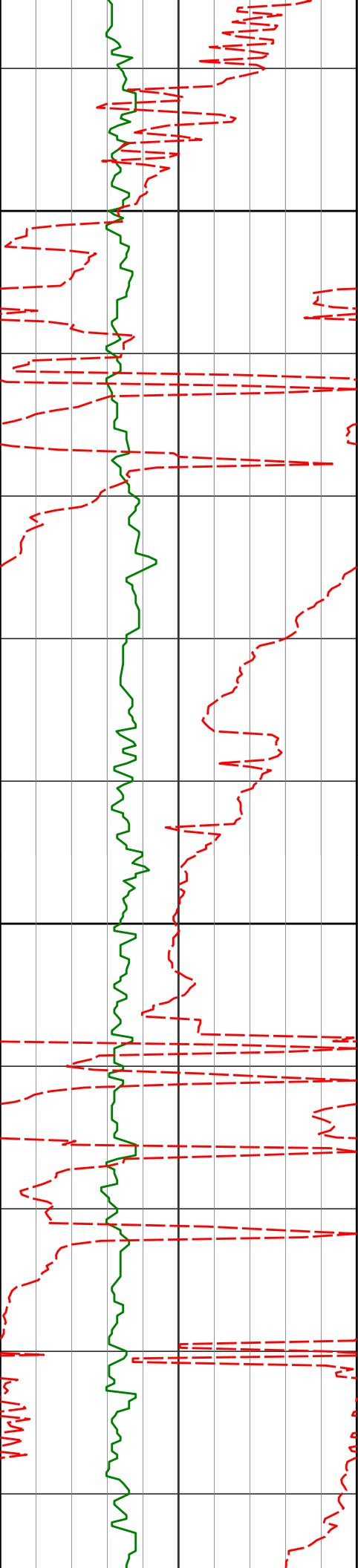
5.51'

1300



1400

1500



1600

1700

1685'

1760'

1.03°

1.15°

242.80°

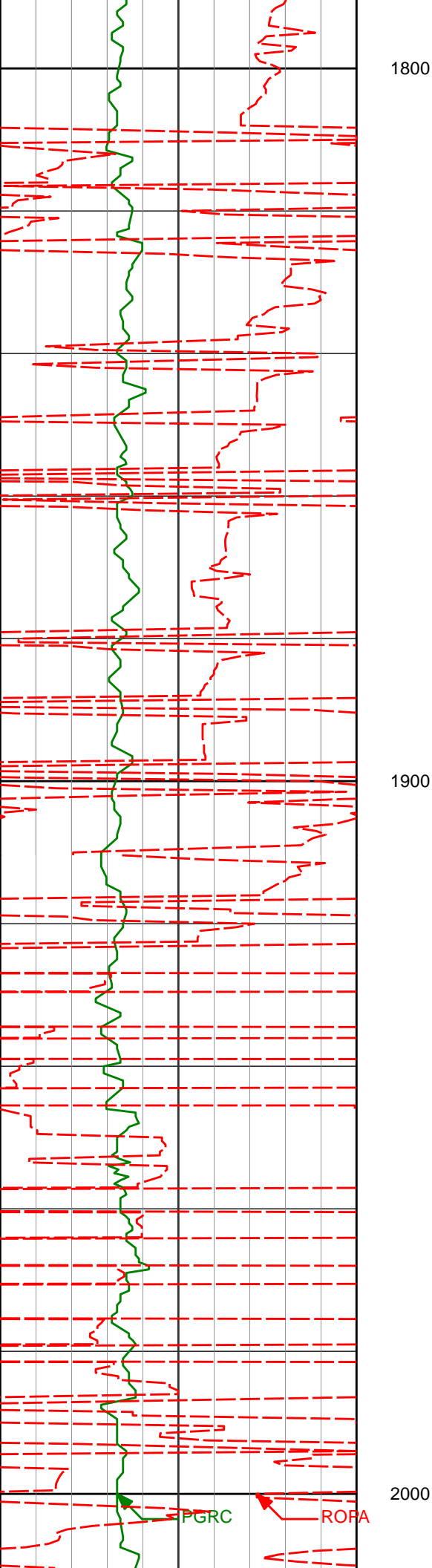
239.55°

1684.80'

1759.79'

7.26'

7.95'

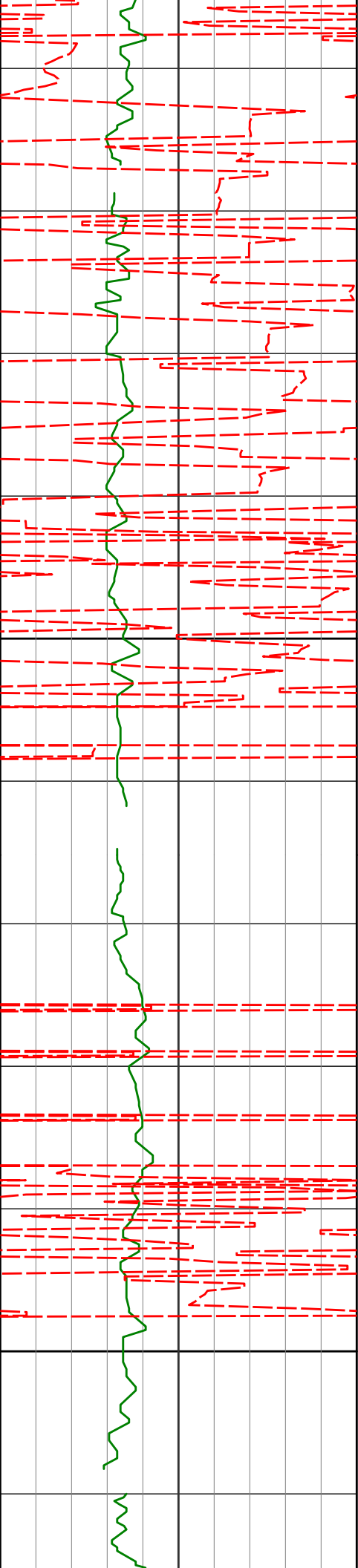


1943'

0.74°

273.02° 1942.77'

8.82'



2100

2126'

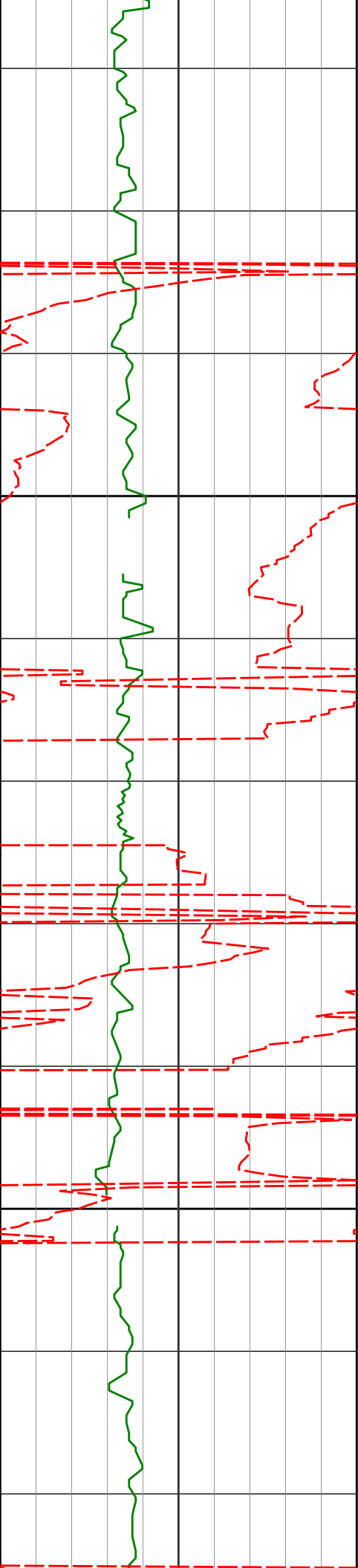
0.47°

278.83°

2125.76'

8.64'

2200



2300

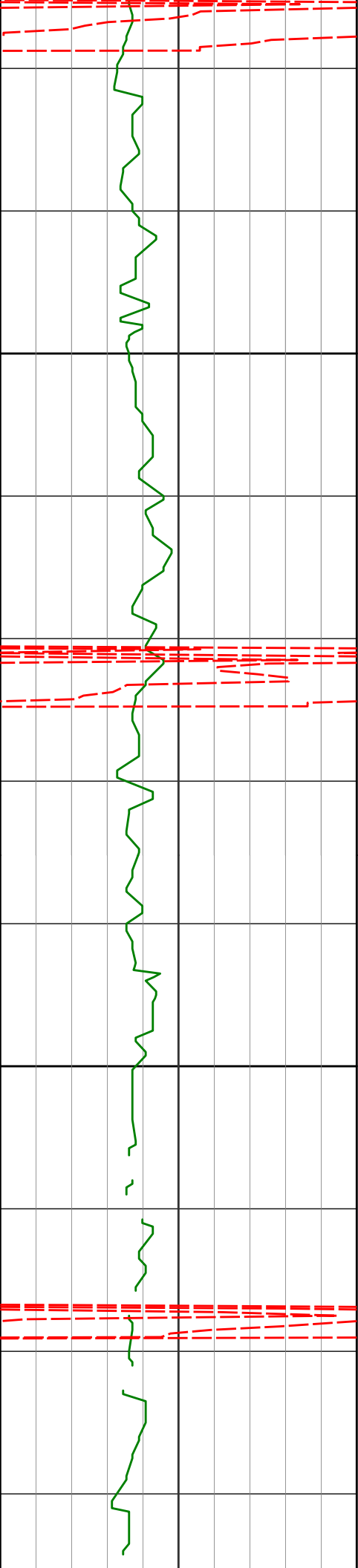
2310'

0.56°

298.46° 2309.75'

8.10'

2400



2493'

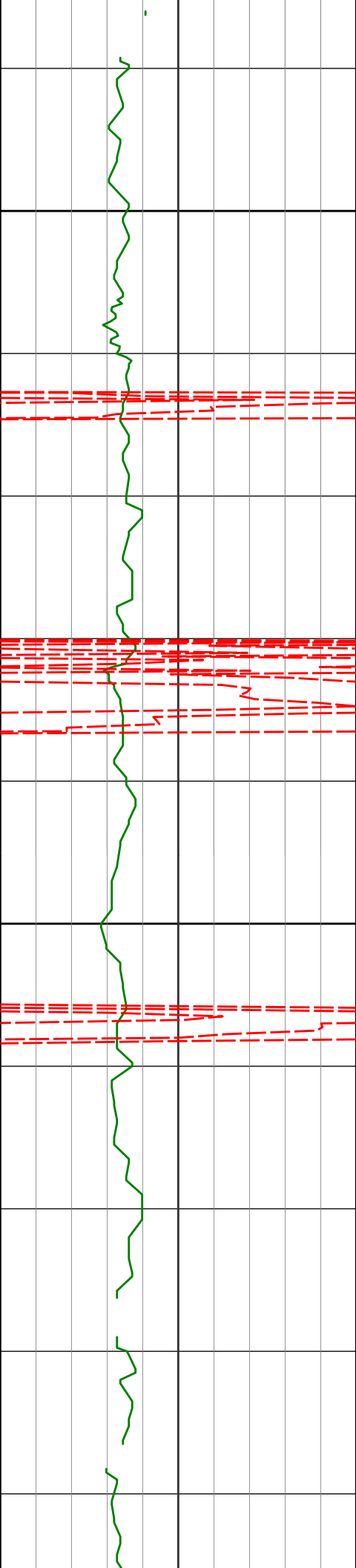
1.43°

187.30° 2492.73'

9.94'

2500

2600



2700

2800

2676'

1.98°

194.45° 2675.65'

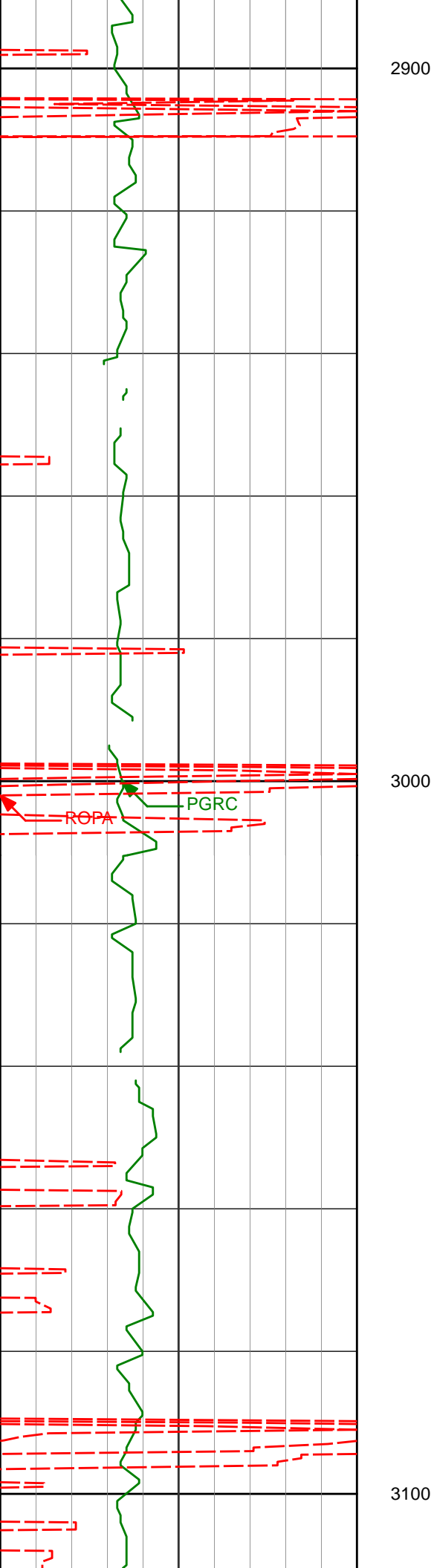
15.26'

2859'

0.59°

155.35° 2858.60'

19.18'

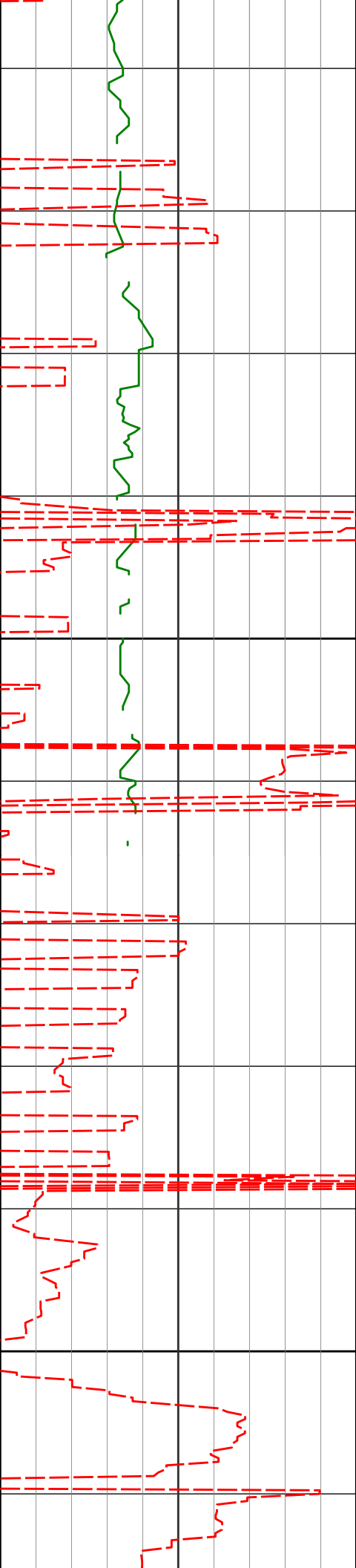


3043'

0.45°

95.75° 3042.59'

20.11'



3200

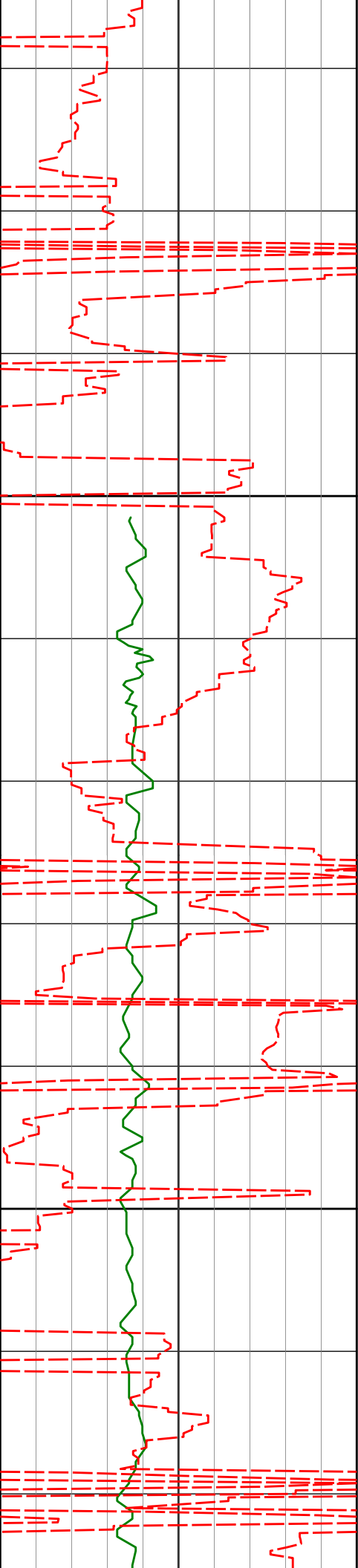
3226'

0.46°

263.99° 3225.59'

20.26'

3300



3400

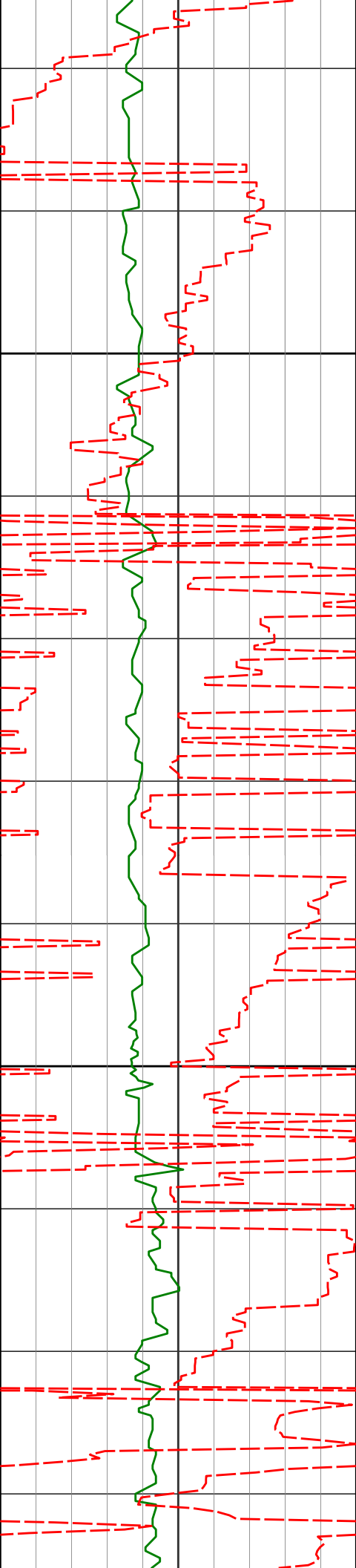
3403'

0.69°

314.91° 3402.58'

19.58'

3500



3600

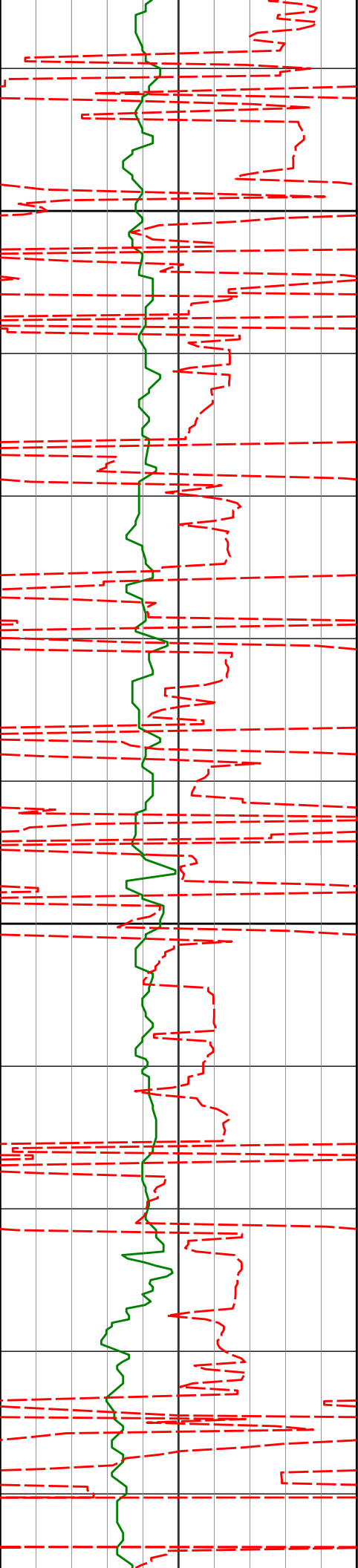
3659'

 0.51°

255.29° 3658.57'

18.79'

3700



3800

3831'

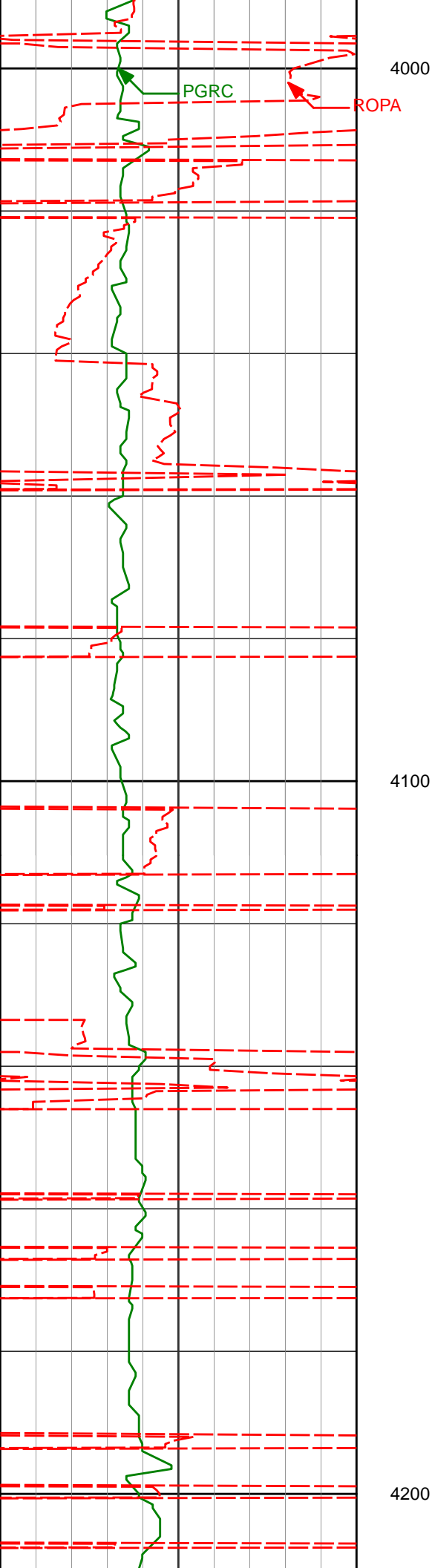
0.85°

211.41°

3830.56'

20.07'

3900



4002'

1.61°

238.93° 4001.52'

22.39'

4100

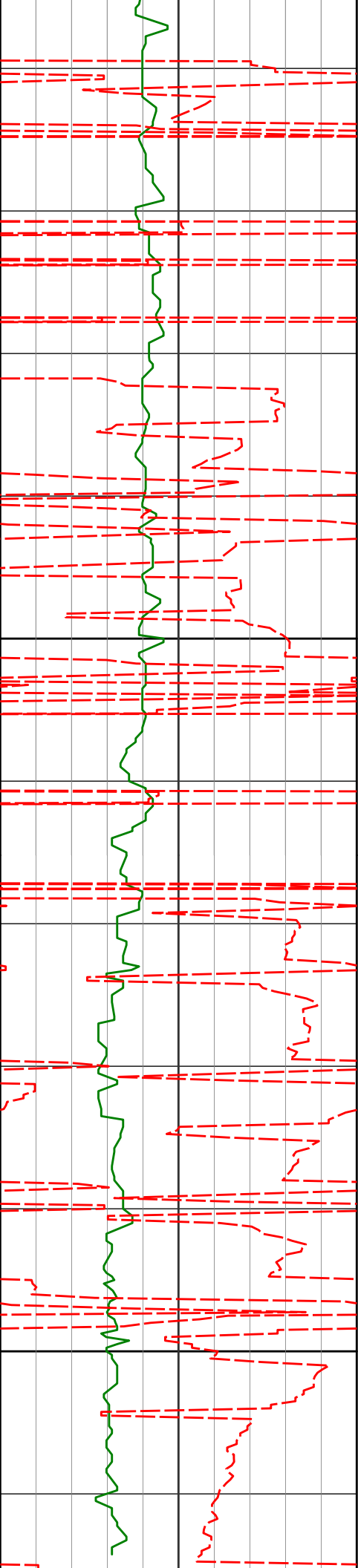
4173'

1.39°

272.45° 4172.46'

23.54'

4200



4300

4345'

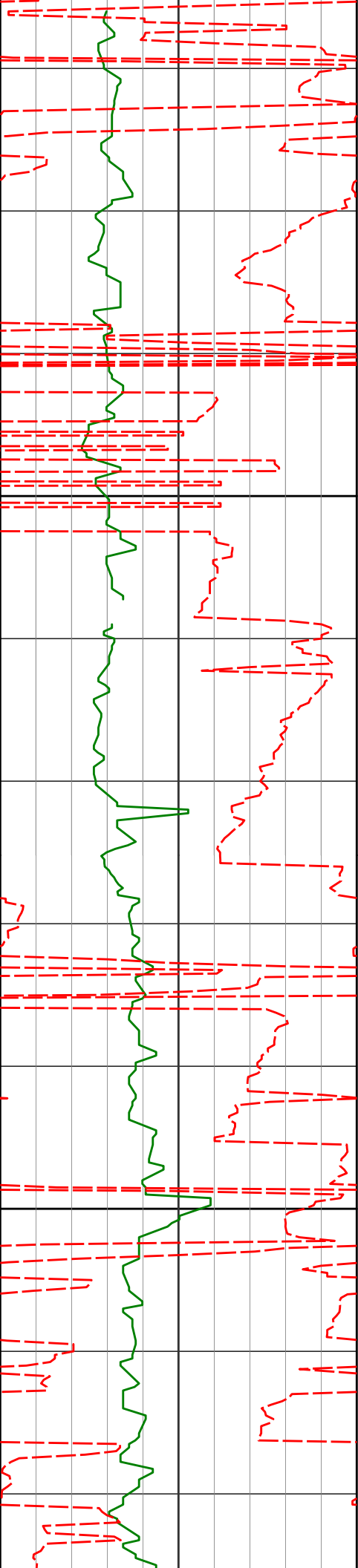
2.33°

283.22°

4344.37'

22.65'

4400



4500

4515'

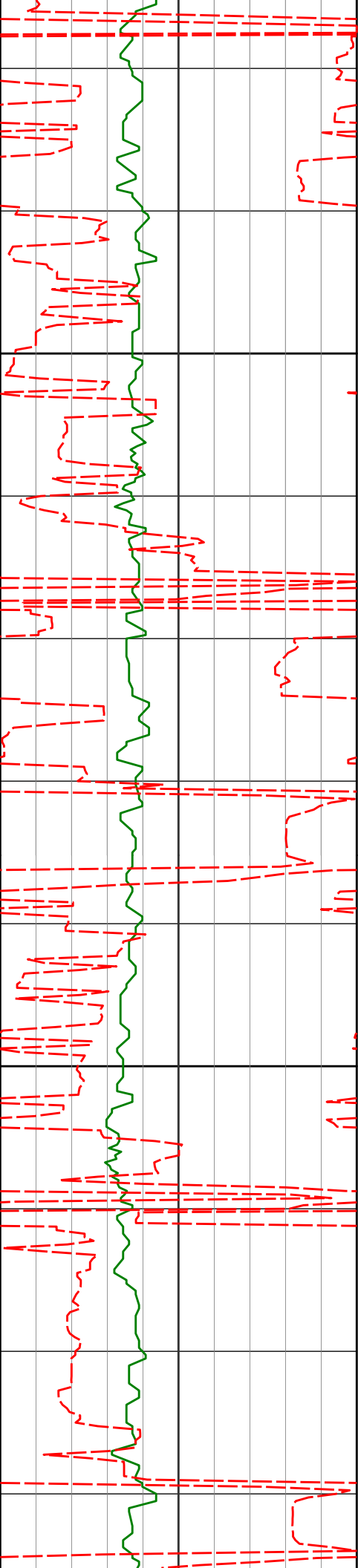
2.67°

274.74°

4514.21'

21.54'

4600



4700

4800

4686'

2.17°

267.96°

4685.06'

21.32'

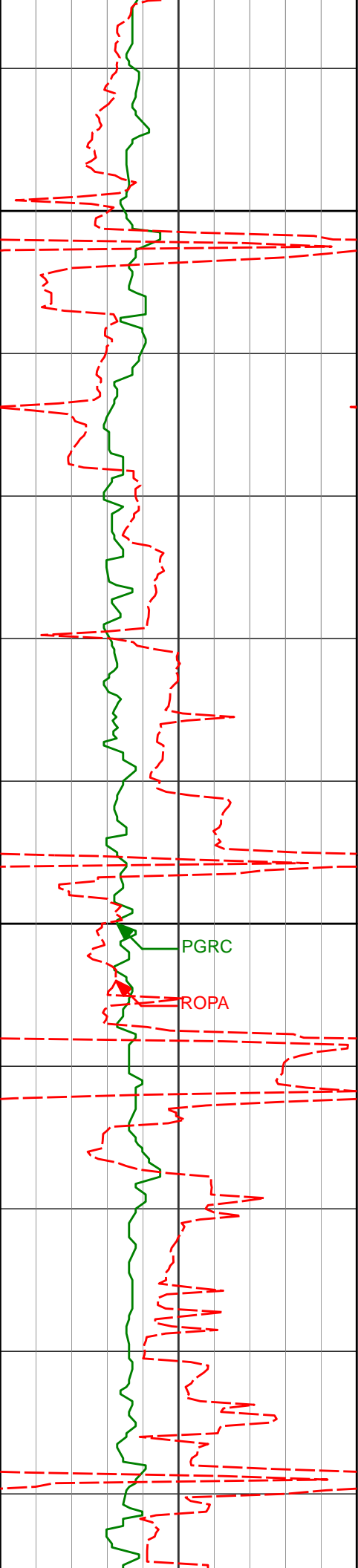
4857'

3.27°

239.72°

4855.87'

23.90'



4900

5000

PGRC

ROPA

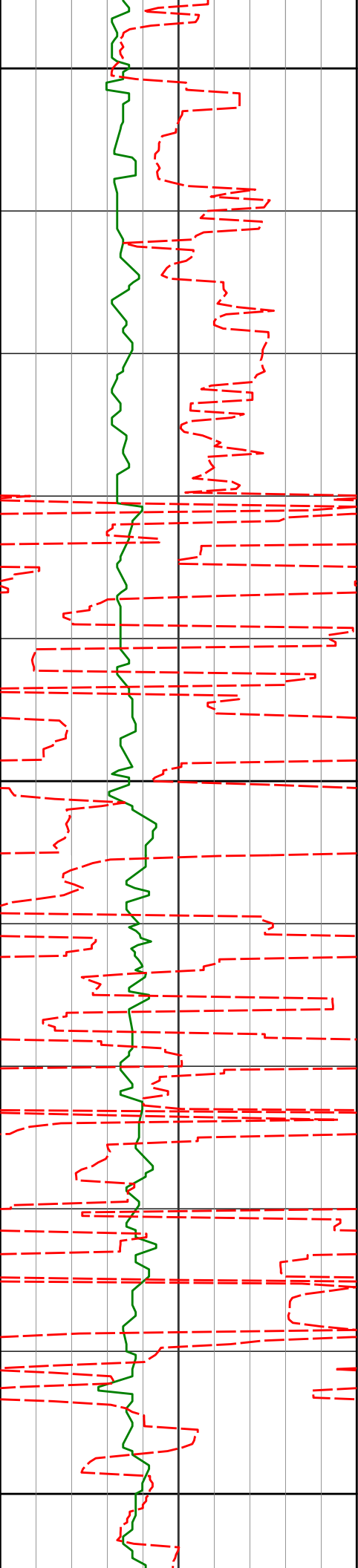
5028'

4.48°

238.05°

5026.48'

29.89'



5100

5200

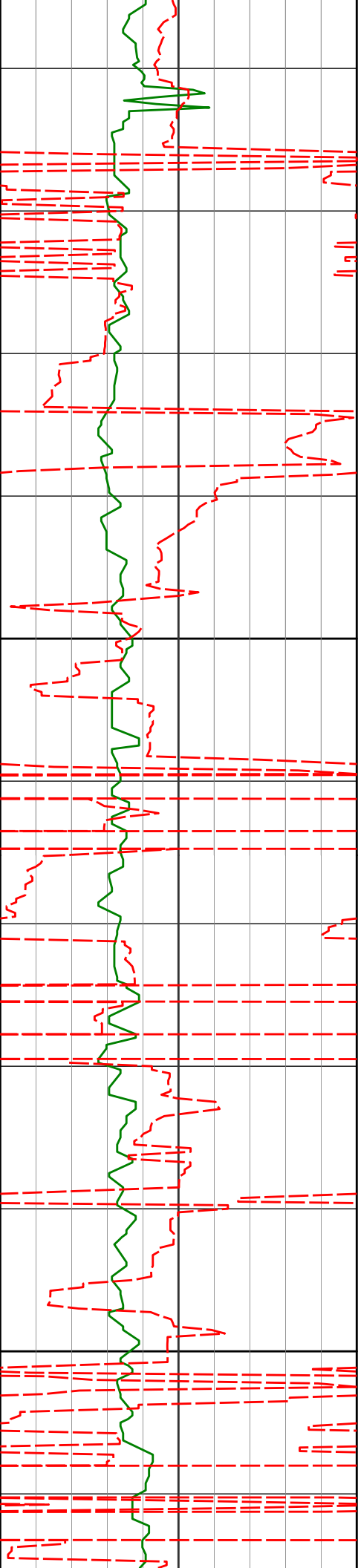
5300

5284'

4.48°

236.19° 5281.69'

40.74'



5400

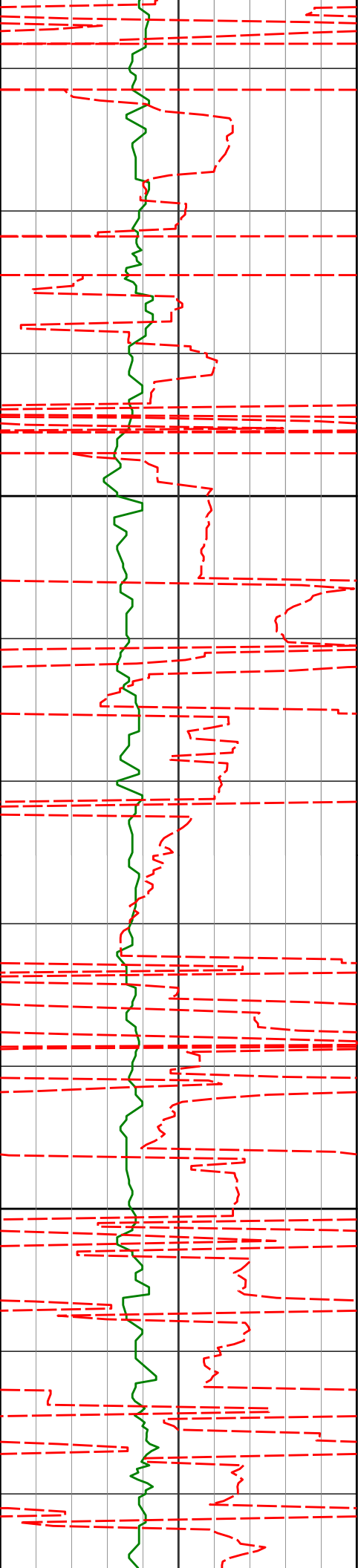
5455'

4.61°

250.00° 5452.16'

46.81'

5500



5600

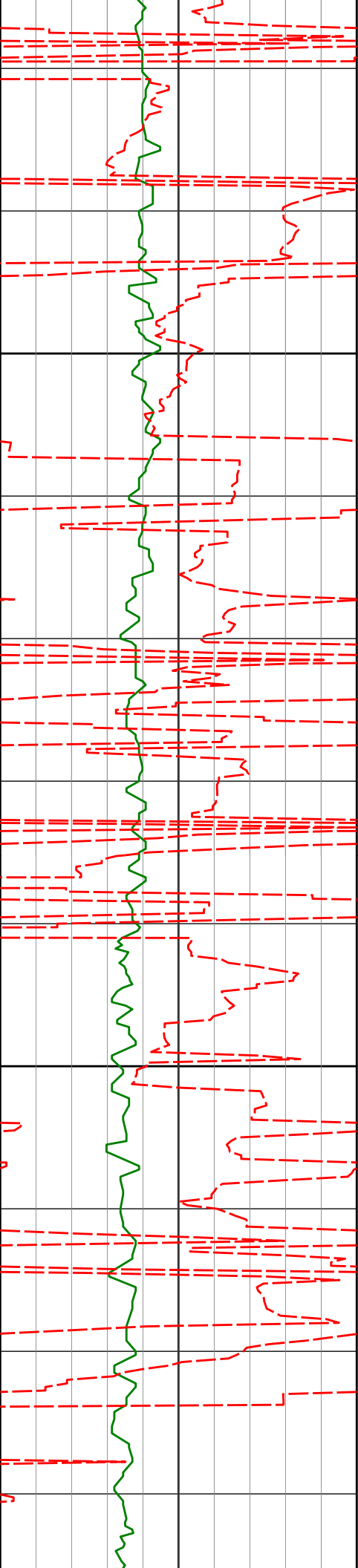
5627'

3.79°

262.21° 5623.70'

49.95'

5700



5800

5798'

3.98°

265.96° 5794.31'

51.13'

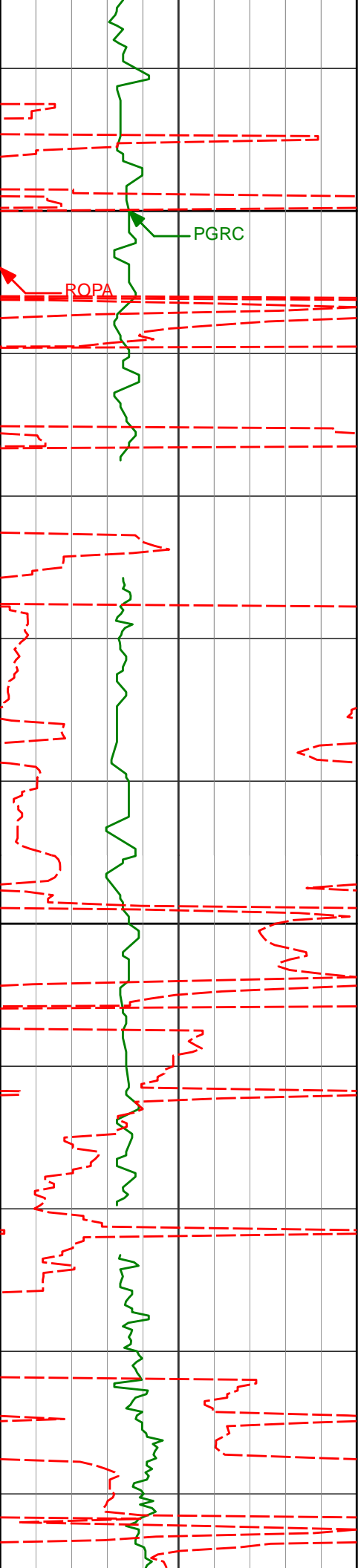
5900

5969'

2.11°

272.89° 5965.06'

51.39'



6000

PGRC

ROPA

6100

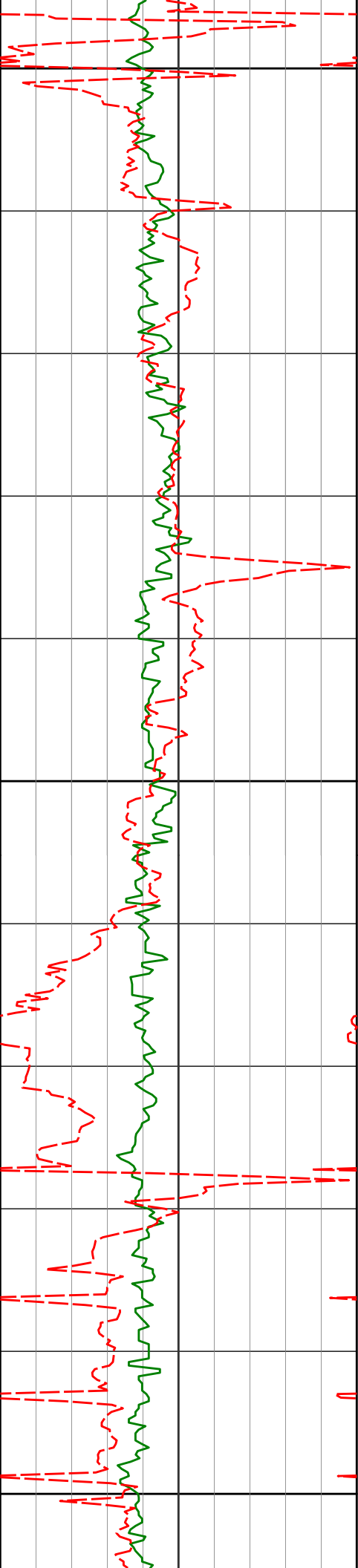
6140'

0.49°

327.83°

6136.01'

50.61'



6200

6300

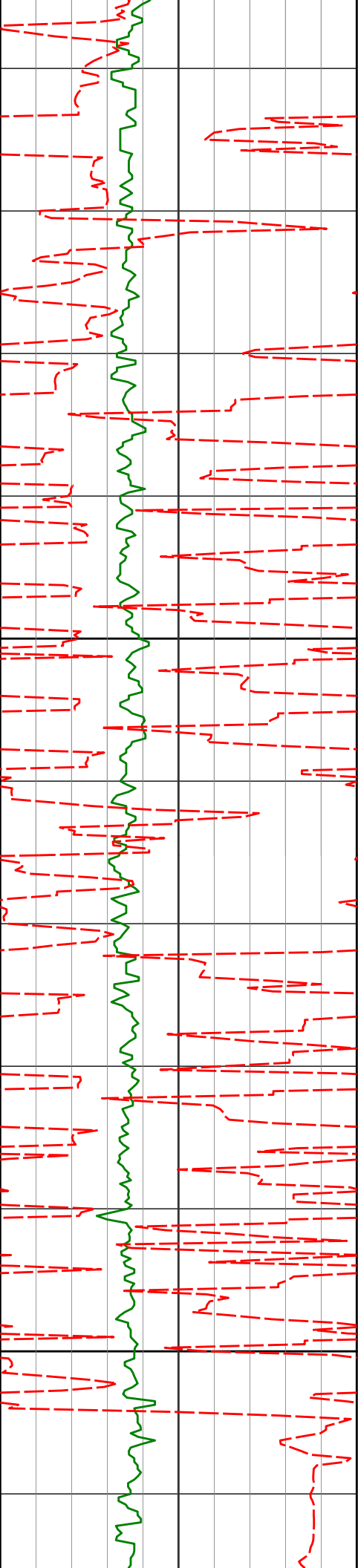
6400

6310'

0.26°

7.05° 6306.01'

49.61'



6500

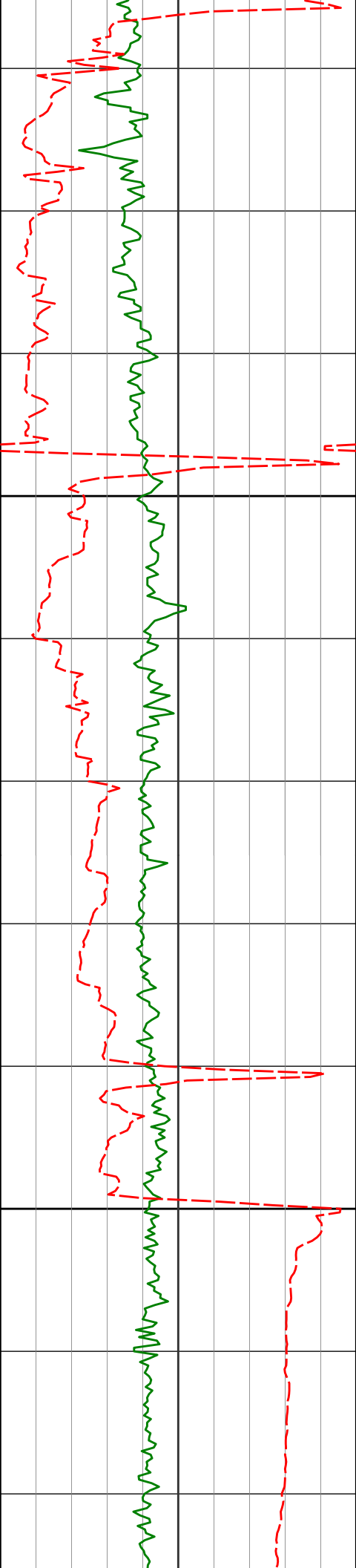
6600

6479'

0.60°

95.71° 6475.01'

49.32'



6700

6800

6651'

1.20°

251.22° 6647.00'

49.99'

6736'

1.14°

237.47° 6731.98'

50.73'

6779'

1.26°

258.25° 6774.97'

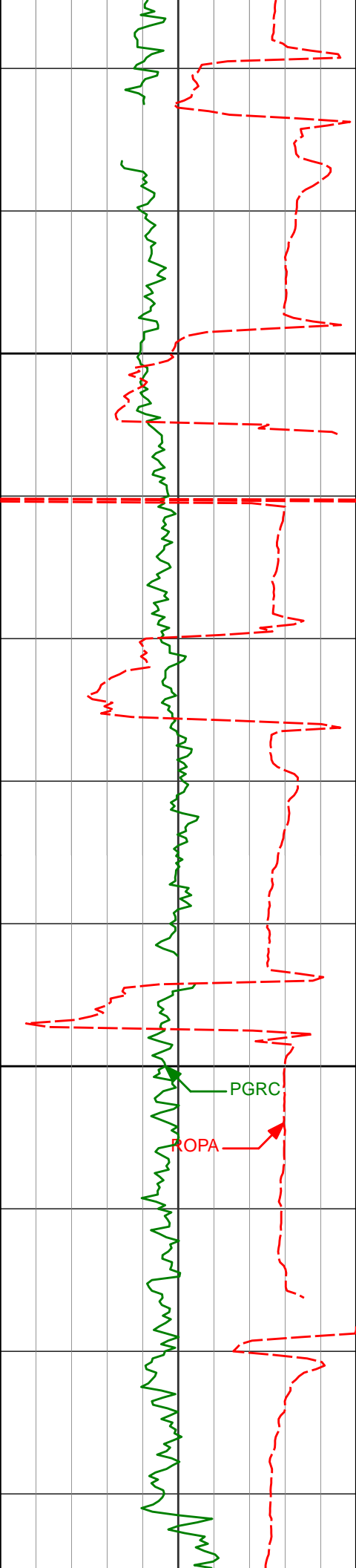
51.06'

6822'

5.16°

211.32° 6817.90'

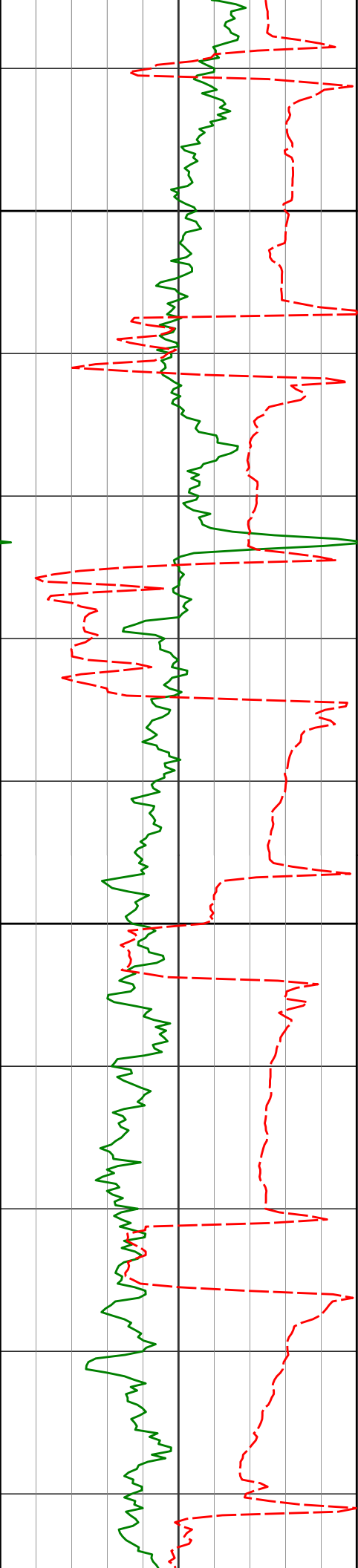
52.81'



6900

7000

6865'	10.38°	206.47°	6860.49'	57.93'
6907'	13.40°	206.01°	6901.58'	65.69'
6950'	16.03°	203.16°	6943.17'	75.63'
6992'	19.92°	201.91°	6983.11'	87.61'
7035'	23.97°	195.80°	7022.99'	102.81'



7100

7200

7077'

28.39°

187.78°

7060.69'

120.93'

7120'

30.82°

180.36°

7098.08'

142.09'

7163'

32.79°

178.15°

7134.63'

164.74'

7206'

35.61°

178.13°

7170.19'

188.90'

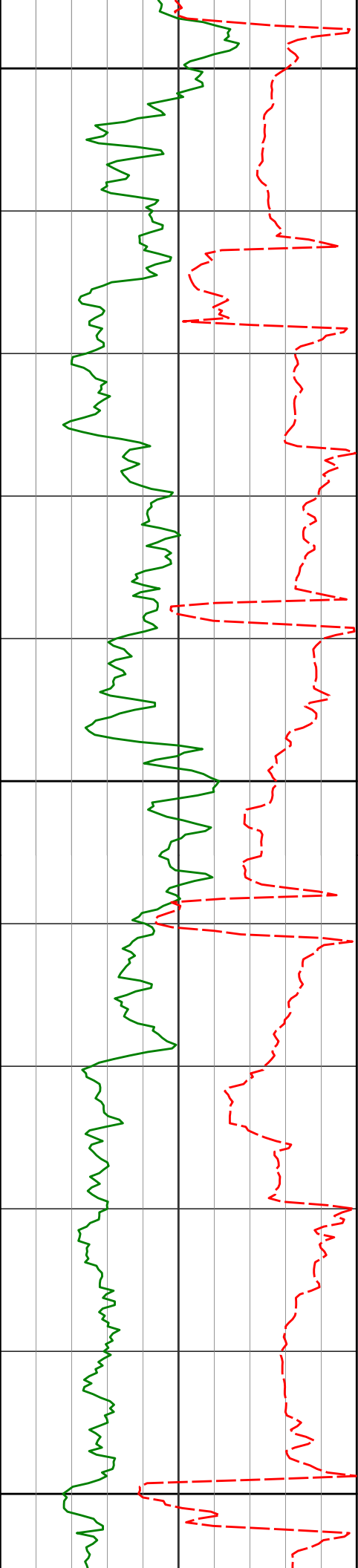
7248'

39.90°

174.98°

7203.39'

214.55'

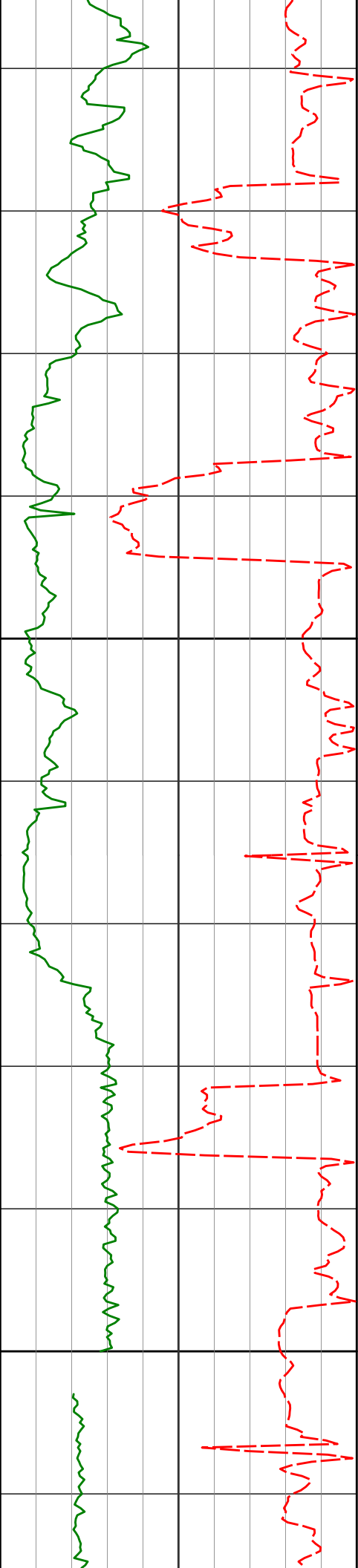


7300

7400

7500

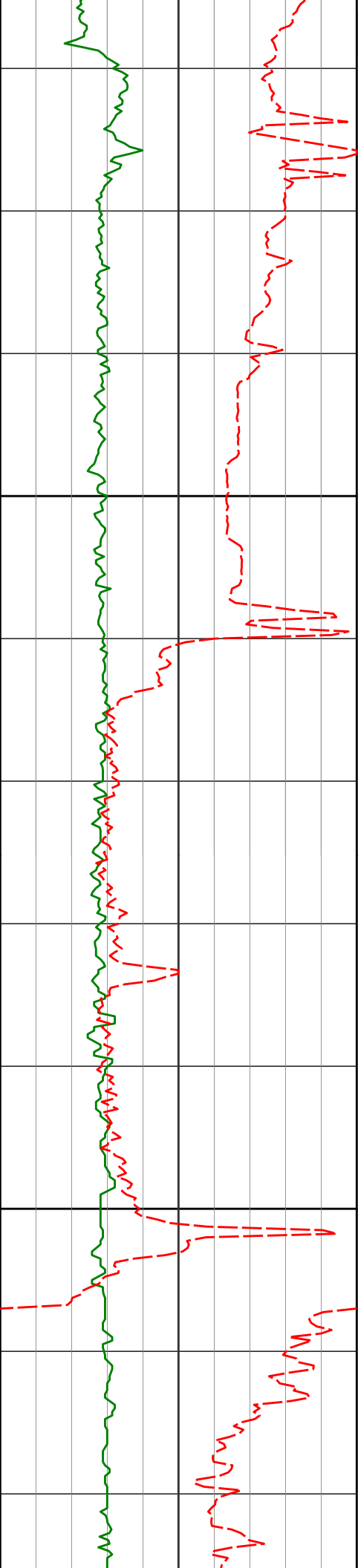
7291'	44.10°	174.70°	7235.34'	243.20'
7333'	47.58°	175.43°	7264.59'	273.21'
7375'	51.67°	177.10°	7291.80'	305.13'
7417'	56.29°	178.91°	7316.49'	339.07'
7459'	61.74°	180.49°	7338.11'	375.06'
7501'	67.32°	179.33°	7356.16'	412.97'



7600

7700

7543'	71.02°	179.56°	7371.09'	452.21'
7585'	74.66°	178.86°	7383.48'	492.33'
7628'	79.81°	179.45°	7392.98'	534.25'
7670'	83.45°	178.83°	7399.09'	575.79'
7707'	85.07°	179.69°	7402.79'	612.60'



Casing Shoe @ 7739' MD

Run 200

7776'

88.98°

180.74° 7406.37'

681.49'

7800

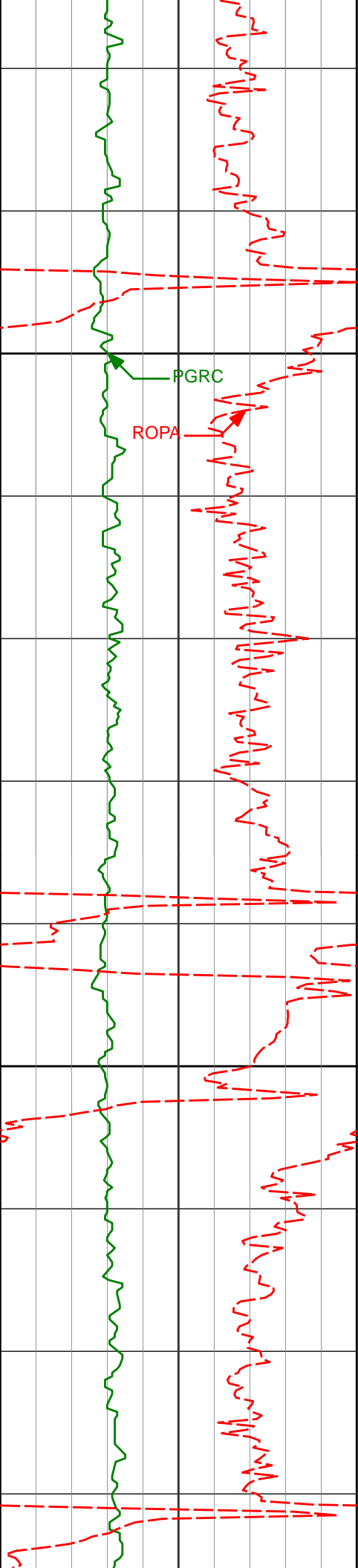
7900

7947'

89.91°

180.75° 7408.03'

852.47'



8000

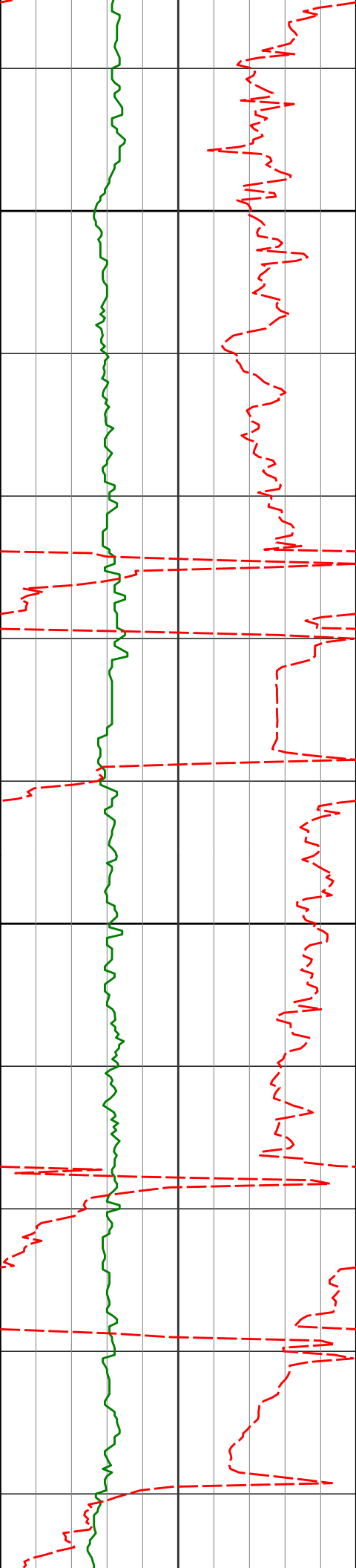
8100

8118'

89.29°

181.87° 7409.22'

1023.42'



8200

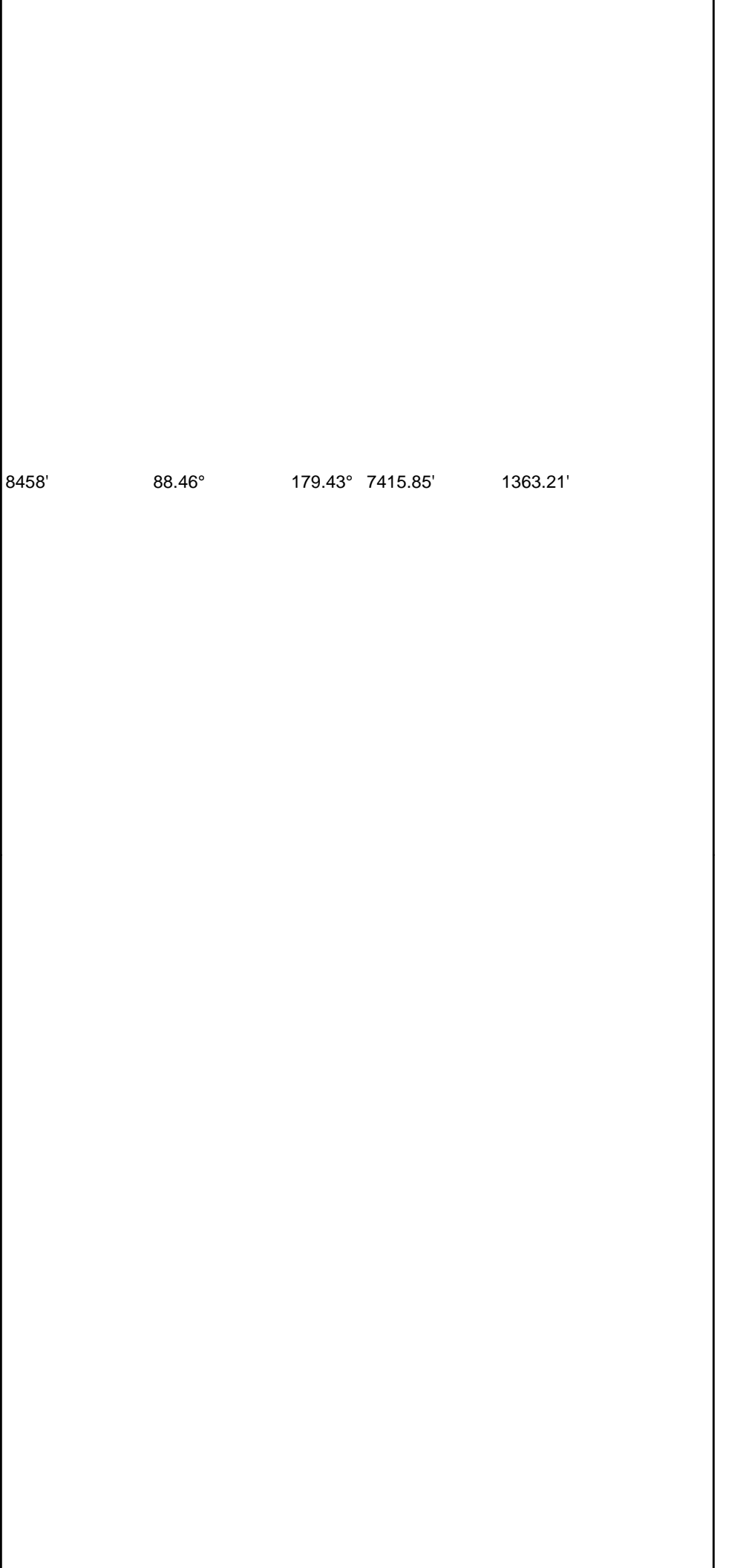
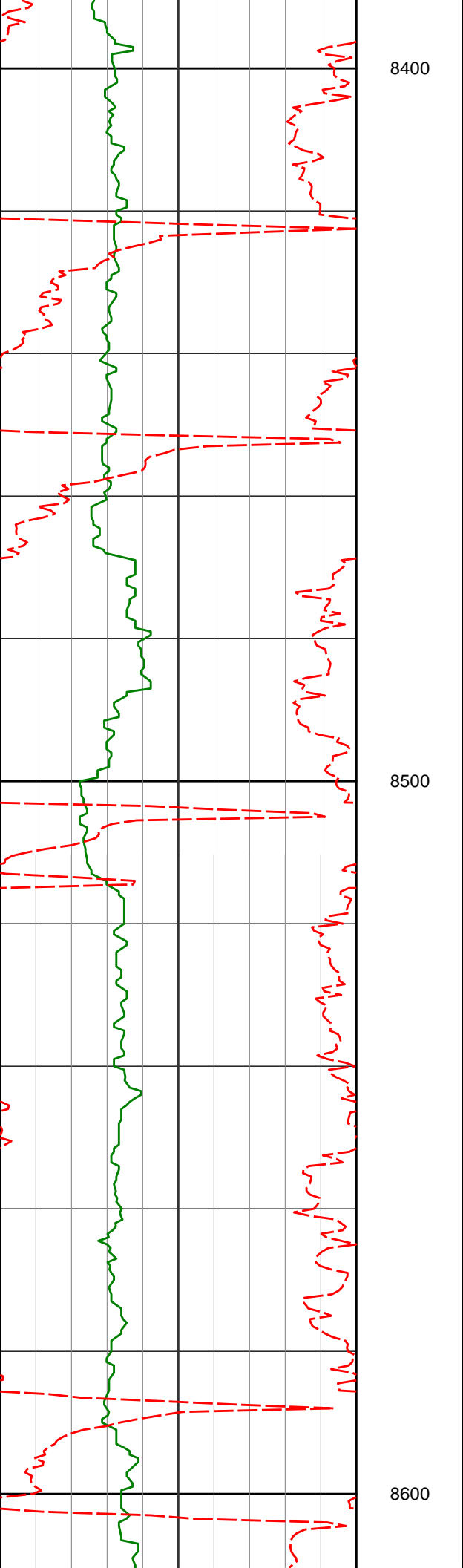
8300

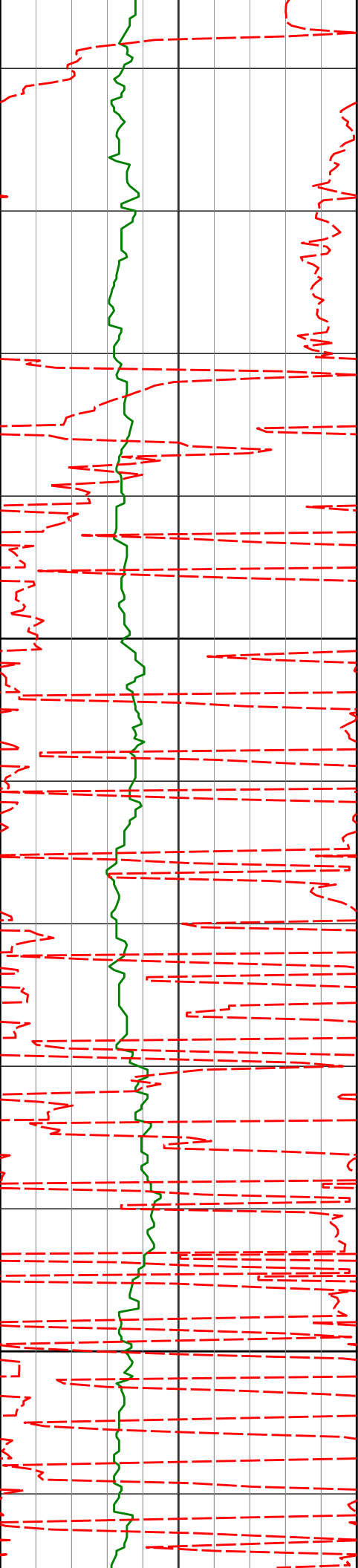
8289'

88.89°

182.18° 7411.94'

1194.29'





8629'

89.97°

178.68° 7418.19'

1534.16'

8700

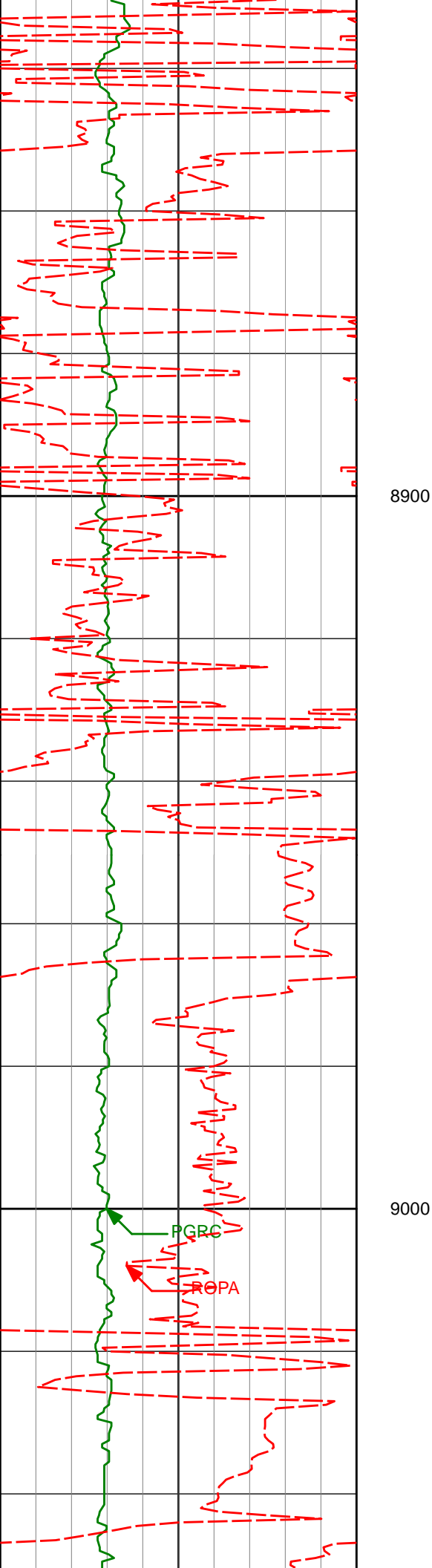
8800

8801'

89.88°

178.35° 7418.42'

1706.10'



8971'

90.62°

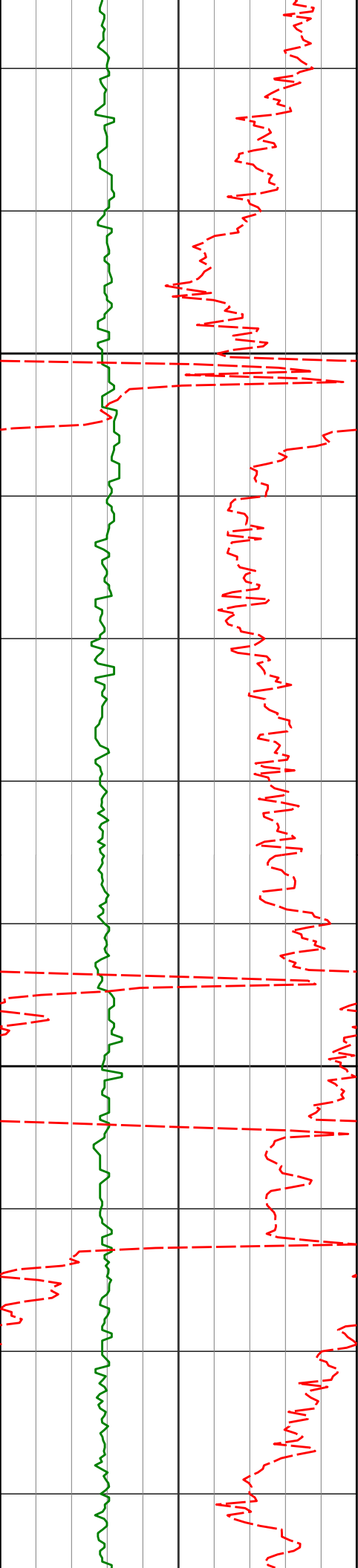
178.80° 7417.68'

1876.05'

9000

PGRC

ROPA



9100

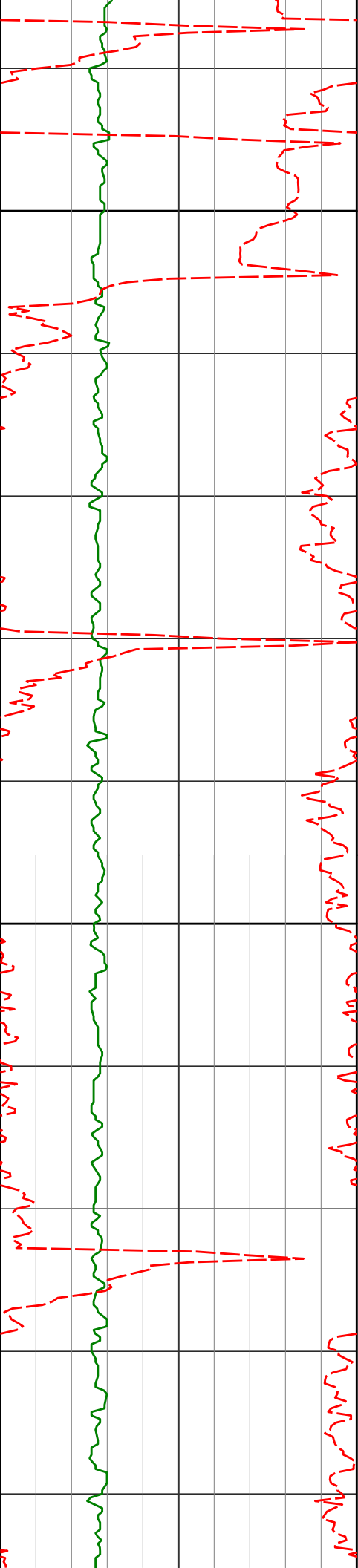
9142'

89.14°

177.84° 7418.03'

2046.97'

9200



9300

9313'

88.49°

180.61° 7421.57'

2217.90'

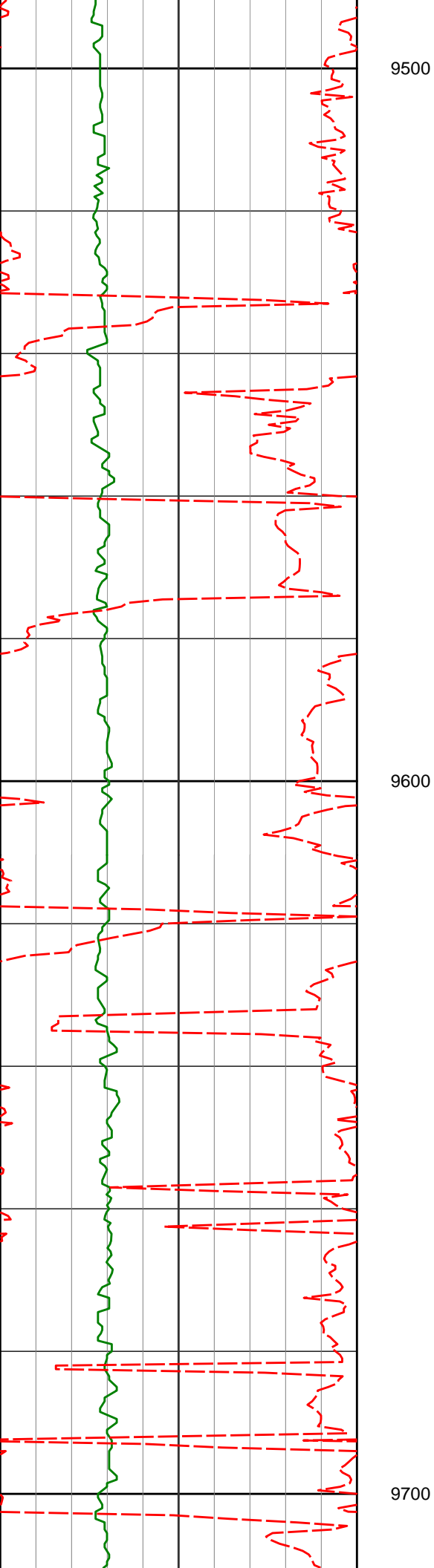
9400

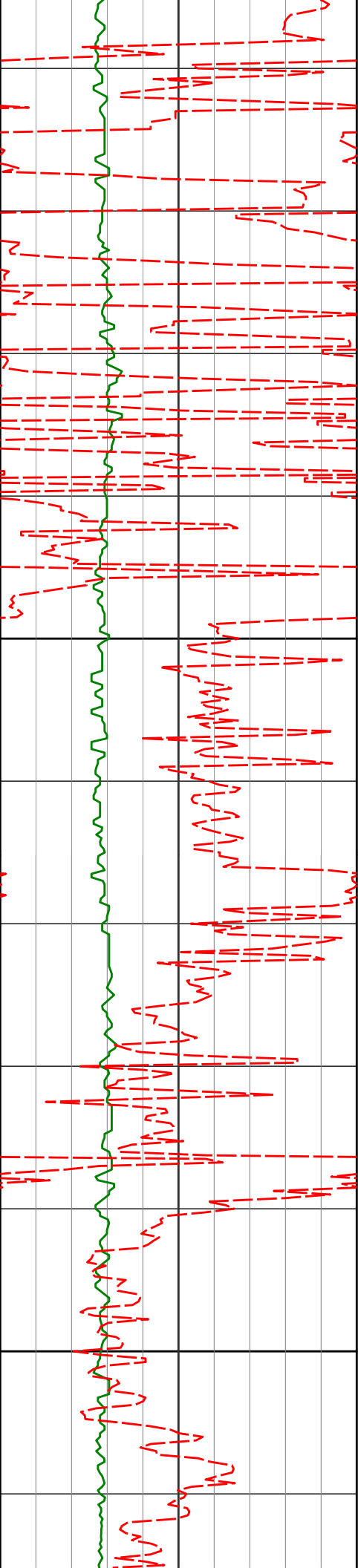
9485'

88.15°

180.07° 7426.61'

2389.82'





9800

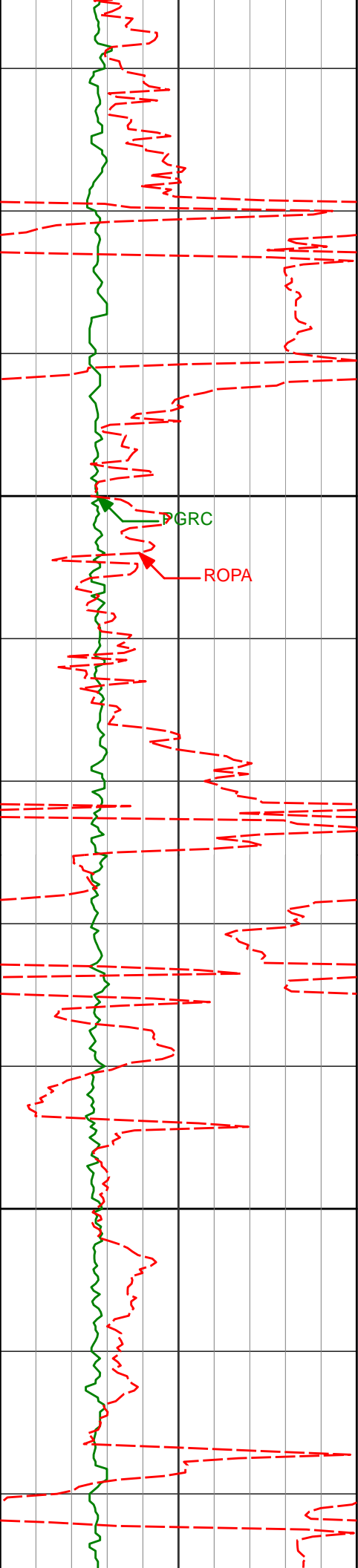
9827'

90.49°

179.03° 7431.12'

2731.75'

9900



10000

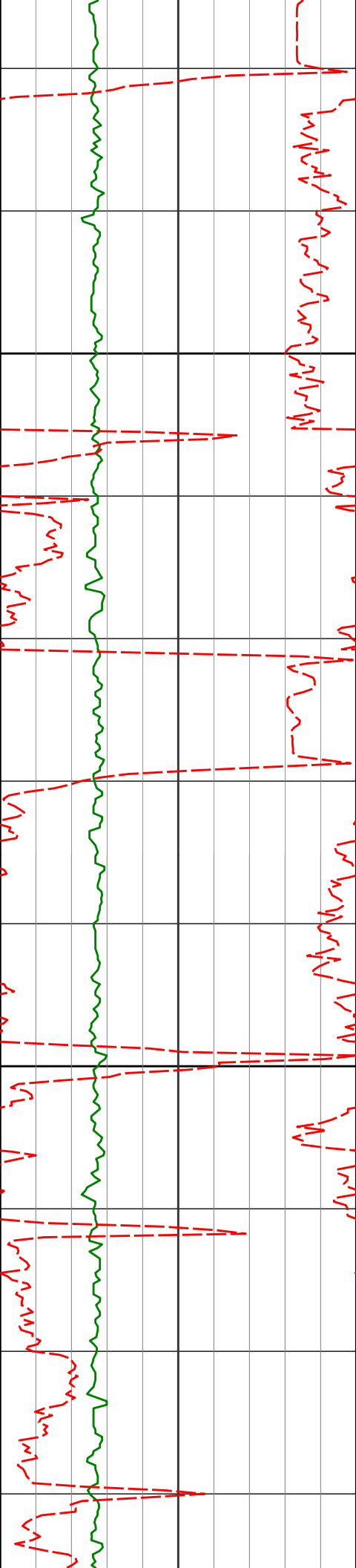
10100

9998'

89.29°

180.27° 7431.45'

2902.74'



10200

10300

10169'

89.05°

178.62° 7433.93'

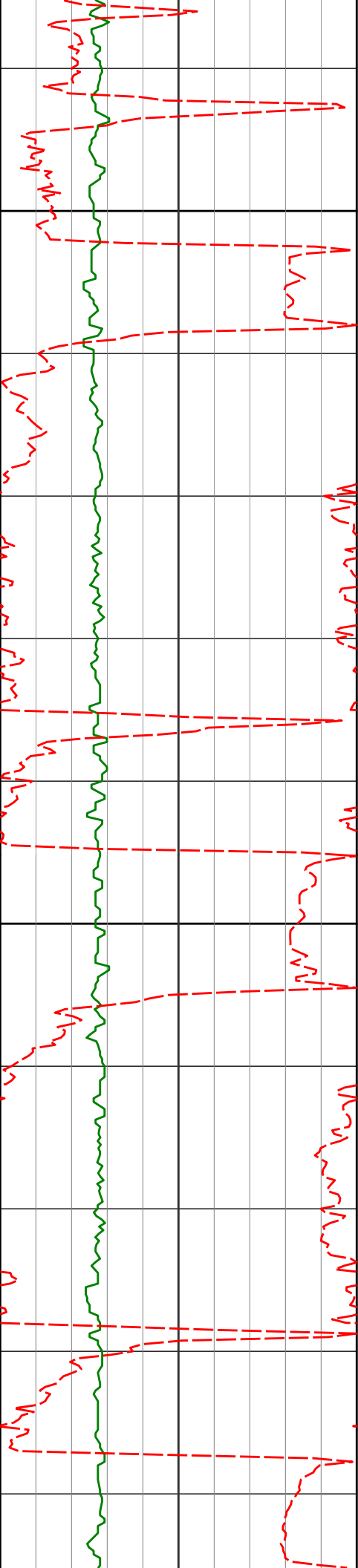
3073.71'

10340'

89.38°

177.15° 7436.27'

3244.57'



10400

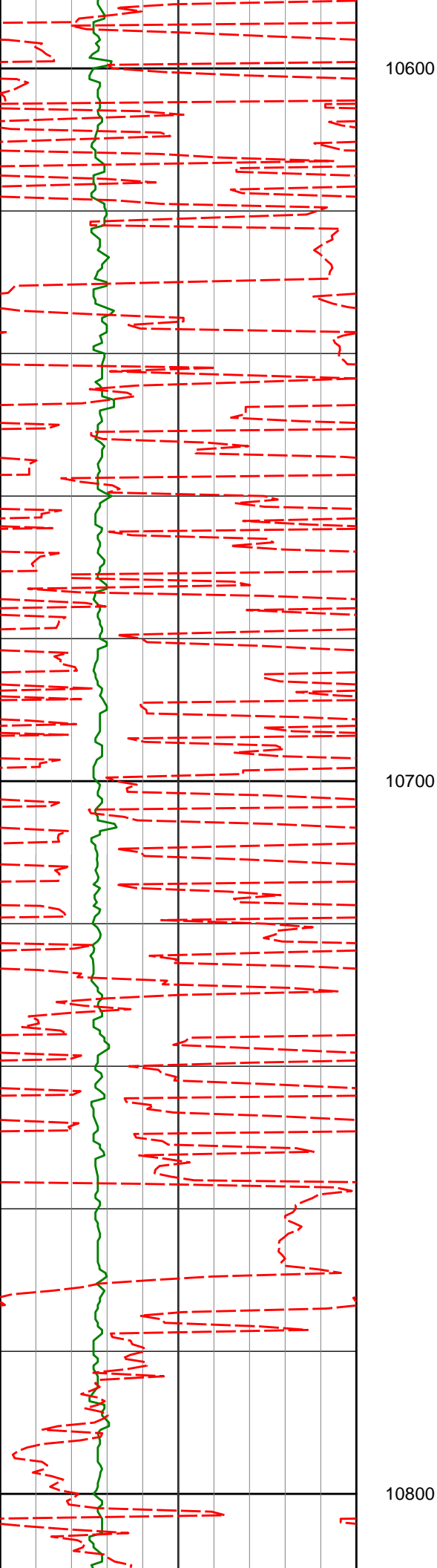
10500

10510'

88.37°

179.22° 7439.61'

3414.44'

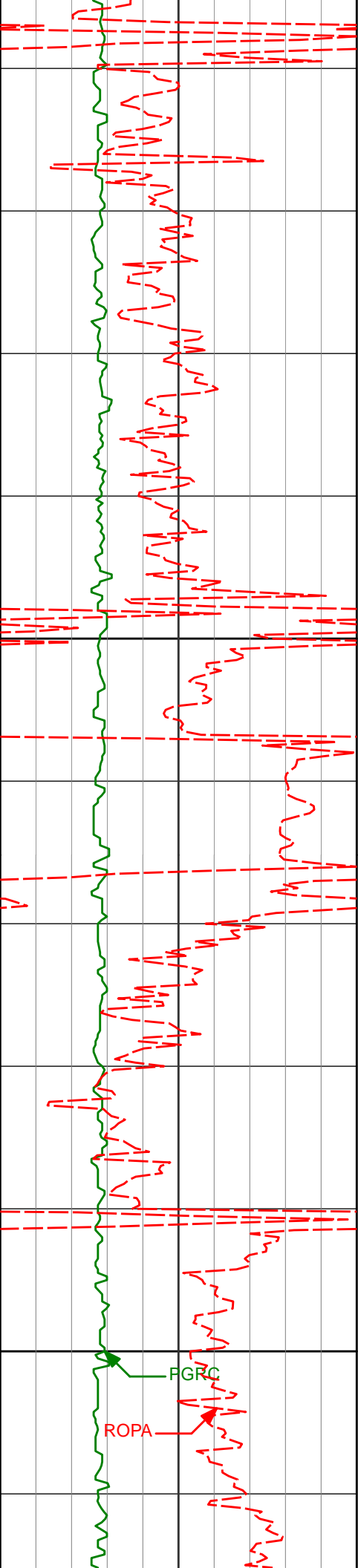


10681'

89.60°

180.38° 7442.64'

3585.41'



10900

11000

10853'

88.12°

180.16° 7446.06'

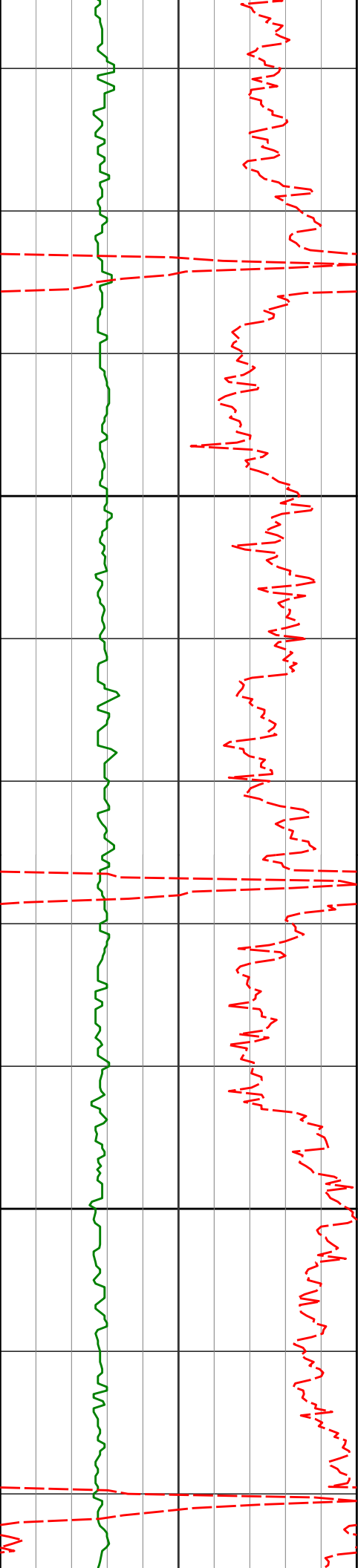
3757.37'

11024'

89.23°

181.12° 7450.01'

3928.31'



11100

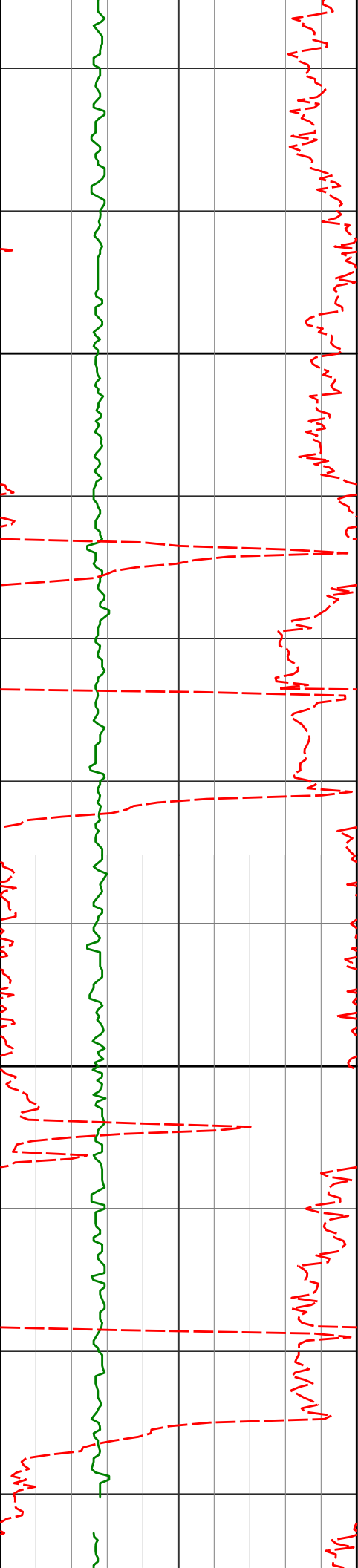
11200

11195'

89.85°

180.83° 7451.38'

4099.28'



11300

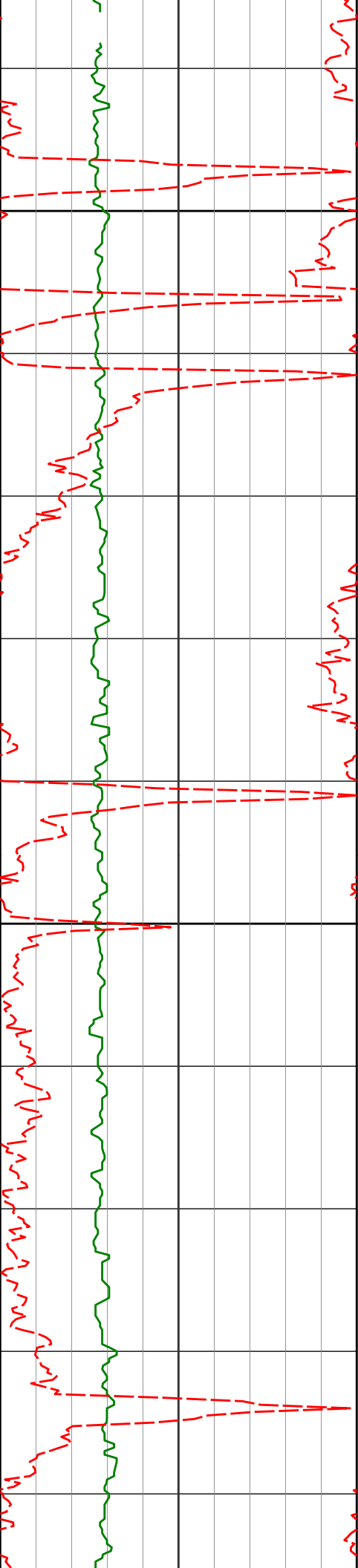
11365'

88.52°

180.60° 7453.80'

4269.24'

11400



11500

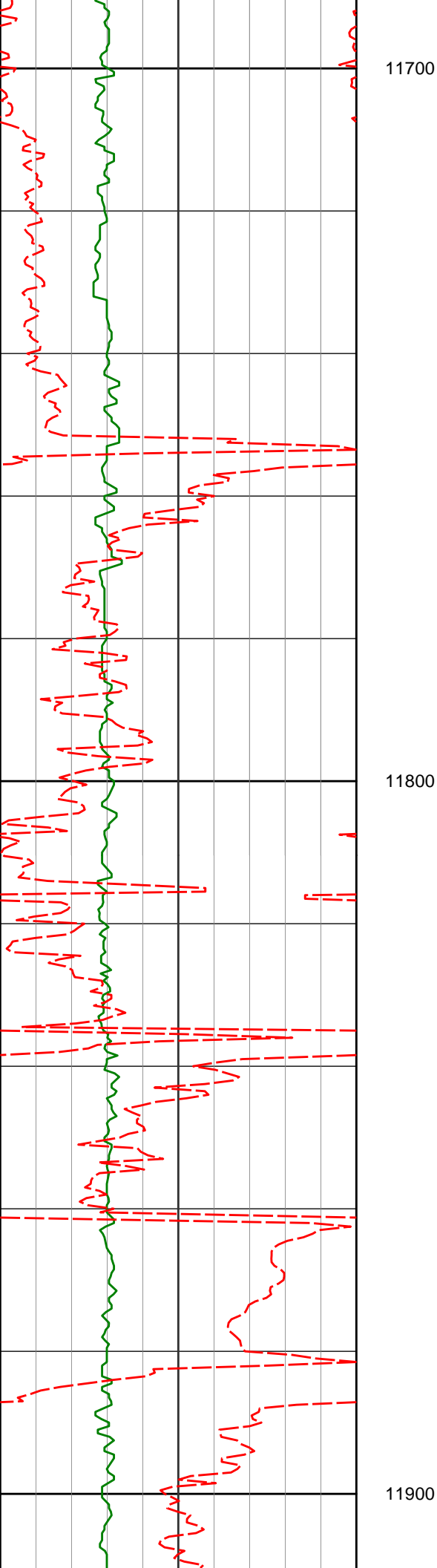
11536'

90.00°

181.06° 7456.01'

4440.21'

11600



11700

11708'

89.54°

179.27° 7456.70'

4612.20'

11800

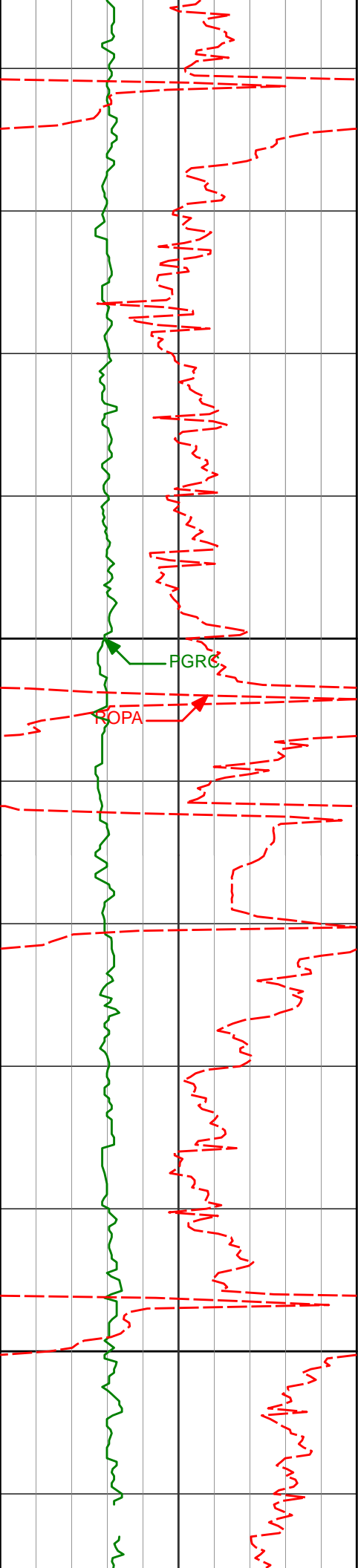
11877'

89.94°

179.81° 7457.47'

4781.19'

11900



12000

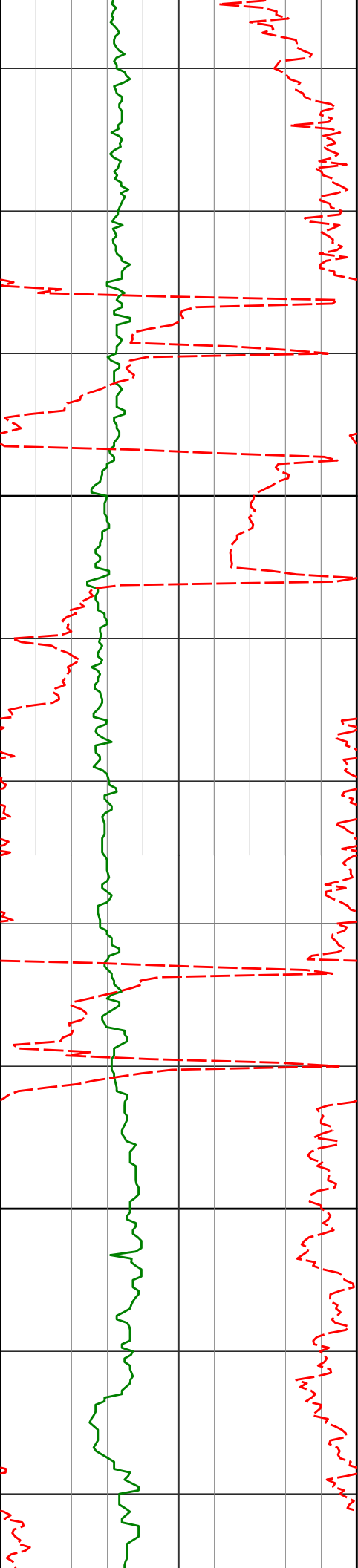
12048'

89.26°

180.85° 7458.66'

4952.18'

12100



12200

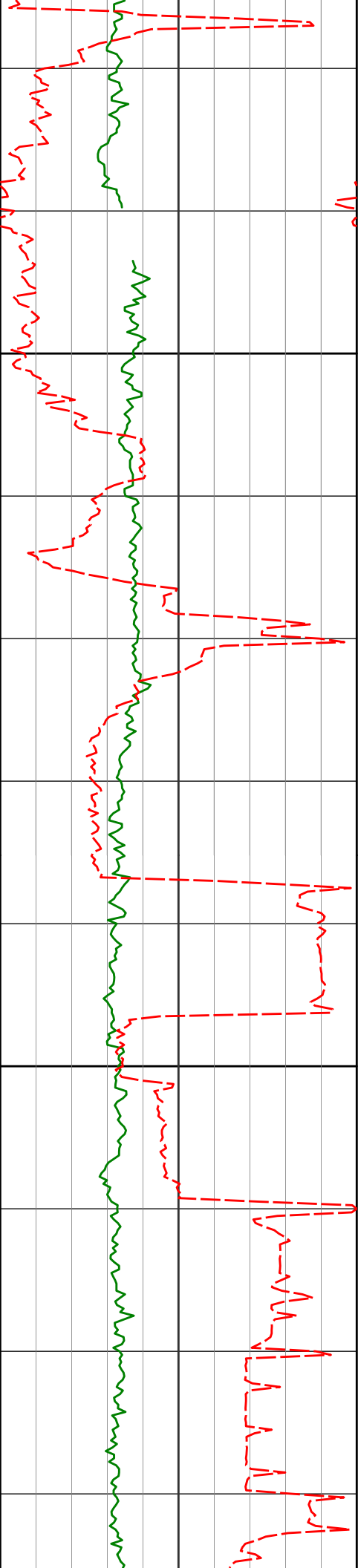
12218'

87.90°

180.36° 7462.88'

5122.11'

12300



12389'

88.58°

180.50° 7468.13'

5293.02'

12400

12475'

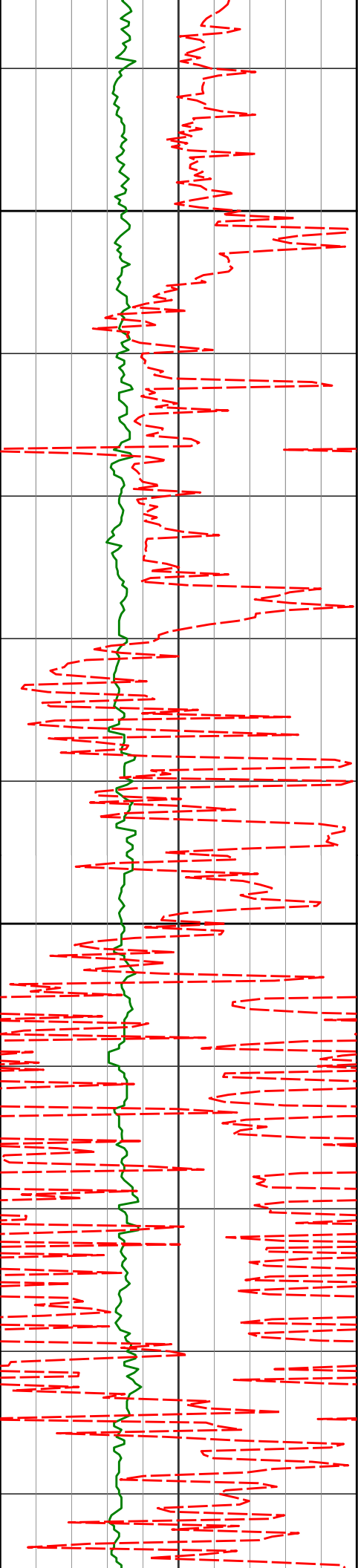
89.63°

180.67° 7469.47'

5379.01'

12500

Run 300



12600

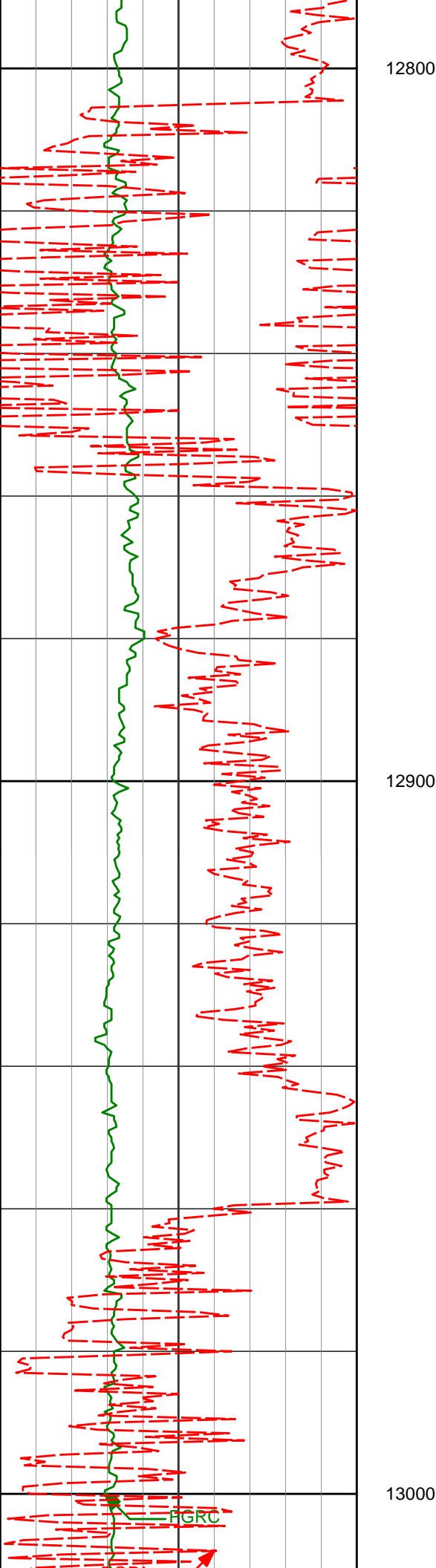
12643'

90.62°

180.48° 7469.10'

5547.00'

12700



12814'

89.29°

180.45° 7469.24'

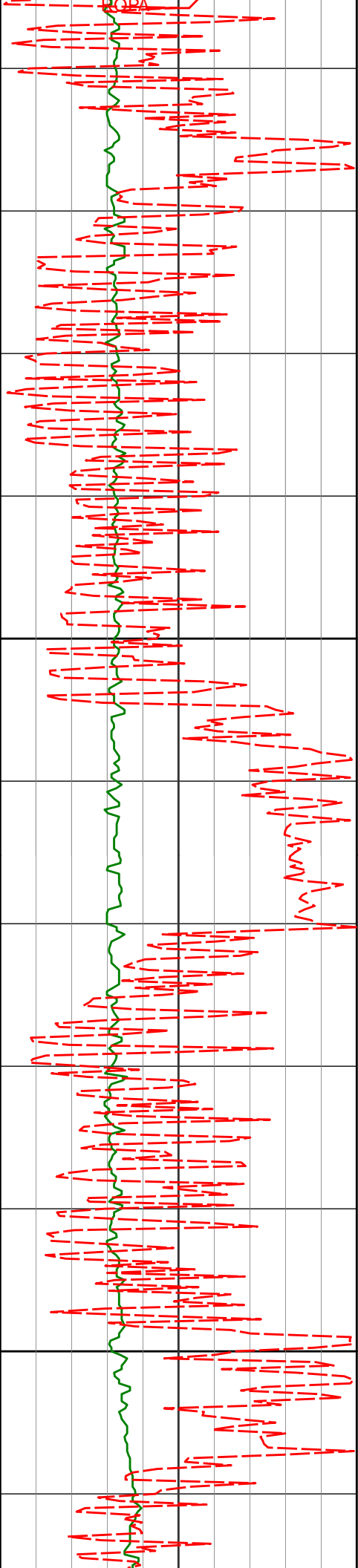
5717.99'

12985'

89.91°

179.69° 7470.43'

5888.98'



13100

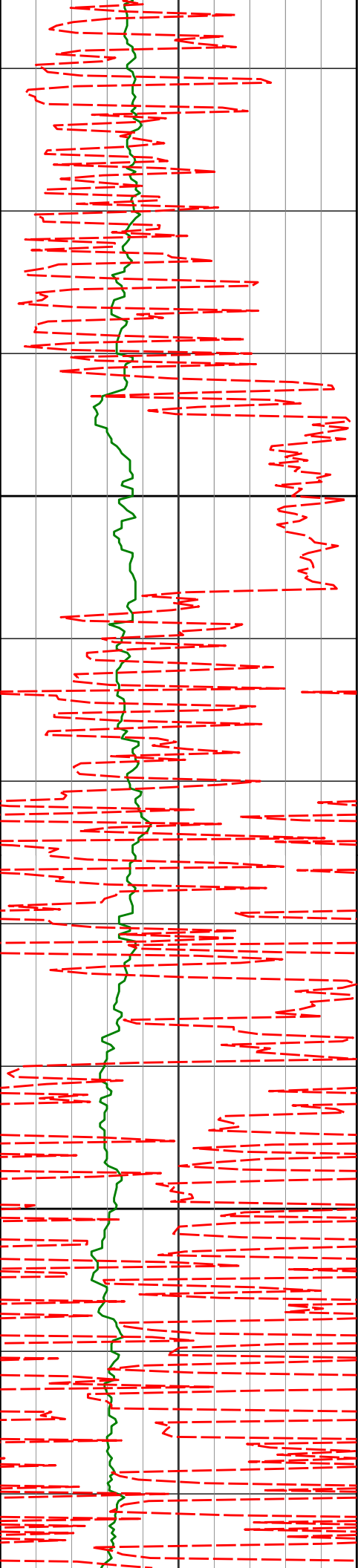
13157'

91.45°

179.89° 7468.39'

6060.96'

13200



13300

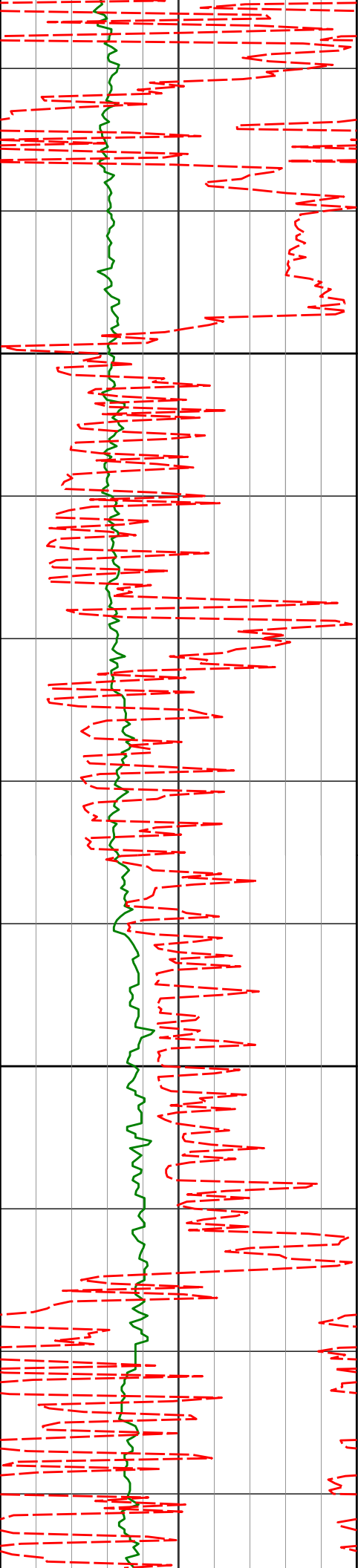
13328'

90.37°

179.28° 7465.68'

6231.93'

13400



13500

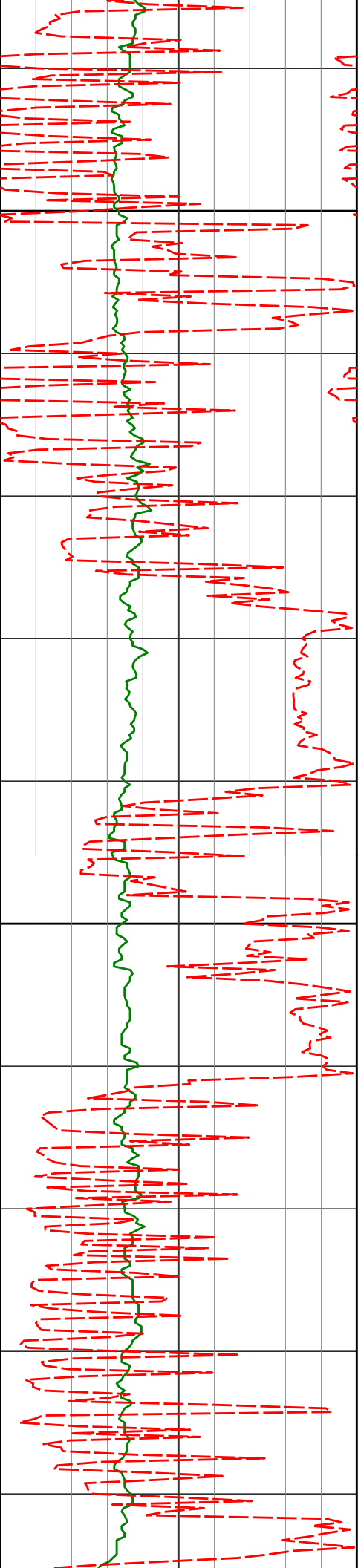
13499'

88.86°

178.14° 7466.82'

6402.88'

13600



13700

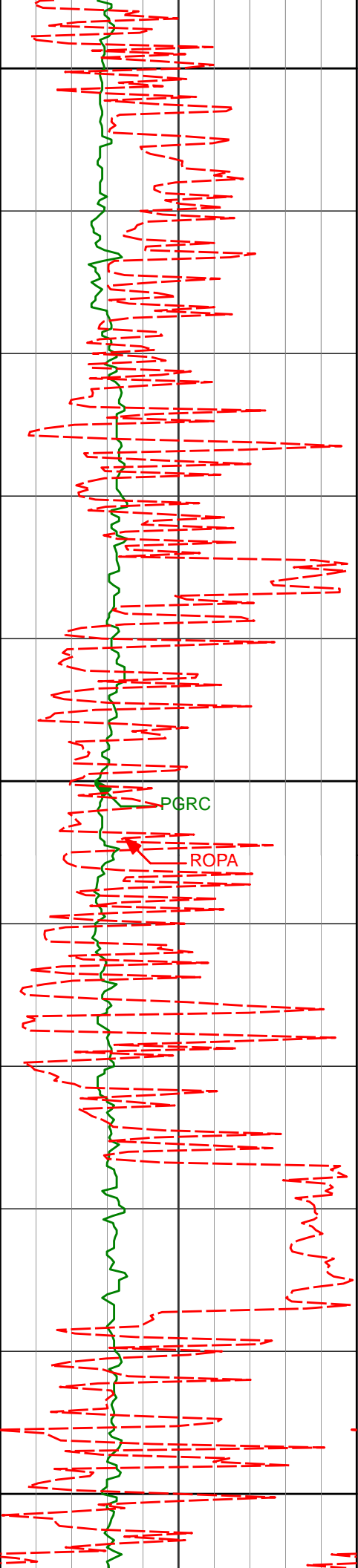
13800

13840'

90.43°

180.84° 7468.35'

6743.74'



13900

14000

14100

PGRC

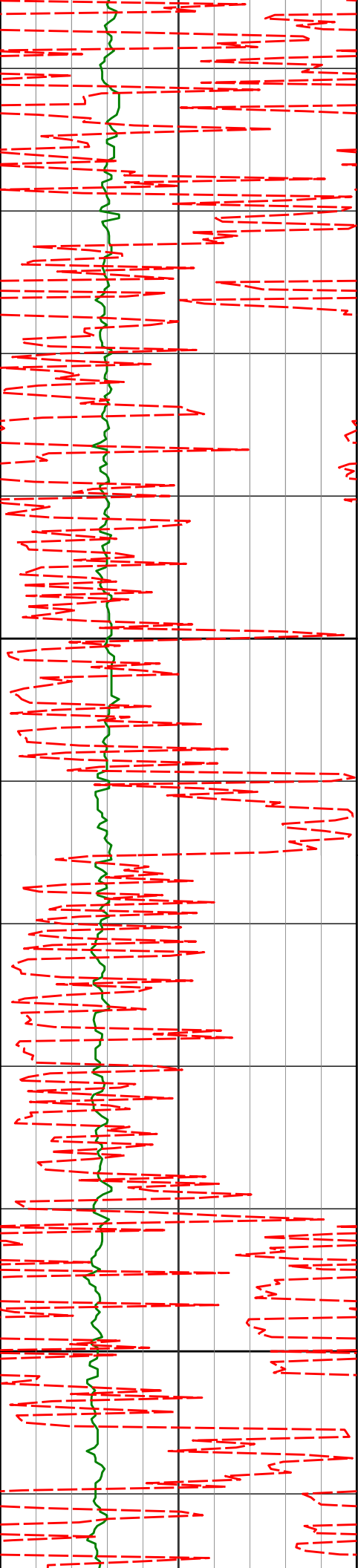
ROPA

14010'

91.20°

180.53° 7465.93'

6913.71'



14181'

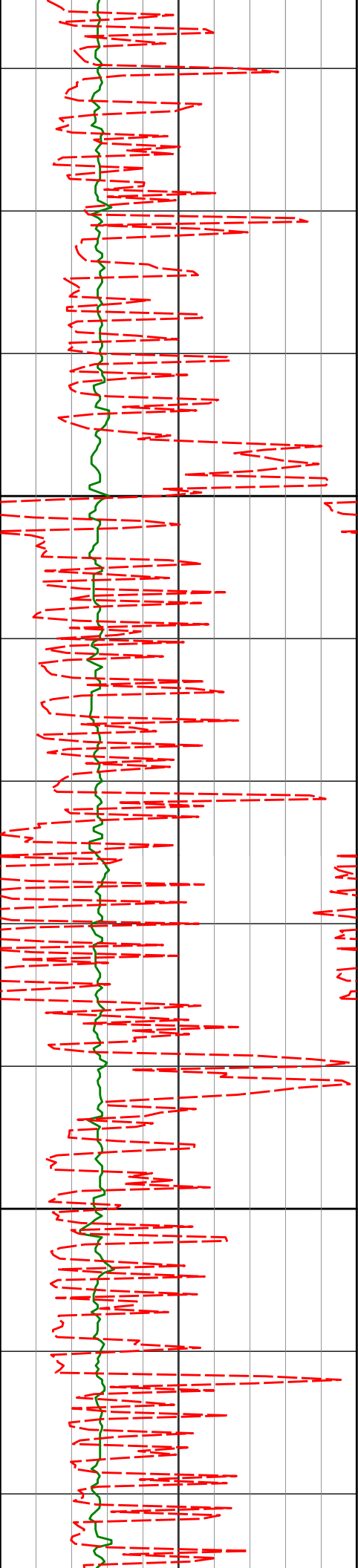
90.06°

181.46° 7464.05'

7084.67'

14200

14300



14352'

90.49°

181.10° 7463.23'

7255.63'

14400

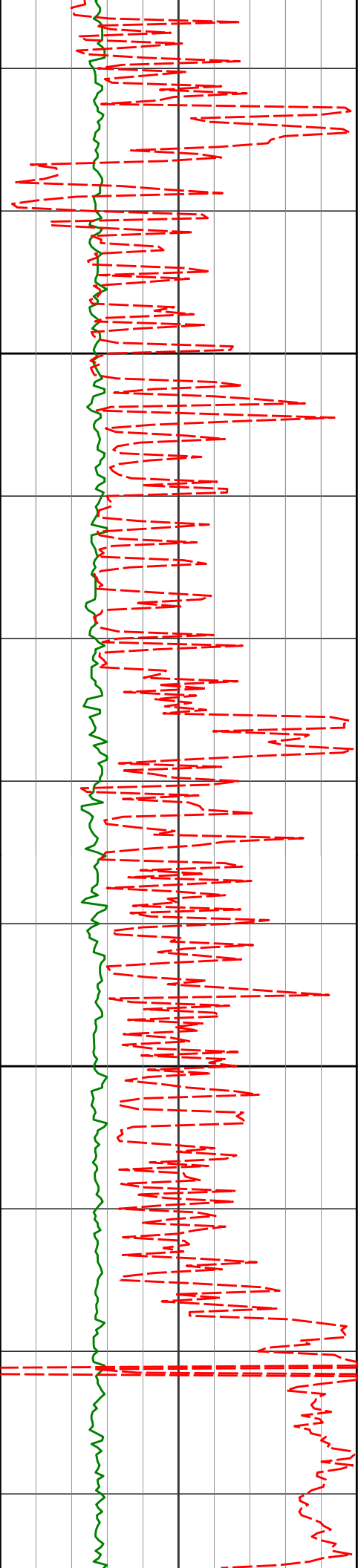
14500

14524'

90.49°

180.35° 7461.76'

7427.60'



14600

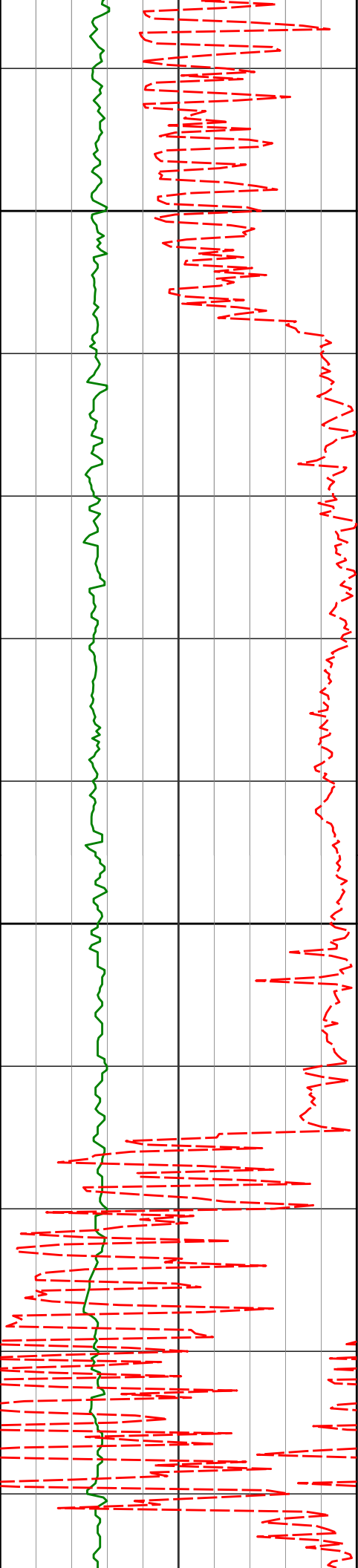
14700

14695'

89.69°

177.81° 7461.49'

7598.57'



14800

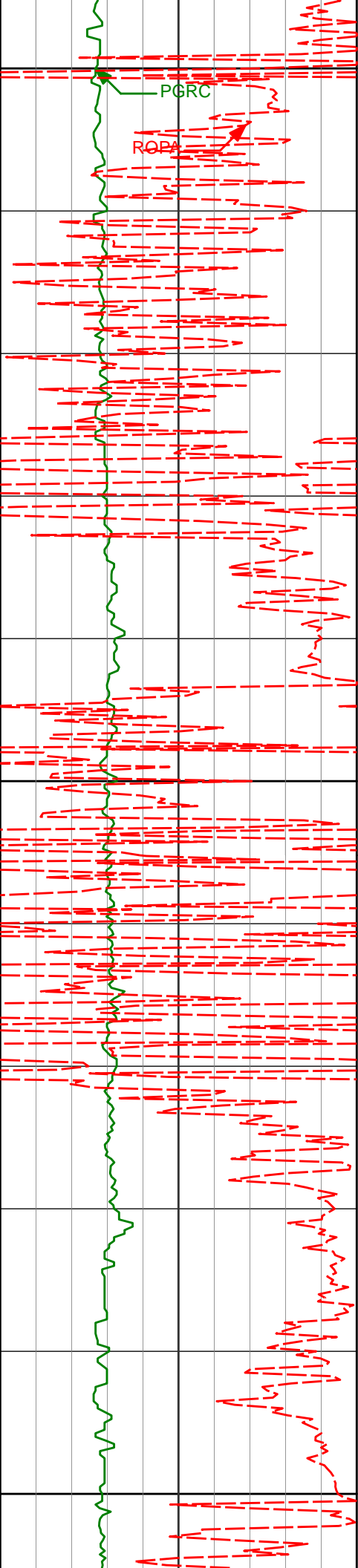
14865'

89.85°

175.63° 7462.17'

7768.28'

14900



15000

PGR

ROP

15036'

89.60°

176.95° 7462.99'

7938.91'

15100

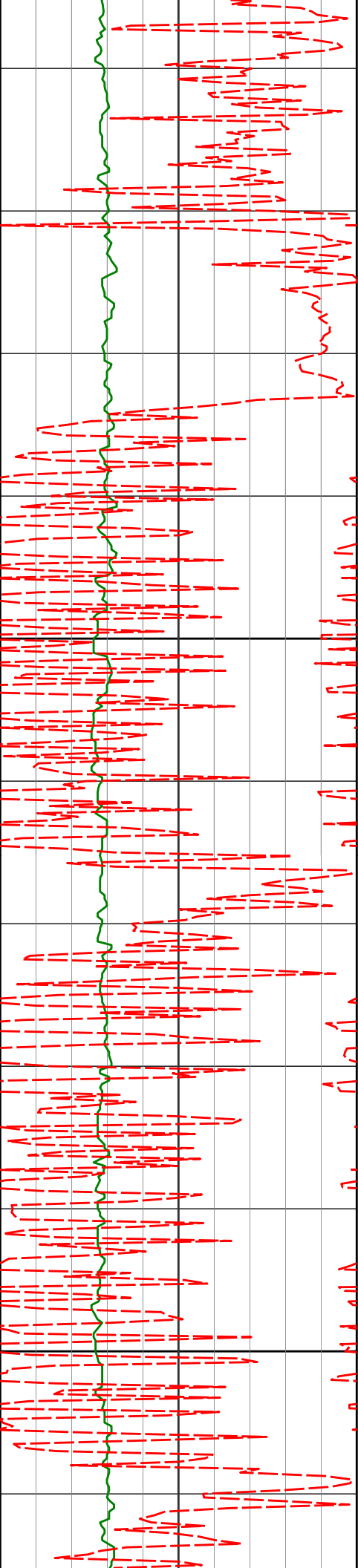
15200

15207'

89.01°

180.07° 7465.07'

8109.82'



15300

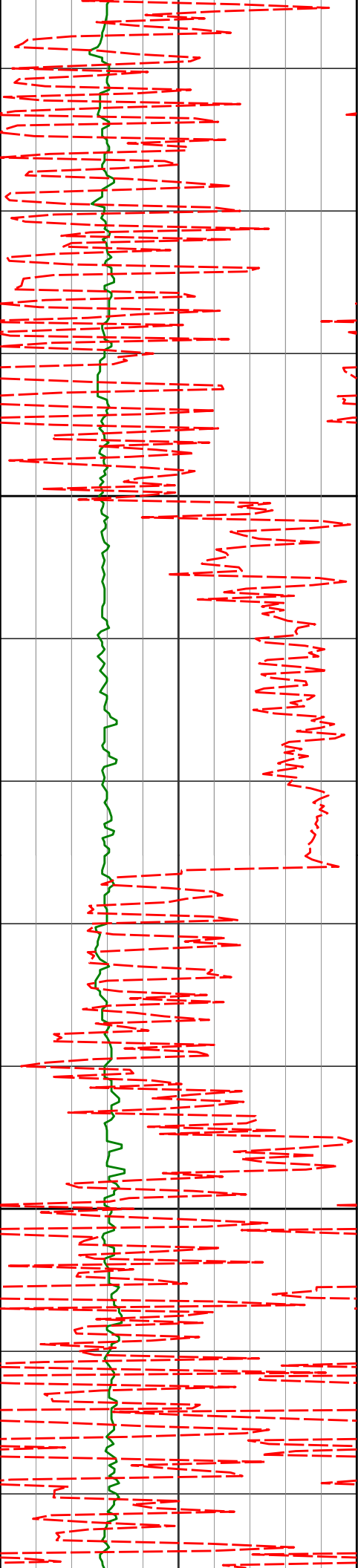
15378'

90.96°

179.81° 7465.11'

8280.81'

15400



15500

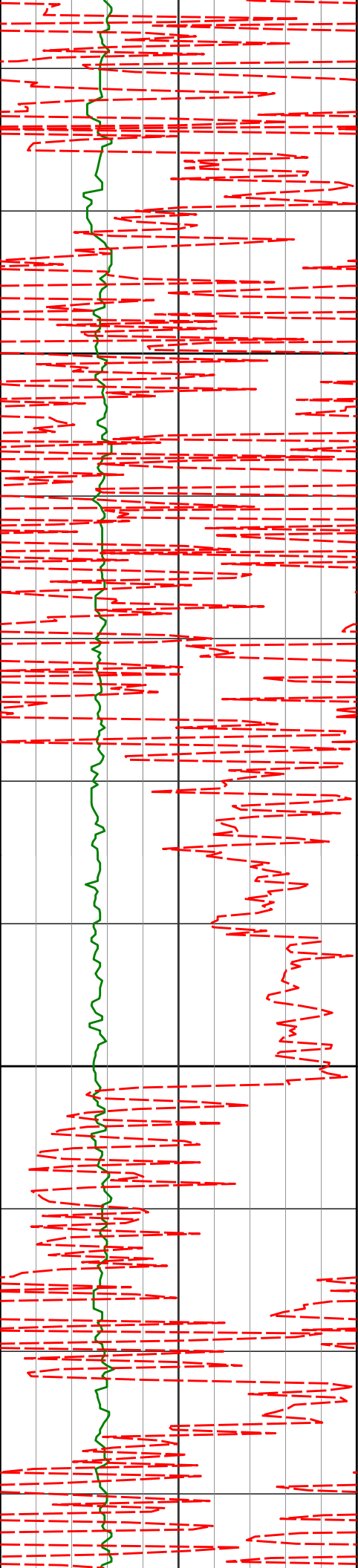
15548'

90.59°

179.76° 7462.81'

8450.79'

15600



15700

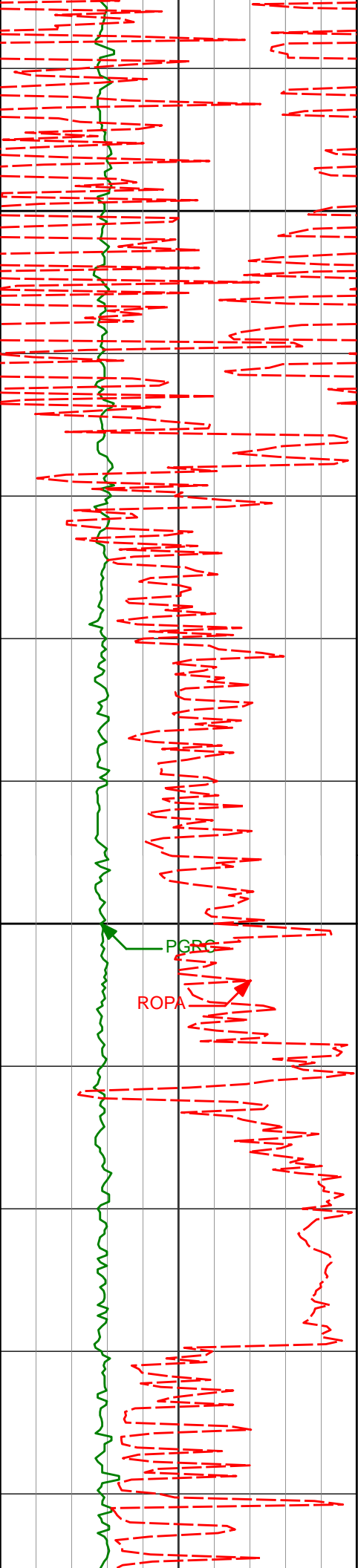
15719'

90.86°

179.29° 7460.65'

8621.78'

15800



15900

16000

PGRC

ROPA

15890'

90.34°

180.60° 7458.86'

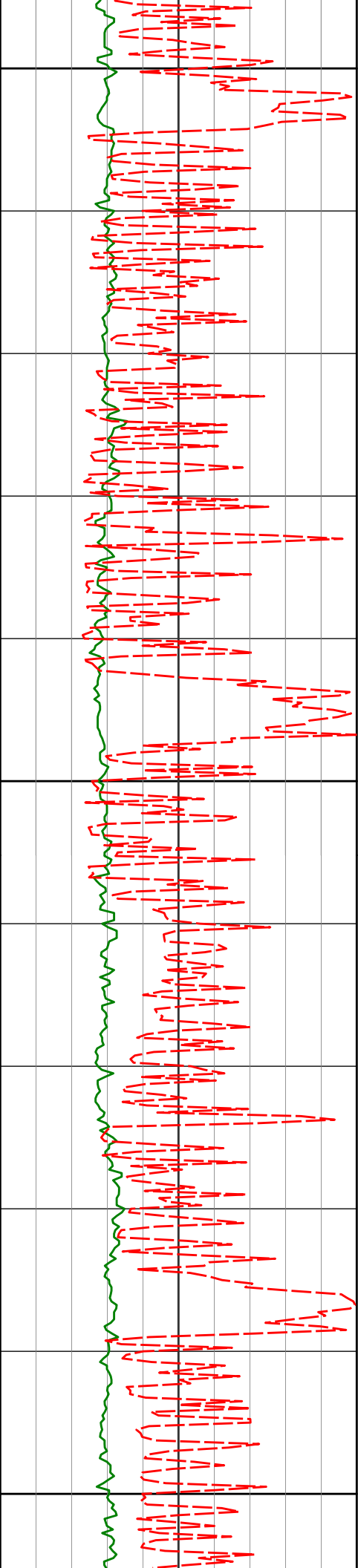
8792.76'

16061'

88.86°

181.51° 7460.05'

8963.72'



16100

16200

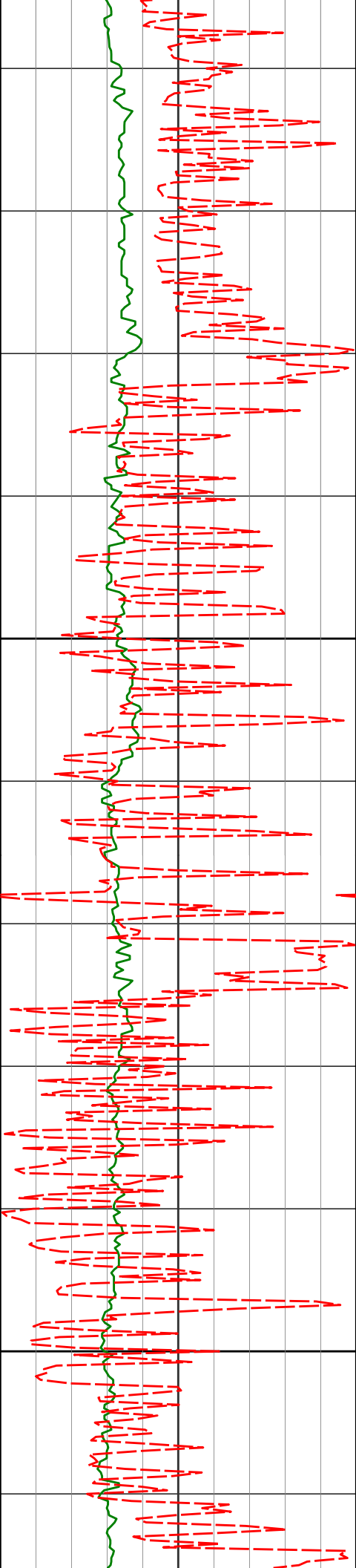
16300

16232'

89.72°

181.57° 7462.17'

9134.64'



16400

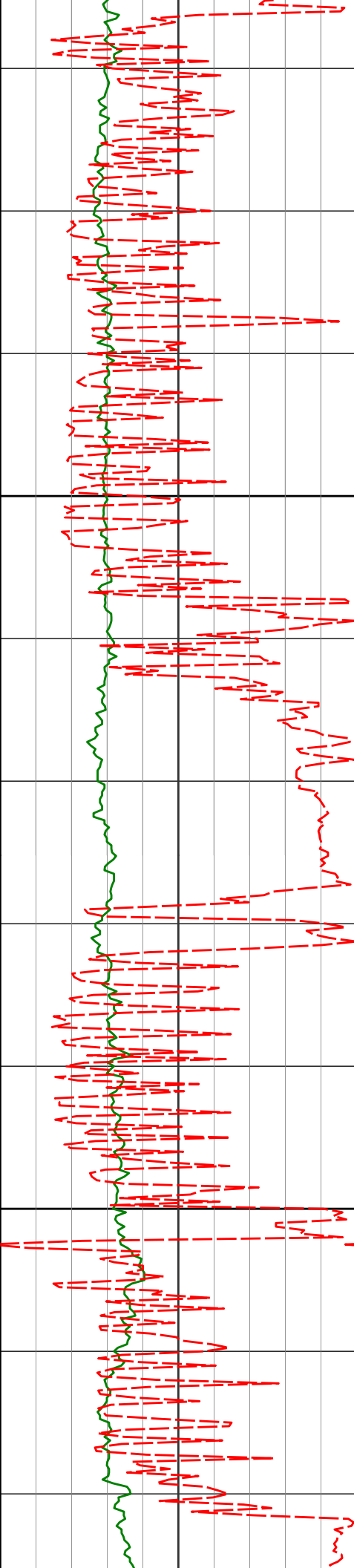
16403'

90.49°

181.28° 7461.86'

9305.59'

16500



16600

16700

16574'

90.99°

179.76° 7459.65'

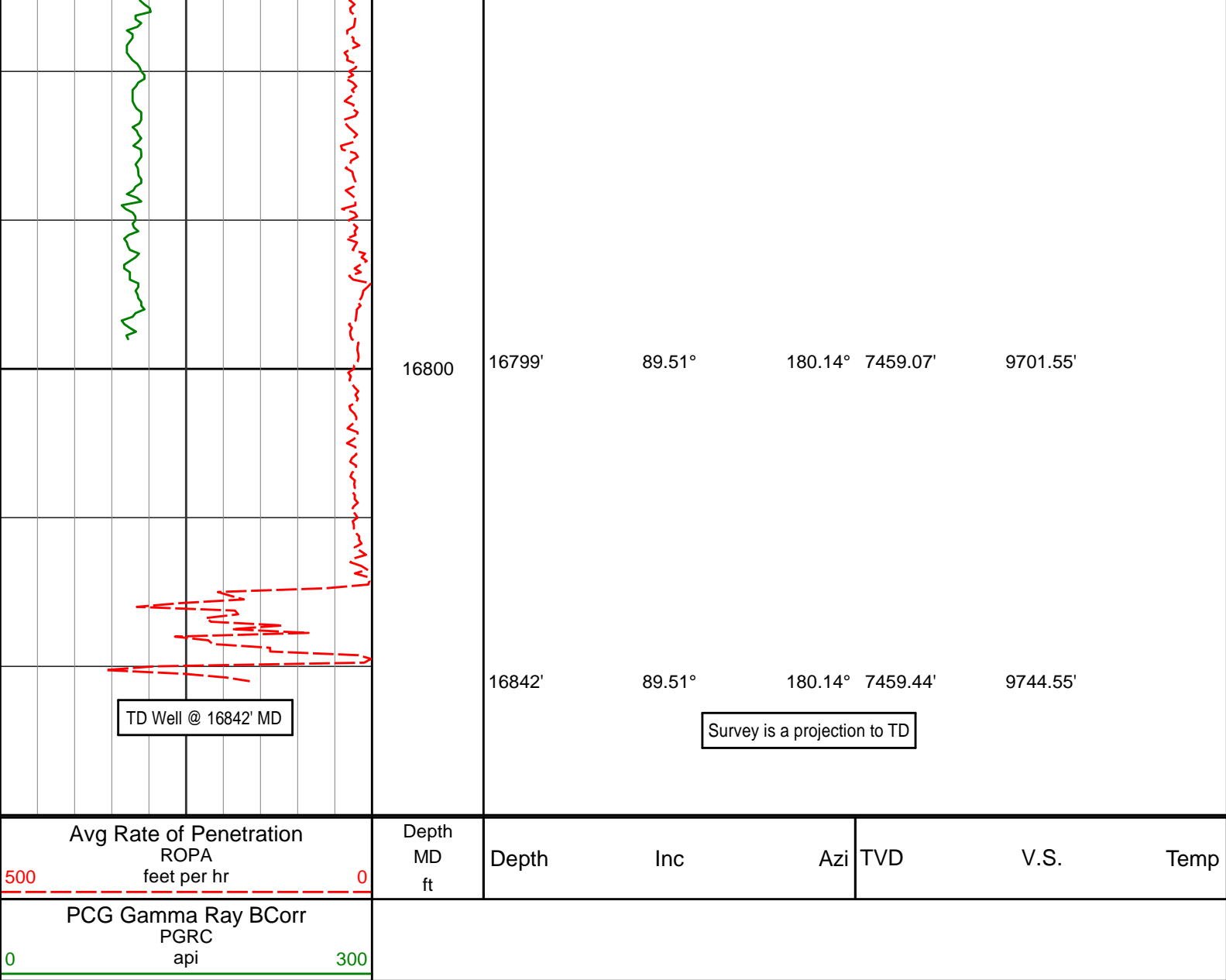
9476.56'

16745'

89.66°

180.78° 7458.68'

9647.55'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

APC
Gee 15C-25HZ
Wattenburg
Weld Colorado
USA
CA-XX-0901848863

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
985.00	0.70	243.50	984.91	5.03 S	11.79 W	5.03	TIE-IN
1200.00	1.11	272.94	1199.88	5.51 S	15.05 W	5.51	0.28
1685.00	1.03	242.80	1684.80	7.26 S	23.61 W	7.26	0.12
1760.00	1.15	239.55	1759.79	7.95 S	24.86 W	7.95	0.18
1943.00	0.74	273.02	1942.77	8.82 S	27.63 W	8.82	0.37
2126.00	0.47	278.83	2125.76	8.64 S	29.55 W	8.64	0.15
2310.00	0.56	298.46	2309.75	8.10 S	31.08 W	8.10	0.11
2493.00	1.43	187.30	2492.73	9.94 S	32.16 W	9.94	0.94
2676.00	1.98	194.45	2675.65	15.26 S	33.24 W	15.26	0.32
2859.00	0.59	155.35	2858.60	19.18 S	33.63 W	19.18	0.86
3043.00	0.45	95.75	3042.59	20.11 S	32.52 W	20.11	0.29

3226.00	0.46	263.99	3225.59	20.26 S	32.54 W	20.26	0.49
3403.00	0.69	314.91	3402.58	19.58 S	34.00 W	19.58	0.30
3659.00	0.51	255.29	3658.57	18.79 S	36.19 W	18.79	0.24
3831.00	0.85	211.41	3830.56	20.07 S	37.60 W	20.07	0.35
4002.00	1.61	238.93	4001.52	22.39 S	40.32 W	22.39	0.55
4173.00	1.39	272.45	4172.46	23.54 S	44.45 W	23.54	0.52
4345.00	2.33	283.22	4344.37	22.65 S	49.93 W	22.65	0.58
4515.00	2.67	274.74	4514.21	21.54 S	57.24 W	21.54	0.30
4686.00	2.17	267.96	4685.06	21.32 S	64.45 W	21.32	0.34
4857.00	3.27	239.72	4855.87	23.90 S	71.90 W	23.90	1.00
5028.00	4.48	238.05	5026.48	29.89 S	81.77 W	29.89	0.71
5284.00	4.48	236.19	5281.69	40.74 S	98.57 W	40.74	0.06
5455.00	4.61	250.00	5452.16	46.81 S	110.57 W	46.81	0.64
5627.00	3.79	262.21	5623.70	49.95 S	122.70 W	49.95	0.70
5798.00	3.98	265.96	5794.31	51.13 S	134.22 W	51.13	0.19
5969.00	2.11	272.89	5965.06	51.39 S	143.28 W	51.39	1.11
6140.00	0.49	327.83	6136.01	50.61 S	146.82 W	50.61	1.09
6310.00	0.26	7.05	6306.01	49.61 S	147.16 W	49.61	0.20
6479.00	0.60	95.71	6475.01	49.32 S	146.23 W	49.32	0.38
6651.00	1.20	251.22	6647.00	49.99 S	147.04 W	49.99	1.03
6736.00	1.14	237.47	6731.98	50.73 S	148.59 W	50.73	0.34
6779.00	1.26	258.25	6774.97	51.06 S	149.42 W	51.06	1.04
6822.00	5.16	211.32	6817.90	52.81 S	150.89 W	52.81	10.22
6865.00	10.38	206.47	6860.49	57.93 S	153.62 W	57.93	12.22
6907.00	13.40	206.01	6901.58	65.69 S	157.44 W	65.69	7.19
6950.00	16.03	203.16	6943.17	75.63 S	161.96 W	75.63	6.34
6992.00	19.92	201.91	6983.11	87.61 S	166.91 W	87.61	9.31
7035.00	23.97	195.80	7022.99	102.81 S	172.03 W	102.81	10.80
7077.00	28.39	187.78	7060.69	120.93 S	175.71 W	120.93	13.46
7120.00	30.82	180.36	7098.08	142.09 S	177.16 W	142.09	10.22
7163.00	32.79	178.15	7134.63	164.74 S	176.85 W	164.74	5.32
7206.00	35.61	178.13	7170.19	188.90 S	176.07 W	188.90	6.56
7248.00	39.90	174.98	7203.39	214.55 S	174.49 W	214.55	11.20
7291.00	44.10	174.70	7235.34	243.20 S	171.90 W	243.20	9.78
7333.00	47.58	175.43	7264.59	273.21 S	169.31 W	273.21	8.38
7375.00	51.67	177.10	7291.80	305.13 S	167.25 W	305.13	10.20
7417.00	56.29	178.91	7316.49	339.07 S	166.08 W	339.07	11.54
7459.00	61.74	180.49	7338.11	375.06 S	165.90 W	375.06	13.37
7501.00	67.32	179.33	7356.16	412.97 S	165.84 W	412.97	13.52
7543.00	71.02	179.56	7371.09	452.21 S	165.46 W	452.21	8.82
7585.00	74.66	178.86	7383.48	492.33 S	164.90 W	492.33	8.81
7628.00	79.81	179.45	7392.98	534.25 S	164.29 W	534.25	12.05
7670.00	83.45	178.83	7399.09	575.79 S	163.66 W	575.79	8.79
7707.00	85.07	179.69	7402.79	612.60 S	163.19 W	612.60	4.95
7776.00	88.98	180.74	7406.37	681.49 S	163.45 W	681.49	5.87
7947.00	89.91	180.75	7408.03	852.47 S	165.67 W	852.47	0.54
8118.00	89.29	181.87	7409.22	1023.42 S	169.58 W	1023.42	0.75
8289.00	88.89	182.18	7411.94	1194.29 S	175.62 W	1194.29	0.30
8458.00	88.46	179.43	7415.85	1363.21 S	177.99 W	1363.21	1.65
8629.00	89.97	178.68	7418.19	1534.16 S	175.17 W	1534.16	0.99
8801.00	89.88	178.35	7418.42	1706.10 S	170.71 W	1706.10	0.20
8971.00	90.62	178.80	7417.68	1876.05 S	166.49 W	1876.05	0.51
9142.00	89.14	177.84	7418.03	2046.97 S	161.47 W	2046.97	1.03
9313.00	88.49	180.61	7421.57	2217.90 S	159.16 W	2217.90	1.66
9485.00	88.15	180.07	7426.61	2389.82 S	160.18 W	2389.82	0.37
9656.00	89.17	179.65	7430.61	2560.77 S	159.76 W	2560.77	0.65
9827.00	90.49	179.03	7431.12	2731.75 S	157.79 W	2731.75	0.85
9998.00	89.29	180.27	7431.45	2902.74 S	156.75 W	2902.74	1.01
10169.00	89.05	178.62	7433.93	3073.71 S	155.09 W	3073.71	0.97
10340.00	89.38	177.15	7436.27	3244.57 S	148.78 W	3244.57	0.88
10510.00	88.37	179.22	7439.61	3414.44 S	143.40 W	3414.44	1.35
10681.00	89.60	180.38	7442.64	3585.41 S	142.80 W	3585.41	0.99
10853.00	88.12	180.16	7446.06	3757.37 S	143.61 W	3757.37	0.87
11024.00	89.23	181.12	7450.01	3928.31 S	145.52 W	3928.31	0.86
11195.00	89.85	180.83	7451.38	4099.28 S	148.43 W	4099.28	0.40
11365.00	88.52	180.60	7453.80	4269.24 S	150.55 W	4269.24	0.79
11536.00	90.00	181.06	7456.01	4440.21 S	153.03 W	4440.21	0.91
11708.00	89.54	179.27	7456.70	4612.20 S	153.53 W	4612.20	1.07
11877.00	89.94	179.81	7457.47	4781.19 S	152.17 W	4781.19	0.40
12048.00	89.26	180.85	7458.66	4952.18 S	153.15 W	4952.18	0.73
12218.00	87.90	180.36	7462.88	5122.11 S	154.95 W	5122.11	0.85

12389.00	88.58	180.50	7468.13	5293.02 S	156.23 W	5293.02	0.41
12475.00	89.63	180.67	7469.47	5379.01 S	157.11 W	5379.01	1.24
12643.00	90.62	180.48	7469.10	5547.00 S	158.79 W	5547.00	0.60
12814.00	89.29	180.45	7469.24	5717.99 S	160.18 W	5717.99	0.78
12985.00	89.91	179.69	7470.43	5888.98 S	160.39 W	5888.98	0.57
13157.00	91.45	179.89	7468.39	6060.96 S	159.76 W	6060.96	0.90
13328.00	90.37	179.28	7465.68	6231.93 S	158.52 W	6231.93	0.73
13499.00	88.86	178.14	7466.82	6402.88 S	154.67 W	6402.88	1.11
13671.00	89.85	178.03	7468.76	6574.77 S	148.93 W	6574.77	0.58
13840.00	90.43	180.84	7468.35	6743.74 S	147.26 W	6743.74	1.70
14010.00	91.20	180.53	7465.93	6913.71 S	149.29 W	6913.71	0.49
14181.00	90.06	181.46	7464.05	7084.67 S	152.26 W	7084.67	0.86
14352.00	90.49	181.10	7463.23	7255.63 S	156.08 W	7255.63	0.33
14524.00	90.49	180.35	7461.76	7427.61 S	158.26 W	7427.60	0.44
14695.00	89.69	177.81	7461.49	7598.57 S	155.51 W	7598.57	1.56
14865.00	89.85	175.63	7462.17	7768.28 S	145.78 W	7768.28	1.29
15036.00	89.60	176.95	7462.99	7938.91 S	134.72 W	7938.91	0.79
15207.00	89.01	180.07	7465.07	8109.82 S	130.27 W	8109.82	1.86
15378.00	90.96	179.81	7465.11	8280.81 S	130.09 W	8280.81	1.15
15548.00	90.59	179.76	7462.81	8450.80 S	129.46 W	8450.79	0.22
15719.00	90.86	179.29	7460.65	8621.78 S	128.04 W	8621.78	0.32
15890.00	90.34	180.60	7458.86	8792.76 S	127.88 W	8792.76	0.82
16061.00	88.86	181.51	7460.05	8963.72 S	131.02 W	8963.72	1.02
16232.00	89.72	181.57	7462.17	9134.65 S	135.62 W	9134.64	0.50
16403.00	90.49	181.28	7461.86	9305.59 S	139.87 W	9305.59	0.48
16574.00	90.99	179.76	7459.65	9476.56 S	141.42 W	9476.56	0.94
16745.00	89.66	180.78	7458.68	9647.55 S	142.23 W	9647.55	0.98
16799.00	89.51	180.14	7459.07	9701.55 S	142.66 W	9701.55	1.22
16842.00	89.51	180.14	7459.44	9744.55 S	142.77 W	9744.55	0.00

CALCULATION BASED ON MINIMUM CURVATURE METHOD

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

**VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 180.00 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 16842.00 FEET
IS 9745.59 FEET ALONG 180.84 DEGREES (TRUE)**

Directional surveys tied onto Gyro's @ 985' MD. Final survey is a straight line projection to bit.