

DC - Pressure Case Directional
PCGK - Pressure Case Gamma



1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	11-Oct-17	15-Oct-17			
Rig Bit Number	2	3			
Bit Size (in)	8.500	6.125			
Tool Nominal OD (in)	6.750	4.560			
Log Start Depth (MD, ft)	1,890.00	5,893.00			
Log End Depth (MD, ft)	5,893.00	14,872.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	10-Oct-17 04:30	11-Oct-17 19:00			
Drill/Wipe End Date and Time	10-Oct-17 18:30	15-Oct-17 07:00			
Min Inc (deg) @ Depth (MD, ft)	0.10 @ 3,983.00	0.22 @ 6,178.00			
Max Inc (deg) @ Depth (MD, ft)	18.63 @ 1,919.00	91.97 @ 7,973.00			
Bit TFA(in2) / Bit Type	0.75 / PDC	0.65 / PDC			
Flow Rate (gpm)	580.75	279.75			
Max AV (fpm) / CV (fpm) @ MWD	N/A	N/A			
Fluid Type	Diesel Mud Base	Diesel Mud Base			
Density (ppg) / Viscosity (spqt)	8.95 / 53.00	9.53 / 61.00			
Filtrate CL (ppm)	46,000.00	43,000.00			
pH / API Filtrate (mptm)	N/A / 4	N/A / 4			
PV (cP) / YP (lbf2)	14 / 10.00	20 / 11.00			
% Solids / % Sand	8.00 / .01	9.32 / .01			
% Oil / Oil:Water Ratio	70.00 / 3:1	76.00 / 76:24			
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Max Tool Temp (deg F) / G	125.50 / 20M	217.50 / 20M			

Max Tool Temp (degF) / Source	165.58 / PCM	247.78 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ 165.58	N/A @ 247.78			
Lead MWD Engineer	Brian Neu	Brian Neu			
Customer Representative	Jackie McKinley	Jackie McKinley			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	12004211	12334774			
Insert Serial Number	11227417	11227490			
Date and Time Initialized	09-Oct-17 22:45	11-Oct-17 09:12			
Date and Time Read	11-Oct-17 00:31	15-Oct-17 21:01			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	46.00	46.00			
Software Version	6.33	6.33			
Sub Serial Number	12004211	12334774			
Sonde Serial Number	11902220	12174344			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	23.00	143.70			

Gamma Ray Sensor Information

Tool Type	PCGK	PCGK			
Distance From Bit (ft)	48.57	39.46			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	12004211	12334774			
Insert/Sonde Serial Number	11680954	12037409			

REMARKS

1. All depths are measured depths, referenced to the Driller's pipe tally and are measured from the drill floor, unless otherwise specified.

2. No depth corrections have been made for pipe stretch or compression.

3. All data presented is recorded data unless otherwise specified.

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

PGRC (Gamma Ray Corrected):

Interval Resolution: 0.5ft

Interval Distance: 0.6ft

Gap Fill: 3.0ft

ROPA (Average Rate of Penetration):

Interval Resolution: 0.5ft

Interval Distance: 1.2ft

Gap Fill: 3.0ft

5. Surveys from 1919'MD to 14826'MD ft are corrected by Alaska Survey Management.

6. Gap in gamma due to sensor distance change between runs.

7. Gap in gamma due to computer shutdown while drilling.

8. Gap in gamma due to fast ROP at connection.

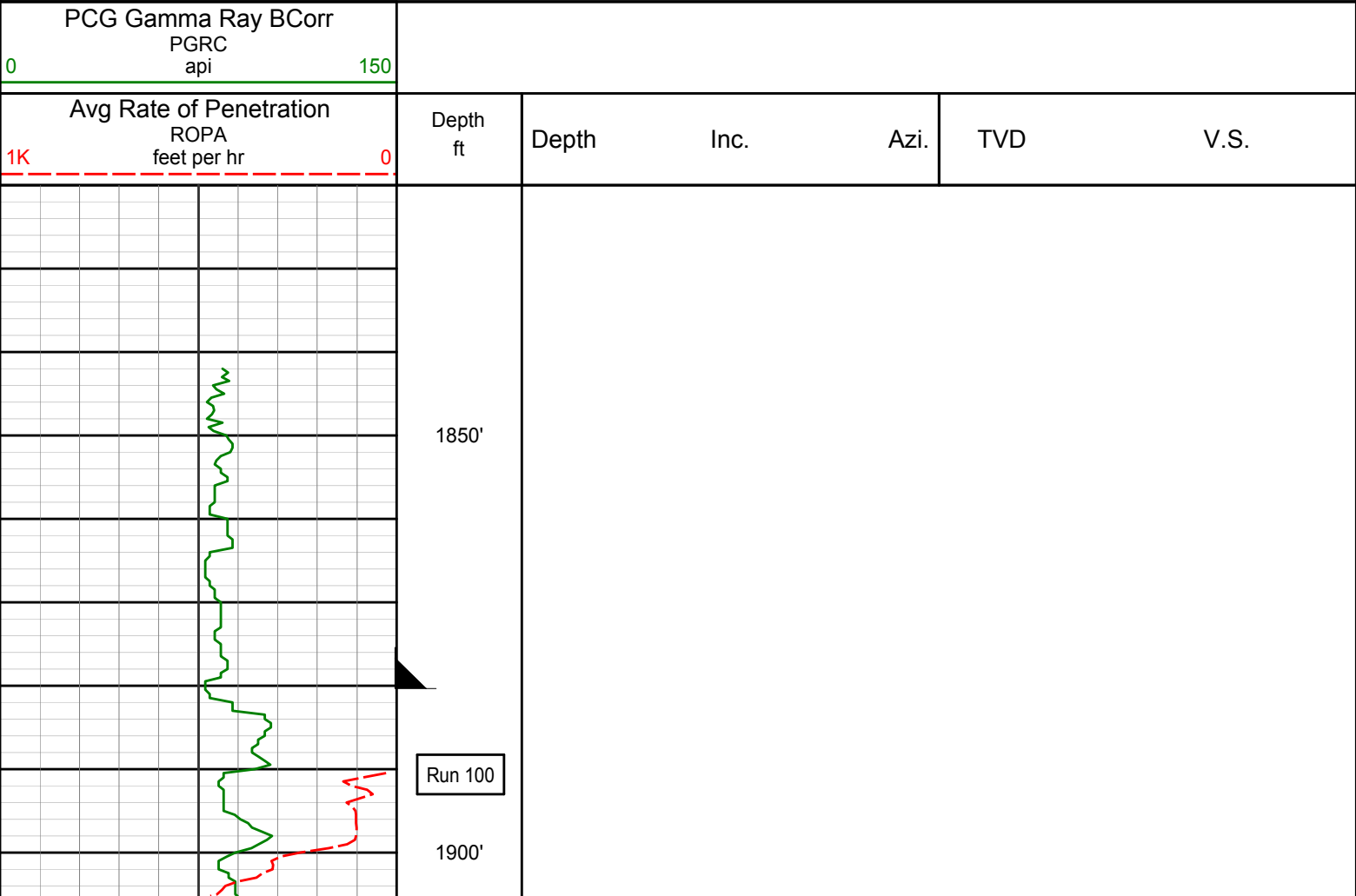
INSITE Version 8.5.2 -MLWD

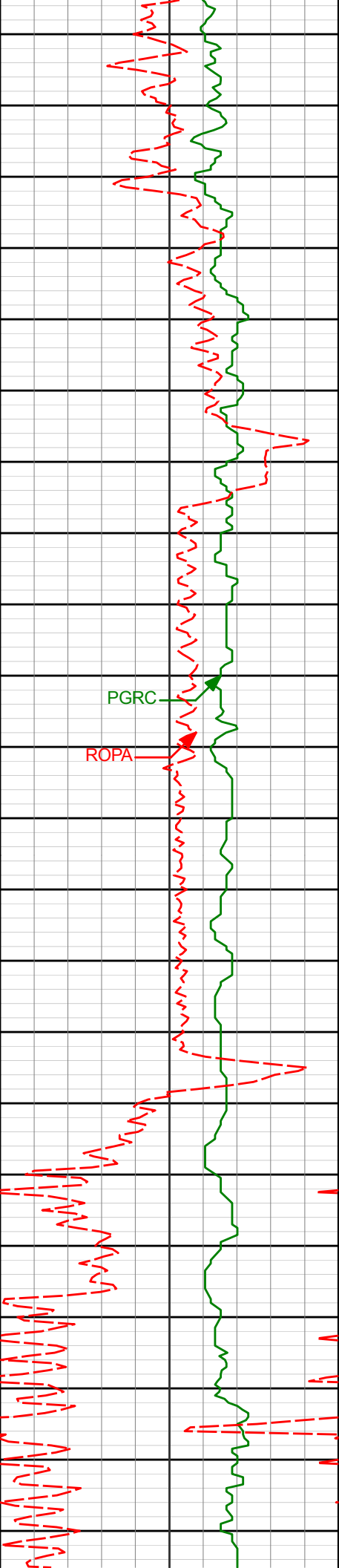
WARRANTY

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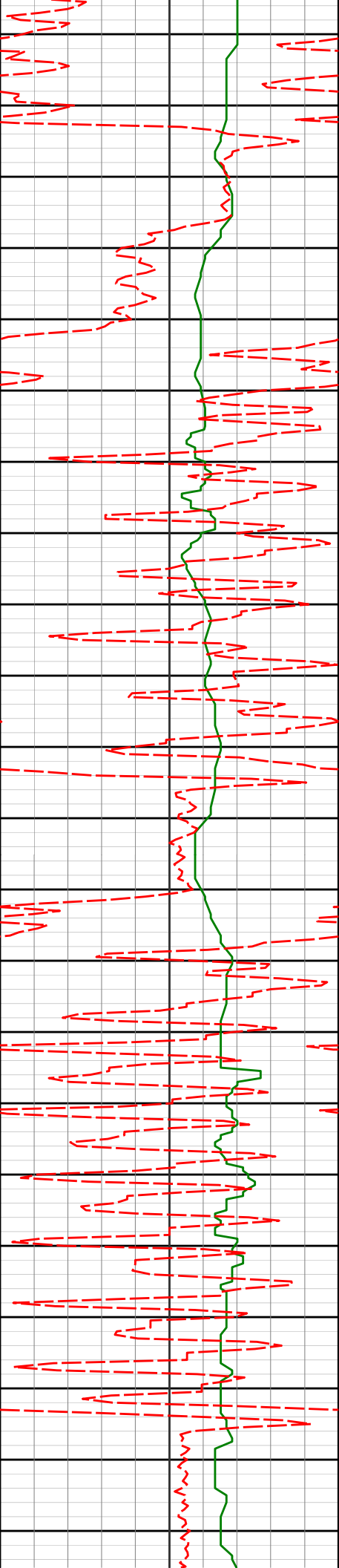


Detail Log 1:240





1919'	18.63°	156.39°	1866.64'	-317.53'
1950'				
2000'				
2008'	17.97°	155.78°	1951.14'	-343.11'
2050'				
2100'	17.46°	154.19°	2036.88'	-367.95'



2150'

2188'

17.29°

153.46°

2122.77'

-392.11'

2200'

2250'

2278'

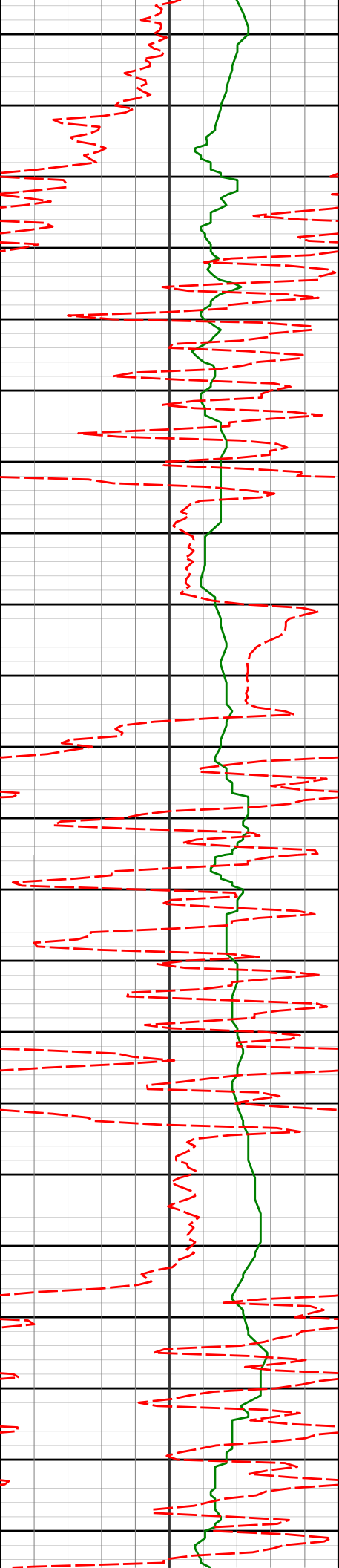
16.77°

152.47°

2208.82'

-415.63'

2300'



2350'

2368'

16.24°

150.45°

2295.12'

-438.13'

2400'

2450'

2457'

13.09°

148.01°

2381.21'

-457.54'

2500'

2550'

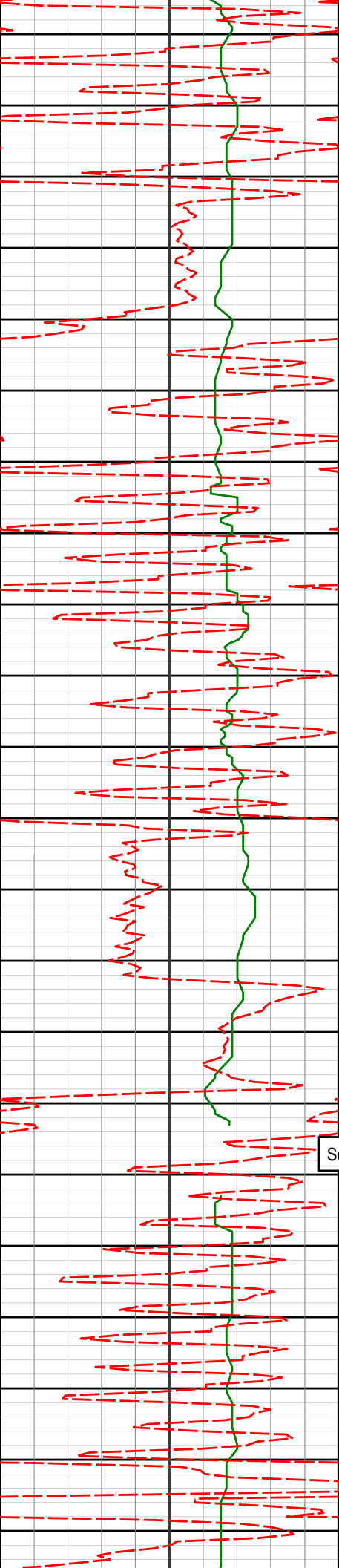
2547'

11.85°

145.39°

2469.08'

-473.82'



2600'

2637'

11.44°

144.49°

2557.23'

-488.72'

2650'

2700'

See Remark #8

2727'

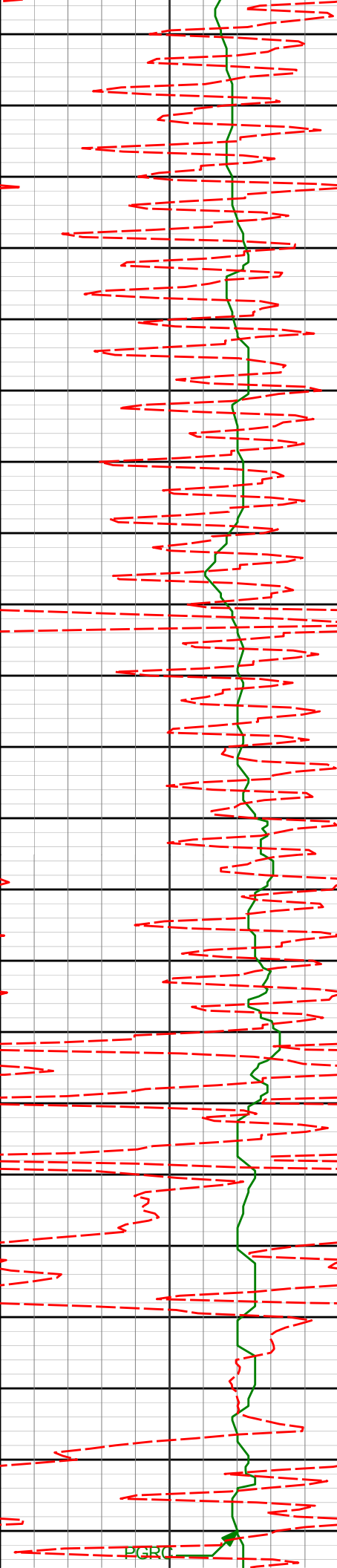
9.46°

150.38°

2645.74'

-502.44'

2750'



2800'

2816'

7.89°

151.62°

2733.72'

-514.20'

2850'

2900'

2906'

6.93°

150.41°

2822.96'

-524.37'

2950'

2996'

8.17°

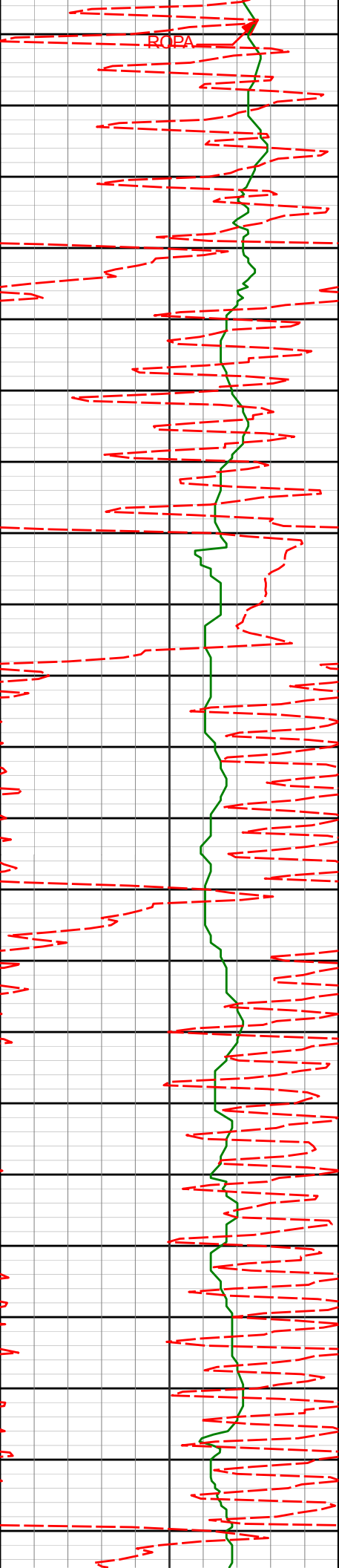
145.60°

2912.18'

-534.38'

3000'

PGRC



ROPA

3050'

3086'

8.63°

148.27°

3001.22'

-545.43'

3100'

3150'

3176'

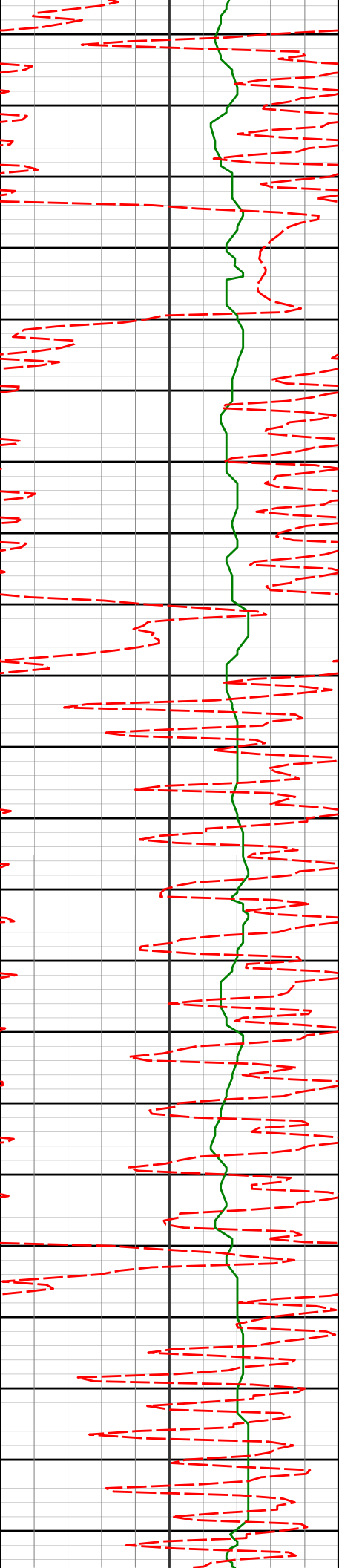
9.03°

150.19°

3090.15'

-557.32'

3200'



3250'

3265'

9.43°

150.34°

3178.00'

-569.74'

3300'

3350'

3355'

9.24°

149.72°

3266.81'

-582.41'

3400'

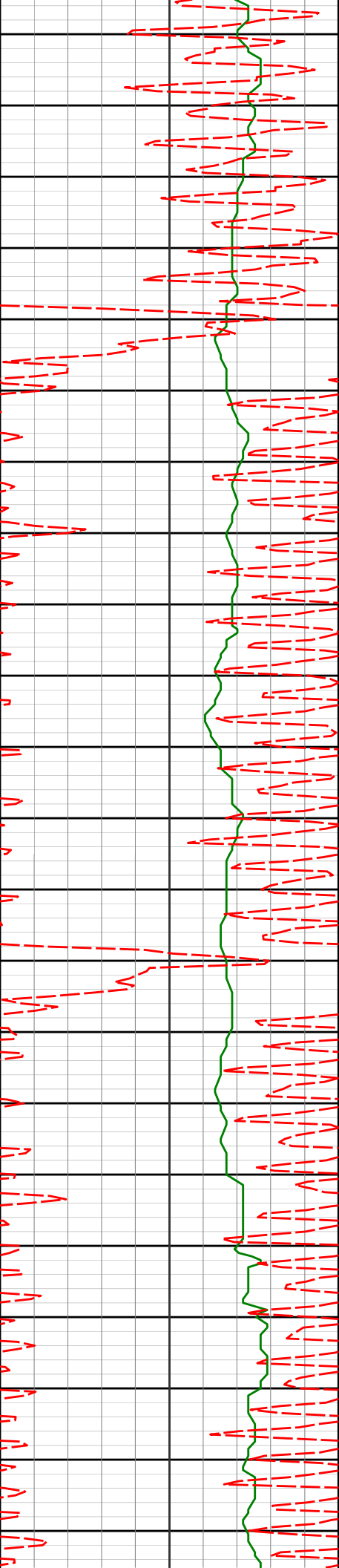
3445'

7.40°

151.97°

3355.86'

-593.78'



3450'

3500'

3535'

3550'

3600'

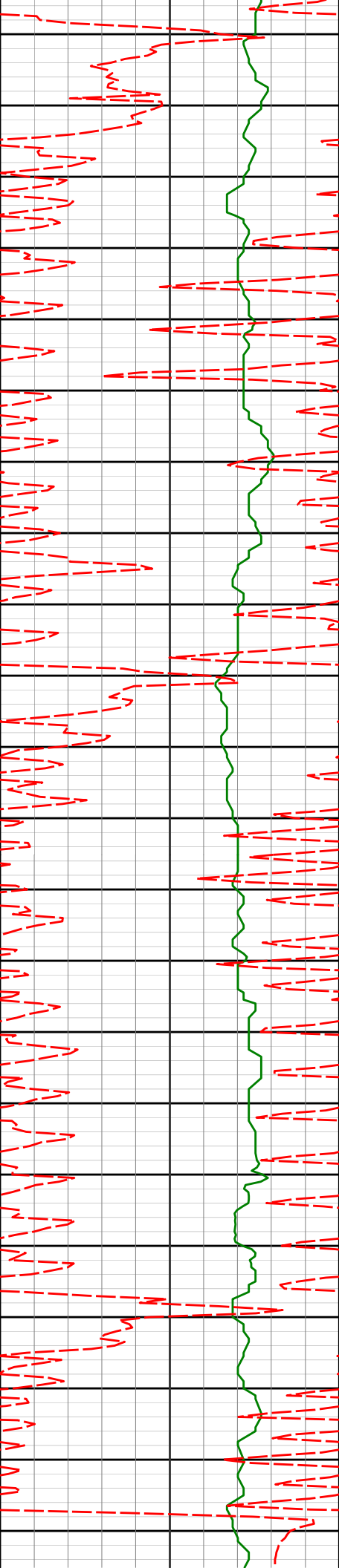
3650'

6.14°

153.14°

3445.23'

-603.21'



3700'

3714'

2.99°

172.84°

3623.65'

-616.39'

3750'

3800'

3804'

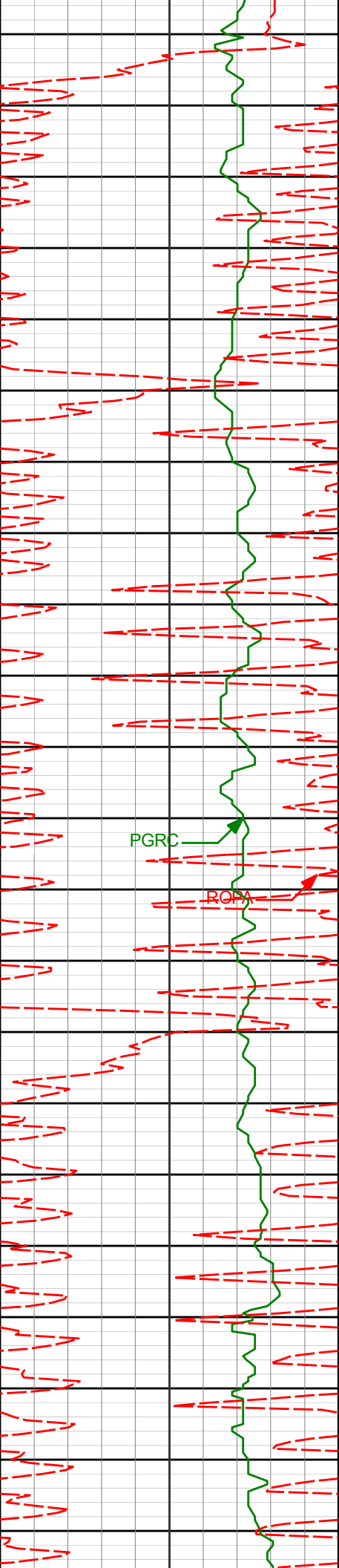
2.58°

184.37°

3713.54'

-620.74'

3850'



3894' 0.79° 155.64° 3803.50' -623.32'

3900'

3950'

3983' 0.10° 66.38° 3892.50' -623.85'

4000'

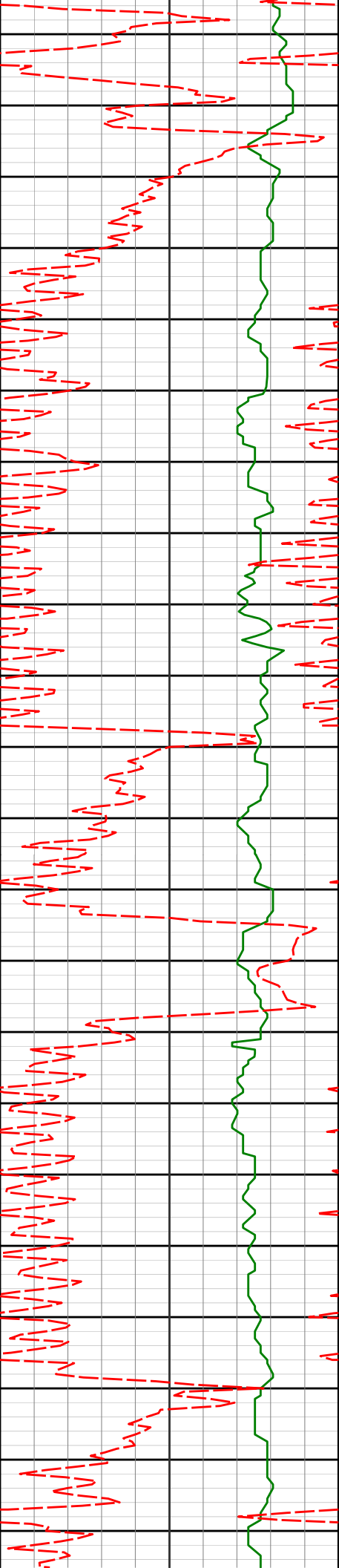
PGRC

ROA

4050'

4073' 0.68° 329.21° 3982.50' -623.35'

4100'



4150'

4163'

1.02°

312.94°

4072.49'

-622.35'

4200'

4250'

4253'

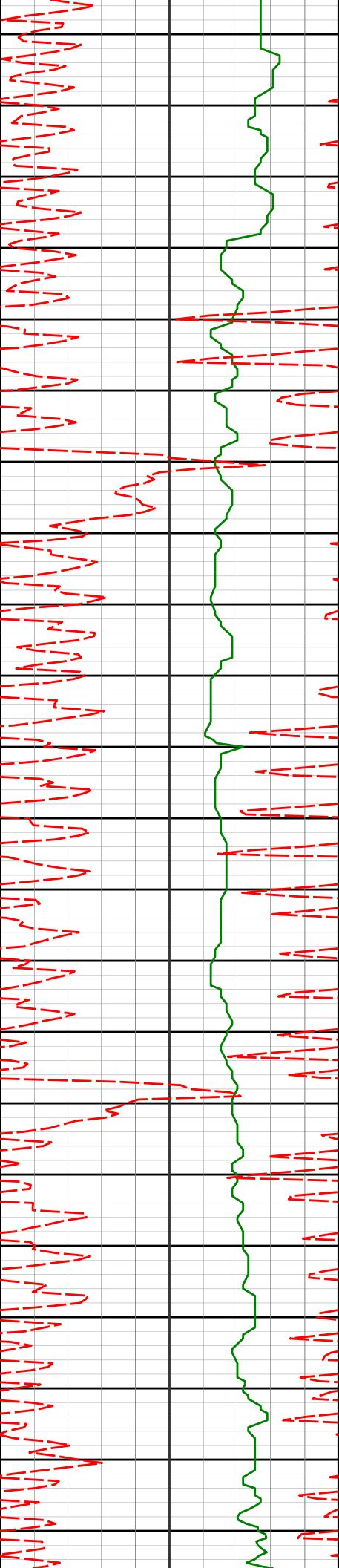
1.61°

341.32°

4162.46'

-620.60'

4300'



4342'

2.05°

352.04°

4251.42'

-617.83'

4350'

4400'

4432'

1.95°

345.88°

4341.36'

-614.75'

4450'

4500'

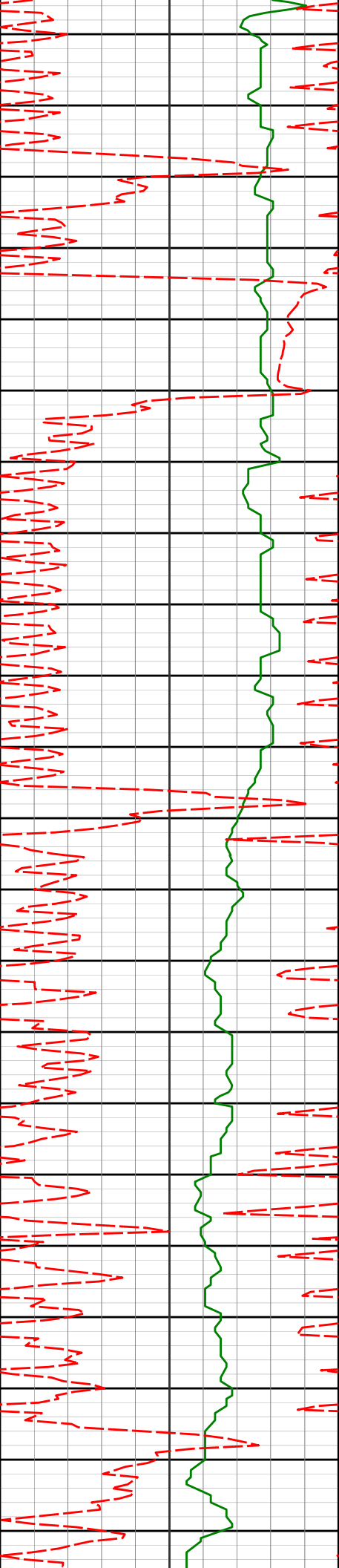
4522'

2.08°

326.53°

4431.31'

-611.90'



4550'

4600'

4650'

4700'

4750'

4612'

2.17°

18.03°

4521.25'

-608.92'

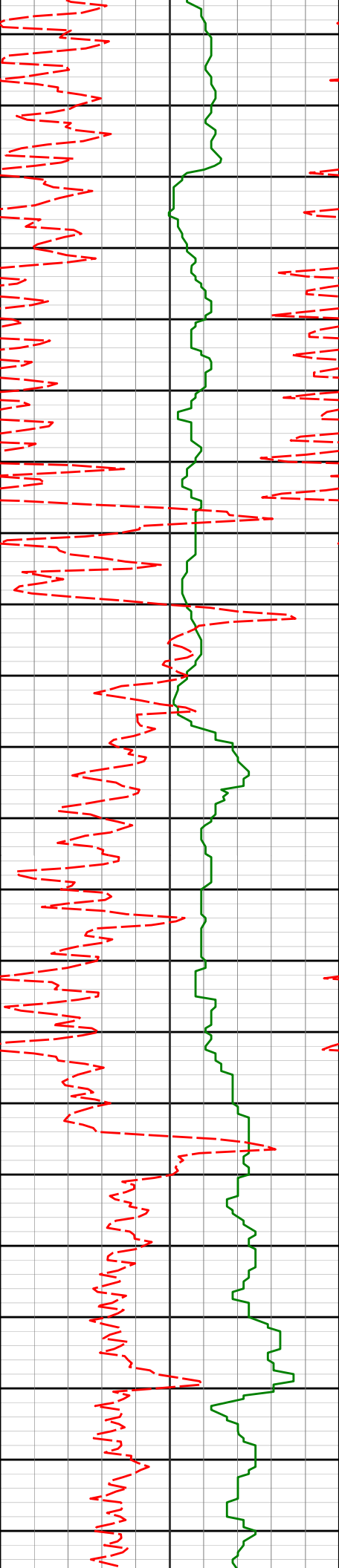
4702'

2.16°

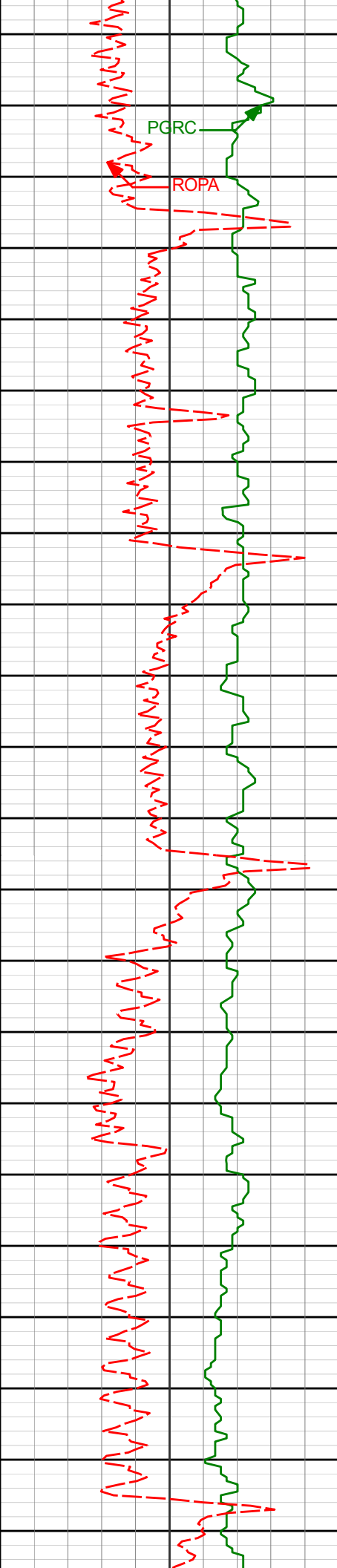
36.69°

4611.19'

-605.94'



4791'	2.06°	41.32°	4700.13'	-603.40'
4881'	1.96°	46.16°	4790.07'	-601.12'
4971'	1.84°	43.34°	4880.03'	-599.01'



5000'

PGRC

ROPA

5050'

5061'

1.10°

25.33°

4970.00'

-597.19'

5100'

5150'

5151'

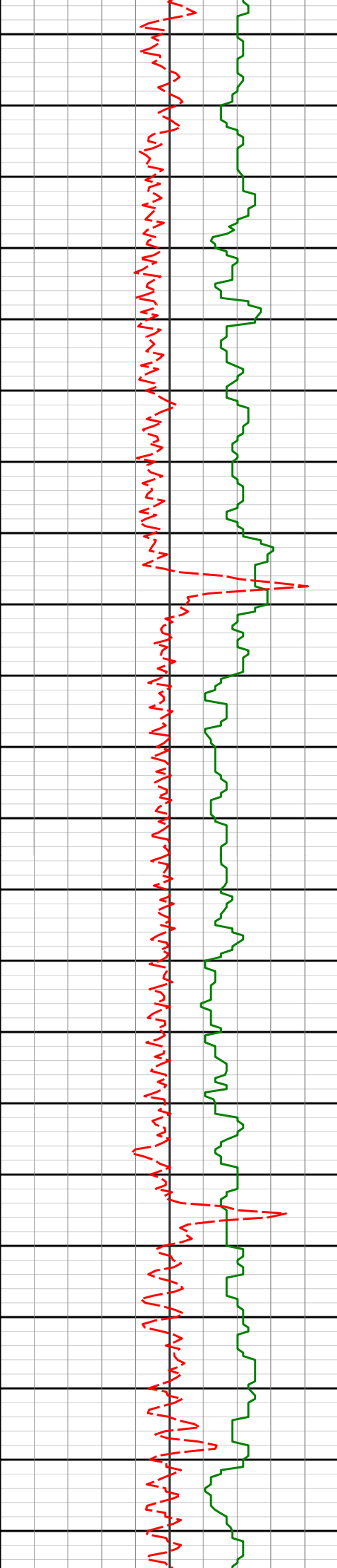
0.86°

5.06°

5059.98'

-595.74'

5200'



5240'

0.85°

352.07°

5148.97'

-594.42'

5250'

5300'

5330'

0.97°

336.17°

5238.96'

-593.06'

5350'

5400'

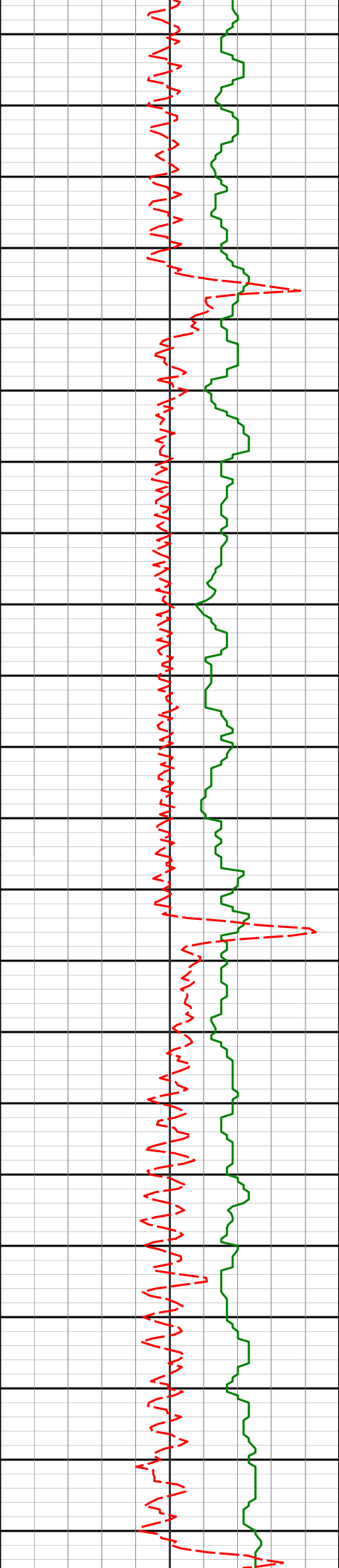
5420'

0.89°

327.42°

5328.95'

-591.77'



5450'

5500'

5550'

5600'

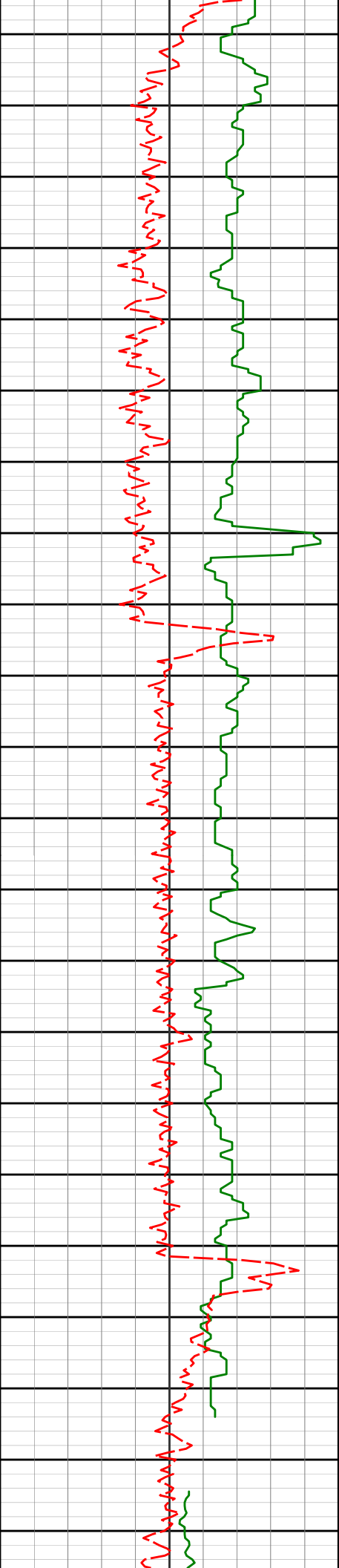
5509'

0.59°

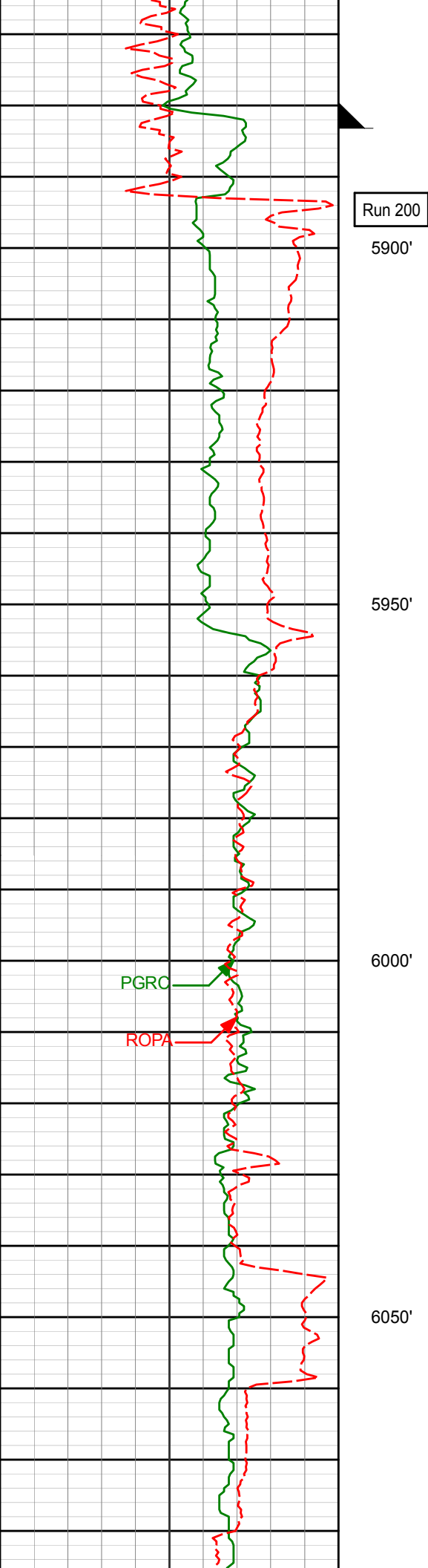
302.64°

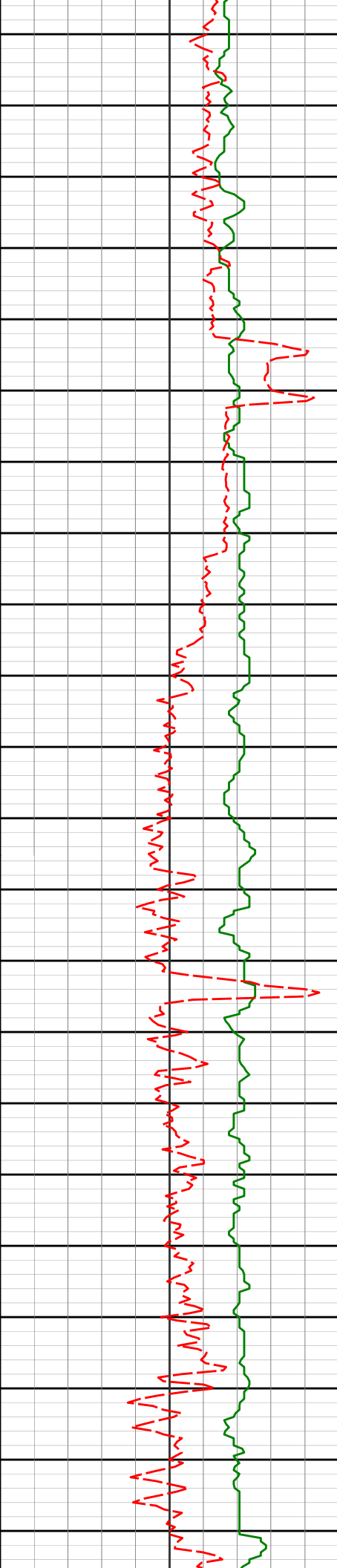
5417.94'

-590.94'

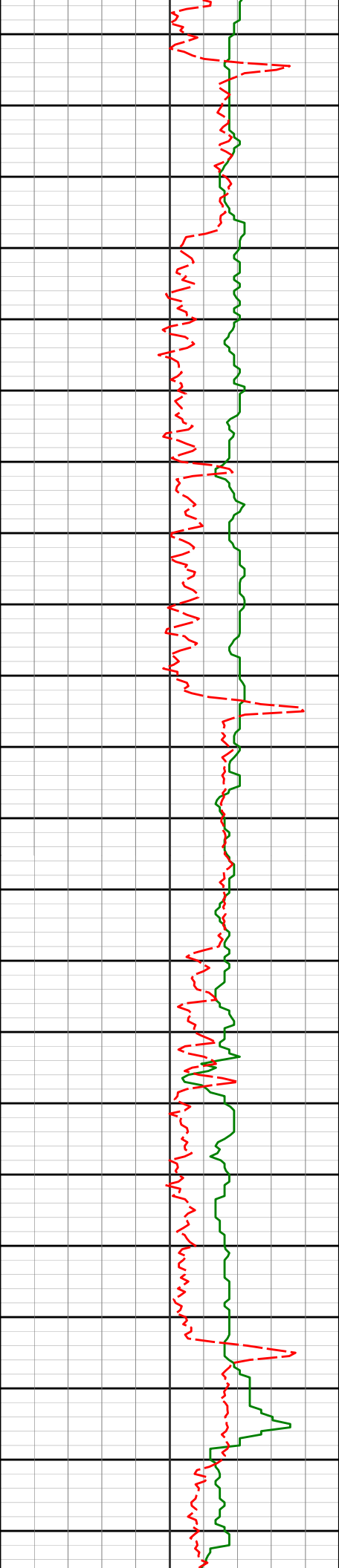


5650'				
5688'	1.20°	320.04°	5596.92'	-589.01'
5700'				
5750'				
5778'	1.37°	330.90°	5686.90'	-587.34'
5800'				
See Remark #6				
5847'	1.44°	329.77°	5755.88'	-585.83'
5850'				





6088'	0.74°	151.18°	5996.81'	-581.29'
6100'				
6150'				
6178'	0.22°	69.09°	6086.80'	-581.74'
6200'				
6250'				
6268'	0.31°	320.23°	6176.80'	-581.49'
6300'				



6350'

6358'

0.72°

346.76°

6266.80'

-580.76'

6400'

6450'

6448'

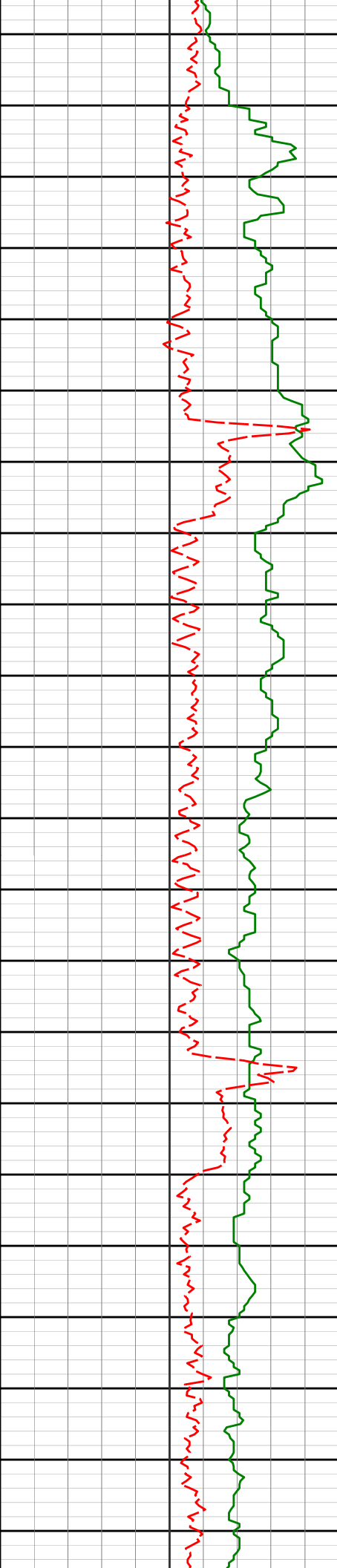
0.68°

325.54°

6356.79'

-579.77'

6500'



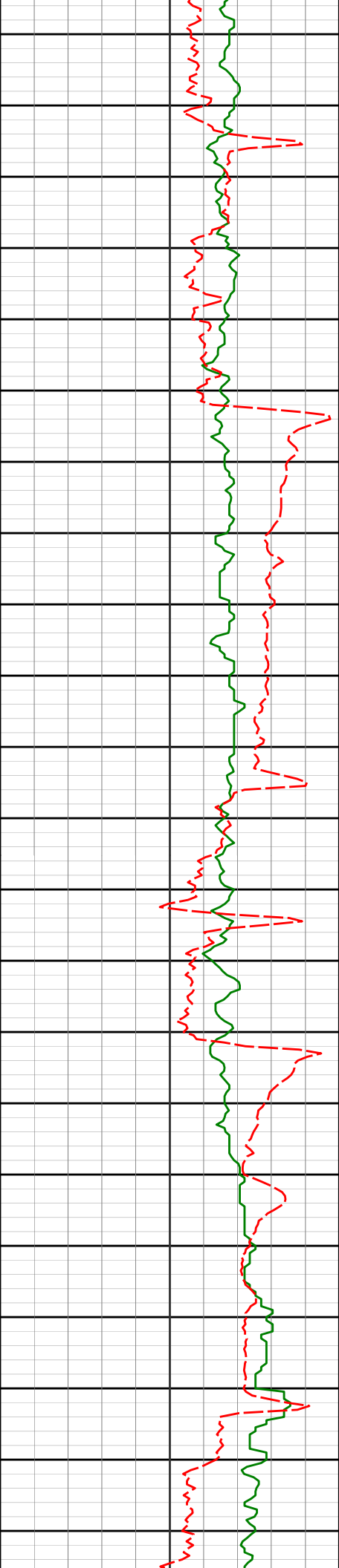
6550'

6600'

6650'

6700'

6537'	0.98°	337.05°	6445.78'	-578.63'
6627'	1.05°	344.71°	6535.77'	-577.12'
6717'	1.30°	347.47°	6625.75'	-575.33'



6750'

6800'
<KOP>

6806'

2.77°

1.97°

6714.69'

-572.20'

6850'

6900'

6896'

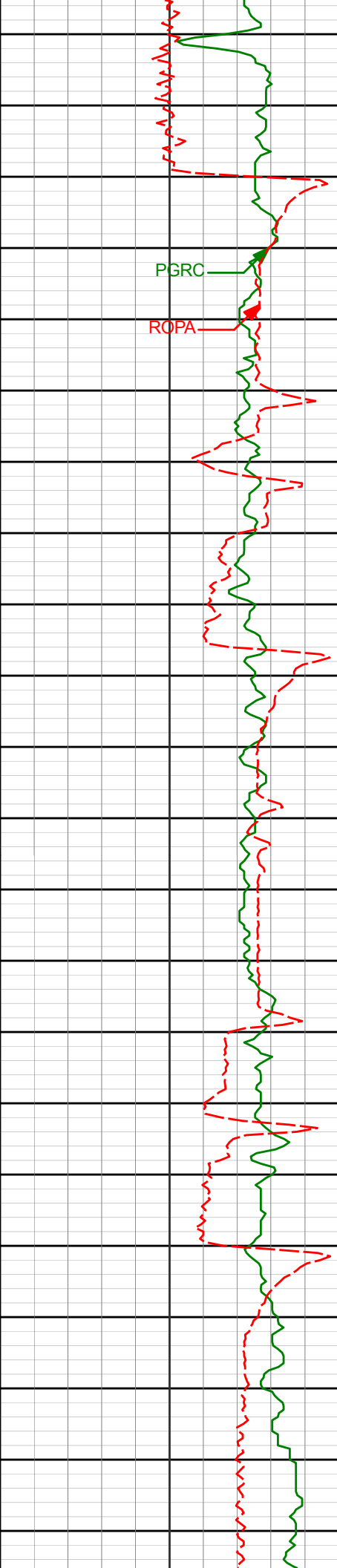
9.72°

356.70°

6804.10'

-562.42'

6950'



6986'

13.91°

355.90°

6892.18'

-544.03'

7000'

PGRC

ROPA

7050'

7076'

19.75°

4.57°

6978.30'

-518.06'

7100'

7150'

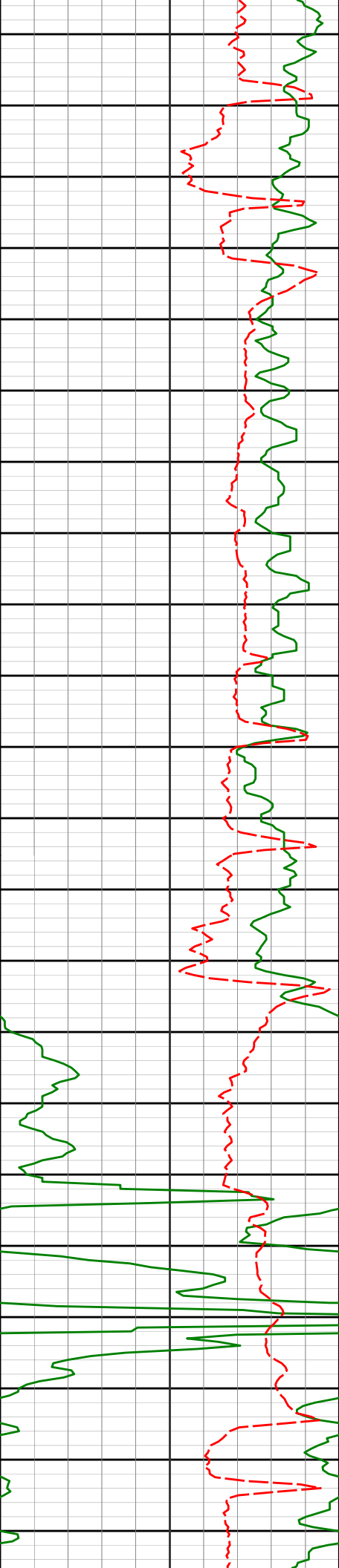
7166'

27.02°

4.67°

7060.85'

-482.49'



7200'

7250'

7300'

7350'

7400'

7255'

34.14°

8.78°

7137.43'

-437.61'

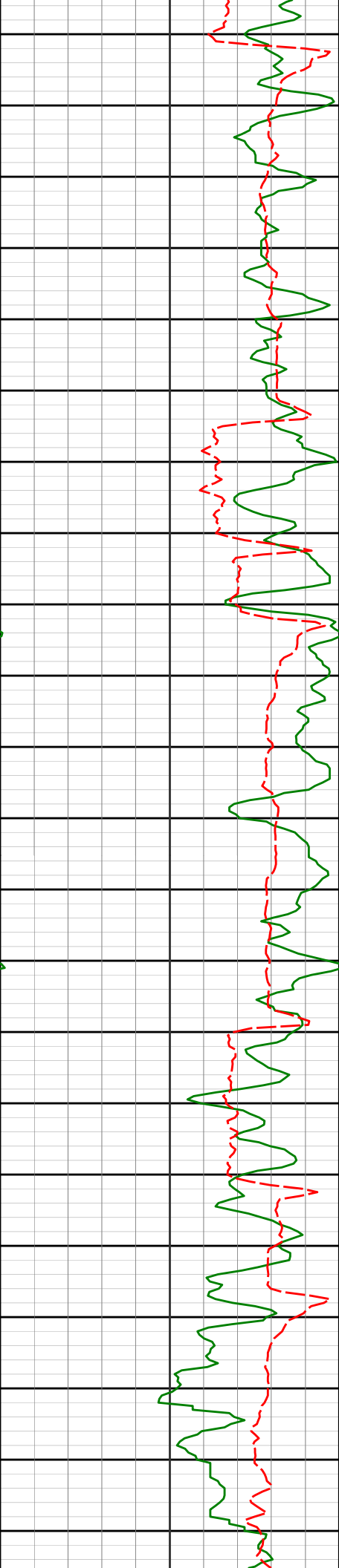
7345'

41.33°

4.81°

7208.57'

-382.98'



7435'	49.43°	359.84°	7271.76'	-319.07'
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7450'

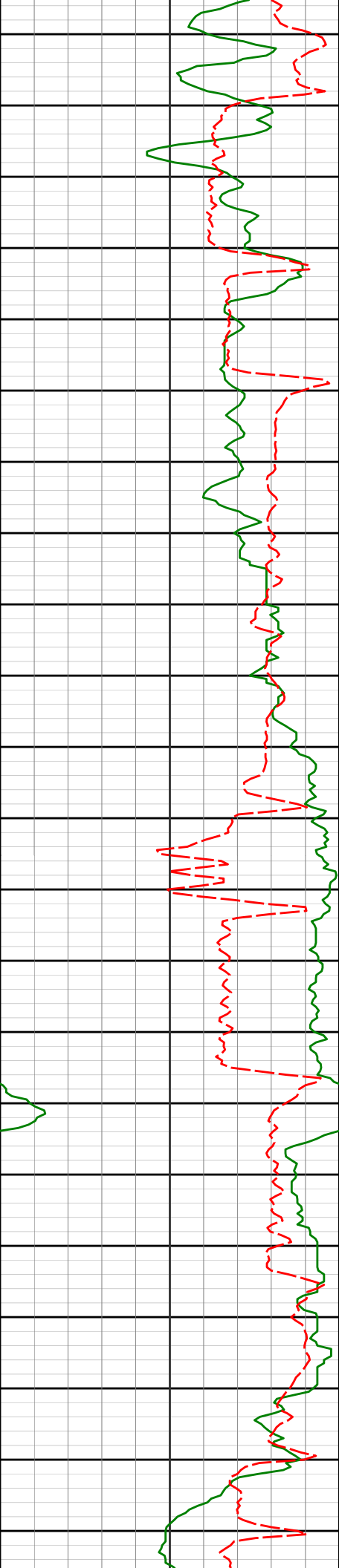
7500'

7525'	57.89°	359.08°	7325.05'	-246.64'
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7550'

7600'

7615'	65.07°	358.94°	7368.00'	-167.63'
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7650'

7700'

7750'

7800'

7704'

72.33°

0.04°

7400.31'

-84.77'

7794'

80.22°

3.52°

7421.65'

2.53'



7850'

7884'

85.28°

5.21°

7433.00'

91.50'

7900'

7950'

7973'

91.97°

1.93°

7435.13'

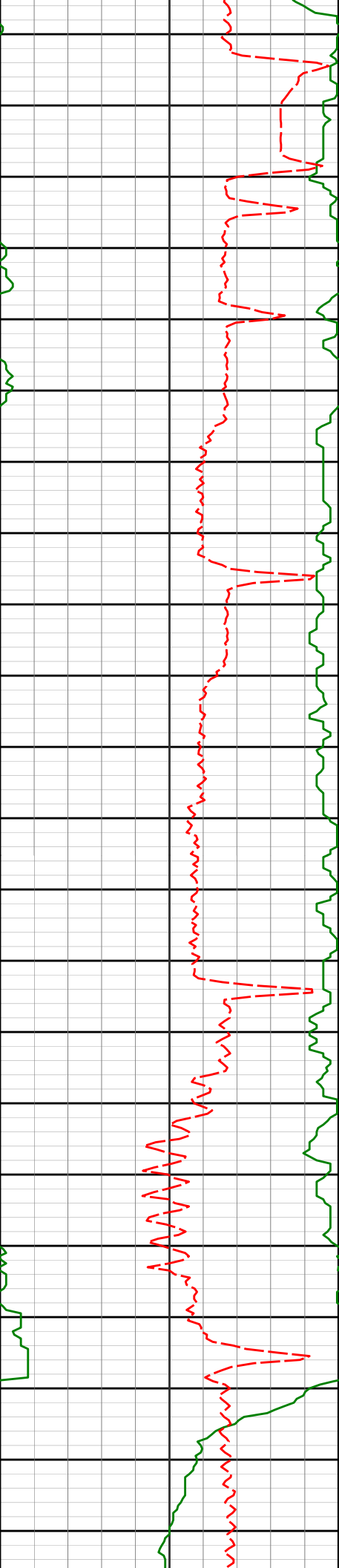
180.22'

8000'

PGRC

ROPA

8050'



8100'

8150'

8200'

8250'

8158'

90.09°

0.43°

7431.79'

365.12'

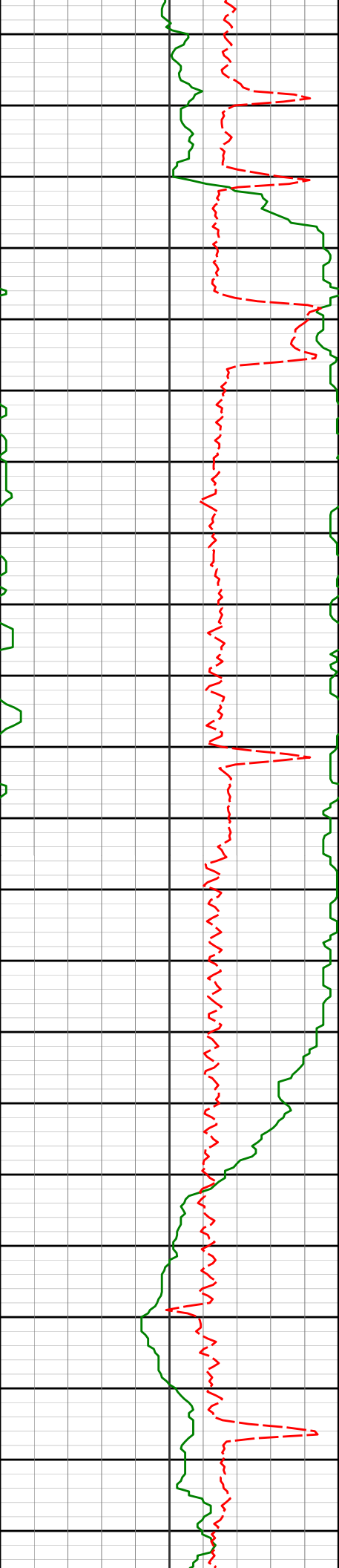
8252'

88.52°

359.45°

7432.93'

459.11'



8300'

8350'

8400'

8450'

8500'

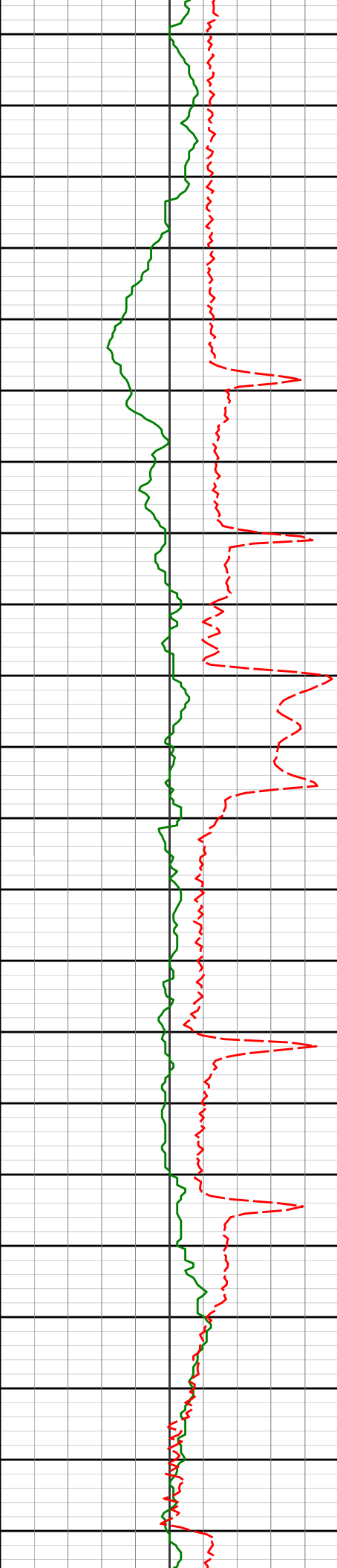
8346'

89.82°

359.26°

7434.29'

553.10'



8534'	88.52°	357.79°	7437.02'	741.02'
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8550'

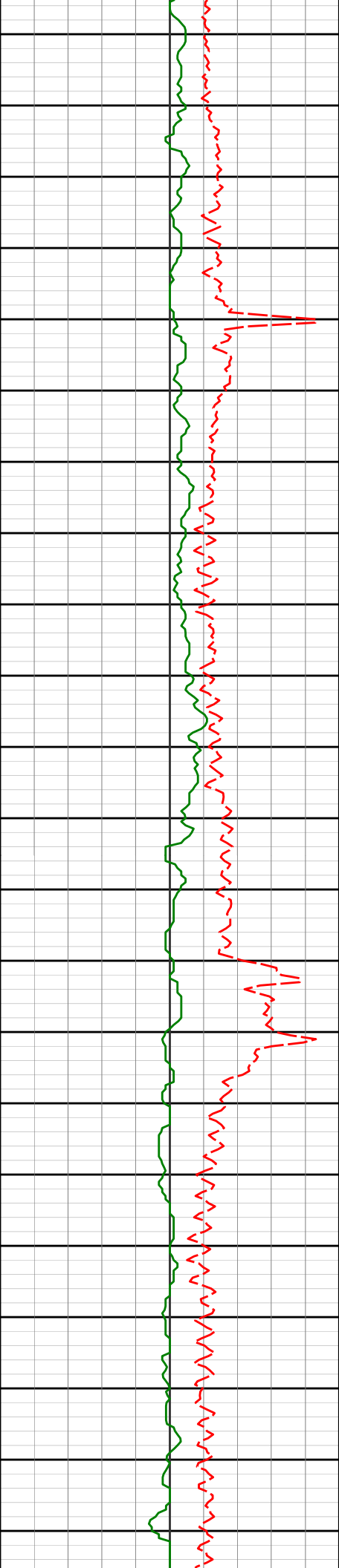
8600'

8629'	90.80°	359.40°	7437.59'	835.99'
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8650'

8700'

8723'	90.25°	359.47°	7436.73'	929.98'
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8750'

8800'

8850'

8900'

8817'

91.30°

0.96°

7435.47'

1023.96'

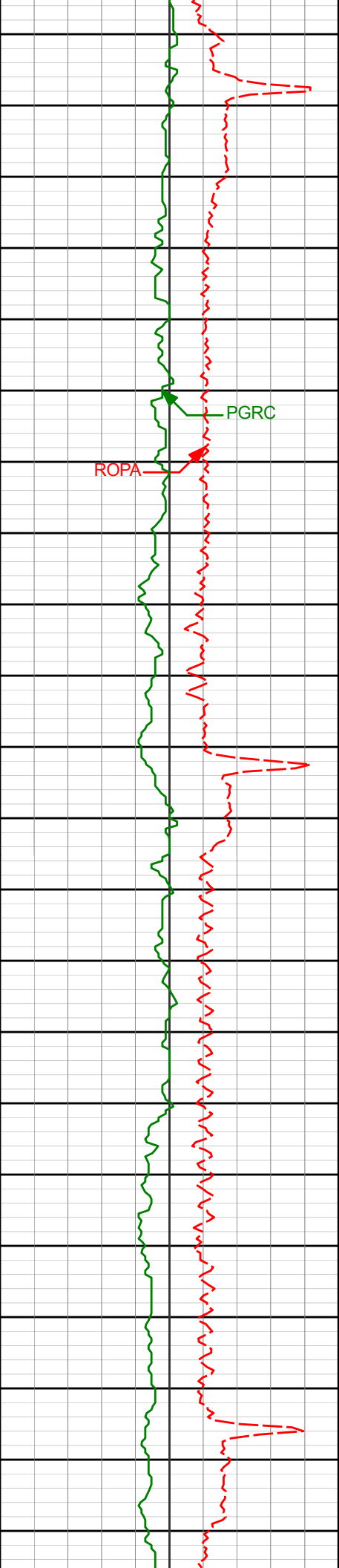
8911'

91.08°

1.02°

7433.52'

1117.92'



8950'

9000'

9050'

9100'

9150'

ROPA

PGRC

9006'

90.62°

0.47°

7432.11'

1212.90'

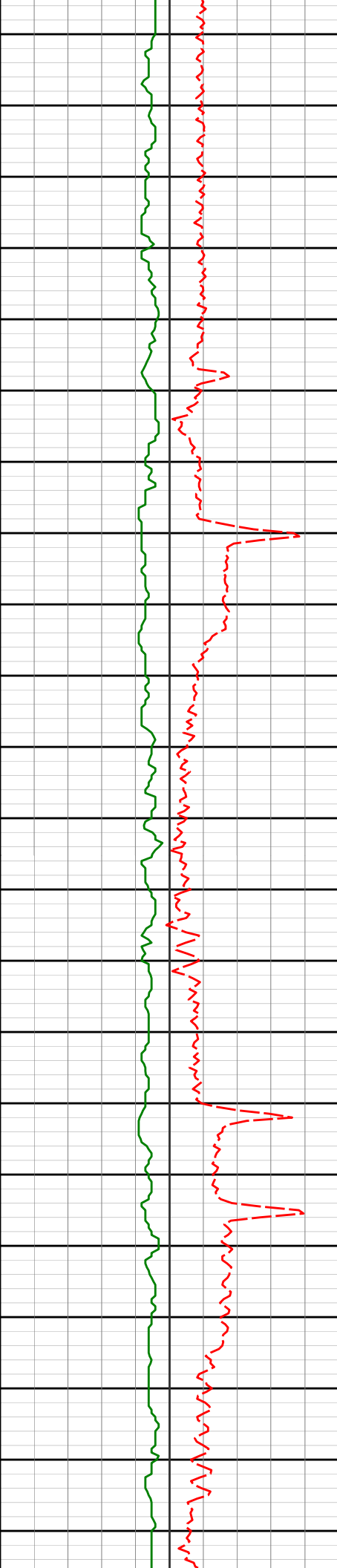
9100'

90.74°

0.66°

7431.00'

1306.89'



9194'	90.15°	0.58°	7430.27'	1400.87'
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9200'

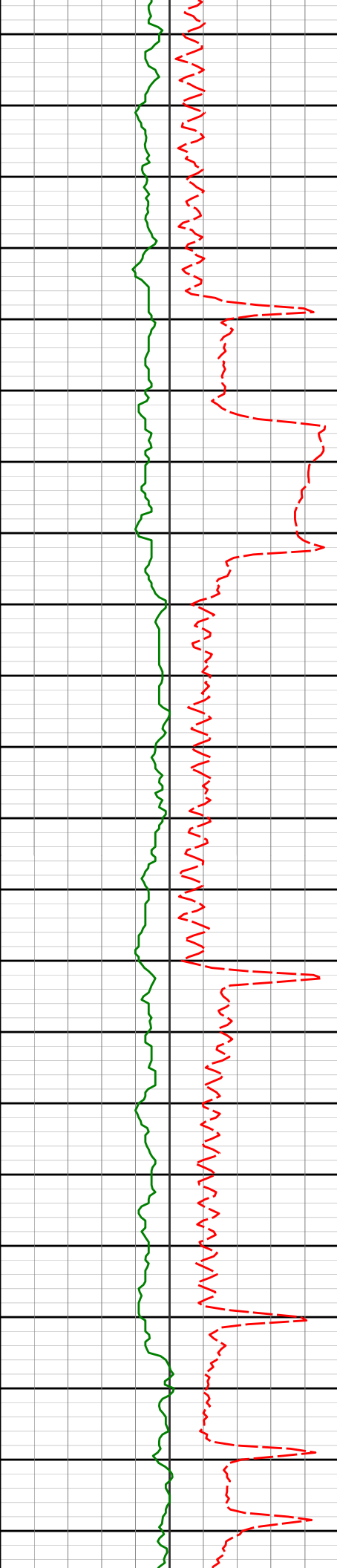
9250'

9288'	90.40°	1.87°	7429.81'	1494.84'
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9300'

9350'

9382'	90.59°	3.36°	7429.00'	1588.72'
-------	--------	-------	----------	----------



9400'

9450'

9477'

9500'

9550'

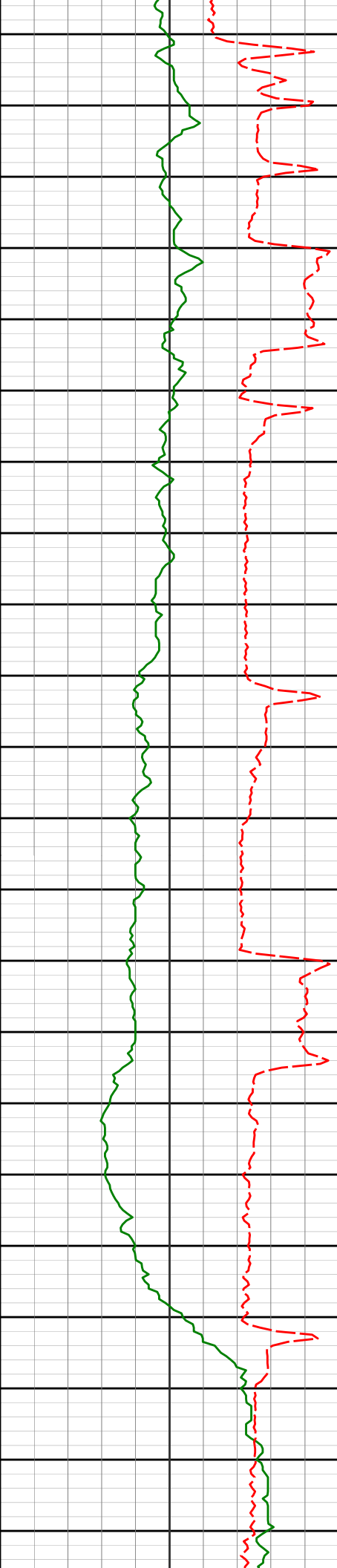
9600'

90.15°

359.52°

7428.39'

1683.67'



9650'

9656'

90.37°

359.04°

7427.57'

1862.66'

9700'

9750'

9746'

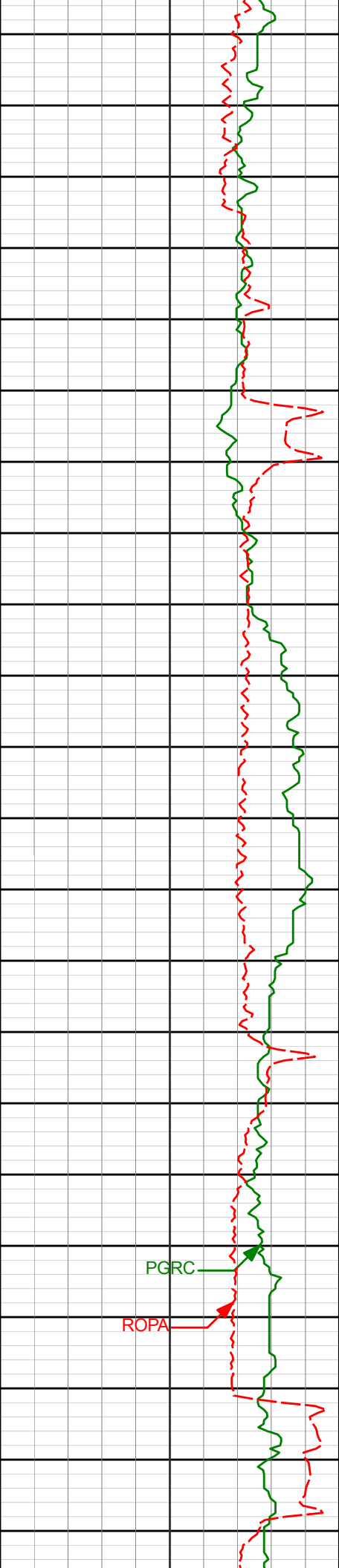
88.83°

357.06°

7428.20'

1952.60'

9800'



9836'

88.40°

356.65°

7430.38'

2042.46'

9850'

9900'

9925'

88.30°

356.40°

7432.94'

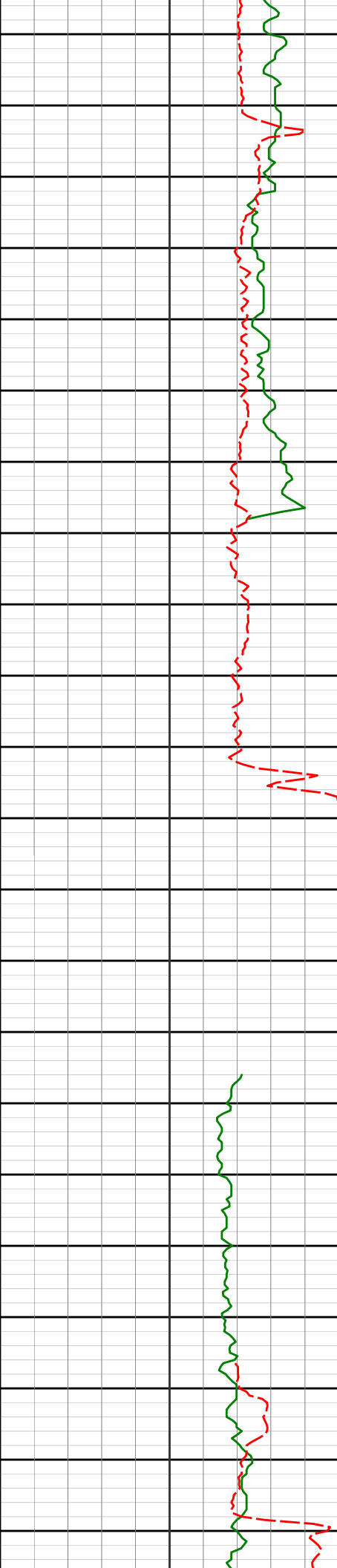
2131.27'

9950'

10000'

PGRC

ROPA



10050'

10100'

10150'

See Remark #7

10200'

10250'

10105'

88.77°

358.06°

7437.55'

2311.02'

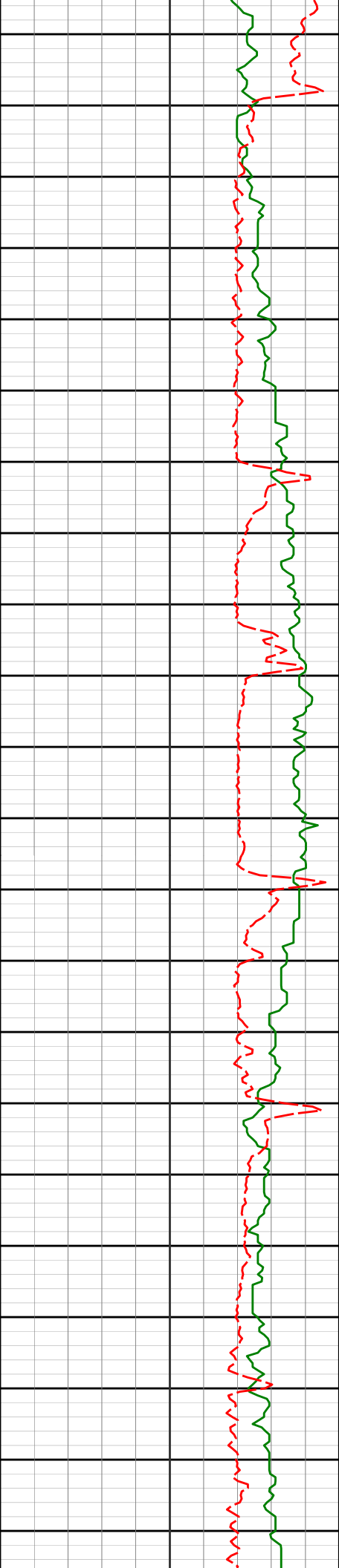
10195'

88.98°

357.86°

7439.31'

2400.96'



10284'

90.31°

0.84°

7439.86'

2489.94'

10300'

10350'

10374'

90.40°

0.13°

7439.30'

2579.93'

10400'

10450'

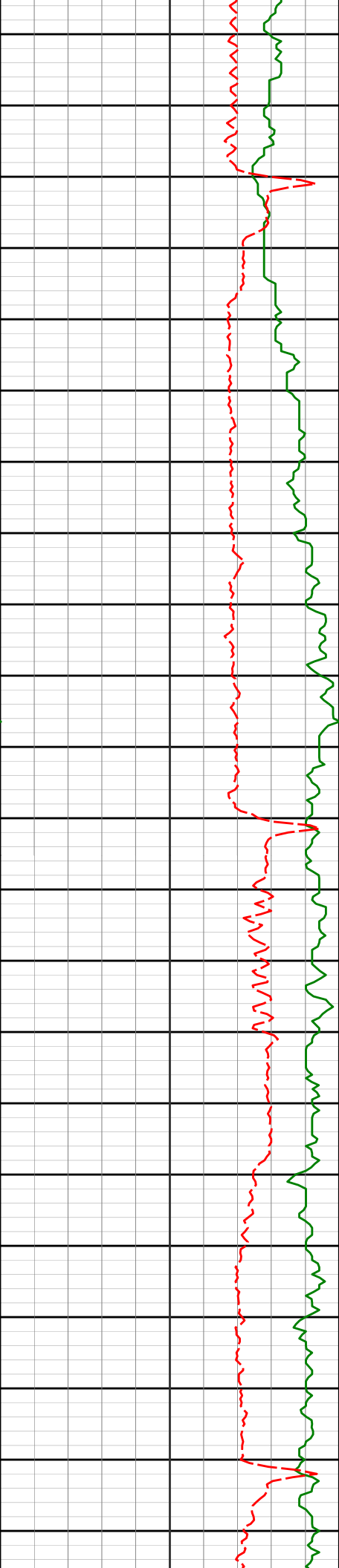
10464'

90.83°

359.85°

7438.34'

2669.93'



10500'

10550'

10600'

10650'

10700'

10554'

90.65°

359.62°

7437.17'

2759.92'

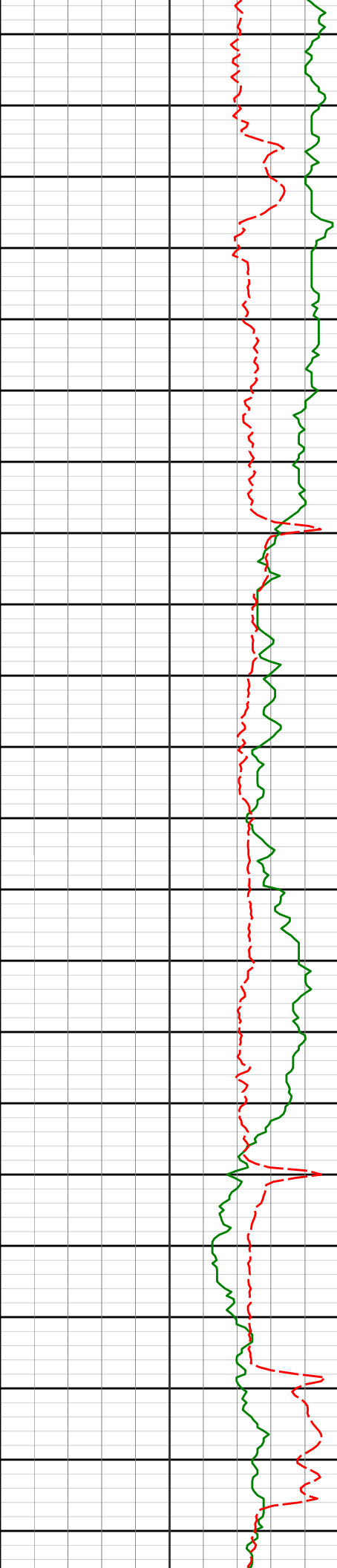
10644'

90.59°

358.97°

7436.21'

2849.91'



10733'

90.99°

359.19°

7434.99'

2938.90'

10750'

10800'

10823'

91.35°

358.54°

7433.15'

3028.86'

10850'

10900'

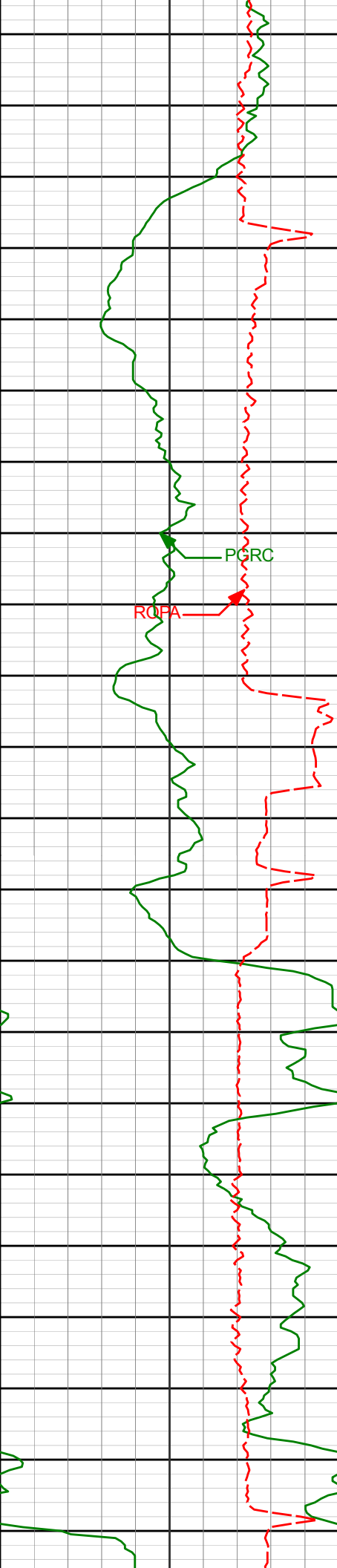
10913'

90.74°

0.55°

7431.50'

3118.84'



10950'

11000'

PGRC

ROPA

11050'

11092'

89.72°

359.82°

7430.78'

3297.83'

11100'



11150'

11182'

90.09°

359.62°

7430.93'

3387.83'

11200'

11250'

11272'

90.55°

359.49°

7430.42'

3477.83'

11300'

11350'

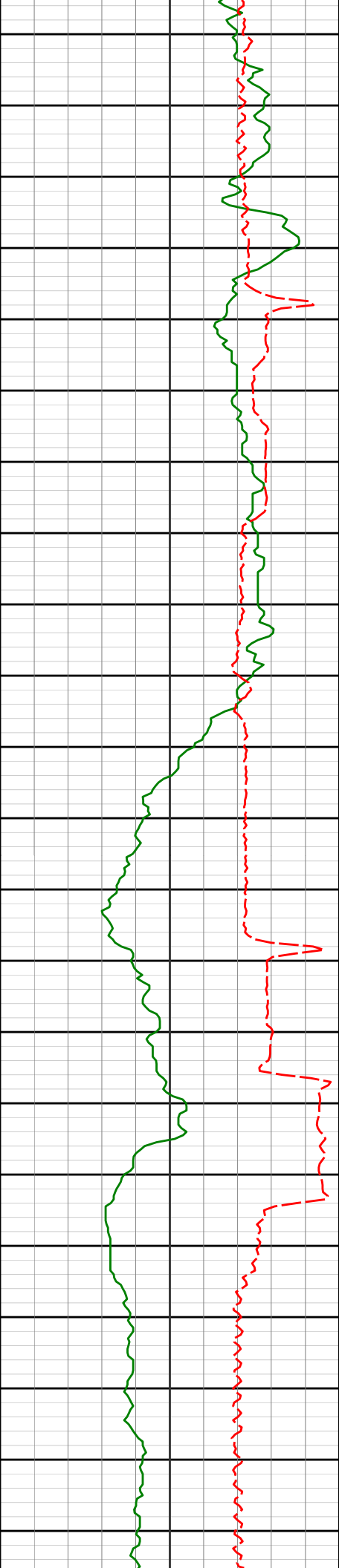
11362'

90.68°

359.01°

7429.45'

3567.82'



11400'

11450'

11500'

11550'

11451'

11541'

91.02°

89.35°

358.73°

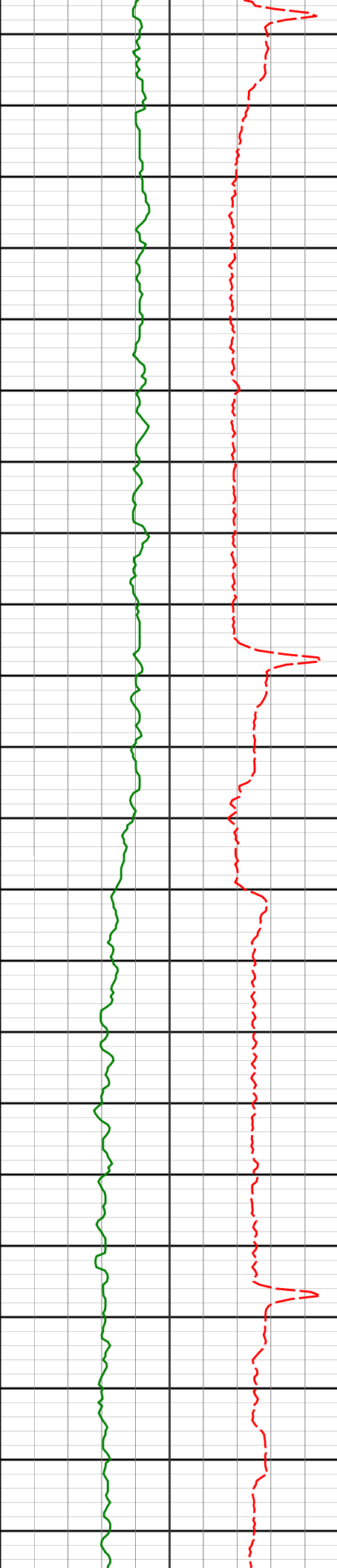
0.52°

7428.14'

7427.85'

3656.80'

3746.79'



11600'

11631'

89.08°

359.93°

7429.08'

3836.78'

11650'

11700'

11721'

88.89°

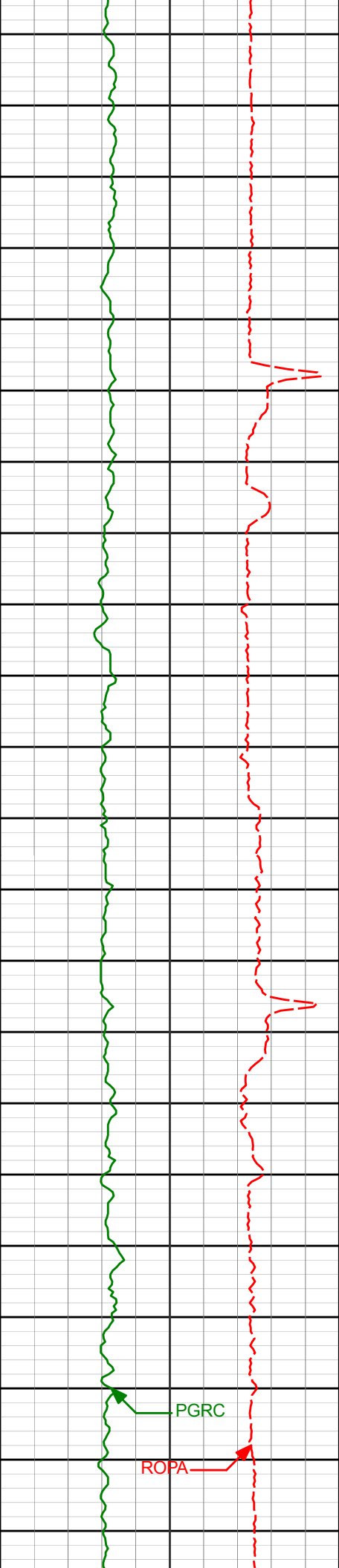
359.90°

7430.68'

3926.76'

11750'

11800'



11811'

89.44°

360.00°

7431.99'

4016.75'

11850'

11900'

11900'

90.18°

0.23°

7432.28'

4105.75'

11950'

11990'

90.59°

0.16°

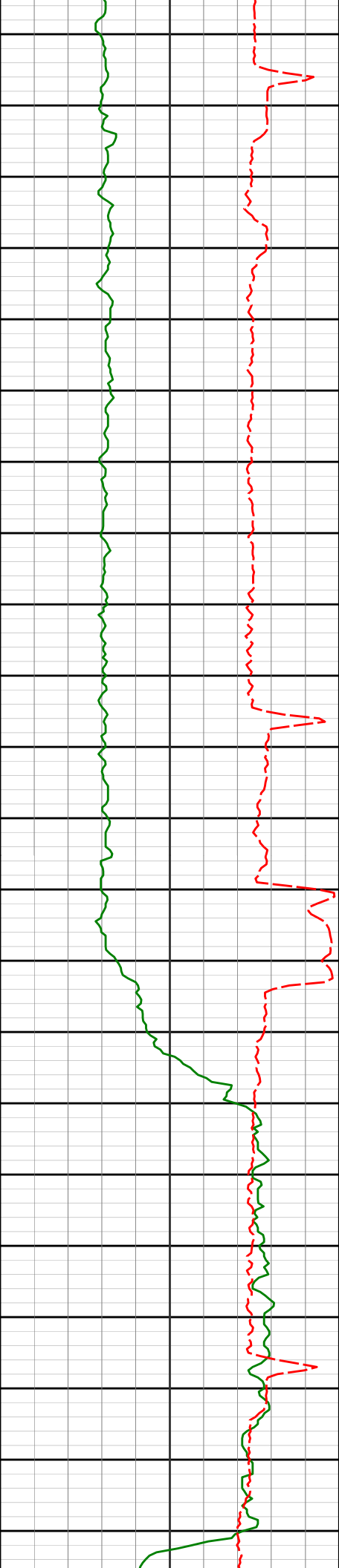
7431.67'

4195.75'

12000'

PGRC

ROPA



12050'

12080'

12100'

12150'

12169'

12200'

91.02°

0.23°

7430.41'

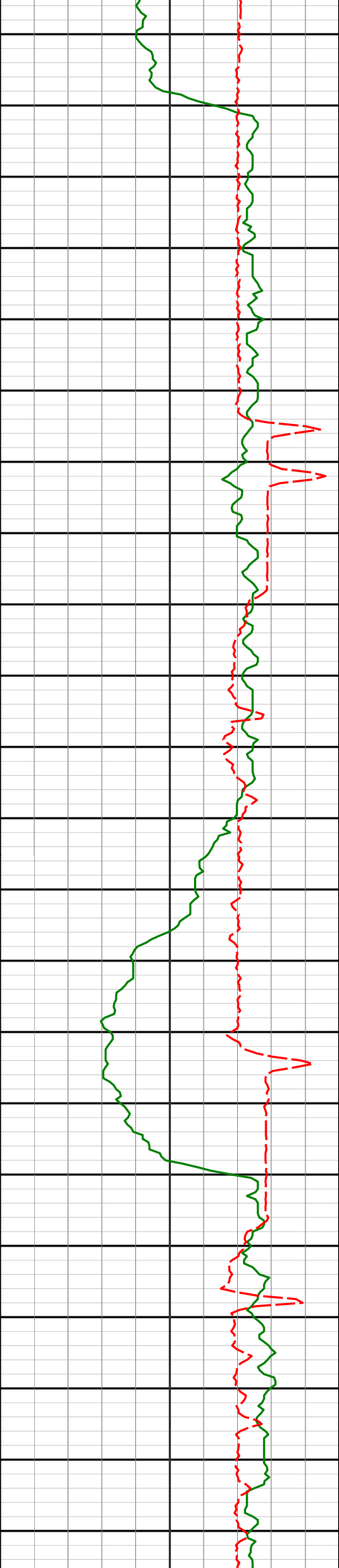
4285.74'

89.66°

1.14°

7429.89'

4374.72'



12250'

12259'

89.75°

359.55°

7430.35'

4464.71'

12300'

12350'

12349'

89.26°

356.44°

7431.12'

4554.65'

12400'

12450'

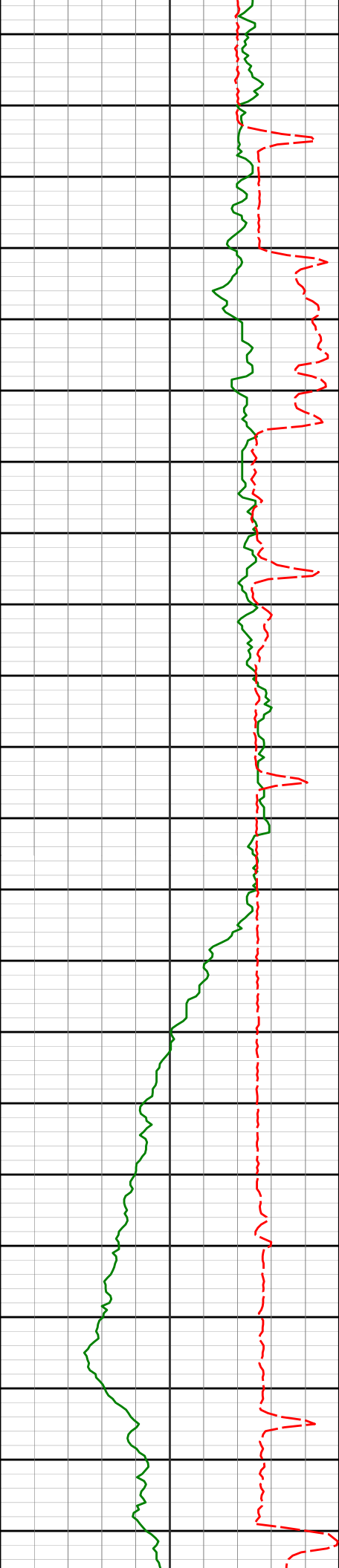
12439'

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355.76°

7432.40'

4644.46'



12500'

12529'

90.65°

358.64°

7432.60'

4734.35'

12550'

12600'

12618'

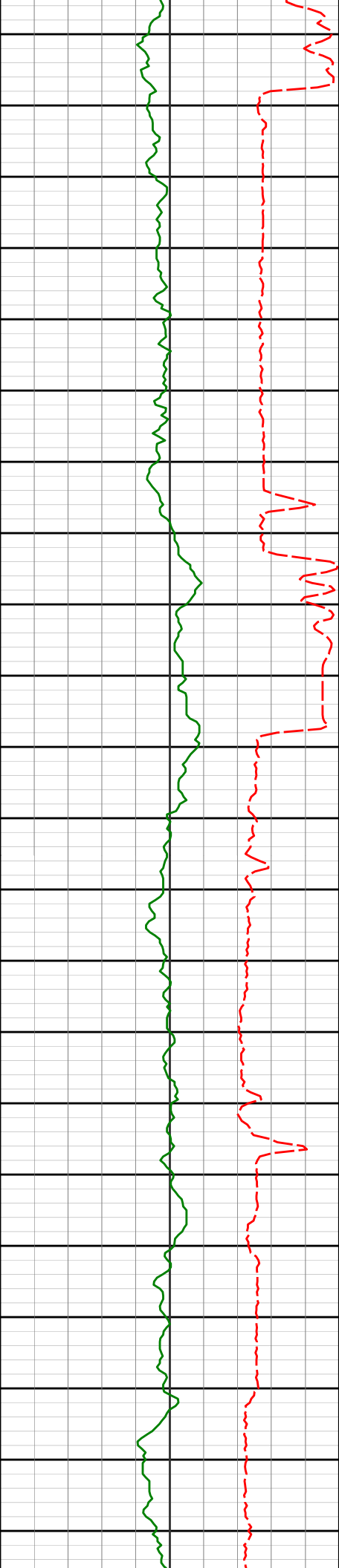
90.86°

358.41°

7431.43'

4823.32'

12650'



12700'

12750'

12800'

12850'

12900'

12708'

89.85°

359.04°

7430.87'

4913.30'

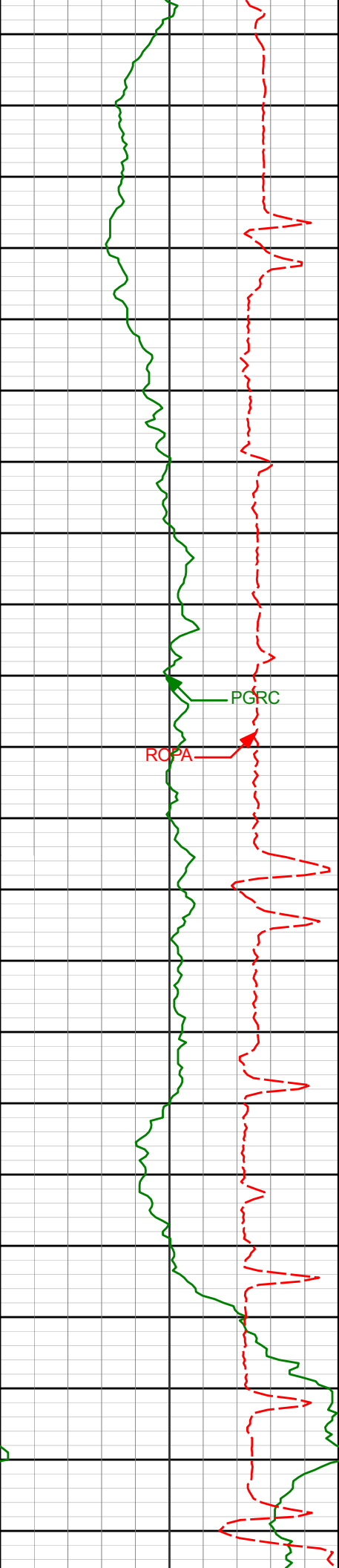
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90.77°

1.73°

7429.91'

5092.27'



12950'

12977'

90.93°

1.23°

7428.58'

5182.22'

13000'

PCRC

ROPA

13050'

13067'

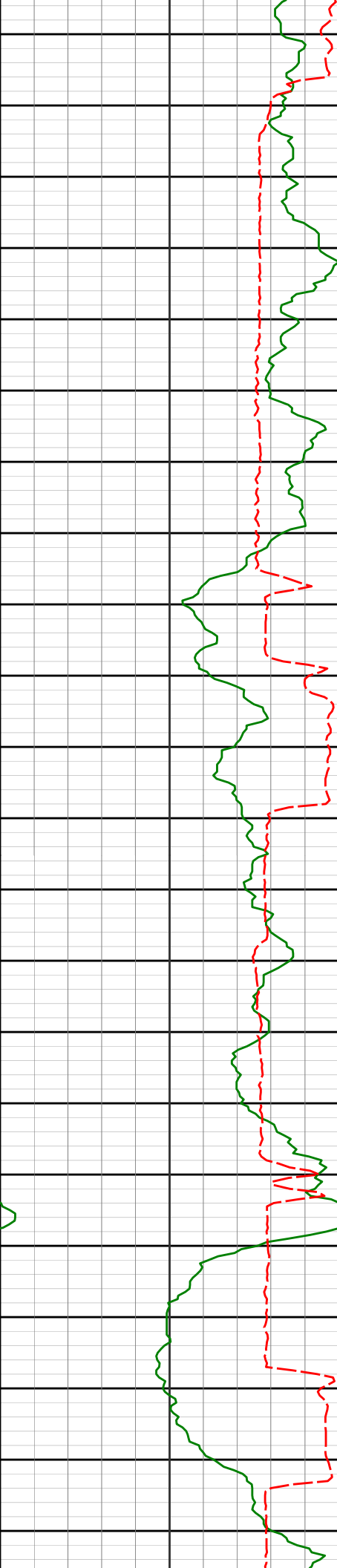
91.45°

0.73°

7426.71'

5272.18'

13100'



13150'

13157'

90.95°

359.99°

7424.83'

5362.16'

13200'

13250'

13247'

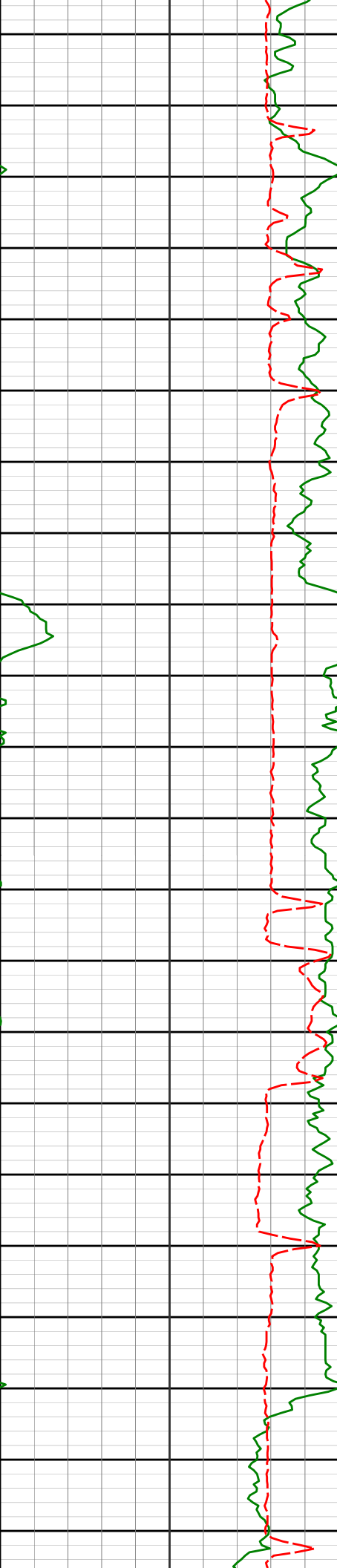
90.19°

2.11°

7423.93'

5452.13'

13300'



13350'

13400'

13450'

13500'

13550'

13426'

90.12°

1.26°

7423.45'

5631.03'

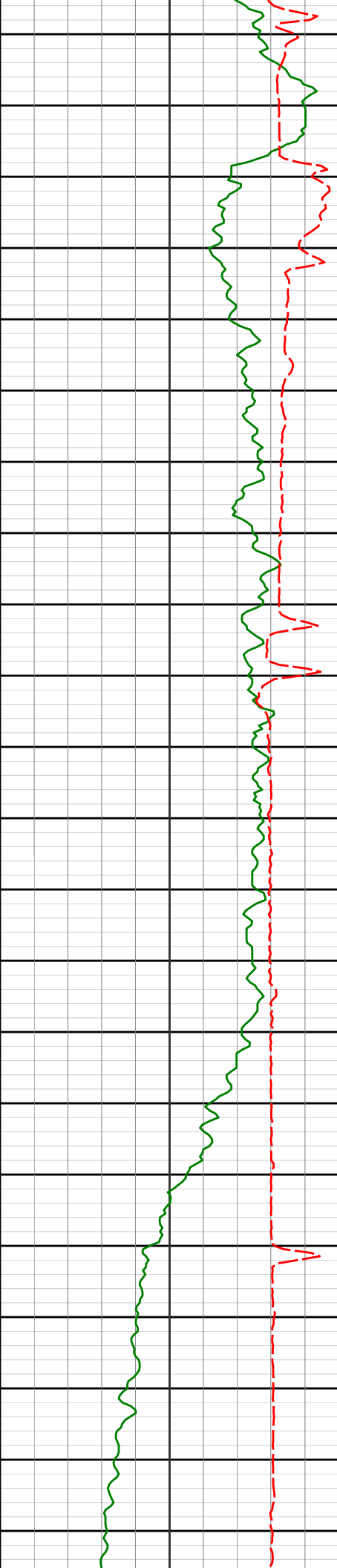
13516'

87.13°

1.04°

7425.61'

5720.97'



13600'

13606'

88.92°

0.87°

7428.71'

5810.90'

13650'

13700'

13695'

89.26°

358.94°

7430.12'

5899.88'

13750'

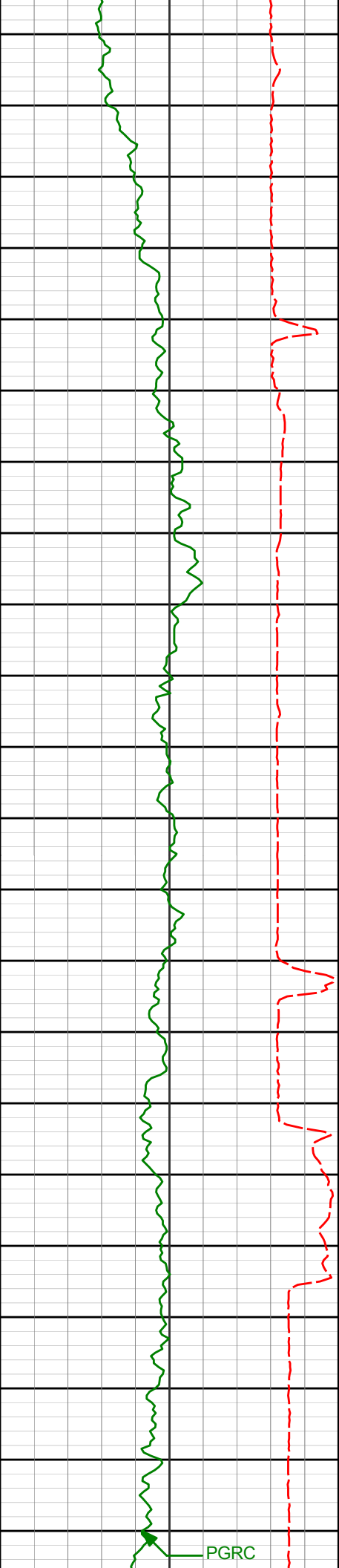
13785'

89.26°

358.42°

7431.28'

5989.85'



13800'

13850'

13900'

13950'

14000'

PGRC

13875'

89.66°

358.70°

7432.13'

6079.83'

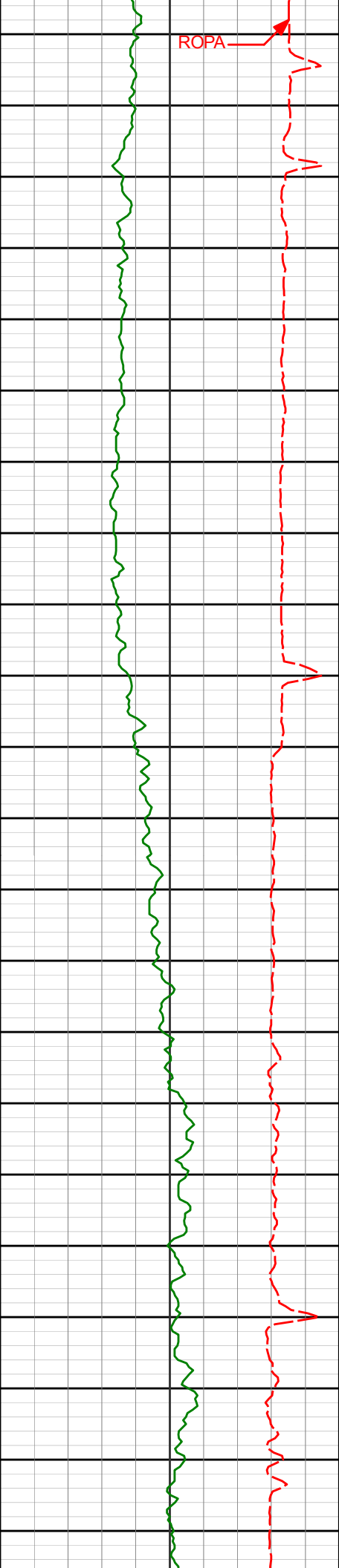
13965'

88.40°

1.07°

7433.65'

6169.81'



14050'

14100'

14150'

14200'

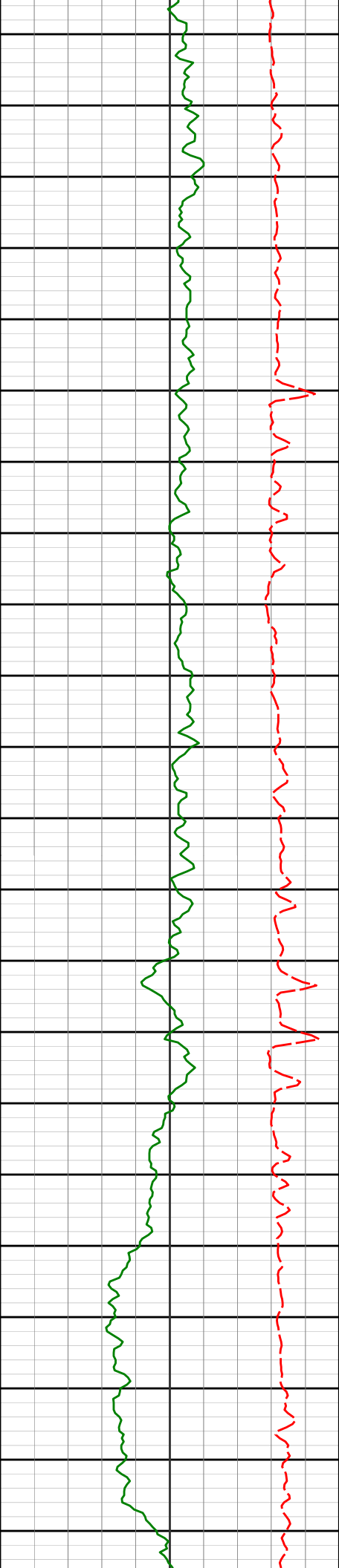
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0.28°

7437.55'

6348.74'



14234'

88.95°

359.61°

7439.07'

6438.73'

14250'

14300'

14324'

88.30°

358.93°

7441.23'

6528.70'

14350'

14400'

14413'

88.21°

358.88°

7443.93'

6617.64'



14450'

14500'

14550'

14600'

14650'

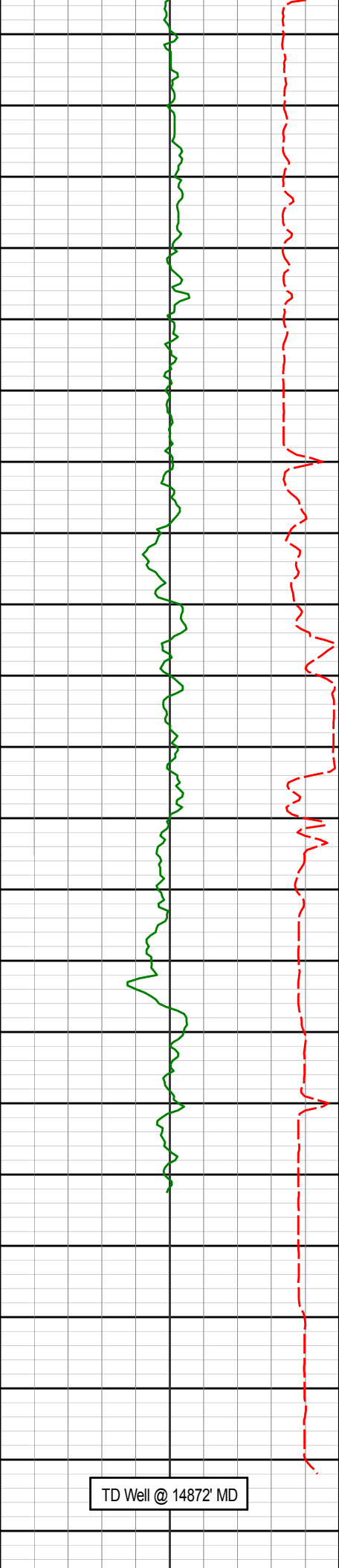
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359.37°

7446.23'

6707.61'



14683'

89.60°

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7448.66'

6887.49'

14700'

14750'

14772'

89.94°

357.77°

7449.02'

6976.40'

14800'

14826'

90.28°

357.64°

7448.91'

7030.37'

14850'

14872'

90.28°

357.64°

7448.69'

7076.33'

[illegible]

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp

Wagner 1N-E10HZ

Wattenberg

Weld Colorado

USA

CA-XX-0904337675

Surveys from 133' to 1840' provided by third party

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
133.00	0.35	208.35	133.00	0.36 S	0.19 W	-0.36	0.26
165.00	0.18	205.80	165.00	0.49 S	0.26 W	-0.49	0.53
197.00	0.35	166.07	197.00	0.63 S	0.26 W	-0.63	0.75
229.00	0.66	171.70	229.00	0.91 S	0.21 W	-0.91	0.98
260.00	0.75	162.38	259.99	1.28 S	0.12 W	-1.28	0.47
292.00	0.75	144.01	291.99	1.65 S	0.06 E	-1.65	0.75
324.00	0.88	117.03	323.99	1.93 S	0.41 E	-1.93	1.25
355.00	0.75	111.14	354.99	2.11 S	0.81 E	-2.11	0.50
387.00	1.14	113.69	386.98	2.31 S	1.29 E	-2.32	1.23
419.00	1.63	123.27	418.97	2.69 S	1.97 E	-2.69	1.69
451.00	1.93	124.41	450.96	3.24 S	2.79 E	-3.25	0.94
483.00	2.55	130.92	482.93	4.01 S	3.77 E	-4.03	2.09
514.00	3.08	132.59	513.89	5.03 S	4.91 E	-5.04	1.73
546.00	3.52	134.08	545.84	6.29 S	6.25 E	-6.31	1.40
577.00	3.82	139.18	576.78	7.74 S	7.61 E	-7.76	1.43
609.00	4.70	141.64	608.69	9.57 S	9.12 E	-9.60	2.81
640.00	5.45	142.08	639.57	11.73 S	10.81 E	-11.76	2.42
672.00	6.15	143.84	671.40	14.31 S	12.75 E	-14.35	2.26
704.00	7.03	142.69	703.19	17.25 S	14.95 E	-17.30	2.78
736.00	7.56	142.60	734.93	20.48 S	17.42 E	-20.54	1.66
767.00	8.44	145.33	765.63	23.97 S	19.95 E	-24.04	3.09
799.00	9.01	145.86	797.26	27.98 S	22.69 E	-28.05	1.80
830.00	9.98	149.90	827.84	32.31 S	25.40 E	-32.39	3.79
862.00	10.77	149.46	859.31	37.29 S	28.31 E	-37.38	2.48
894.00	10.99	149.90	890.74	42.50 S	31.36 E	-42.60	0.73
925.00	11.51	149.37	921.14	47.72 S	34.42 E	-47.83	1.71
957.00	12.52	149.11	952.44	53.44 S	37.83 E	-53.56	3.16
988.00	12.96	148.76	982.68	59.30 S	41.35 E	-59.43	1.44
1020.00	13.36	148.14	1013.84	65.51 S	45.17 E	-65.65	1.33
1052.00	14.06	147.97	1044.92	71.94 S	49.18 E	-72.10	2.19
1083.00	15.25	148.76	1074.92	78.62 S	53.29 E	-78.79	3.89
1115.00	15.38	147.79	1105.78	85.81 S	57.74 E	-85.99	0.90
1147.00	15.69	148.14	1136.61	93.07 S	62.28 E	-93.27	1.01
1178.00	16.26	147.00	1166.41	100.28 S	66.86 E	-100.48	2.10

Wagner 1N-E10HZ

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
1210.00	17.01	149.72	1197.07	108.07 S	71.66 E	-108.30	3.38
1242.00	17.10	149.11	1227.67	116.15 S	76.43 E	-116.39	0.63
1274.00	16.79	149.90	1258.28	124.19 S	81.17 E	-124.44	1.21
1305.00	16.79	151.92	1287.96	132.01 S	85.52 E	-132.28	1.88
1337.00	16.96	151.66	1318.58	140.20 S	89.91 E	-140.48	0.58
1368.00	17.84	152.89	1348.16	148.41 S	94.22 E	-148.70	3.08
1400.00	18.11	153.68	1378.60	157.23 S	98.66 E	-157.54	1.14
1432.00	17.89	152.54	1409.03	166.05 S	103.13 E	-166.37	1.30
1463.00	18.37	152.80	1438.49	174.62 S	107.56 E	-174.95	1.57
1495.00	19.73	153.50	1468.74	183.94 S	112.28 E	-184.29	4.31
1527.00	20.30	155.00	1498.81	193.80 S	117.03 E	-194.17	2.40
1558.00	20.57	154.47	1527.86	203.59 S	121.65 E	-203.97	1.06
1590.00	21.18	154.38	1557.75	213.87 S	126.57 E	-214.27	1.91
1622.00	20.92	155.96	1587.62	224.30 S	131.40 E	-224.72	1.95
1652.00	21.09	155.61	1615.63	234.11 S	135.81 E	-234.54	0.70
1684.00	21.40	155.79	1645.45	244.68 S	140.58 E	-245.12	0.99
1716.00	20.87	155.79	1675.30	255.20 S	145.32 E	-255.66	1.66
1748.00	20.61	155.70	1705.22	265.53 S	149.97 E	-266.00	0.82
1780.00	20.39	154.91	1735.20	275.72 S	154.65 E	-276.20	1.10
1811.00	19.47	156.05	1764.34	285.33 S	159.04 E	-285.83	3.22
1840.00	18.54	155.96	1791.76	293.96 S	162.88 E	-294.47	3.21
1919.00	18.63	156.39	1866.64	316.99 S	173.05 E	-317.53	0.21
2008.00	17.97	155.78	1951.14	342.53 S	184.37 E	-343.11	0.77
2098.00	17.46	154.19	2036.88	367.34 S	195.94 E	-367.95	0.78
2188.00	17.29	153.46	2122.77	391.46 S	207.80 E	-392.11	0.30
2278.00	16.77	152.47	2208.82	414.94 S	219.78 E	-415.63	0.66
2368.00	16.24	150.45	2295.12	437.40 S	231.98 E	-438.13	0.87
2457.00	13.09	148.01	2381.21	456.78 S	243.46 E	-457.54	3.60
2547.00	11.85	145.39	2469.08	473.02 S	254.11 E	-473.82	1.52
2637.00	11.44	144.49	2557.23	487.89 S	264.54 E	-488.72	0.49
2727.00	9.46	150.38	2645.74	501.59 S	273.38 E	-502.44	2.50
2816.00	7.89	151.62	2733.72	513.32 S	279.90 E	-514.20	1.77
2906.00	6.93	150.41	2822.96	523.47 S	285.51 E	-524.37	1.08
2996.00	8.17	145.60	2912.18	533.47 S	291.81 E	-534.38	1.55
3086.00	8.63	148.27	3001.22	544.49 S	298.97 E	-545.43	0.67
3176.00	9.03	150.19	3090.15	556.36 S	306.03 E	-557.32	0.56
3265.00	9.43	150.34	3178.00	568.76 S	313.11 E	-569.74	0.45
3355.00	9.24	149.72	3266.81	581.40 S	320.40 E	-582.41	0.24
3445.00	7.40	151.97	3355.86	592.76 S	326.77 E	-593.78	2.07
3535.00	6.14	153.14	3445.23	602.17 S	331.67 E	-603.21	1.41
3714.00	2.99	172.84	3623.65	615.33 S	336.57 E	-616.39	1.94
3804.00	2.58	184.37	3713.54	619.68 S	336.71 E	-620.74	0.77
3894.00	0.79	155.64	3803.50	622.26 S	336.81 E	-623.32	2.14
3983.00	0.10	66.38	3892.50	622.79 S	337.13 E	-623.85	0.89
4073.00	0.68	329.21	3982.50	622.30 S	336.93 E	-623.35	0.78
4163.00	1.02	312.94	4072.49	621.29 S	336.07 E	-622.35	0.45
4253.00	1.61	341.32	4162.46	619.55 S	335.08 E	-620.60	0.96
4342.00	2.05	352.04	4251.42	616.79 S	334.46 E	-617.83	0.62
4432.00	1.95	345.88	4341.36	613.71 S	333.86 E	-614.75	0.26
4522.00	2.08	326.53	4431.31	610.86 S	332.58 E	-611.90	0.77
4612.00	2.17	18.03	4521.25	607.88 S	332.21 E	-608.92	2.05
4702.00	2.16	36.69	4611.19	604.89 S	333.75 E	-605.94	0.78
4791.00	2.06	41.32	4700.13	602.35 S	335.81 E	-603.40	0.22
4881.00	1.96	46.16	4790.07	600.06 S	337.99 E	-601.12	0.22
4971.00	1.84	43.34	4880.03	597.95 S	340.09 E	-599.01	0.17
5061.00	1.10	25.33	4970.00	596.12 S	341.45 E	-597.19	0.96
5151.00	0.86	5.06	5059.98	594.67 S	341.88 E	-595.74	0.46
5240.00	0.85	352.07	5148.97	593.35 S	341.85 E	-594.42	0.22
5330.00	0.97	336.17	5238.96	591.99 S	341.45 E	-593.06	0.31
5420.00	0.89	327.42	5328.95	590.71 S	340.77 E	-591.77	0.18

Wagner 1N-E10HZ

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
5509.00	0.59	302.64	5417.94	589.88 S	340.01 E	-590.94	0.49
5688.00	1.20	320.04	5596.92	587.95 S	338.04 E	-589.01	0.37
5778.00	1.37	330.90	5686.90	586.29 S	336.91 E	-587.34	0.33
5999.00	1.72	335.71	5907.82	580.96 S	334.26 E	-582.01	0.17
6088.00	0.74	151.18	5996.81	580.24 S	333.99 E	-581.29	2.76
6178.00	0.22	69.09	6086.80	580.69 S	334.43 E	-581.74	0.82
6268.00	0.31	320.23	6176.80	580.45 S	334.43 E	-581.49	0.48
6358.00	0.72	346.76	6266.80	579.71 S	334.15 E	-580.76	0.52
6448.00	0.68	325.54	6356.79	578.72 S	333.72 E	-579.77	0.29
6537.00	0.98	337.05	6445.78	577.59 S	333.13 E	-578.63	0.39
6627.00	1.05	344.71	6535.77	576.08 S	332.61 E	-577.12	0.17
6717.00	1.30	347.47	6625.75	574.29 S	332.17 E	-575.33	0.28
6806.00	2.77	1.97	6714.69	571.15 S	332.02 E	-572.20	1.74
6896.00	9.72	356.70	6804.10	561.38 S	331.66 E	-562.42	7.74
6986.00	13.91	355.90	6892.18	542.99 S	330.45 E	-544.03	4.66
7076.00	19.75	4.57	6978.30	517.02 S	330.89 E	-518.06	7.04
7166.00	27.02	4.67	7060.85	481.44 S	333.77 E	-482.49	8.08
7255.00	34.14	8.78	7137.43	436.55 S	339.23 E	-437.61	8.33
7345.00	41.33	4.81	7208.57	381.90 S	345.59 E	-382.98	8.43
7435.00	49.43	359.84	7271.76	317.98 S	347.99 E	-319.07	9.81
7525.00	57.89	359.08	7325.05	245.55 S	347.28 E	-246.64	9.43
7615.00	65.07	358.94	7368.00	166.54 S	345.91 E	-167.63	7.98
7704.00	72.33	0.04	7400.31	83.68 S	345.19 E	-84.77	8.24
7794.00	80.22	3.52	7421.65	3.62 N	347.95 E	2.53	9.54
7884.00	85.28	5.21	7433.00	92.61 N	354.75 E	91.50	5.92
7973.00	91.97	1.93	7435.13	181.35 N	360.29 E	180.22	8.37
8158.00	90.09	0.43	7431.79	366.27 N	364.10 E	365.12	1.30
8252.00	88.52	359.45	7432.93	460.26 N	364.01 E	459.11	1.97
8346.00	89.82	359.26	7434.29	554.24 N	362.95 E	553.10	1.39
8534.00	88.52	357.79	7437.02	742.15 N	358.12 E	741.02	1.04
8629.00	90.80	359.40	7437.59	837.11 N	355.79 E	835.99	2.94
8723.00	90.25	359.47	7436.73	931.10 N	354.86 E	929.98	0.59
8817.00	91.30	0.96	7435.47	1025.09 N	355.22 E	1023.96	1.94
8911.00	91.08	1.02	7433.52	1119.05 N	356.85 E	1117.92	0.24
9006.00	90.62	0.47	7432.11	1214.03 N	358.09 E	1212.90	0.76
9100.00	90.74	0.66	7431.00	1308.02 N	359.02 E	1306.89	0.24
9194.00	90.15	0.58	7430.27	1402.01 N	360.04 E	1400.87	0.63
9288.00	90.40	1.87	7429.81	1495.99 N	362.04 E	1494.84	1.40
9382.00	90.59	3.36	7429.00	1589.88 N	366.33 E	1588.72	1.59
9477.00	90.15	359.52	7428.39	1684.83 N	368.71 E	1683.67	4.06
9656.00	90.37	359.04	7427.57	1863.82 N	366.47 E	1862.66	0.29
9746.00	88.83	357.06	7428.20	1953.76 N	363.41 E	1952.60	2.80
9836.00	88.40	356.65	7430.38	2043.59 N	358.48 E	2042.46	0.66
9925.00	88.30	356.40	7432.94	2132.39 N	353.09 E	2131.27	0.30
10105.00	88.77	358.06	7437.55	2312.12 N	344.40 E	2311.02	0.96
10195.00	88.98	357.86	7439.31	2402.04 N	341.19 E	2400.96	0.33
10284.00	90.31	0.84	7439.86	2491.02 N	340.19 E	2489.94	3.66
10374.00	90.40	0.13	7439.30	2581.02 N	340.95 E	2579.93	0.80
10464.00	90.83	359.85	7438.34	2671.01 N	340.93 E	2669.93	0.57
10554.00	90.65	359.62	7437.17	2761.00 N	340.52 E	2759.92	0.33
10644.00	90.59	358.97	7436.21	2850.99 N	339.42 E	2849.91	0.72
10733.00	90.99	359.19	7434.99	2939.97 N	337.99 E	2938.90	0.51
10823.00	91.35	358.54	7433.15	3029.93 N	336.21 E	3028.86	0.82
10913.00	90.74	0.55	7431.50	3119.91 N	335.50 E	3118.84	2.33
11092.00	89.72	359.82	7430.78	3298.91 N	336.08 E	3297.83	0.70
11182.00	90.09	359.62	7430.93	3388.90 N	335.65 E	3387.83	0.47
11272.00	90.55	359.49	7430.42	3478.90 N	334.95 E	3477.83	0.54
11362.00	90.68	359.01	7429.45	3568.89 N	333.77 E	3567.82	0.55
11451.00	91.02	358.73	7428.14	3657.86 N	332.01 E	3656.80	0.49
11541.00	89.35	0.52	7427.85	3747.85 N	331.42 E	3746.79	2.71

Wagner 1N-E10HZ

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
11631.00	89.08	359.93	7429.08	3837.84 N	331.77 E	3836.78	0.73
11721.00	88.89	359.90	7430.68	3927.83 N	331.63 E	3926.76	0.21
11811.00	89.44	360.00	7431.99	4017.82 N	331.55 E	4016.75	0.63
11900.00	90.18	0.23	7432.28	4106.82 N	331.73 E	4105.75	0.87
11990.00	90.59	0.16	7431.67	4196.81 N	332.03 E	4195.75	0.45
12080.00	91.02	0.23	7430.41	4286.80 N	332.34 E	4285.74	0.48
12169.00	89.66	1.14	7429.89	4375.79 N	333.40 E	4374.72	1.83
12259.00	89.75	359.55	7430.35	4465.79 N	333.94 E	4464.71	1.77
12349.00	89.26	356.44	7431.12	4555.72 N	330.80 E	4554.65	3.49
12439.00	89.11	355.76	7432.40	4645.50 N	324.68 E	4644.46	0.78
12529.00	90.65	358.64	7432.60	4735.38 N	320.29 E	4734.35	3.62
12618.00	90.86	358.41	7431.43	4824.34 N	317.99 E	4823.32	0.35
12708.00	89.85	359.04	7430.87	4914.32 N	315.98 E	4913.30	1.33
12887.00	90.77	1.73	7429.91	5093.29 N	317.18 E	5092.27	1.59
12977.00	90.93	1.23	7428.58	5183.25 N	319.51 E	5182.22	0.58
13067.00	91.45	0.73	7426.71	5273.22 N	321.05 E	5272.18	0.81
13157.00	90.95	359.99	7424.83	5363.20 N	321.61 E	5362.16	0.99
13247.00	90.19	2.11	7423.93	5453.17 N	323.26 E	5452.13	2.51
13426.00	90.12	1.26	7423.45	5632.09 N	328.53 E	5631.03	0.48
13516.00	87.13	1.04	7425.61	5722.04 N	330.33 E	5720.97	3.33
13606.00	88.92	0.87	7428.71	5811.97 N	331.83 E	5810.90	1.99
13695.00	89.26	358.94	7430.12	5900.95 N	331.68 E	5899.88	2.20
13785.00	89.26	358.42	7431.28	5990.92 N	329.61 E	5989.85	0.58
13875.00	89.66	358.70	7432.13	6080.89 N	327.34 E	6079.83	0.54
13965.00	88.40	1.07	7433.65	6170.86 N	327.16 E	6169.81	2.98
14144.00	89.11	0.28	7437.55	6349.81 N	329.27 E	6348.74	0.59
14234.00	88.95	359.61	7439.07	6439.79 N	329.19 E	6438.73	0.76
14324.00	88.30	358.93	7441.23	6529.76 N	328.04 E	6528.70	1.05
14413.00	88.21	358.88	7443.93	6618.70 N	326.34 E	6617.64	0.11
14503.00	88.86	359.37	7446.23	6708.66 N	324.96 E	6707.61	0.90
14683.00	89.60	356.81	7448.66	6888.53 N	318.96 E	6887.49	1.48
14772.00	89.94	357.77	7449.02	6977.43 N	314.75 E	6976.40	1.14
14826.00	90.28	357.64	7448.91	7031.38 N	312.59 E	7030.37	0.67
14872.00	90.28	357.64	7448.69	7077.34 N	310.69 E	7076.33	0.01

CALCULATION BASED ON MINIMUM CURVATURE METHOD

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

VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 359.82 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.15 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 14872.00 FEET
IS 7084.16 FEET ALONG 2.51 DEGREES (TRUE)

First Sperry survey at 1919'.
Last survey is a projection to bit at TD.
Surveys from 1919 to 14826 are corrected by Alaska Survey management.