



WELL INFORMATION					
MWD Run Number	100	200			
Date run completed	31-May-15	02-Jun-15			
Rig Bit Number	0100	0200			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.750	4.740			
Log Start Depth (MD, ft)	599.00	7,028.00			
Log End Depth (MD, ft)	7,028.00	13,840.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	30-May-15 01:30	01-Jun-15 01:30			
Drill/Wipe End Date and Time	31-May-15 01:40	02-Jun-15 13:10			
Min Inc (deg) @ Depth (MD, ft)	0.18 @ 638.00	85.19 @ 7,069.00			
Max Inc (deg) @ Depth (MD, ft)	81.65 @ 6,965.00	92.37 @ 9,307.00			
Bit TFA(in2) / Bit Type	0.98 /	0.64 / PDC			
Flow Rate (gpm)	596.67	322.33			
Max AV (fpm) / CV (fpm) @ MWD	233.70 / 479.40	337.80 / 631.20			
Fluid Type	Native/Spud Mud	Polymer			
Density (ppg) / Viscosity (spqt)	9.60 / 27.00	9.15 / 33.00			
Filtrate CL (ppm)	2,300.00	2,500.00			
pH / Fluid Loss (mptm)	9.60 / 0	9.50 / 0			
PV (cP) / YP (lbf2)	2 / 3.00	7 / 10.00			
% Solids / % Sand	2.7 / .40	4.5 / .10			
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A			
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 (in F) / S	168.00 / PDM	221.40 / PDM			

Max Tool Temp (degF) / Source	163.20 / PCM	234.12 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ 163.20	N/A @ 234.12			
Lead MWD Engineer	Cody Wurdeman	Cody Wurdeman			
Customer Representative	JW Ewrin	JW Ewrin			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11404299	11675316			
Insert Serial Number	11680801	11680708			
Date and Time Initialized	29-May-15 10:28	31-May-15 13:37			
Date and Time Read	31-May-15 05:55	02-Jun-15 22:29			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	63.00	68.00			
Software Version	6.21	6.33			
Sub Serial Number	11404299	11675316			
Sonde Serial Number	11833212	11145692			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	311.50	93.40			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	56.42	61.44			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11404299	11675316			
Insert/Sonde Serial Number	11579761	11579775			

REMARKS

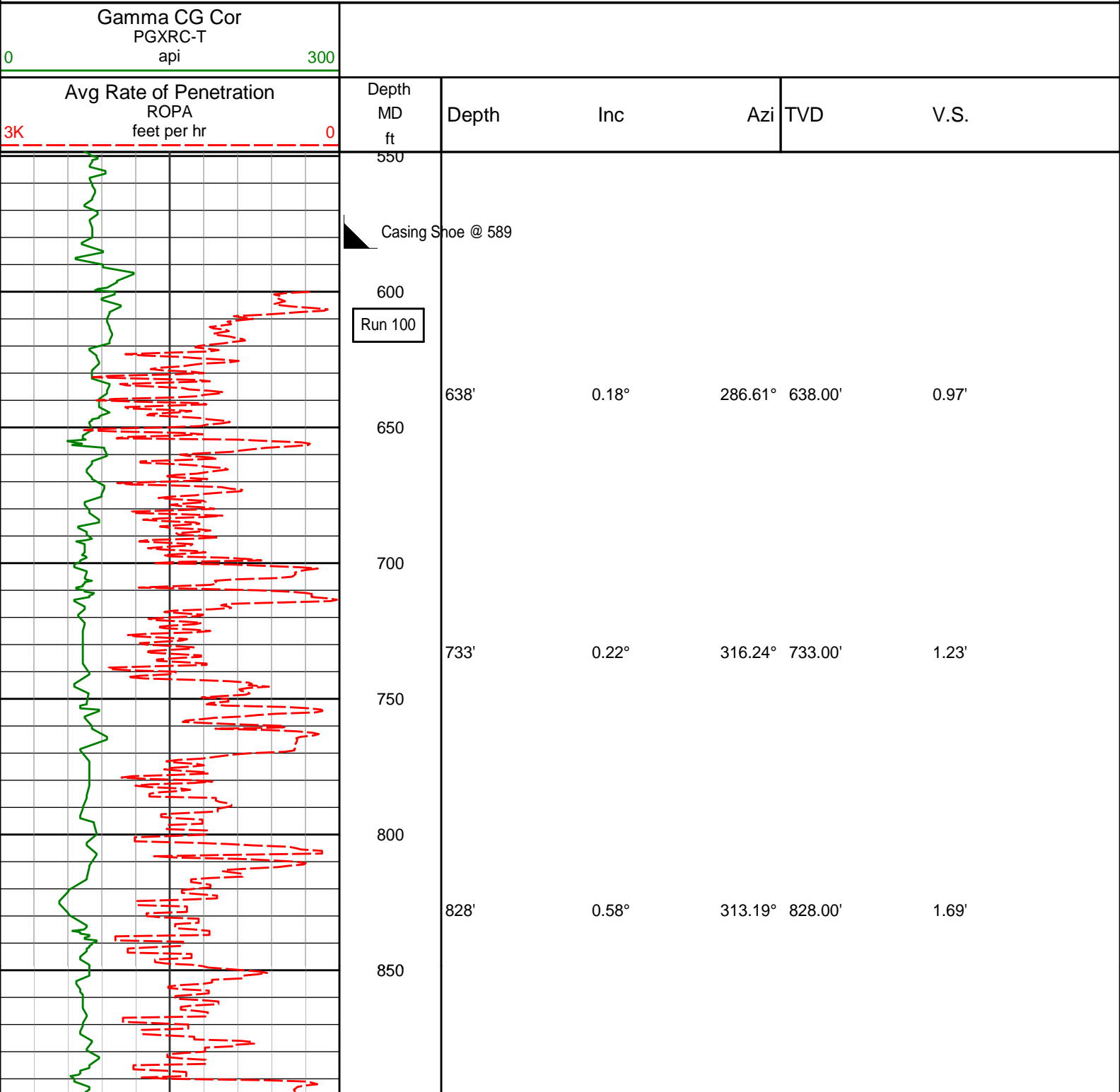
1. All depths are calibrated to driller's pipe tally and are total vertical depth from the drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. Environmental parameters used in gamma and resistance processing:
Hole Size: 8.75"
Mud Density: 9.9-11.0
5. The following smoothing parameters have been applied to the data:
Interval: 0.5 ft
Coercion Distance: 1.2 ft (ROPA)
Interval: 0.5 ft
Coercion Distance: 0.6 ft (Gamma Ray)

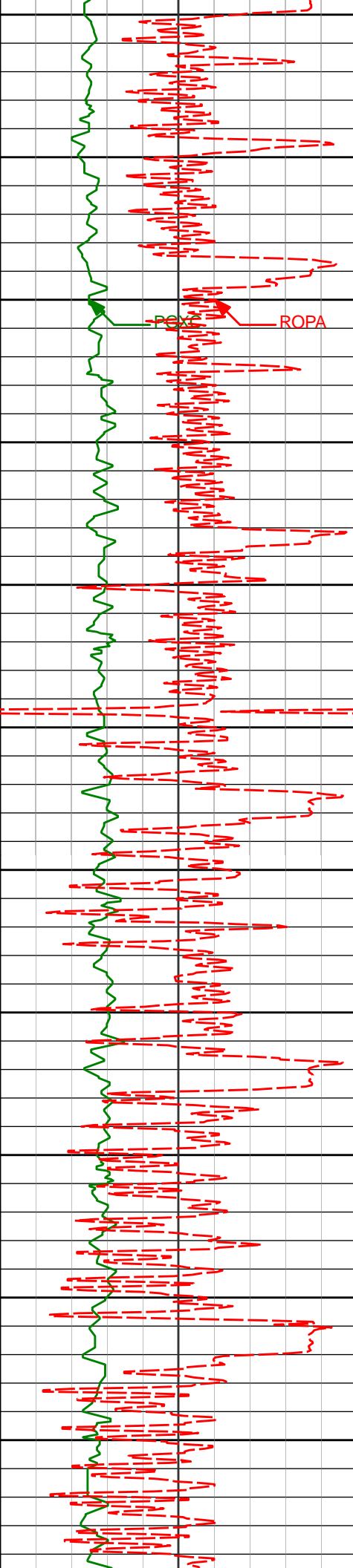
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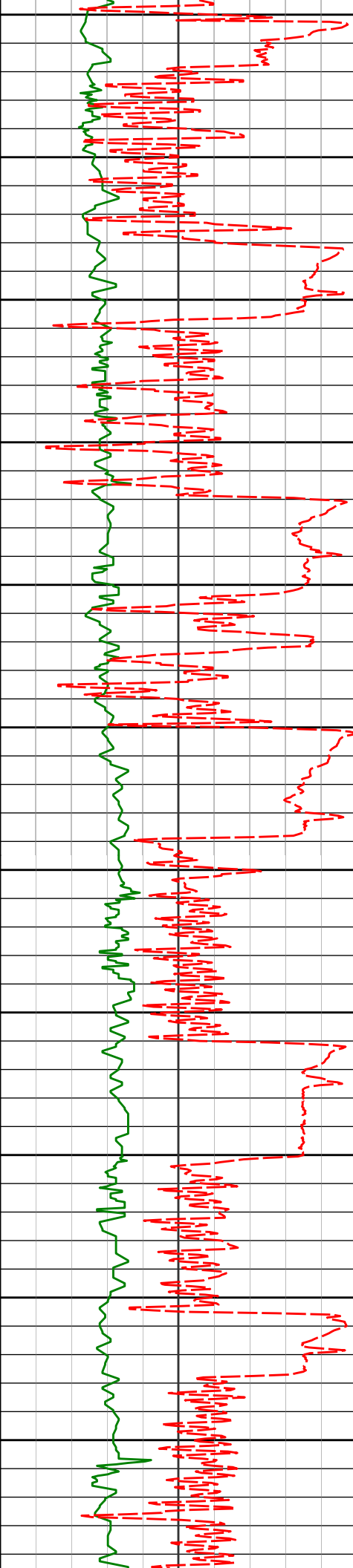
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MD Detail 1:600 Scale





Depth (m)	Distance (m)	Angle (°)	Distance (m)	Angle (°)	Distance (m)
900	922'	0.56°	298.87°	921.99'	2.41'
950					
1000	1017'	0.59°	303.33°	1016.99'	3.20'
1050					
1100	1111'	0.66°	317.57°	1110.98'	3.93'
1150					
1200	1204'	0.50°	334.77°	1203.98'	4.42'
1250					
1300	1296'	0.38°	311.62°	1295.97'	4.79'
1350					
1400	1390'	0.29°	313.03°	1389.97'	5.18'



1450

1483'

0.35°

299.92° 1482.97'

5.58'

1500

1550

1575'

2.71°

188.15° 1574.94'

6.24'

1600

1650

1668'

5.58°

161.41° 1667.69'

5.46'

1700

1750

1760'

6.71°

144.44° 1759.17'

1.37'

1800

1850

1853'

7.56°

140.45° 1851.45'

-5.19'

1900

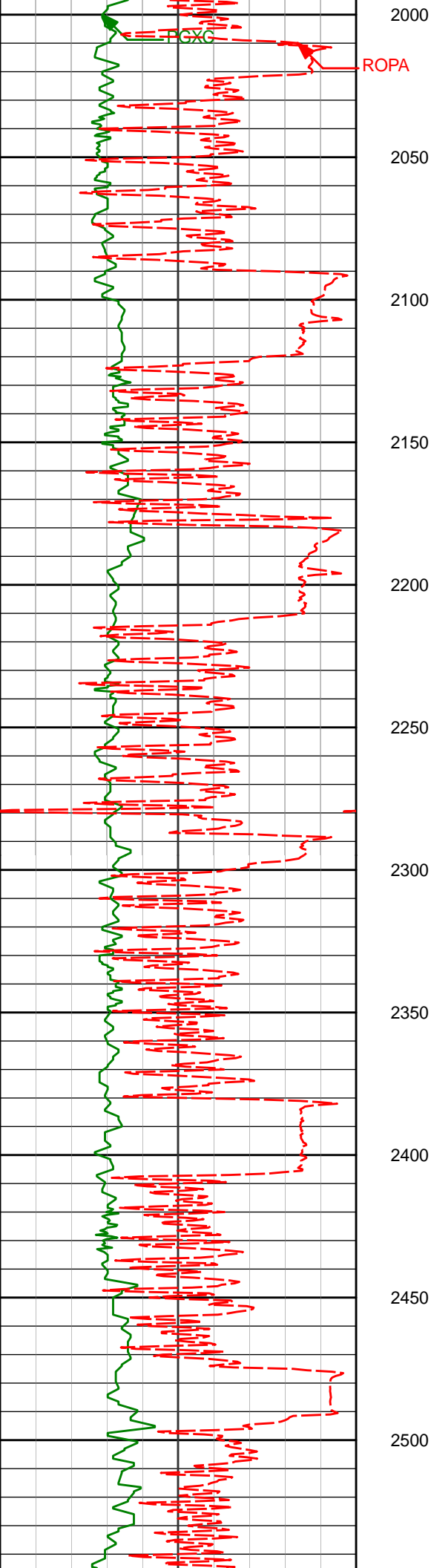
1950

1946'

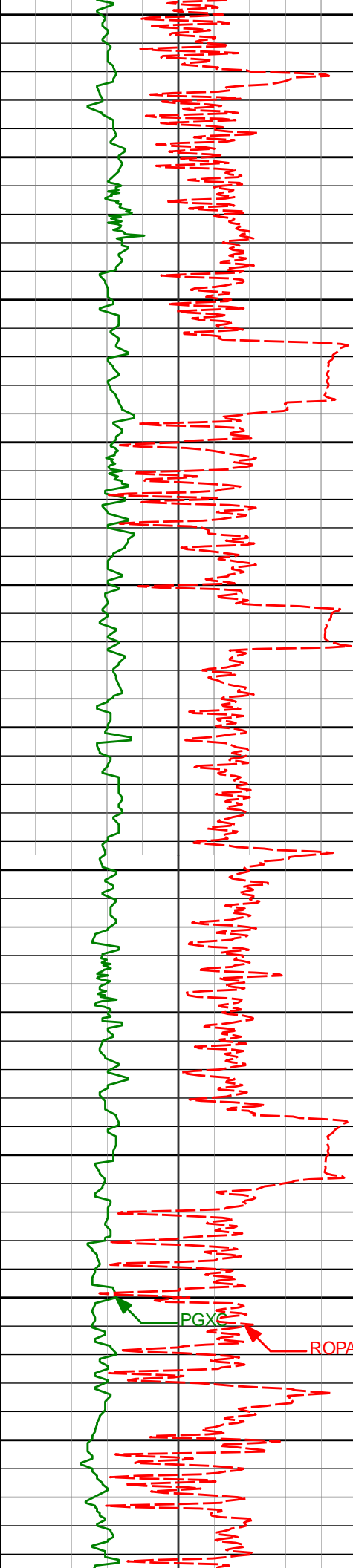
8.63°

133.17° 1943.52'

-13.65'



2039'	7.67°	129.17°	2035.58'	-23.08'
2050				
2100				
2131'	9.07°	129.56°	2126.60'	-32.96'
2150				
2200				
2222'	10.11°	130.67°	2216.33'	-44.01'
2250				
2300				
2314'	9.79°	124.50°	2306.95'	-56.05'
2350				
2400				
2407'	9.12°	118.79°	2398.69'	-68.58'
2450				
2500				
2500'	8.54°	123.18°	2490.58'	-80.41'



2550

2600

2650

2700

2750

2800

2850

2900

2950

3000

3050

2593'

7.98°

119.98° 2582.62'

-91.39'

2686'

8.71°

138.74° 2674.65'

-101.16'

2778'

8.81°

145.26° 2765.58'

-109.17'

2870'

8.67°

140.00° 2856.51'

-117.04'

2965'

9.03°

153.44° 2950.39'

-124.32'

3060'

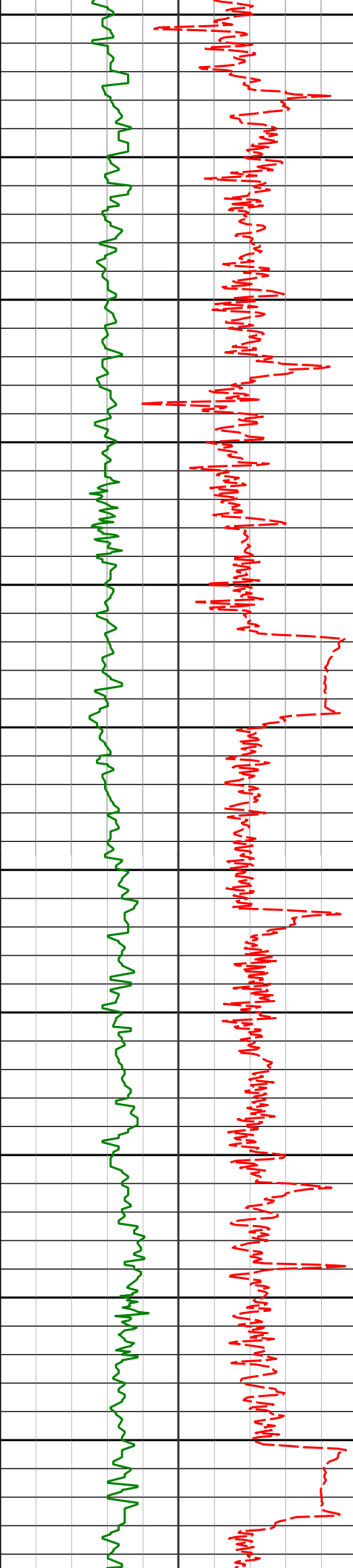
9.46°

151.65° 3044.16'

-130.63'

PGXC

ROPA



3100

3150

3200

3250

3300

3350

3400

3450

3500

3550

3600

3155'

8.85°

148.08° 3137.95'

-137.50'

3249'

8.26°

141.63° 3230.90'

-144.89'

3344'

9.75°

145.65° 3324.73'

-153.02'

3438'

8.64°

135.88° 3417.53'

-161.79'

3533'

8.26°

129.69° 3511.50'

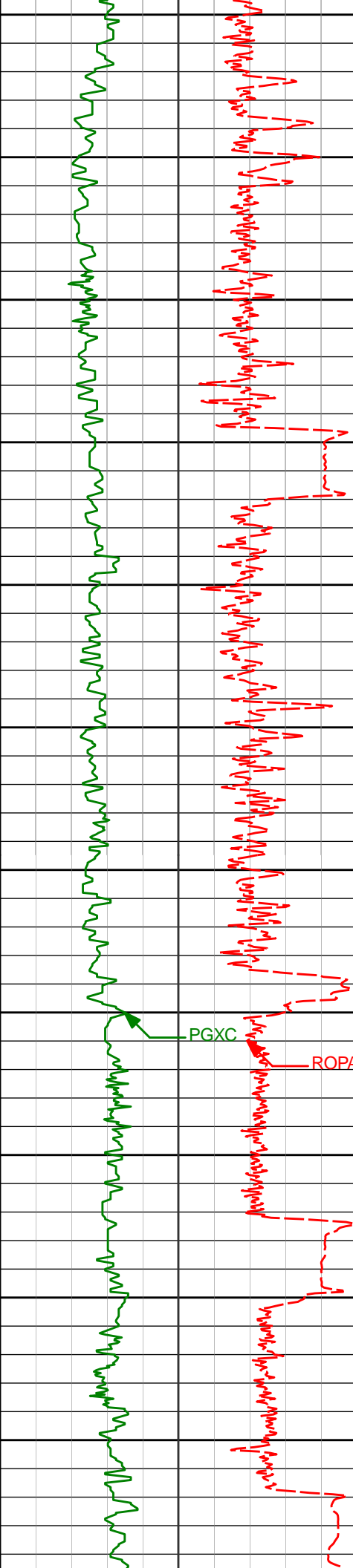
-171.48'

3628'

9.23°

141.52° 3605.40'

-180.91'



3650

3700

3722'

10.45°

141.93° 3698.02'

-190.17'

3750

3800

3817'

10.85°

157.65° 3791.40'

-198.07'

3850

3900

3911'

11.61°

159.12° 3883.60'

-203.89'

3950

4000

4006'

10.43°

158.30° 3976.85'

-209.57'

PGXC

ROPA

4050

4100

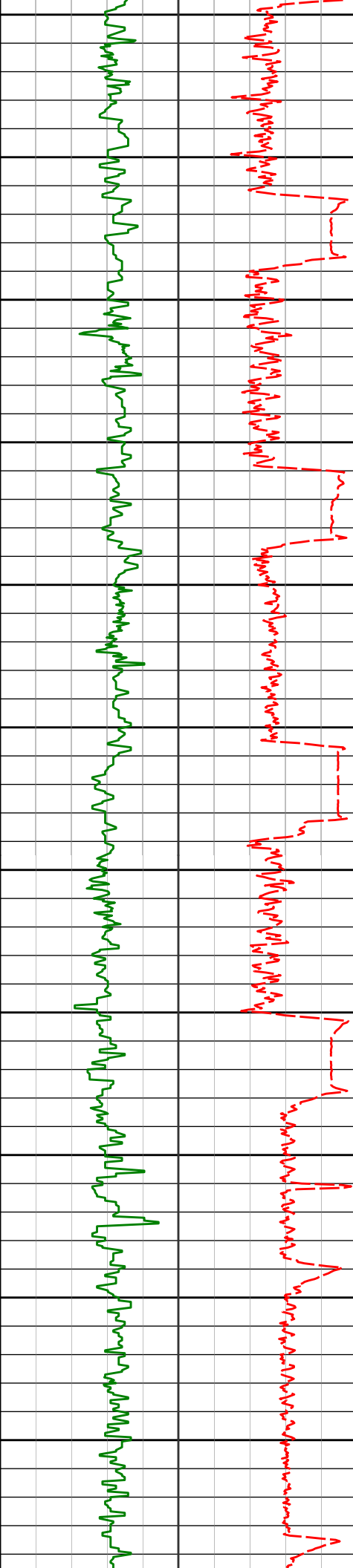
4101'

7.25°

159.08° 4070.71'

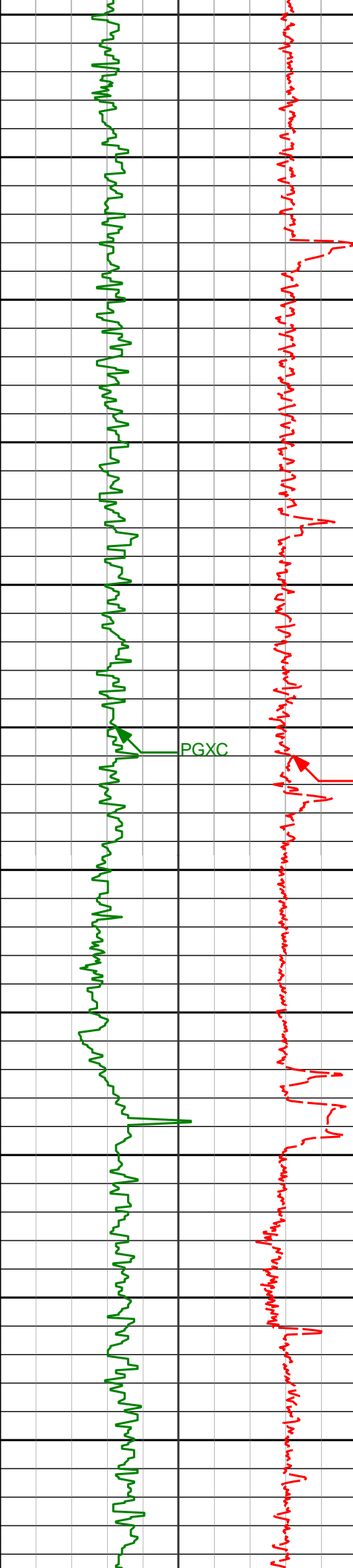
-214.16'

4150



4200
4250
4290'
4300
4350
4400
4450
4478'
4500
4550
4573'
4600
4650
4668'
4700

4193	7.00	144.74	4103.98	-219.00
4290'	5.15°	120.57°	4258.46'	-225.72'
4354'	3.50°	123.22°	4322.27'	-229.69'
4478'	1.91°	89.13°	4446.14'	-234.81'
4573'	2.36°	357.72°	4541.09'	-236.42'
4668'	2.74°	331.33°	4636.00'	-235.47'



4750

4763'

2.41°

312.72° 4730.91'

-233.10'

4800

4850

4857'

2.45°

309.60° 4824.82'

-230.24'

4900

4950

4952'

2.75°

301.07° 4919.73'

-226.86'

5000

PGXC

ROPA

5050

5047'

3.17°

289.22° 5014.60'

-222.54'

5100

5150

5141'

1.17°

268.61° 5108.53'

-219.18'

5200

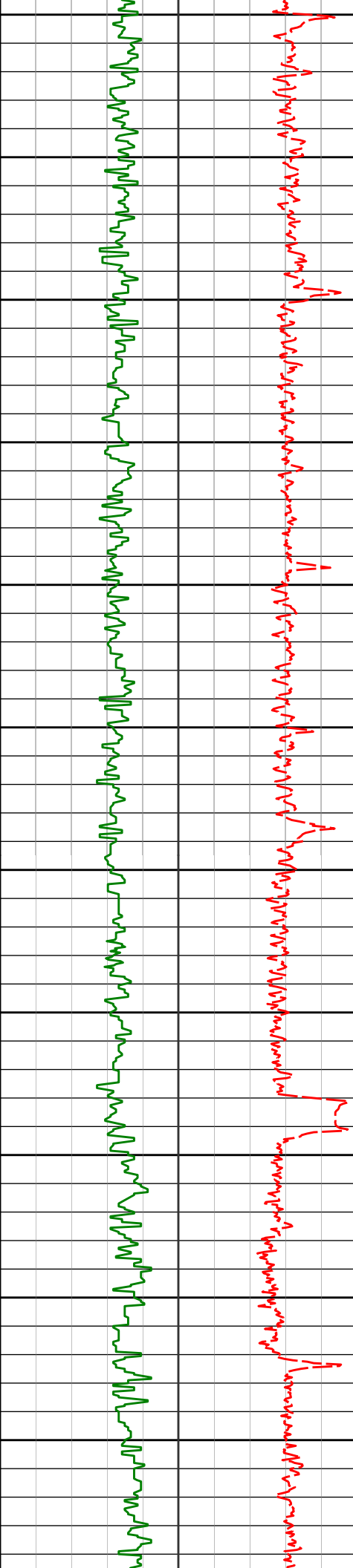
5250

5236'

0.45°

177.97° 5203.52'

-218.21'



5300

5330'

0.89°

141.09° 5297.52'

-218.63'

5350

5400

5425'

0.90°

120.18° 5392.50'

-219.69'

5450

5500

5520'

1.05°

126.11° 5487.49'

-220.99'

5550

5600

5614'

1.07°

122.40° 5581.47'

-222.37'

5650

5700

5709'

1.39°

200.08° 5676.46'

-222.64'

5750

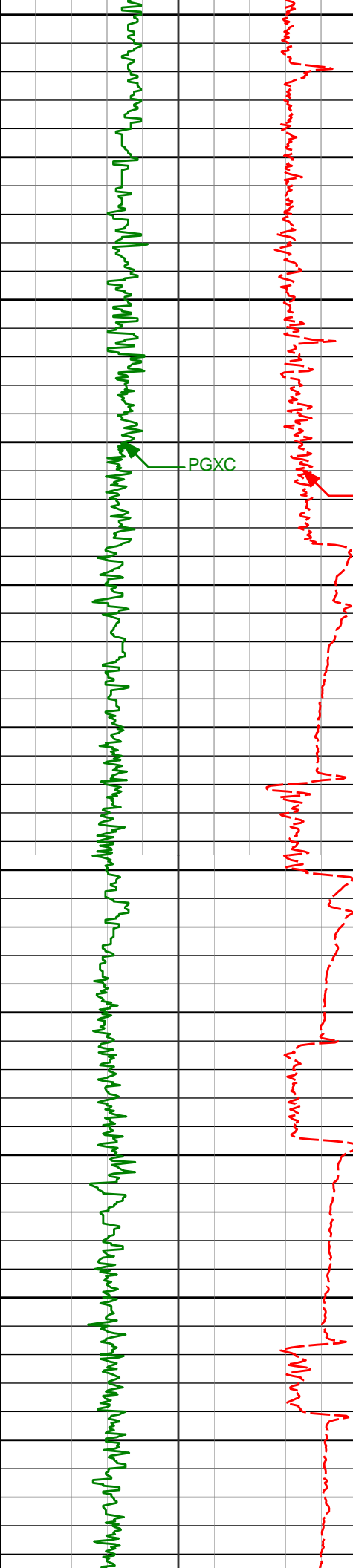
5800

5803'

1.55°

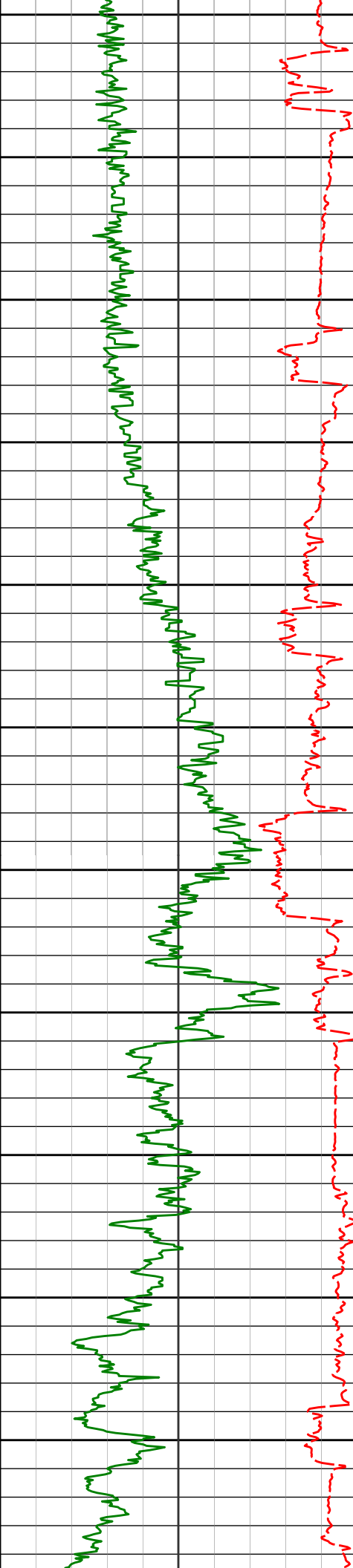
185.22° 5770.43'

-222.01'

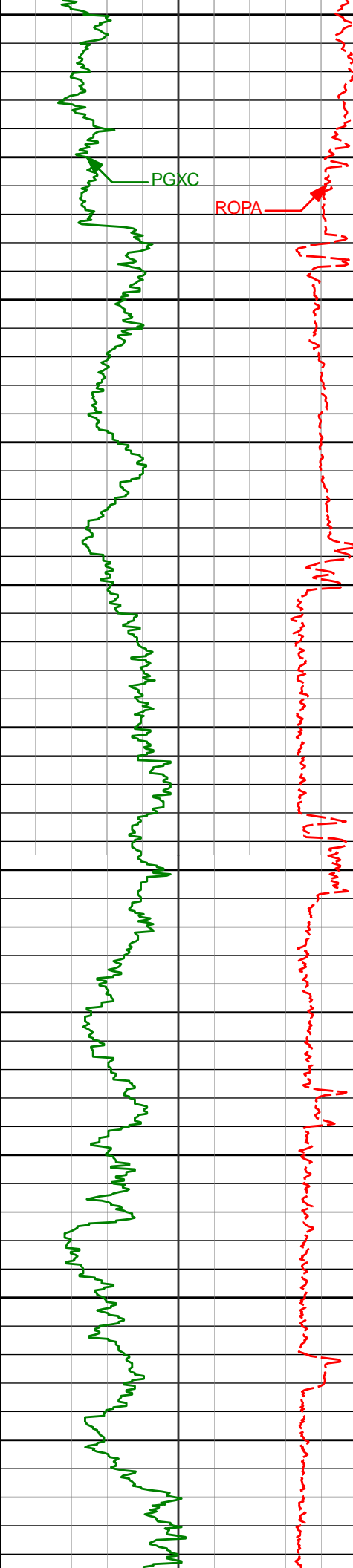


5850
5900
5950
6000
6050
6100
6150
6200
6250
6300
6350

5898'	1.67°	171.72°	5865.39'	-221.95'
5992'	1.66°	163.25°	5959.35'	-222.40'
6087'	7.42°	244.07°	6054.06'	-217.07'
6182'	13.07°	256.13°	6147.52'	-200.85'
6276'	18.84°	261.17°	6237.86'	-175.29'
6371'	26.96°	265.16°	6325.31'	-138.44'



6466'	35.62°	267.35°	6406.42'	-89.16'
6560'	47.53°	268.97°	6476.61'	-26.91'
6655'	57.77°	274.65°	6534.19'	48.16'
6750'	64.33°	273.00°	6580.15'	130.65'
6844'	70.04°	270.03°	6616.59'	216.98'
6939'	77.87°	267.44°	6642.84'	308.15'



6950

6965'

81.65°

267.70°

6647.46'

333.73'

7000

Casing Shoe @ 7023

Run 200

7050

7069'

85.19°

270.85°

6659.38'

436.93'

7100

7150

7164'

86.45°

268.90°

6666.30'

531.55'

7200

7250

7258'

88.83°

269.96°

6670.17'

625.37'

7300

7350

7353'

89.66°

269.77°

6671.42'

720.24'

7400

7450

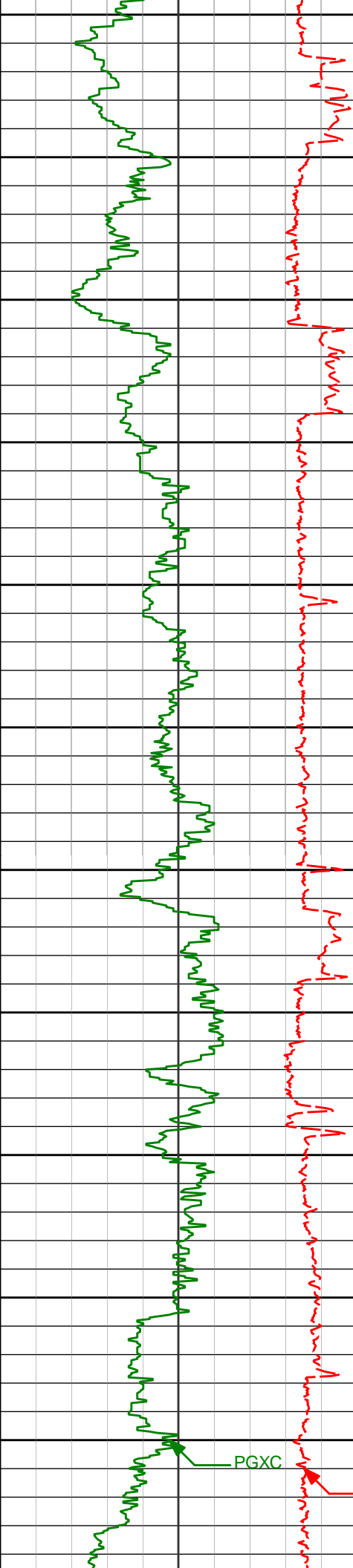
7447'

90.99°

269.53°

6670.89'

814.13'



7500

7542'

91.48°

269.89° 6668.84'

909.00'

7550

7600

7636'

89.85°

270.70° 6667.75'

1002.83'

7650

7700

7731'

90.59°

270.84° 6667.39'

1097.62'

7750

7800

7825'

90.40°

271.57° 6666.57'

1191.36'

7850

7900

7918'

89.75°

271.45° 6666.45'

1284.06'

7950

8000

8011'

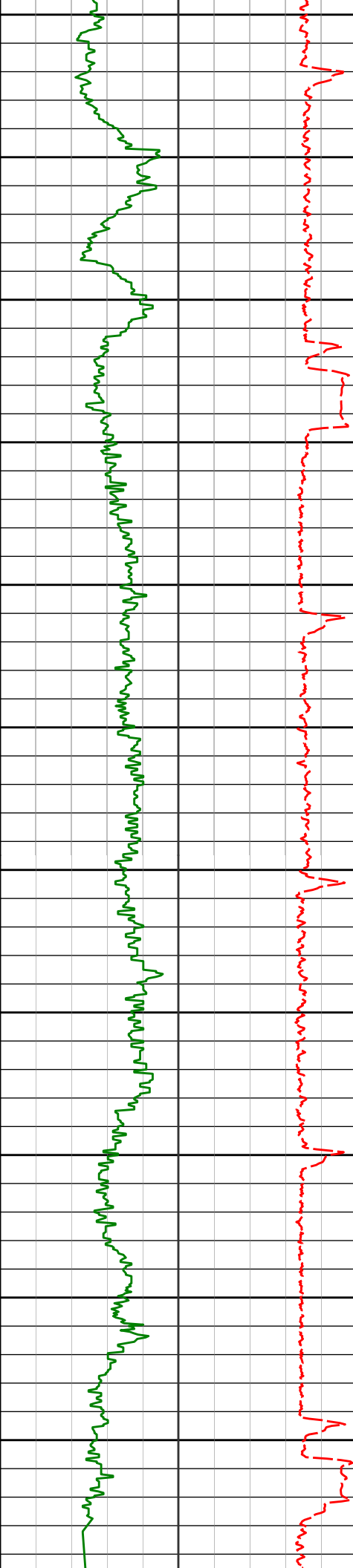
89.75°

271.27° 6666.86'

1376.78'

PGXC

ROPA



8050

8100

8150

8200

8250

8300

8350

8400

8450

8500

8550

8104'

91.36°

272.77° 6665.96'

1469.41'

8197'

89.38°

268.94° 6665.36'

1562.17'

8289'

89.60°

269.17° 6666.18'

1654.11'

8382'

89.72°

268.48° 6666.73'

1747.05'

8474'

90.12°

269.16° 6666.86'

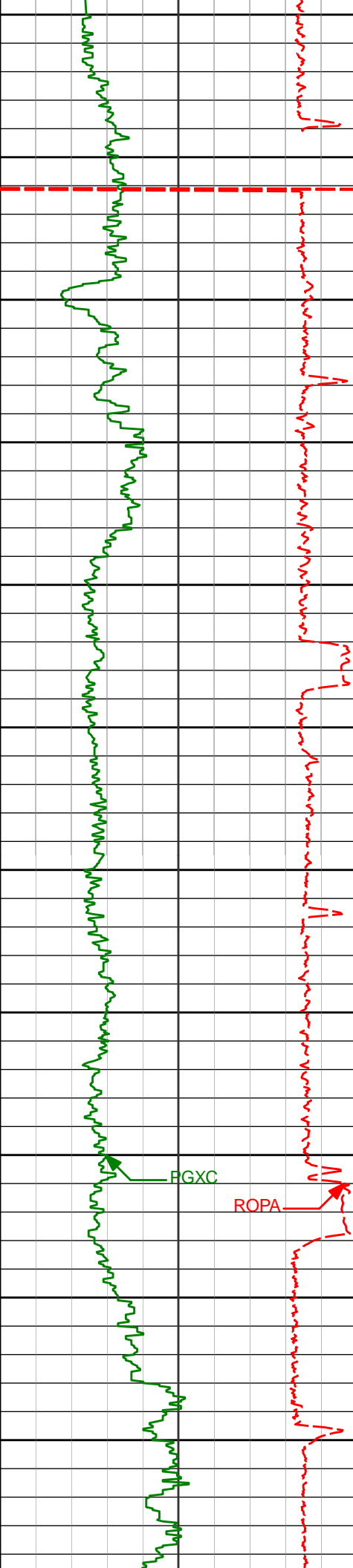
1839.00'

8567'

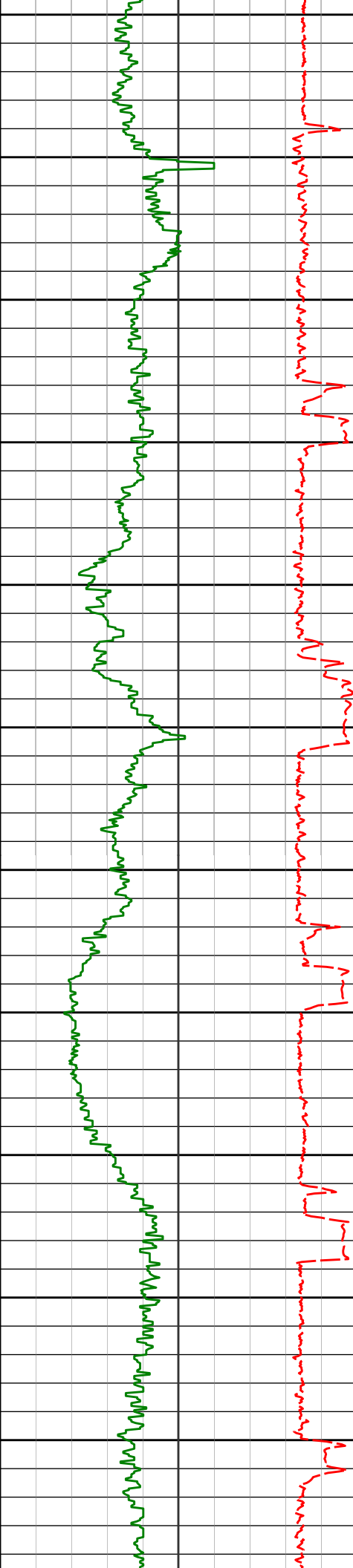
89.63°

269.14° 6667.06'

1931.93'



8660'	90.40°	269.01°	6667.03'	2024.87'
8753'	90.49°	268.32°	6666.31'	2117.82'
8845'	89.91°	268.65°	6665.99'	2209.79'
8936'	90.80°	268.82°	6665.43'	2300.74'
9028'	89.32°	269.12°	6665.33'	2392.68'
9121'	89.85°	268.67°	6666.00'	2485.63'



9150

9200

9250

9300

9350

9400

9450

9500

9550

9600

9650

9214'

90.46°

268.52° 6665.75'

2578.59'

9307'

92.37°

270.42° 6663.46'

2671.46'

9400'

91.79°

270.83° 6660.08'

2764.21'

9492'

90.62°

269.90° 6658.15'

2856.02'

9584'

89.88°

269.74° 6657.75'

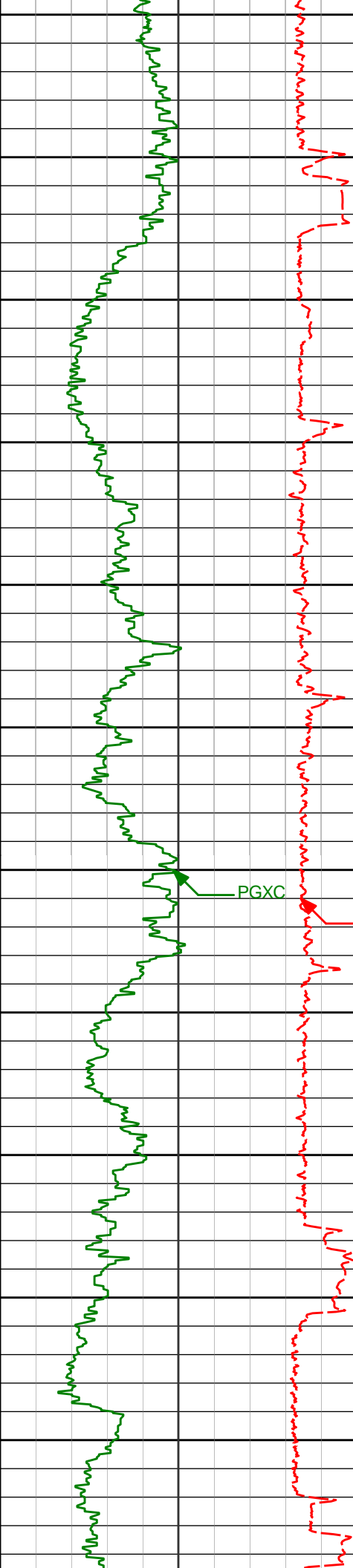
2947.91'

9679'

89.94°

268.99° 6657.89'

3042.82'



9700

9750

9800

9850

9900

9950

10000

10050

10100

10150

10200

9774'

88.00°

268.37° 6659.60'

3137.76'

9868'

88.34°

268.29° 6662.60'

3231.68'

9963'

88.06°

267.63° 6665.59'

3326.62'

10057'

87.84°

267.75° 6668.95'

3420.55'

10152'

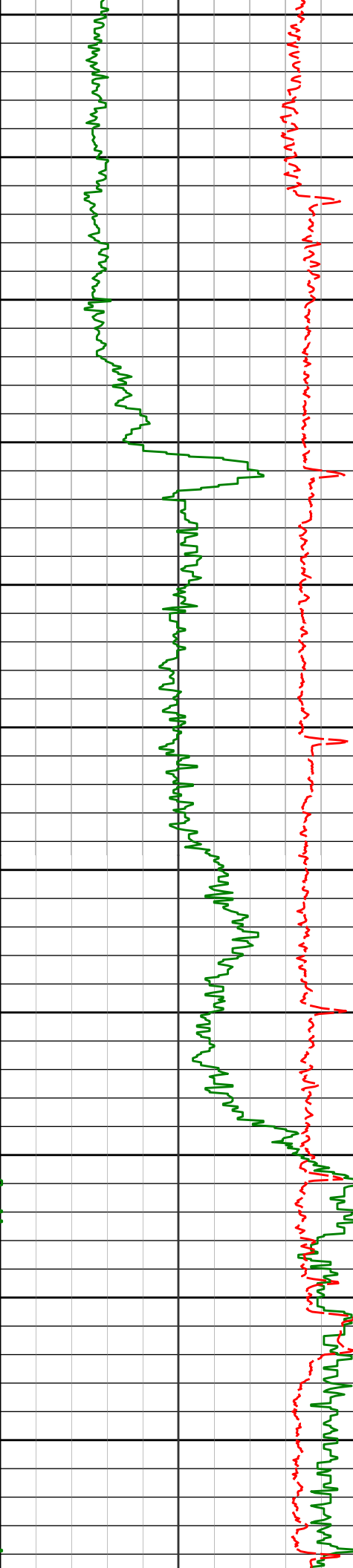
88.24°

270.80° 6672.20'

3515.41'

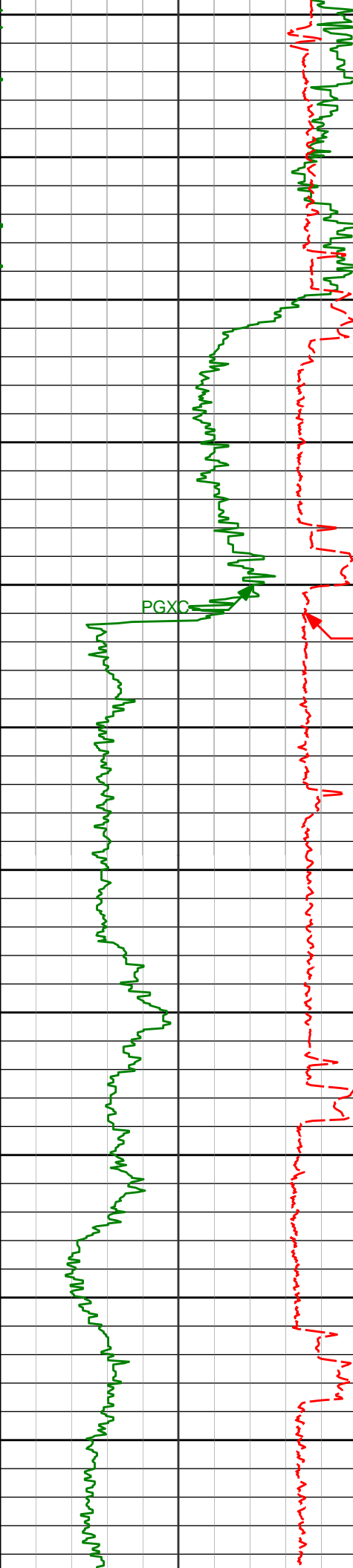
PGXC

ROPA



10250
10300
10350
10400
10450
10500
10550
10600
10650
10700
10750

10247'	89.48°	271.60°	6674.09'	3610.12'
10341'	89.57°	271.10°	6674.87'	3703.84'
10436'	89.78°	271.90°	6675.41'	3798.54'
10531'	90.12°	272.08°	6675.49'	3893.17'
10626'	89.35°	272.48°	6675.93'	3987.76'
10720'	90.22°	271.21°	6676.28'	4081.41'



10800
10850
10900
10950
11000
11050
11100
11150
11200
11250
11300

10815'	89.51°	268.86°	6676.51'	4176.27'
10909'	89.69°	270.59°	6677.16'	4270.15'
11004'	91.11°	271.01°	6676.50'	4364.93'
11099'	91.36°	270.35°	6674.45'	4459.71'
11193'	90.96°	269.19°	6672.55'	4553.57'
11288'	90.59°	269.75°	6671.27'	4648.47'



11350

11383'

91.85°

269.82° 6669.24'

4743.33'

11400

11450

11477'

90.96°

269.73° 6666.94'

4837.19'

11500

11550

11572'

89.51°

267.87° 6666.55'

4932.13'

11600

11650

11667'

89.32°

266.61° 6667.52'

5027.13'

11700

11750

11761'

90.00°

265.87° 6668.08'

5121.12'

11800

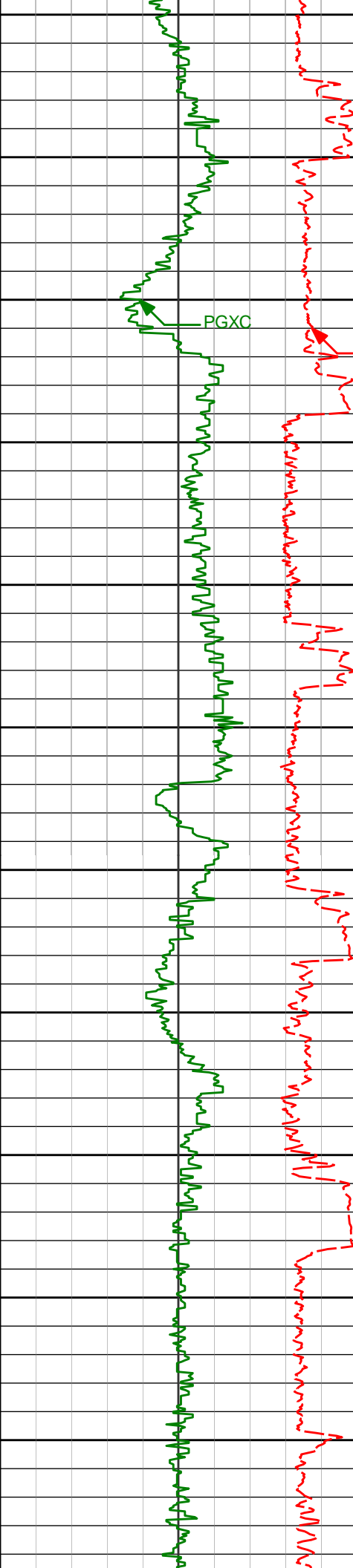
11850

11856'

90.83°

266.82° 6667.39'

5216.11'



11900

11950

12000

12050

12100

12150

12200

12250

12300

12350

12400

11951'

91.69°

267.96° 6665.30'

5311.08'

12045'

90.74°

268.03° 6663.31'

5405.04'

12140'

91.57°

268.22° 6661.39'

5500.00'

12234'

90.71°

268.92° 6659.52'

5593.94'

12329'

89.14°

268.36° 6659.65'

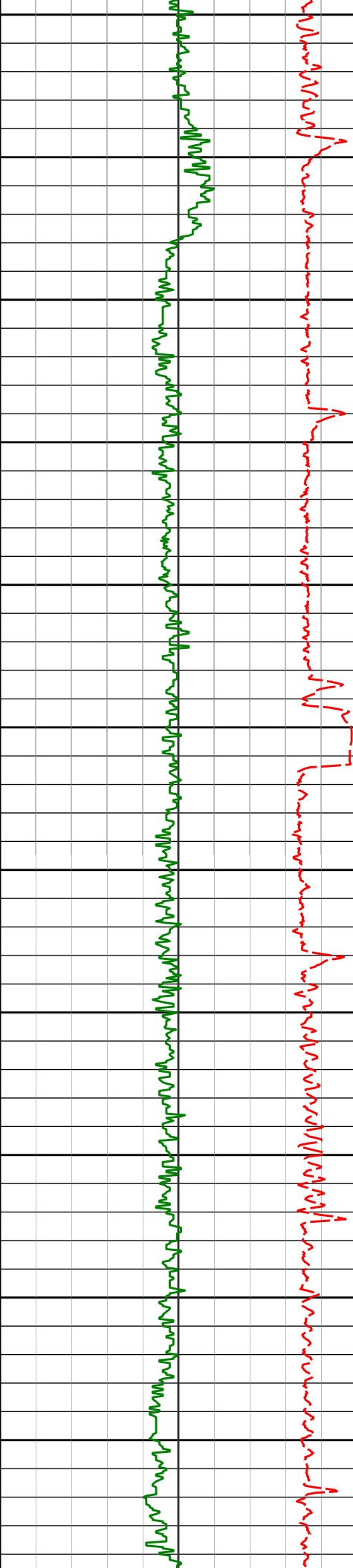
5688.90'

12424'

89.48°

268.64° 6660.79'

5783.85'



12450
12500
12550
12600
12650
12700
12750
12800
12850
12900
12950

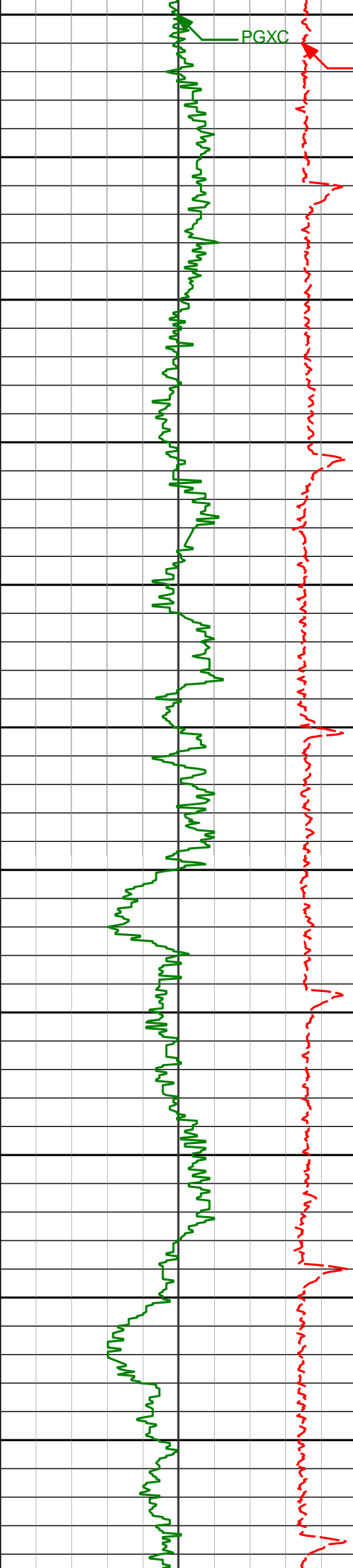
12518'
12613'
12708'
12802'
12897'
12991'

89.54°
89.97°
89.17°
89.35°
89.54°
89.78°

268.40°
267.83°
269.86°
270.49°
270.22°
269.56°

6661.59'
6662.00'
6662.71'
6663.93'
6664.85'
6665.40'

5877.82'
5972.80'
6067.73'
6161.58'
6256.41'
6350.28'

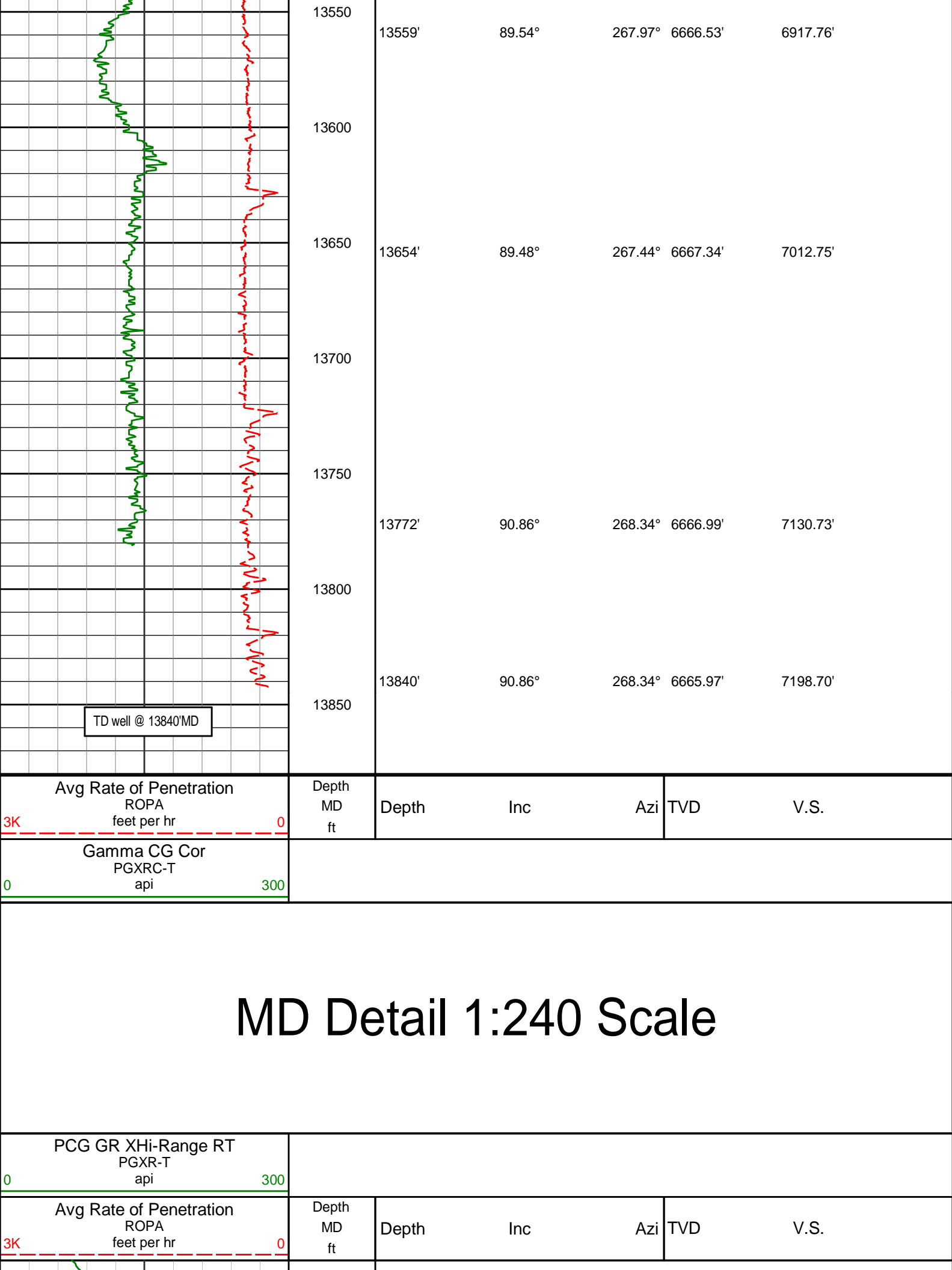


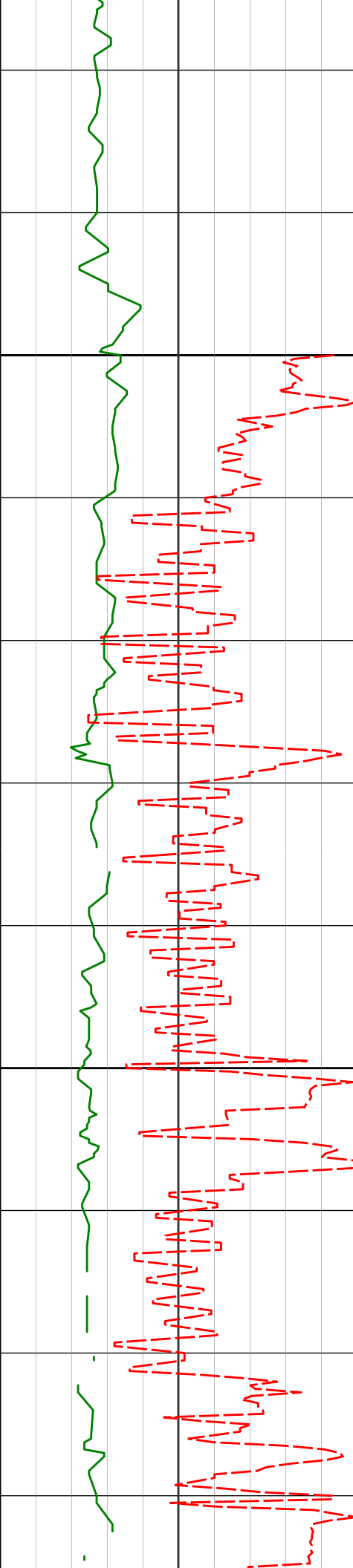
PGXC

ROPA

13000
13050
13100
13150
13200
13250
13300
13350
13400
13450
13500

13086'	90.03°	269.97°	6665.56'	6445.16'
13180'	90.37°	269.96°	6665.23'	6539.03'
13275'	89.97°	269.35°	6664.95'	6633.93'
13370'	89.63°	269.07°	6665.28'	6728.85'
13464'	89.66°	268.78°	6665.87'	6822.79'





Casing Shoe @ 589

Run 100

600

638'

0.18°

286.61° 638.00'

0.97'

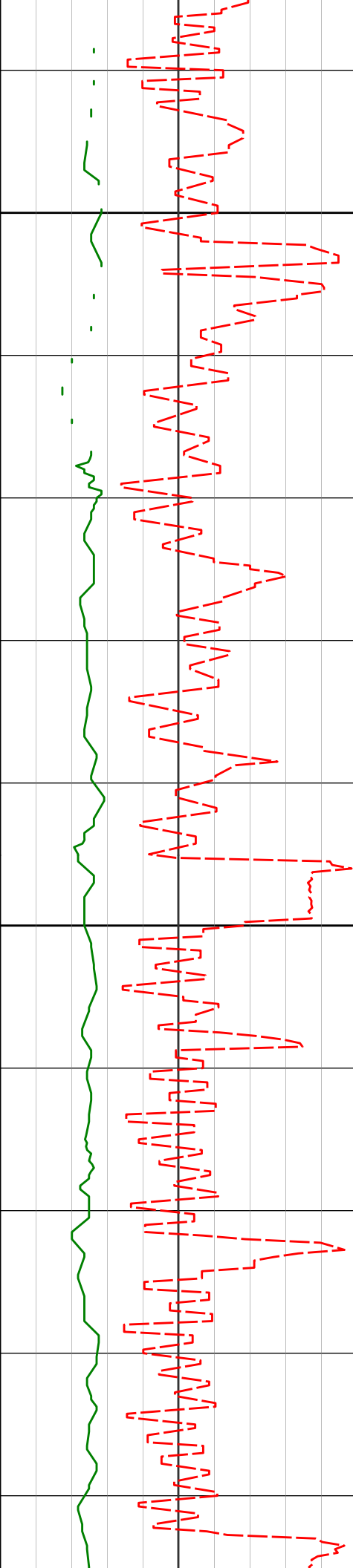
700

733'

0.22°

316.24° 733.00'

1.23'



800

828'

0.58°

313.19° 828.00'

1.69'

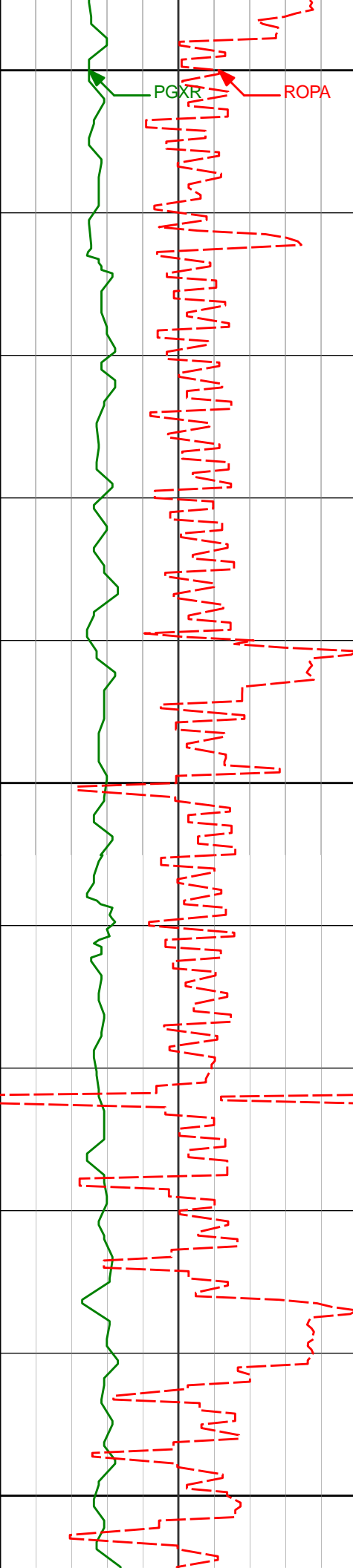
900

922'

0.56°

298.87° 921.99'

2.41'



1000

PGXR

ROPA

1017'

0.59°

303.33° 1016.99'

3.20'

1100

1111'

0.66°

317.57° 1110.98'

3.93'

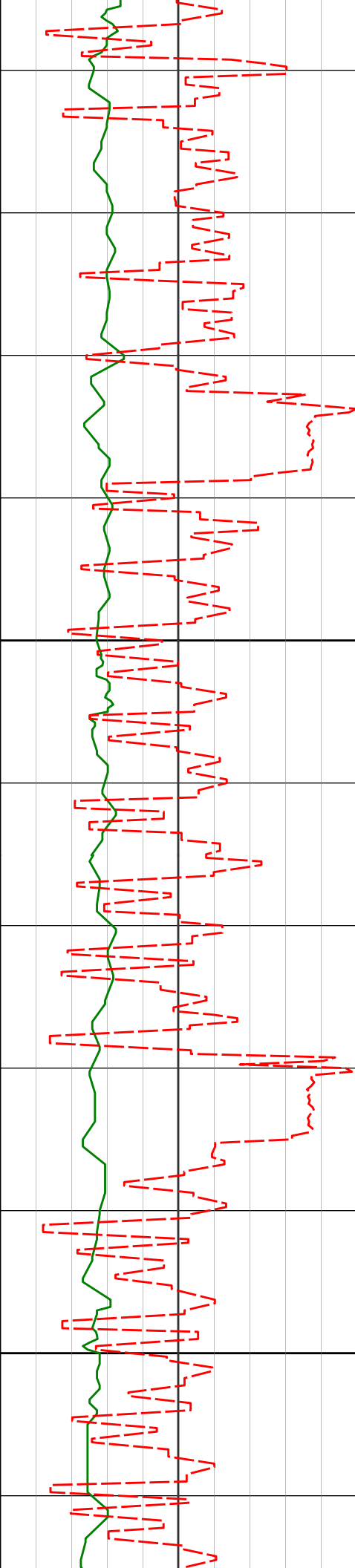
1200

1204'

0.50°

334.77° 1203.98'

4.42'



1300

1400

1296'

0.38°

311.62° 1295.97'

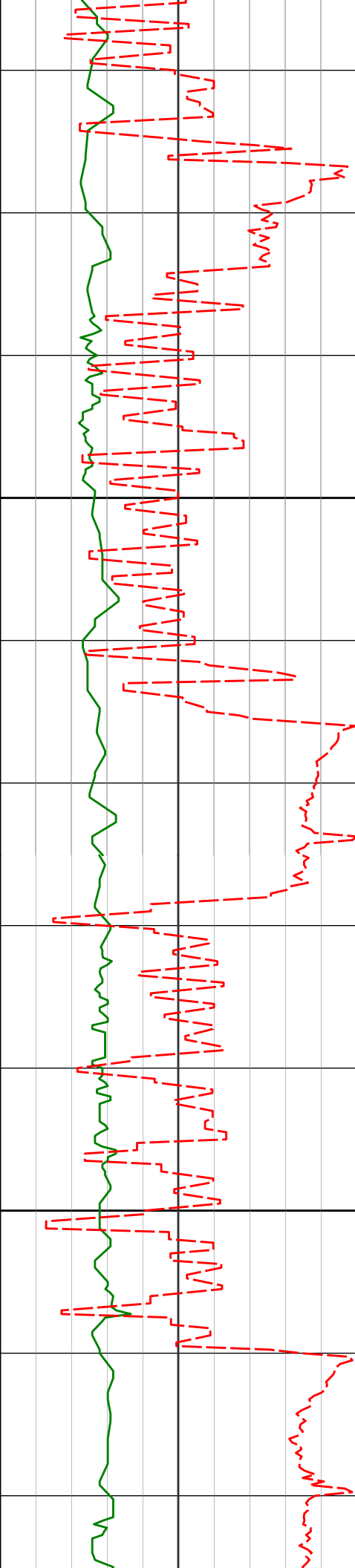
4.79'

1390'

0.29°

313.03° 1389.97'

5.18'



1500

1600

1483'

0.35°

299.92° 1482.97'

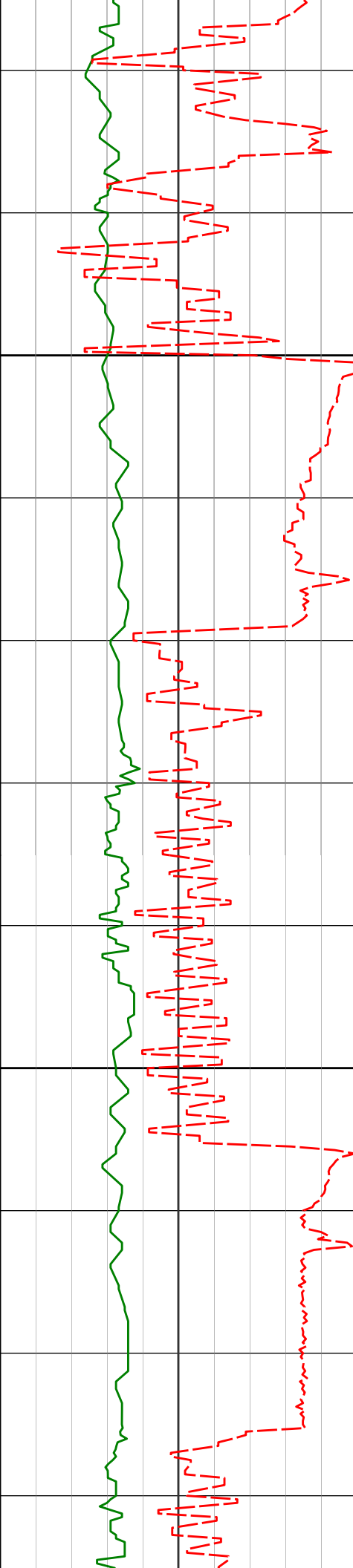
5.58'

1575'

2.71°

188.15° 1574.94'

6.24'



1700

1800

1668'

5.58°

161.41° 1667.69'

5.46'

1760'

6.71°

144.44° 1759.17'

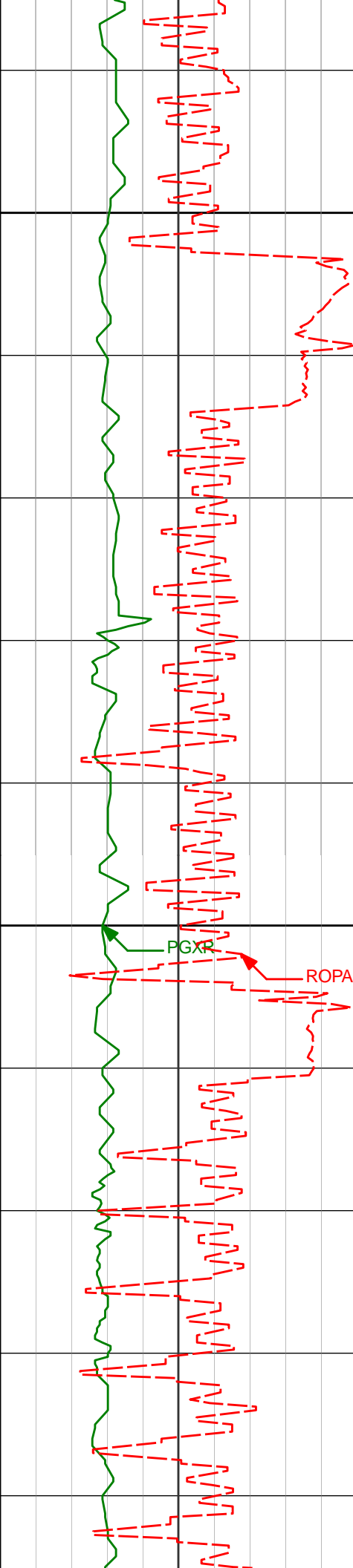
1.37'

1853'

7.56°

140.45° 1851.45'

-5.19'



1900

1946'

8.63°

133.17° 1943.52'

-13.65'

2000

PGXR

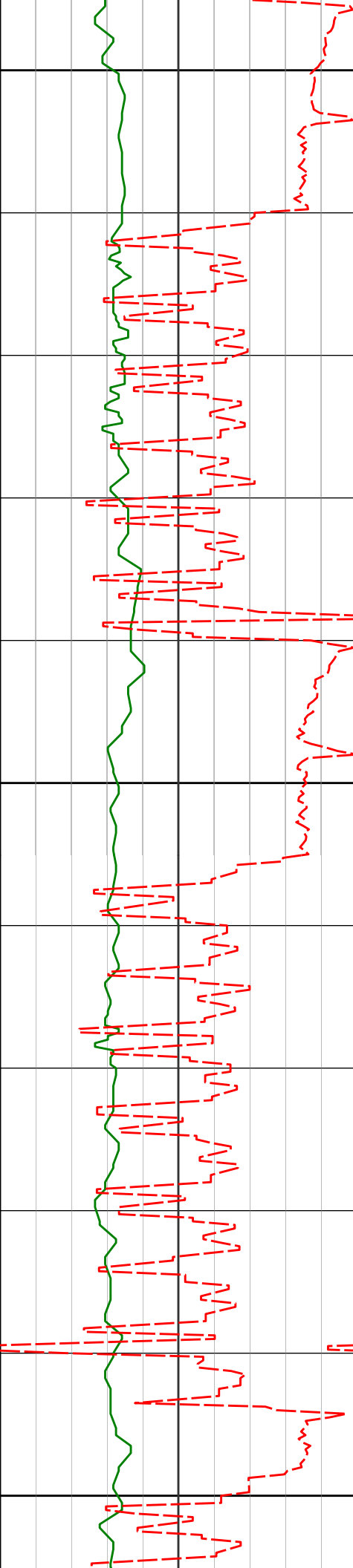
ROPA

2039'

7.67°

129.17° 2035.58'

-23.08'



2100

2131'

9.07°

129.56° 2126.60'

-32.96'

2200

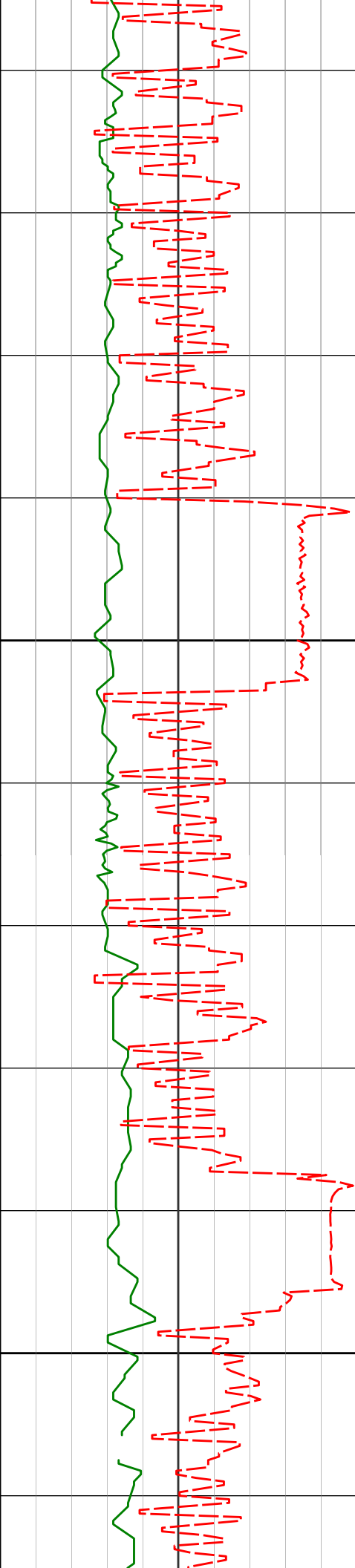
2222'

10.11°

130.67° 2216.33'

-44.01'

2300



2400

2500

2314'

2407'

2500'

9.79°

9.12°

8.54°

124.50° 2306.95'

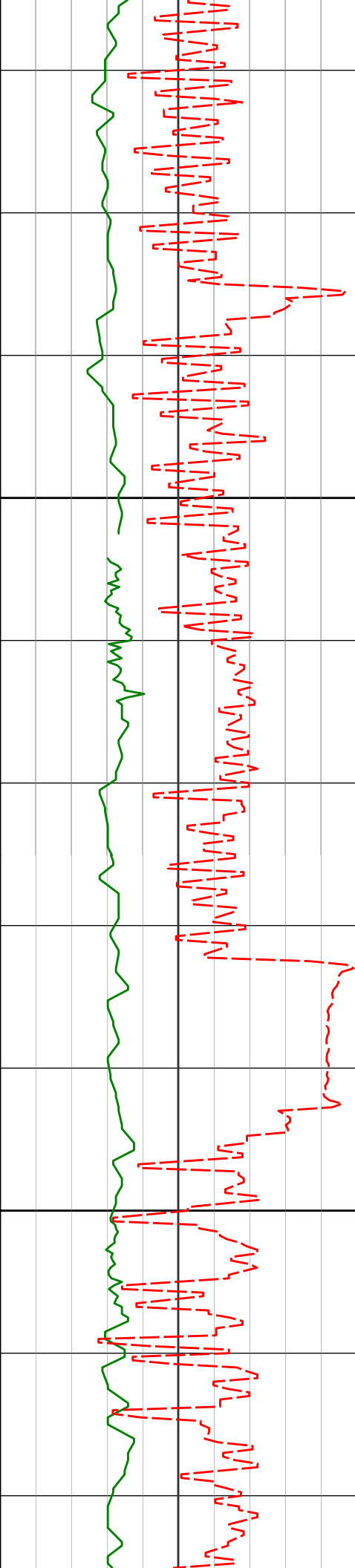
118.79° 2398.69'

123.18° 2490.58'

-56.05'

-68.58'

-80.41'



2600

2700

2593'

7.98°

119.98° 2582.62'

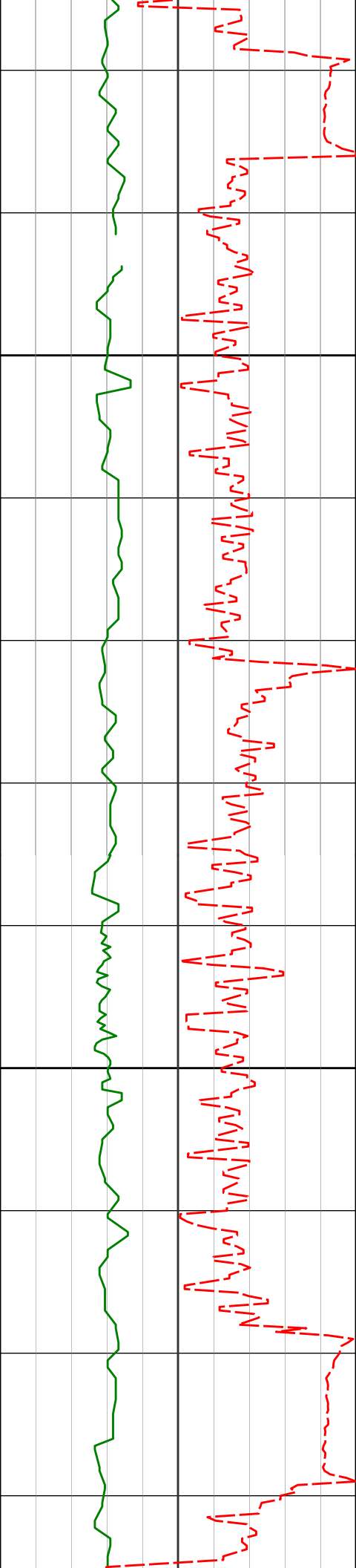
-91.39'

2686'

8.71°

138.74° 2674.65'

-101.16'



2778'

8.81°

145.26° 2765.58'

-109.17'

2800

2870'

8.67°

140.00° 2856.51'

-117.04'

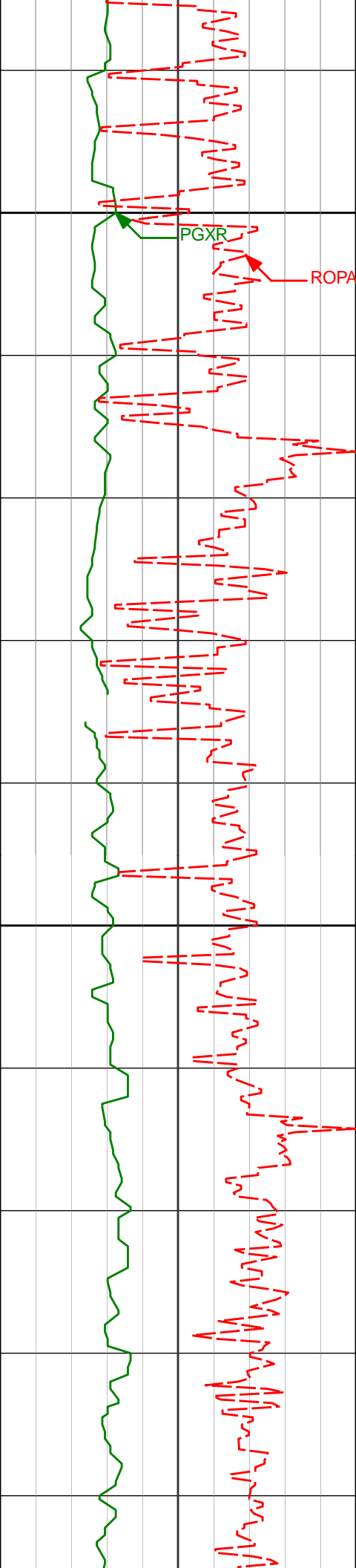
2900

2965'

9.03°

153.44° 2950.39'

-124.32'



3000

3060'

9.46°

151.65° 3044.16'

-130.63'

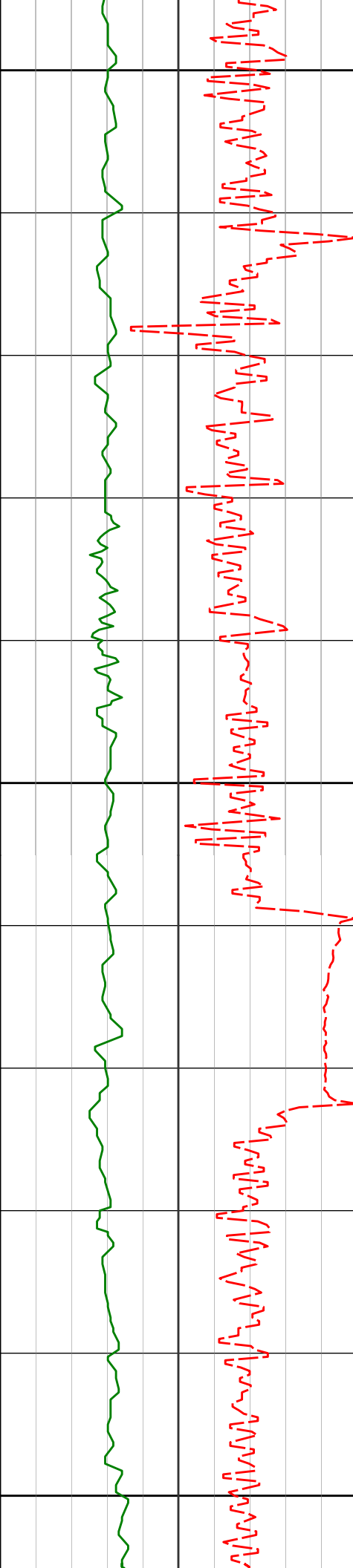
3100

3155'

8.85°

148.08° 3137.95'

-137.50'



3200

3249'

8.26°

141.63° 3230.90'

-144.89'

3300

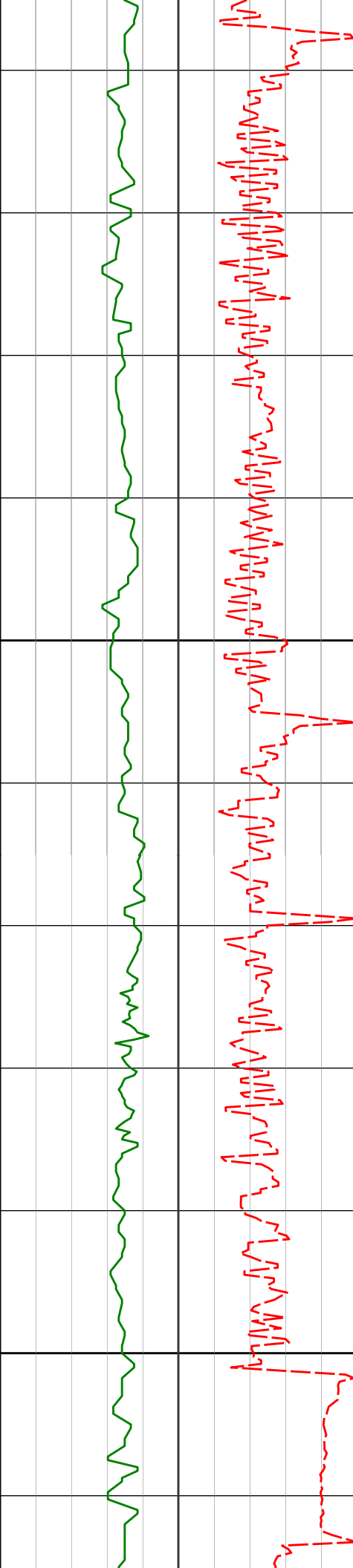
3344'

9.75°

145.65° 3324.73'

-153.02'

3400



3500

3600

3438'

8.64°

135.88° 3417.53'

-161.79'

3533'

8.26°

129.69° 3511.50'

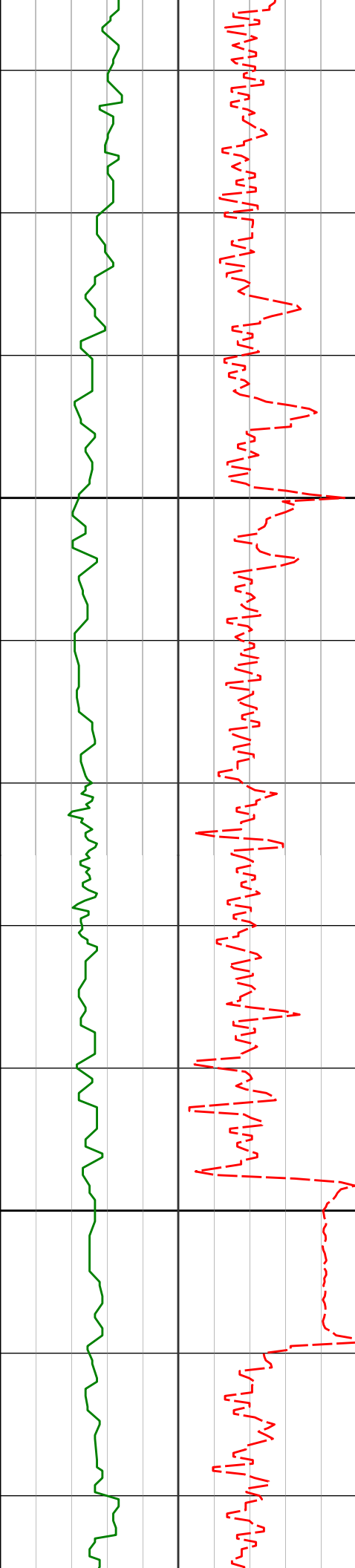
-171.48'

3628'

9.23°

141.52° 3605.40'

-180.91'



3700

3722'

10.45°

141.93° 3698.02'

-190.17'

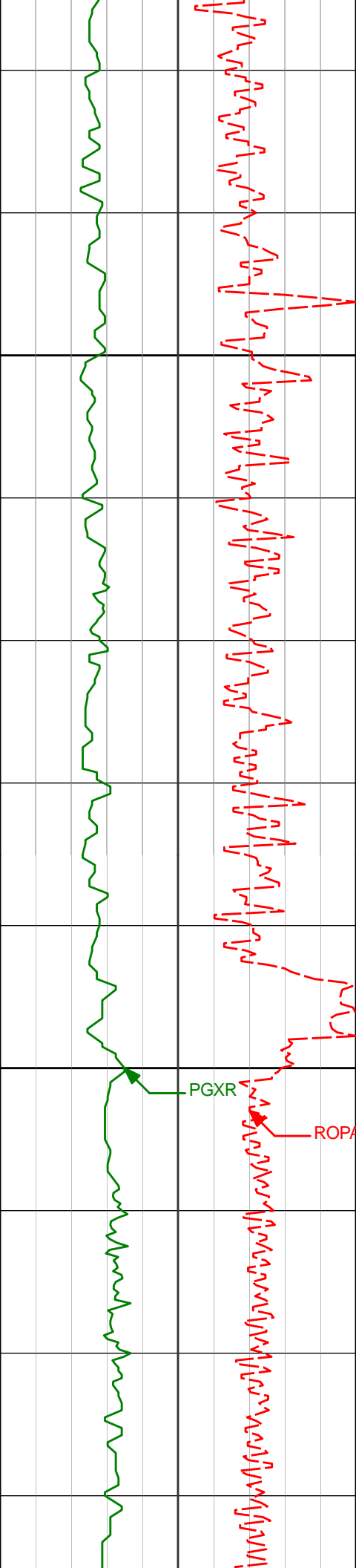
3800

3817'

10.85°

157.65° 3791.40'

-198.07'



3900

3911'

11.61°

159.12° 3883.60'

-203.89'

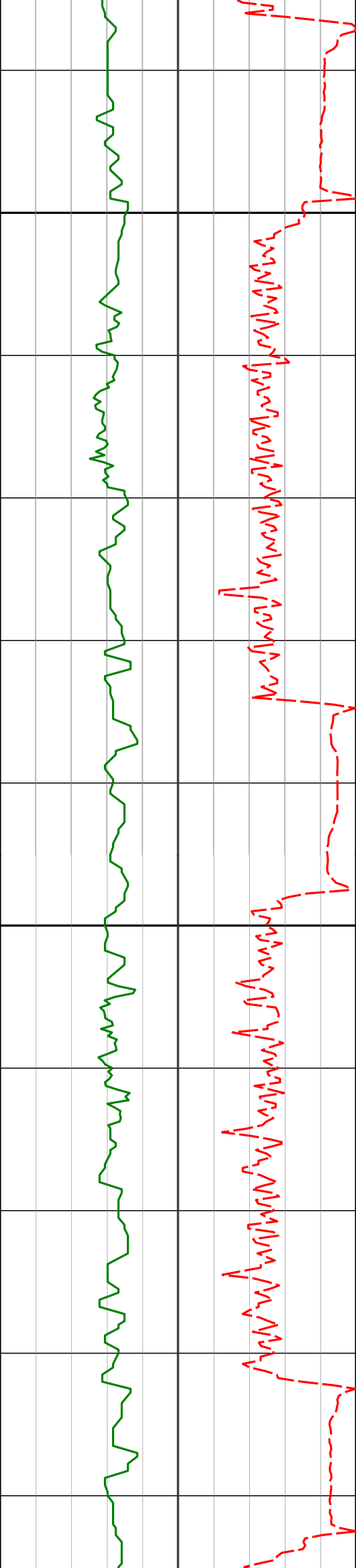
4000

4006'

10.43°

158.30° 3976.85'

-209.57'



4100

4101'

7.25°

159.08° 4070.71'

-214.16'

4200

4195'

7.06°

144.74° 4163.98'

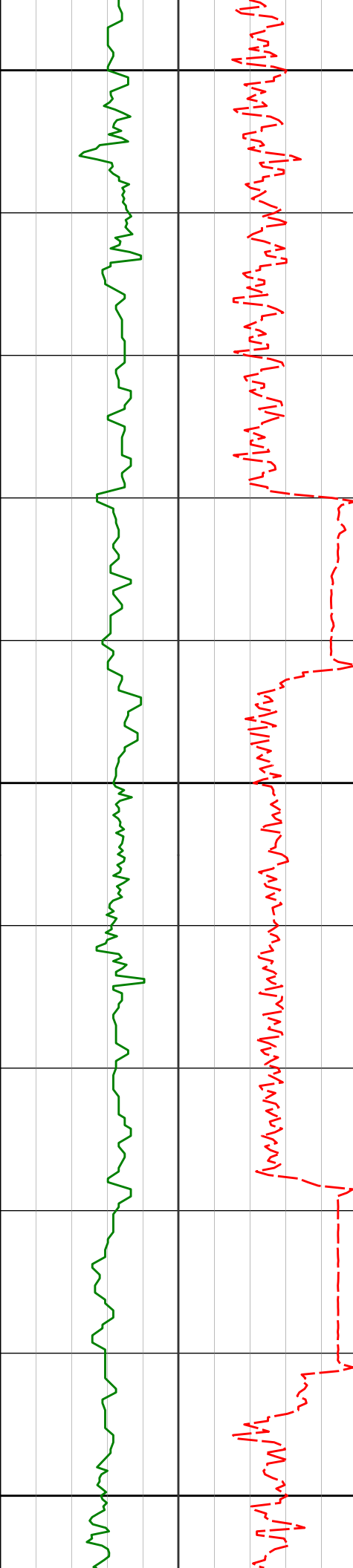
-219.06'

4290'

5.15°

120.57° 4258.46'

-225.72'



4300

4354'

4400

4478'

4500

3.50°

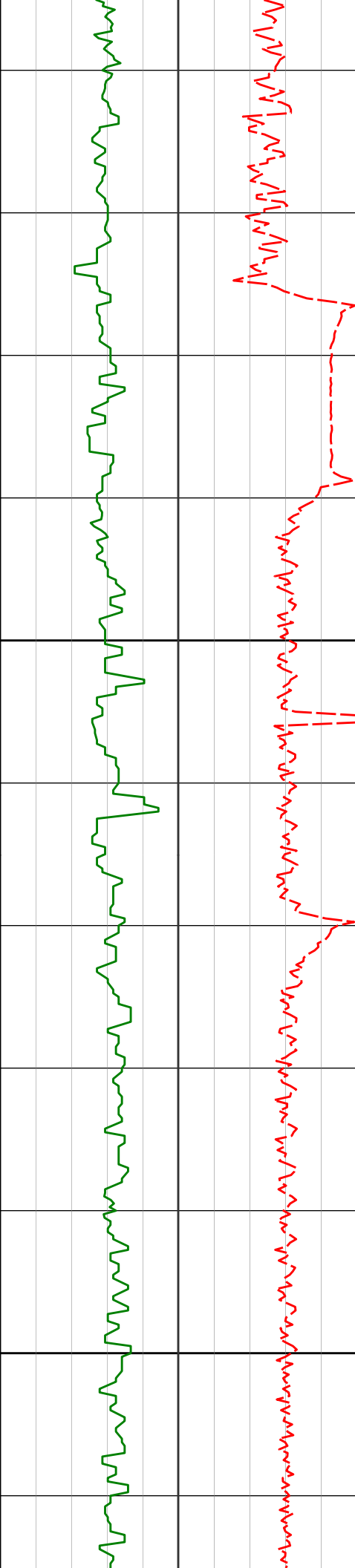
123.22° 4322.27'

-229.69'

1.91°

89.13° 4446.14'

-234.81'



4600

4700

4573'

2.36°

357.72° 4541.09'

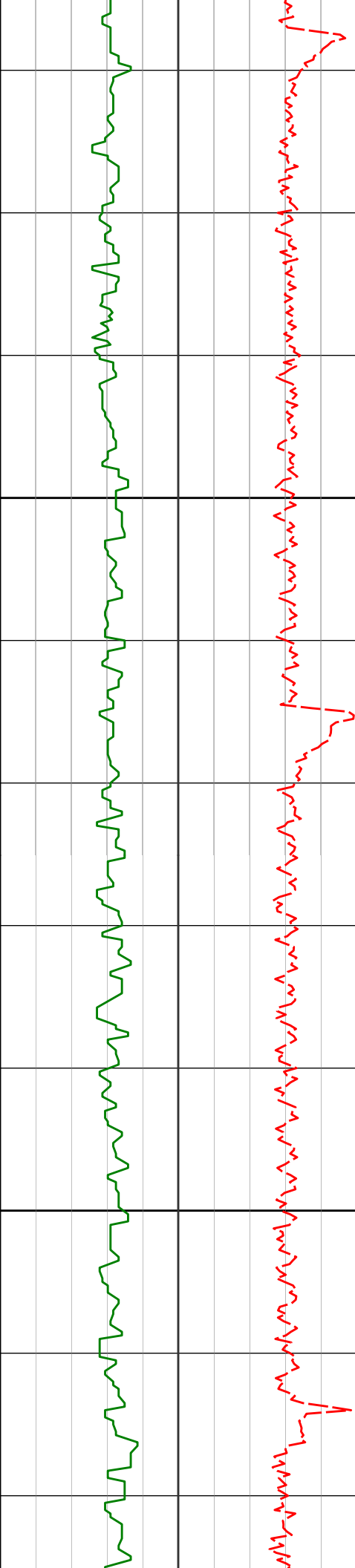
-236.42'

4668'

2.74°

331.33° 4636.00'

-235.47'



4800

4900

4763'

2.41°

312.72° 4730.91'

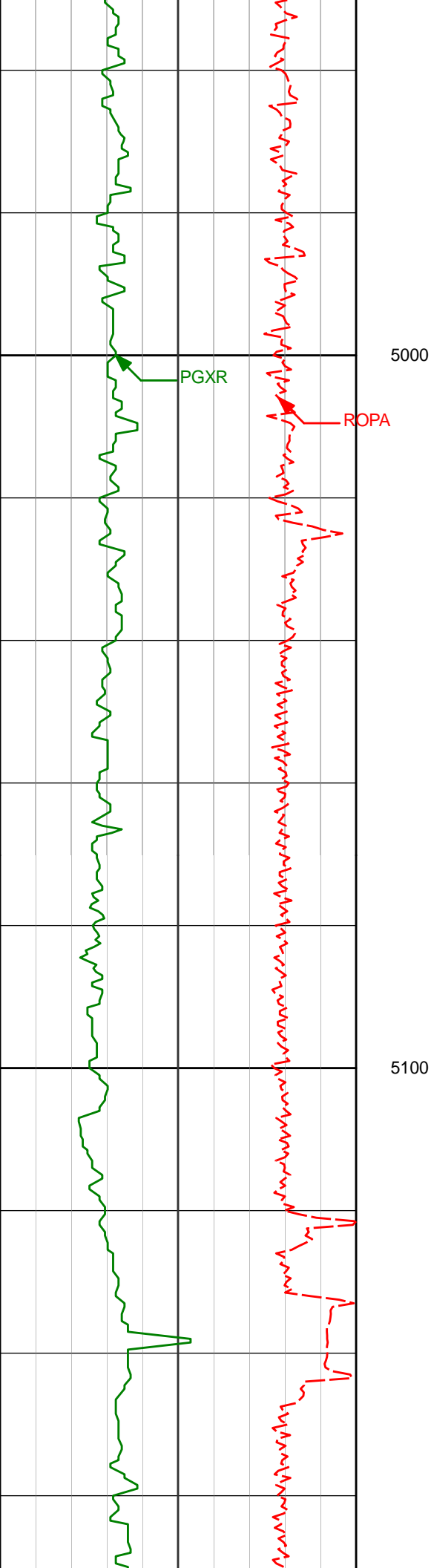
-233.10'

4857'

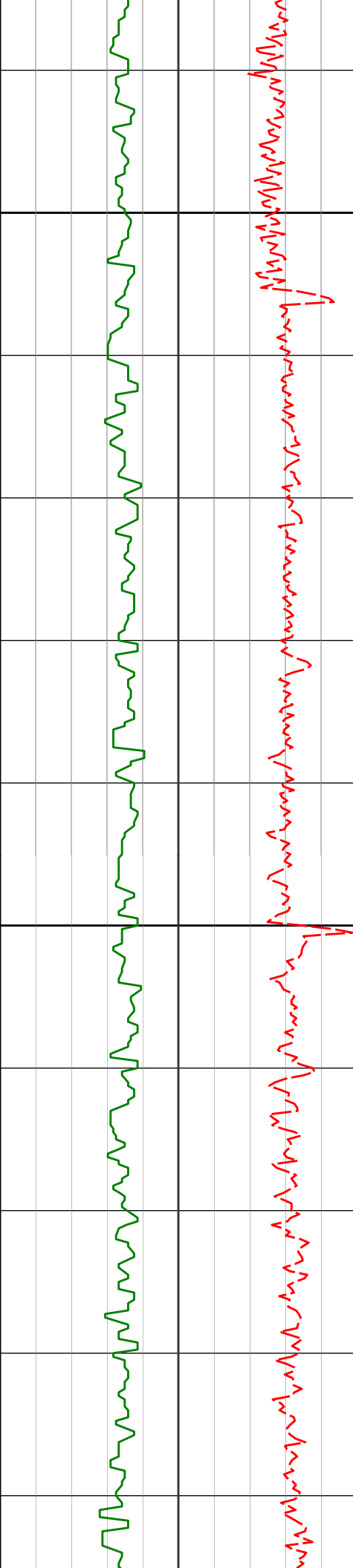
2.45°

309.60° 4824.82'

-230.24'



4952'	2.75°	301.07°	4919.73'	-226.86'
5047'	3.17°	289.22°	5014.60'	-222.54'
5141'	1.17°	268.61°	5108.53'	-219.18'



5200

5236'

0.45°

177.97° 5203.52'

-218.21'

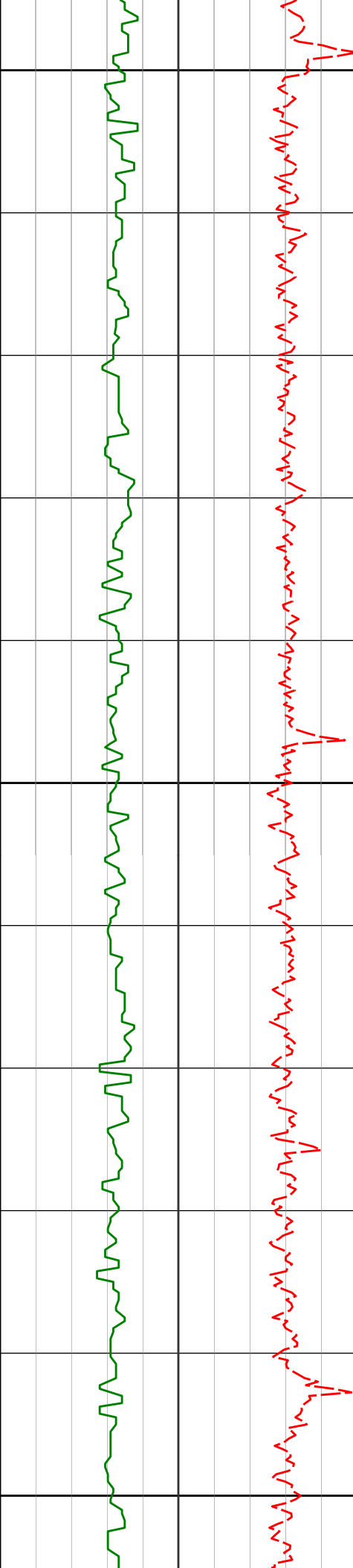
5300

5330'

0.89°

141.09° 5297.52'

-218.63'



5400

5425'

0.90°

120.18° 5392.50'

-219.69'

5500

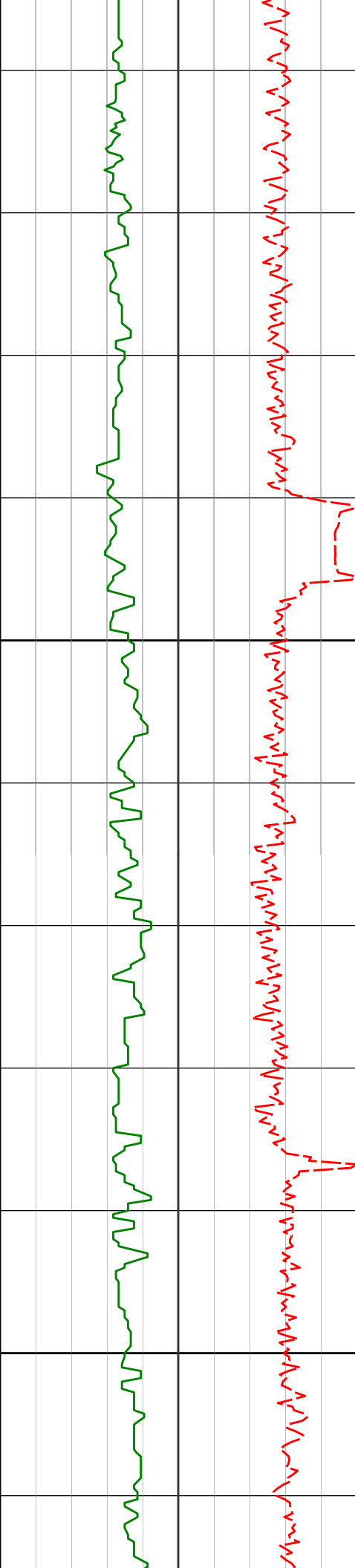
5520'

1.05°

126.11° 5487.49'

-220.99'

5600



5700

5800

5614'

5709'

5803'

1.07°

1.39°

1.55°

122.40° 5581.47'

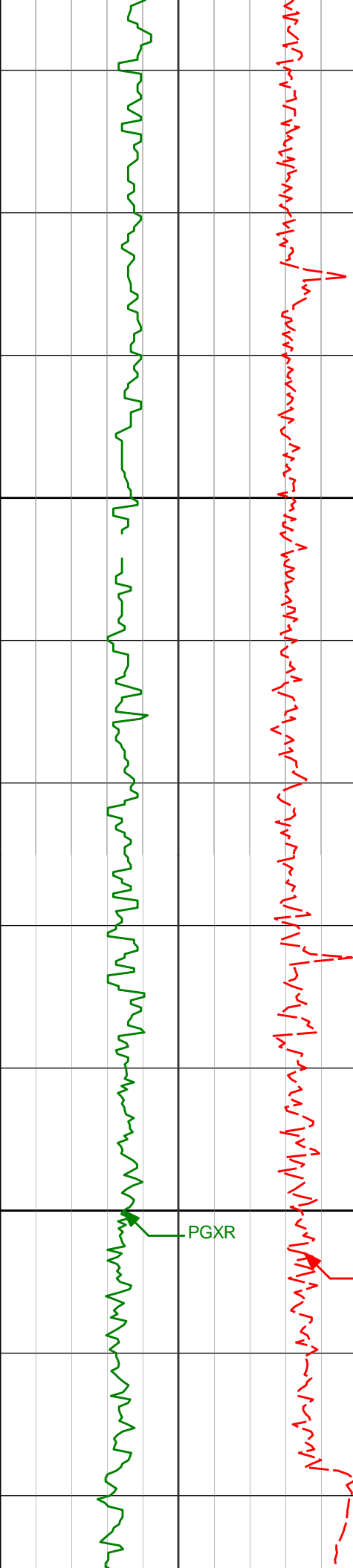
200.08° 5676.46'

185.22° 5770.43'

-222.37'

-222.64'

-222.01'



5900

5898'

1.67°

171.72° 5865.39'

-221.95'

6000

5992'

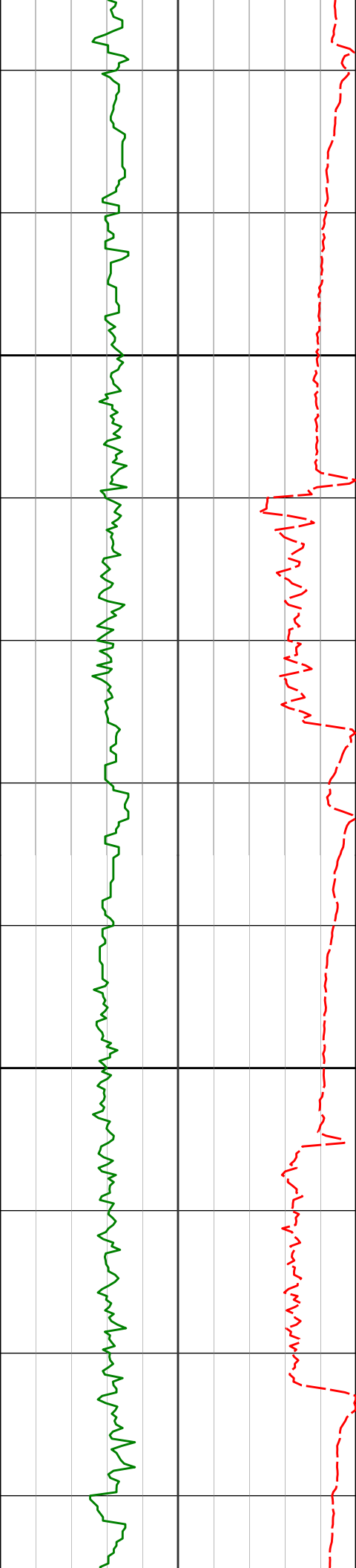
1.66°

163.25° 5959.35'

-222.40'

PGXR

ROPA



6100

6200

6087'

7.42°

244.07° 6054.06'

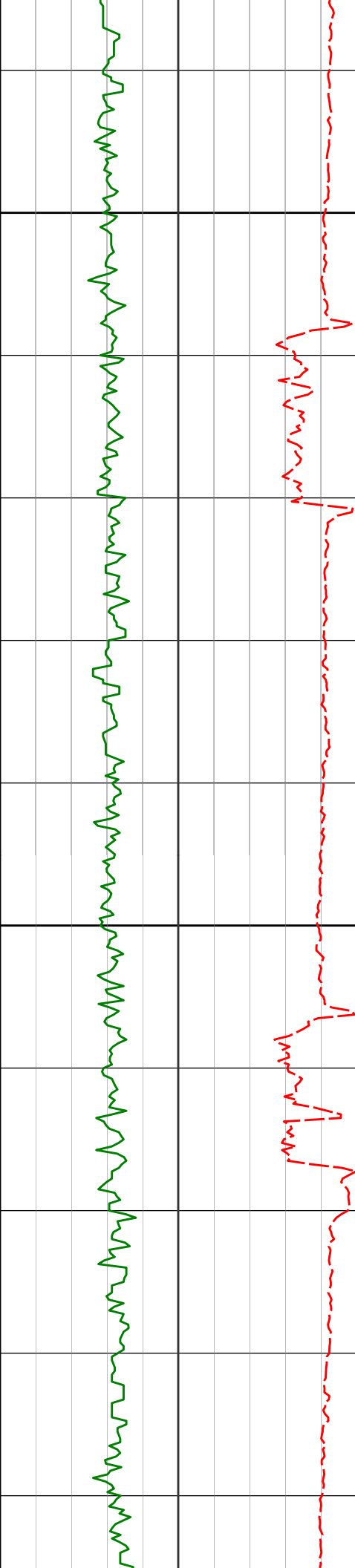
-217.07'

6182'

13.07°

256.13° 6147.52'

-200.85'



6300

6400

6276'

18.84°

261.17° 6237.86'

-175.29'

6371'

26.96°

265.16° 6325.31'

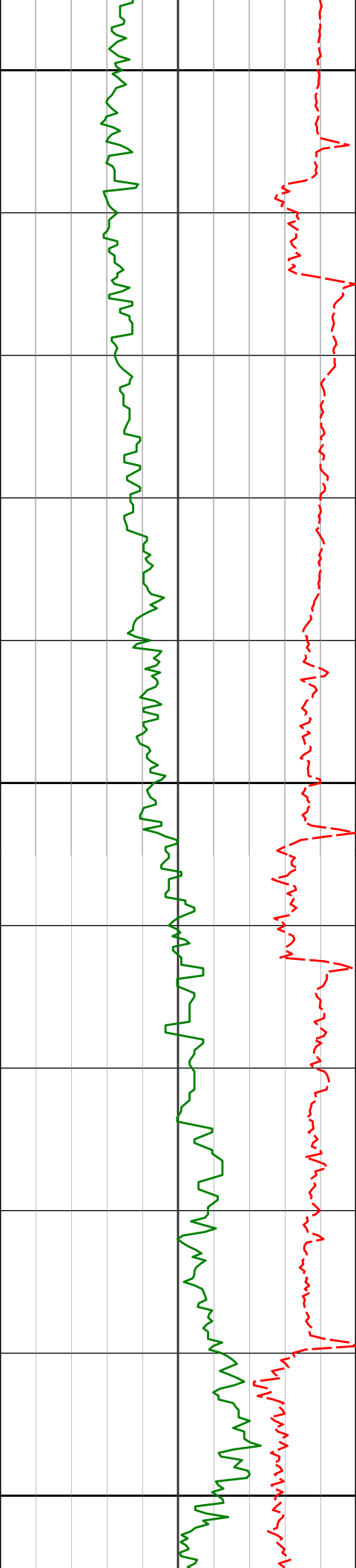
-138.44'

6466'

35.62°

267.35° 6406.42'

-89.16'



6500

6560'

47.53°

268.97° 6476.61'

-26.91'

6600

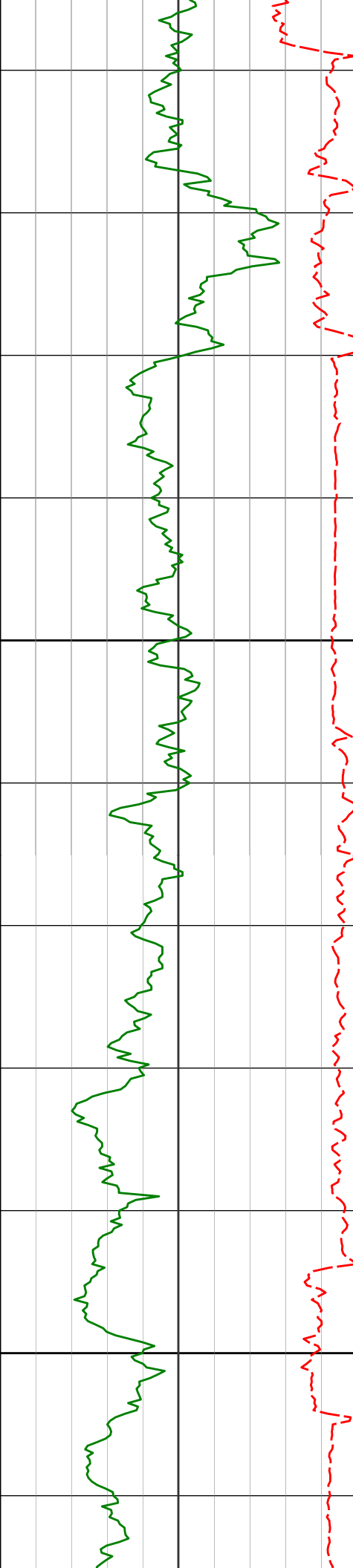
6655'

57.77°

274.65° 6534.19'

48.16'

6700



6800

6900

6750'

64.33°

273.00° 6580.15'

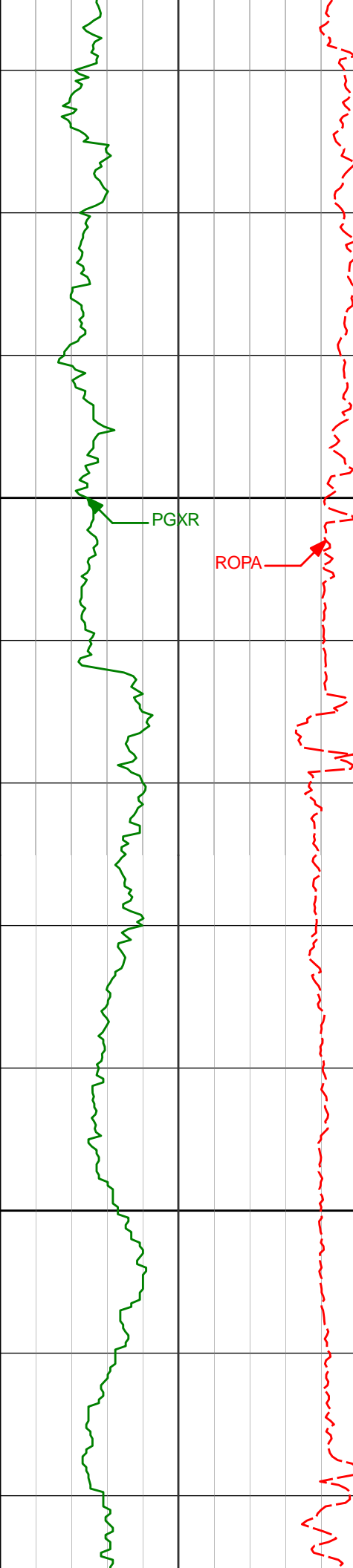
130.65'

6844'

70.04°

270.03° 6616.59'

216.98'



6939' 77.87° 267.44° 6642.84' 308.15'

6965' 81.65° 267.70° 6647.46' 333.73'

7000

Run 200

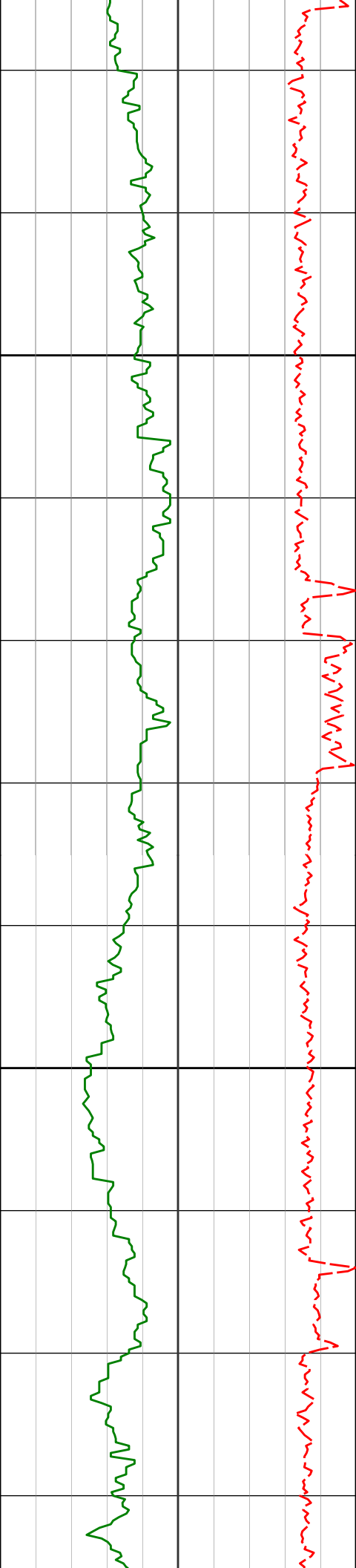
ROPA



Casing Shoe @ 7023

7069' 85.19° 270.85° 6659.38' 436.93'

7100



7200

7300

7164'

86.45°

268.90° 6666.30'

531.55'

7258'

88.83°

269.96° 6670.17'

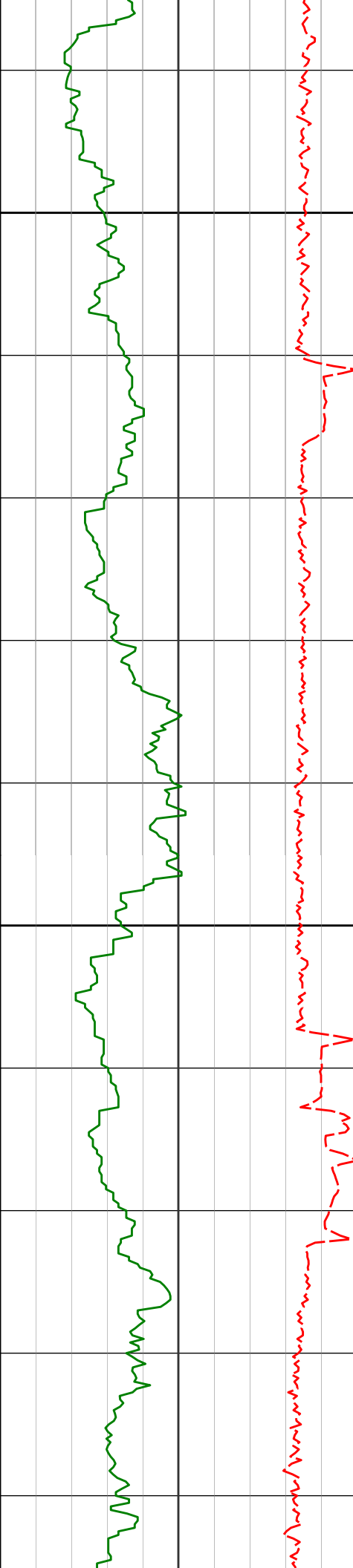
625.37'

7353'

89.66°

269.77° 6671.42'

720.24'



7400

7447'

90.99°

269.53° 6670.89'

814.13'

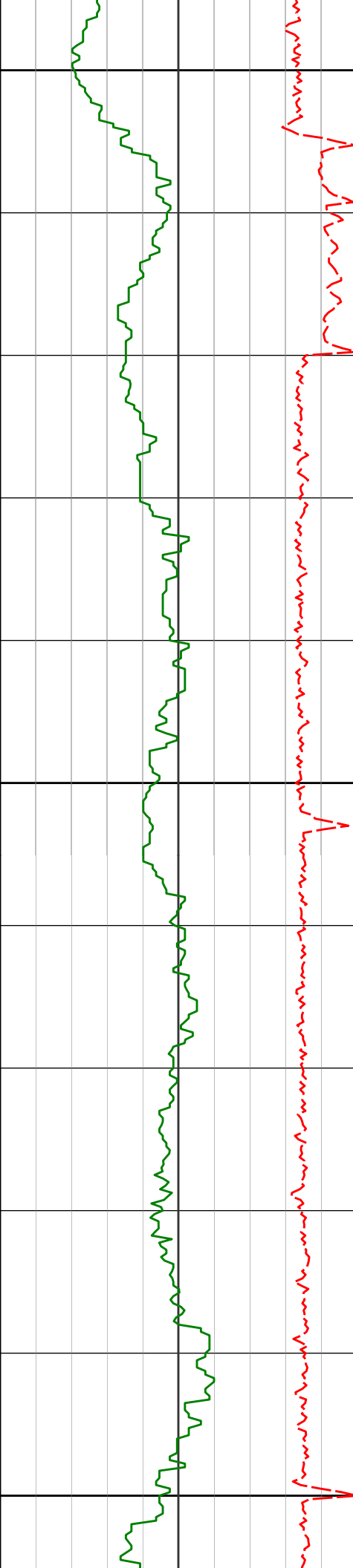
7500

7542'

91.48°

269.89° 6668.84'

909.00'



7600

7636'

89.85°

270.70° 6667.75'

1002.83'

7700

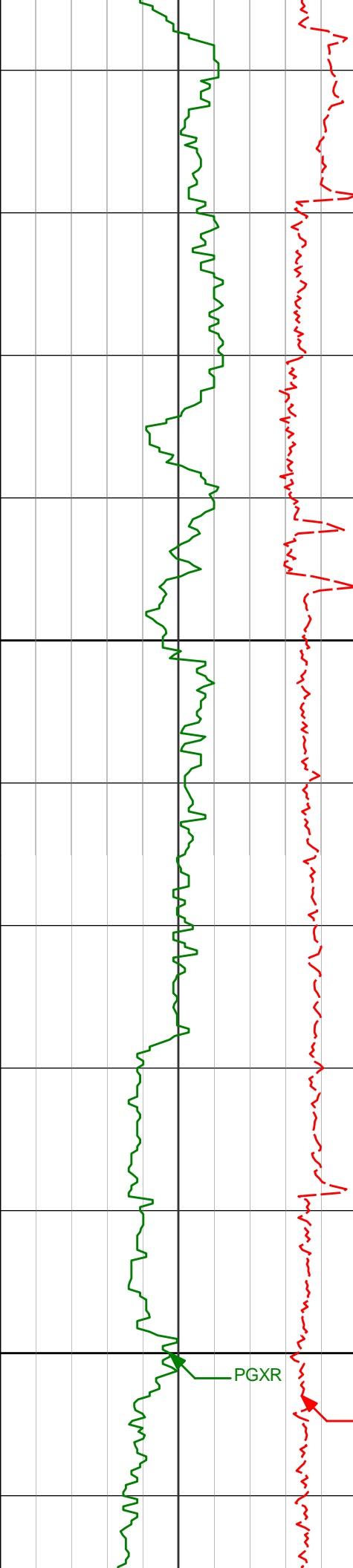
7731'

90.59°

270.84° 6667.39'

1097.62'

7800



7900

8000

7825'

90.40°

271.57° 6666.57'

1191.36'

7918'

89.75°

271.45° 6666.45'

1284.06'

8011'

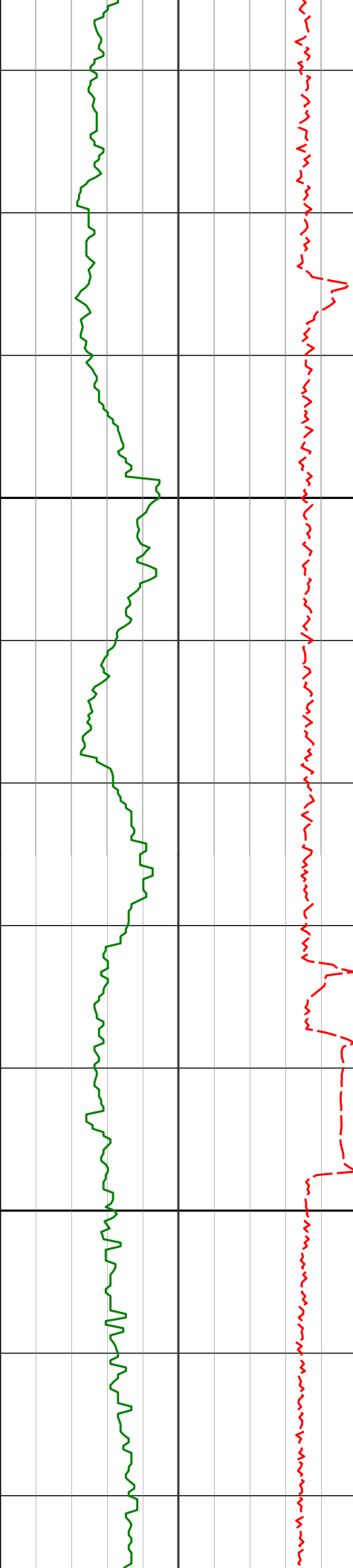
89.75°

271.27° 6666.86'

1376.78'

PGXR

ROPA



8100

8104'

91.36°

272.77° 6665.96'

1469.41'

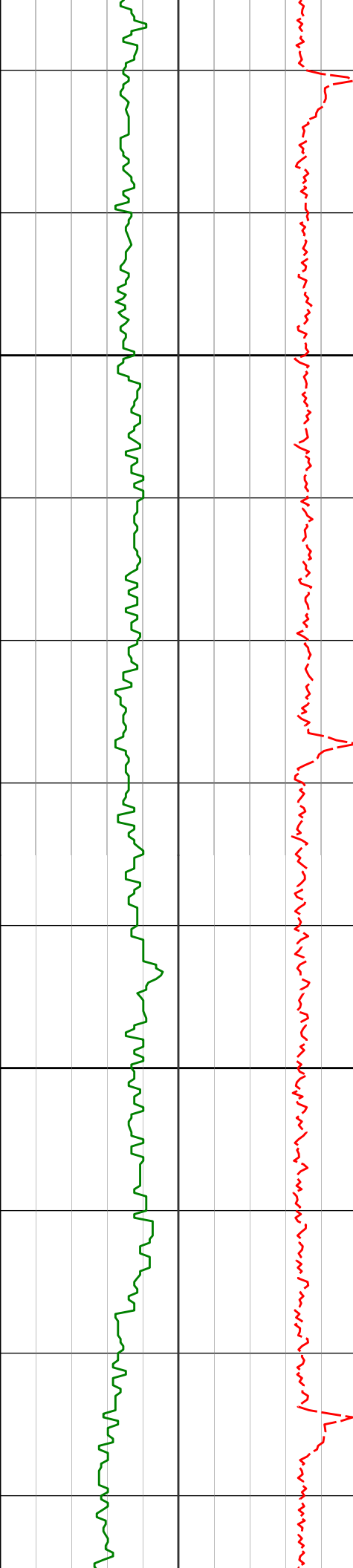
8200

8197'

89.38°

268.94° 6665.36'

1562.17'



8300

8289'

89.60°

269.17° 6666.18'

1654.11'

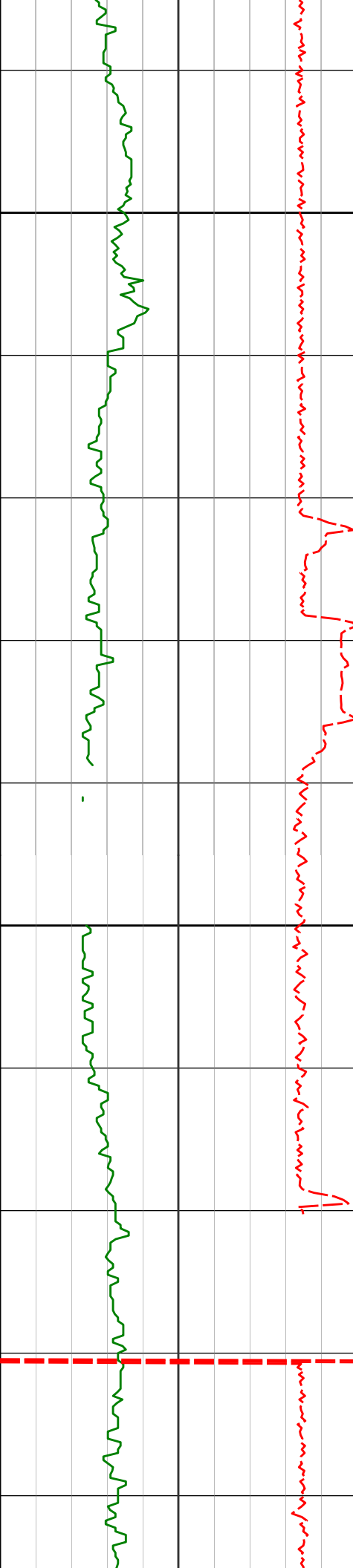
8400

8382'

89.72°

268.48° 6666.73'

1747.05'



8500

8600

8474'

90.12°

269.16° 6666.86'

1839.00'

8567'

89.63°

269.14° 6667.06'

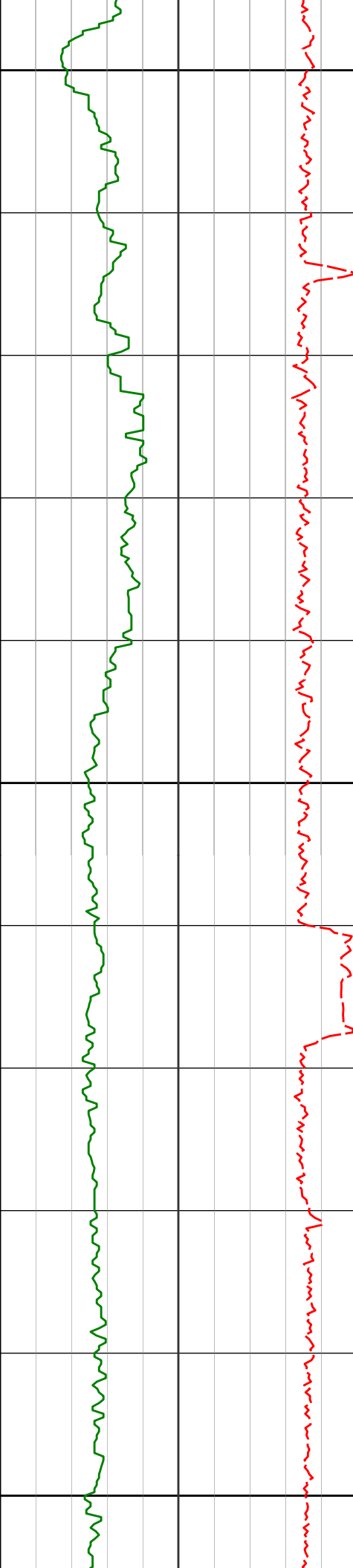
1931.93'

8660'

90.40°

269.01° 6667.03'

2024.87'



8700

8753'

90.49°

268.32° 6666.31'

2117.82'

8800

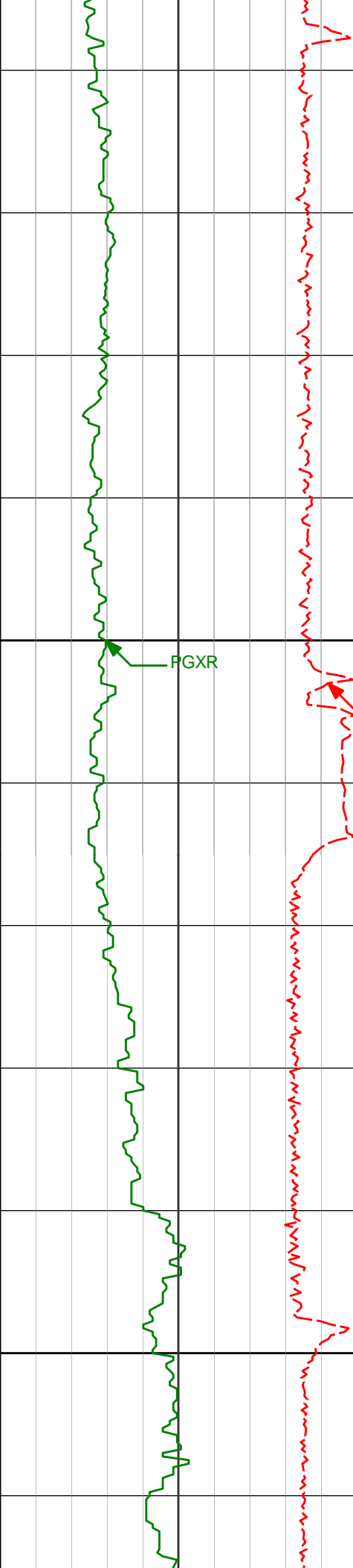
8845'

89.91°

268.65° 6665.99'

2209.79'

8900



8936' 90.80° 268.82° 6665.43' 2300.74'

9000

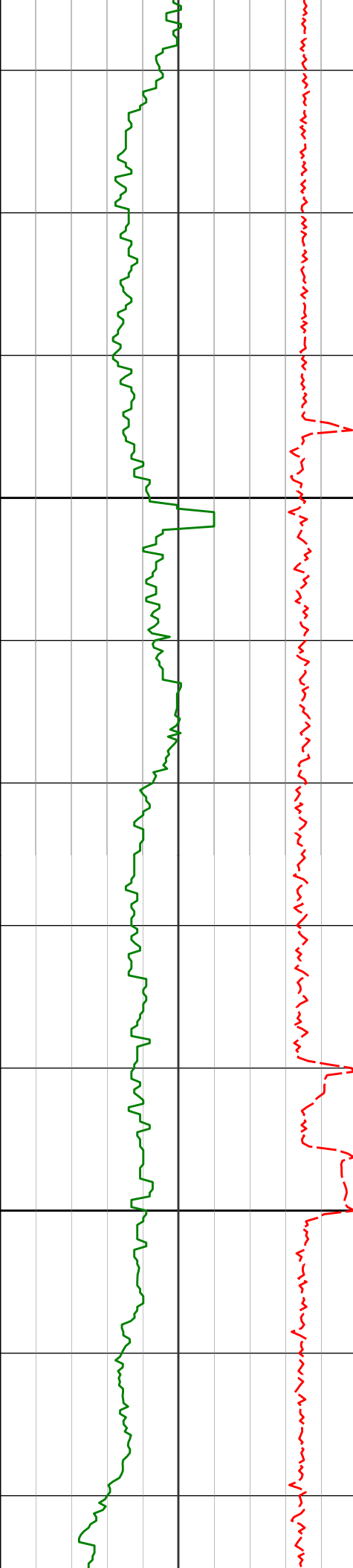
PGXR

ROPA

9028' 89.32° 269.12° 6665.33' 2392.68'

9100

9121' 89.85° 268.67° 6666.00' 2485.63'



9200

9214'

90.46°

268.52° 6665.75'

2578.59'

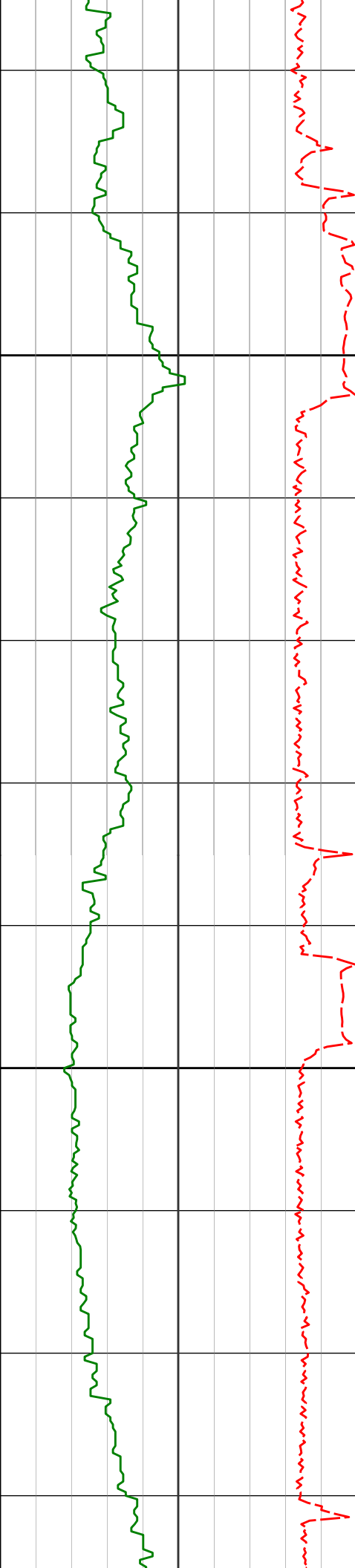
9300

9307'

92.37°

270.42° 6663.46'

2671.46'



9400

9400'

91.79°

270.83° 6660.08'

2764.21'

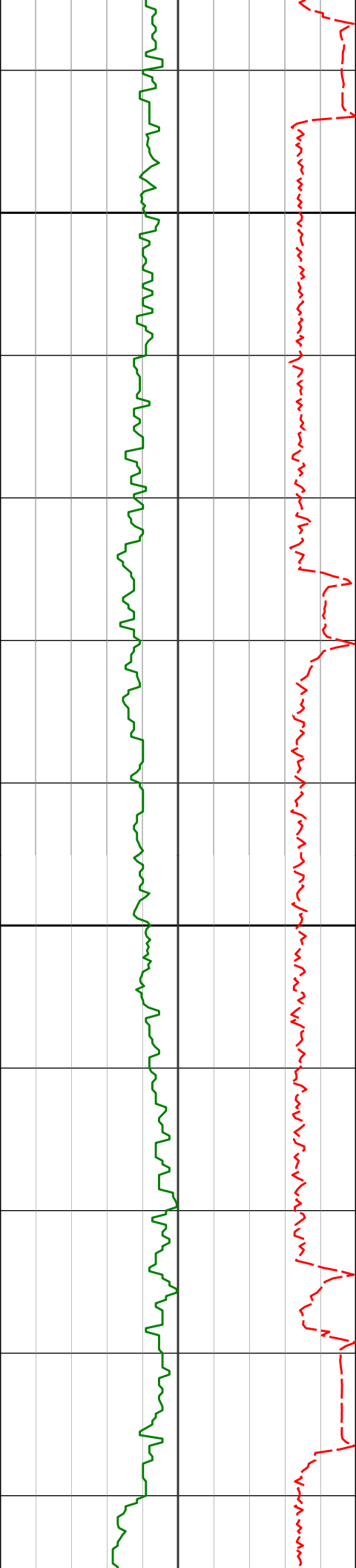
9500

9492'

90.62°

269.90° 6658.15'

2856.02'



9600

9700

9584'

89.88°

269.74° 6657.75'

2947.91'

9679'

89.94°

268.99° 6657.89'

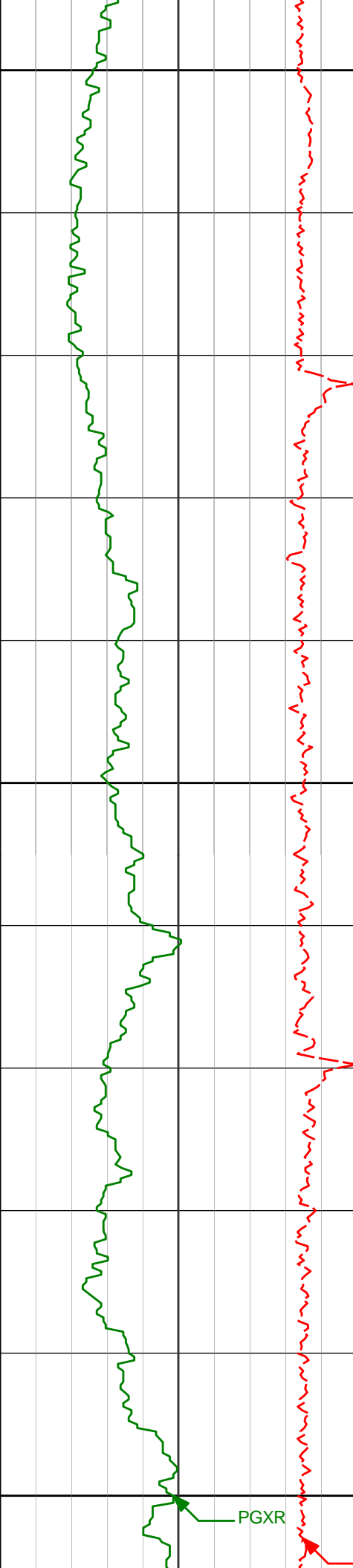
3042.82'

9774'

88.00°

268.37° 6659.60'

3137.76'



9800

9868'

88.34°

268.29° 6662.60'

3231.68'

9900

9963'

88.06°

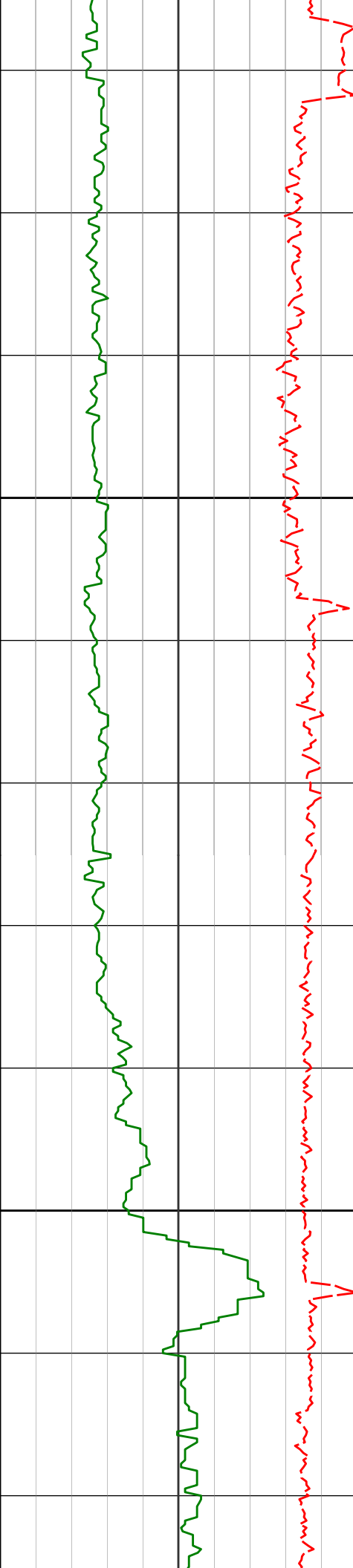
267.63° 6665.59'

3326.62'

10000

PGXR

ROPA



10300

10400

10247'

89.48°

271.60° 6674.09'

3610.12'

10341'

89.57°

271.10° 6674.87'

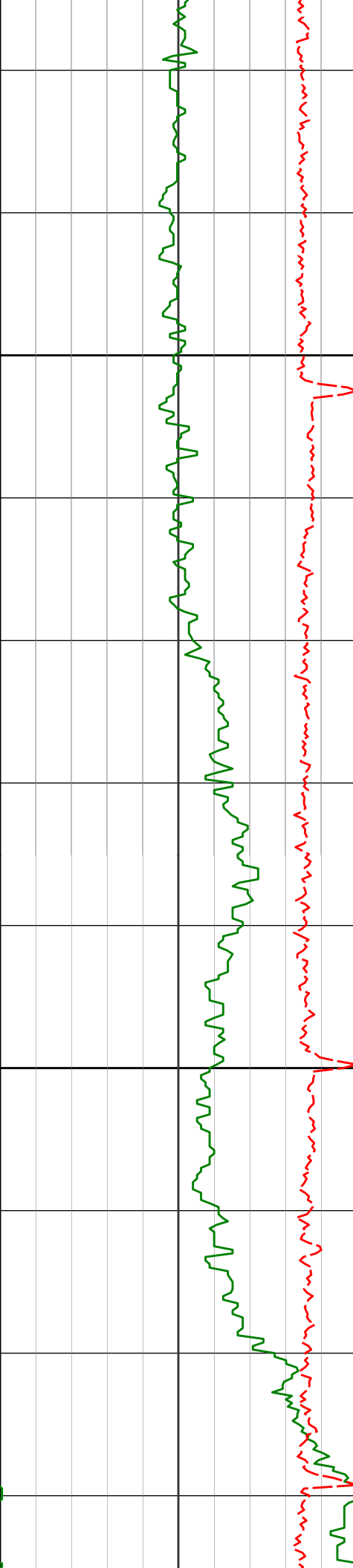
3703.84'

10436'

89.78°

271.90° 6675.41'

3798.54'



10500

10531'

90.12°

272.08° 6675.49'

3893.17'

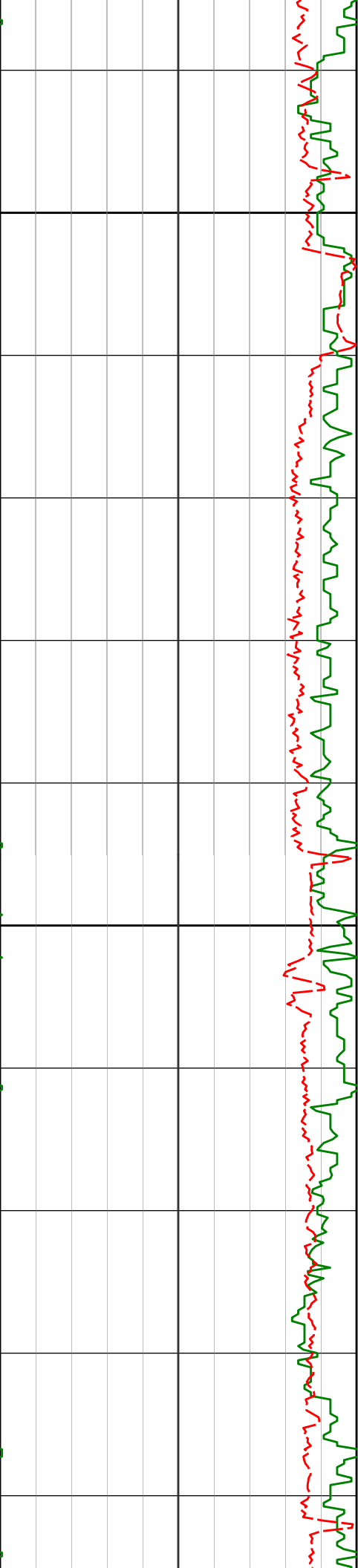
10600

10626'

89.35°

272.48° 6675.93'

3987.76'



10700

10720'

90.22°

271.21° 6676.28'

4081.41'

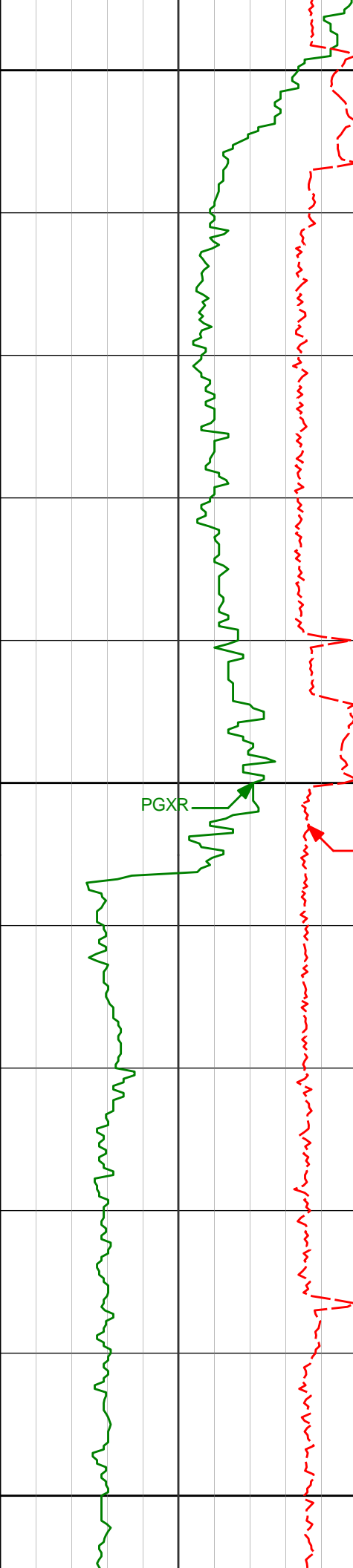
10800

10815'

89.51°

268.86° 6676.51'

4176.27'



10900

10909'

89.69°

270.59° 6677.16'

4270.15'

11000

11004'

91.11°

271.01° 6676.50'

4364.93'

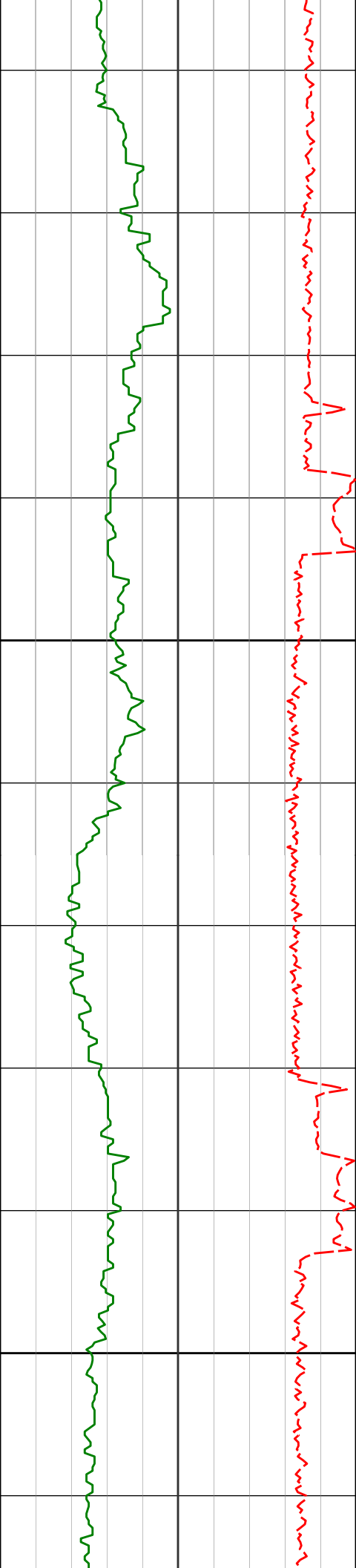
11100

11099'

91.36°

270.35° 6674.45'

4459.71'



11200

11300

11193'

90.96°

269.19° 6672.55'

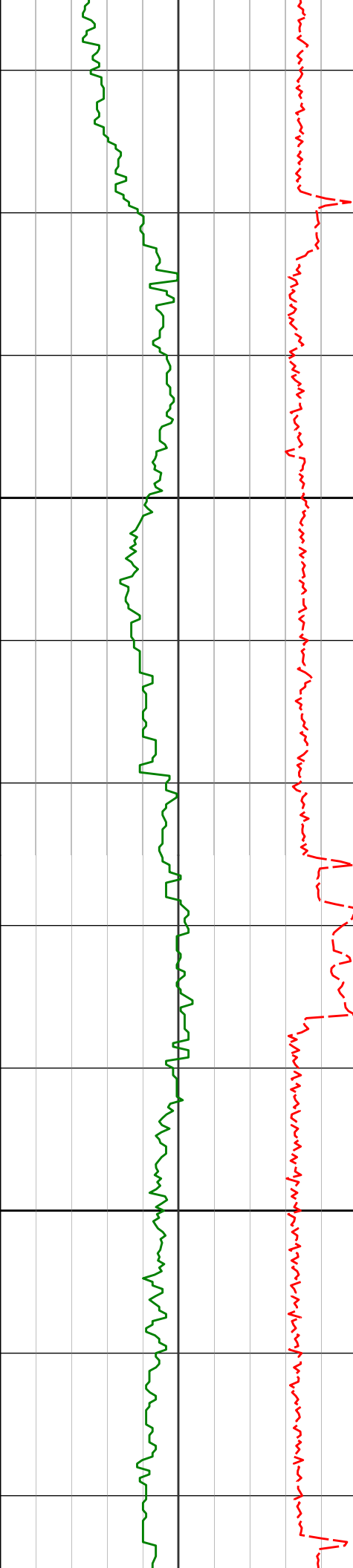
4553.57'

11288'

90.59°

269.75° 6671.27'

4648.47'



11400

11500

11383'

91.85°

269.82° 6669.24'

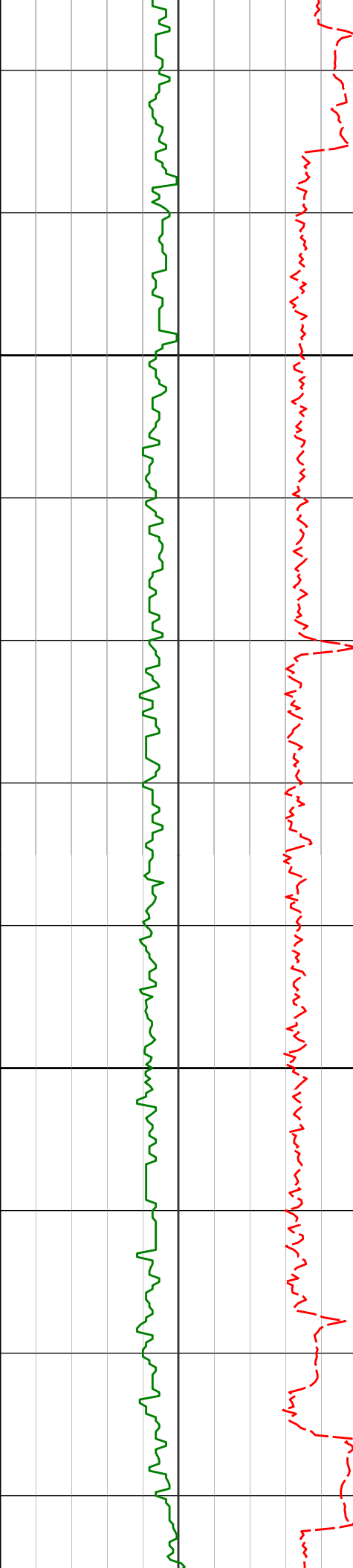
4743.33'

11477'

90.96°

269.73° 6666.94'

4837.19'



11600

11700

11572'

89.51°

267.87° 6666.55'

4932.13'

11667'

89.32°

266.61° 6667.52'

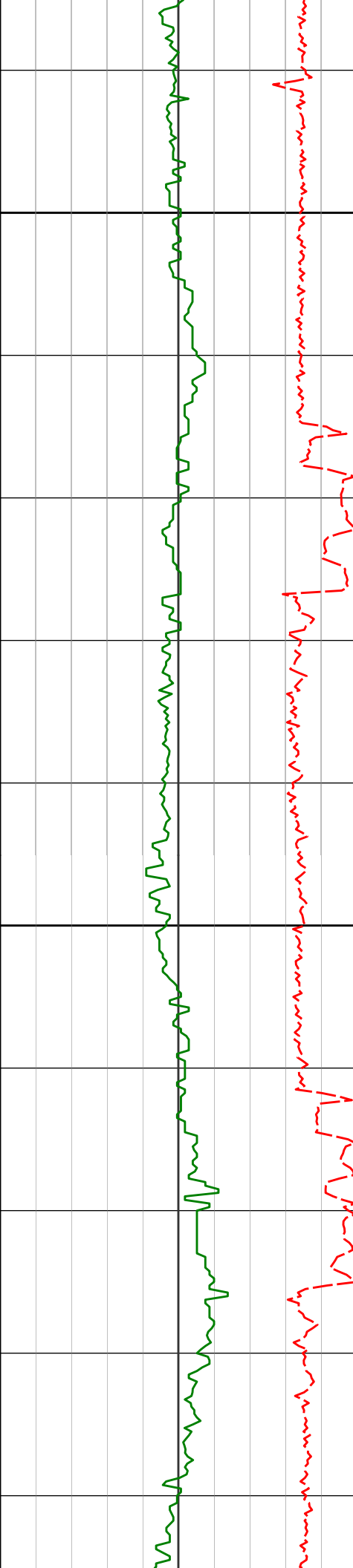
5027.13'

11761'

90.00°

265.87° 6668.08'

5121.12'



11800

11856'

90.83°

266.82° 6667.39'

5216.11'

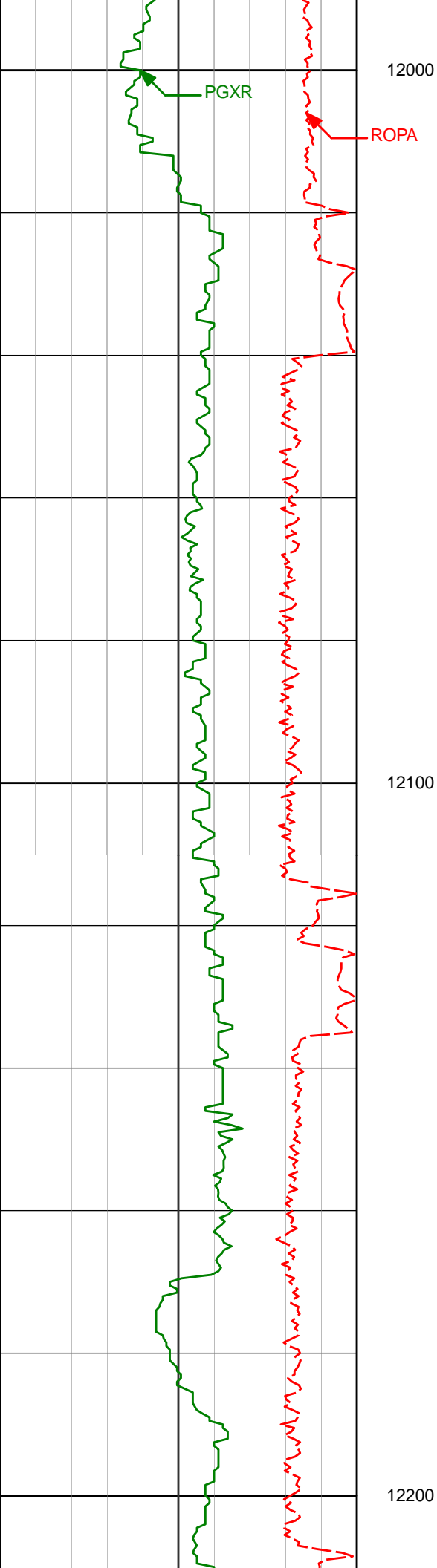
11900

11951'

91.69°

267.96° 6665.30'

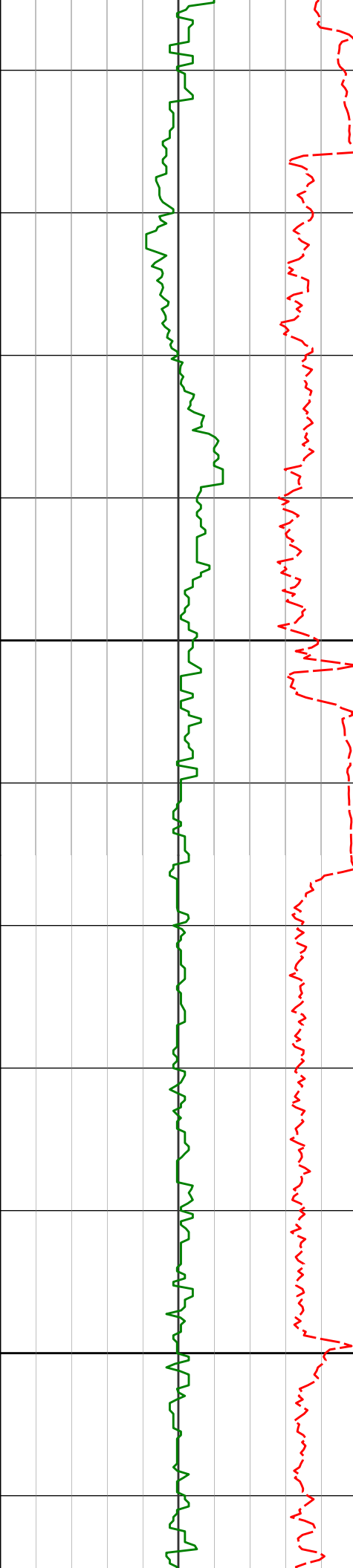
5311.08'



12045' 90.74° 268.03° 6663.31' 5405.04'

12140' 91.57° 268.22° 6661.39' 5500.00'

12200



12300

12400

12234'

90.71°

268.92° 6659.52'

5593.94'

12329'

89.14°

268.36° 6659.65'

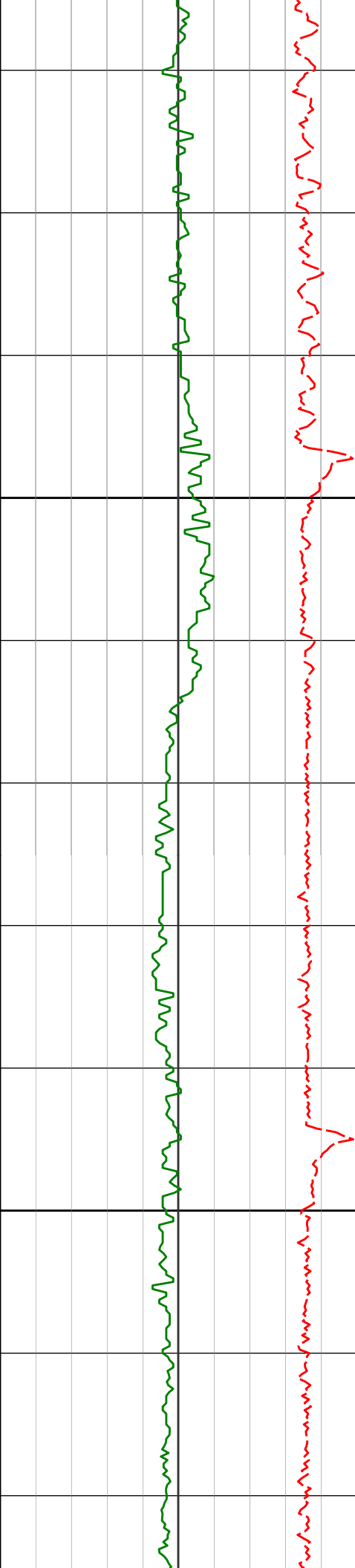
5688.90'

12424'

89.48°

268.64° 6660.79'

5783.85'



12500

12518'

89.54°

268.40° 6661.59'

5877.82'

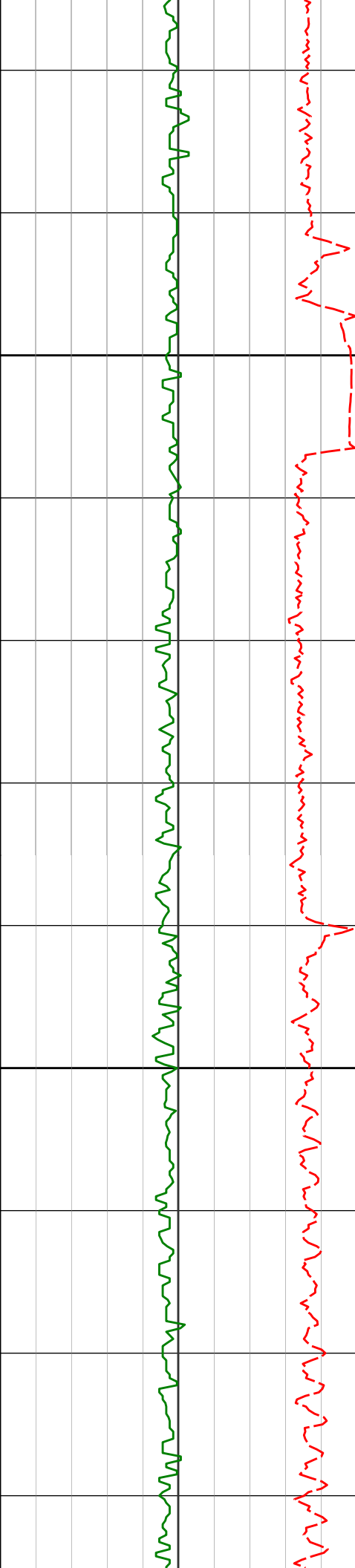
12600

12613'

89.97°

267.83° 6662.00'

5972.80'



12700

12708'

89.17°

269.86° 6662.71'

6067.73'

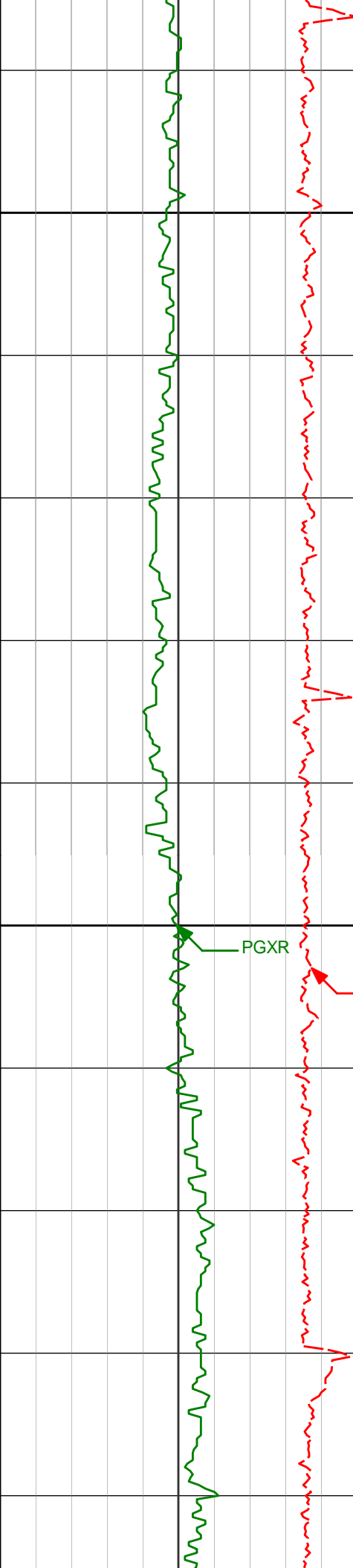
12800

12802'

89.35°

270.49° 6663.93'

6161.58'



12900

13000

12897'

89.54°

270.22° 6664.85'

6256.41'

12991'

89.78°

269.56° 6665.40'

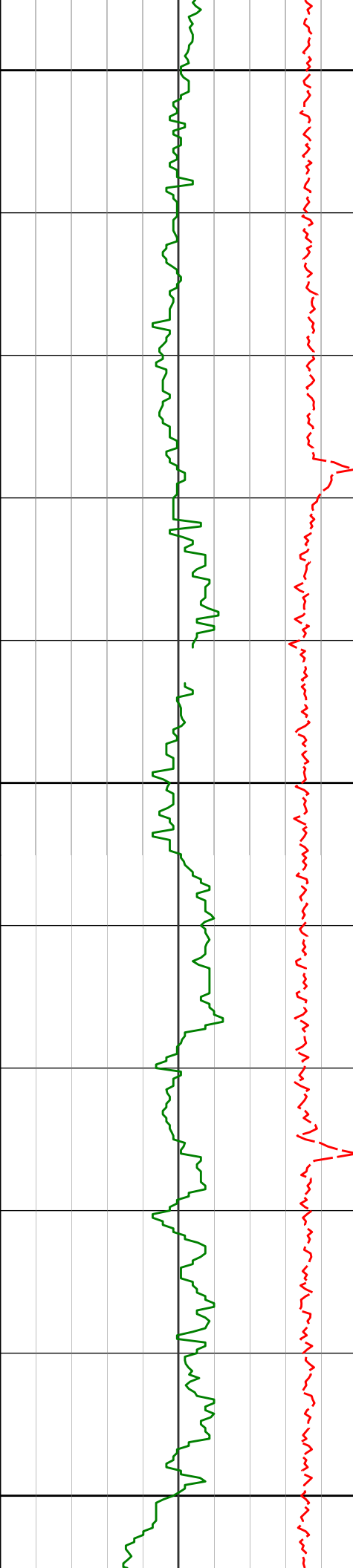
6350.28'

13086'

90.03°

269.97° 6665.56'

6445.16'



13100

13180'

90.37°

269.96° 6665.23'

6539.03'

13200

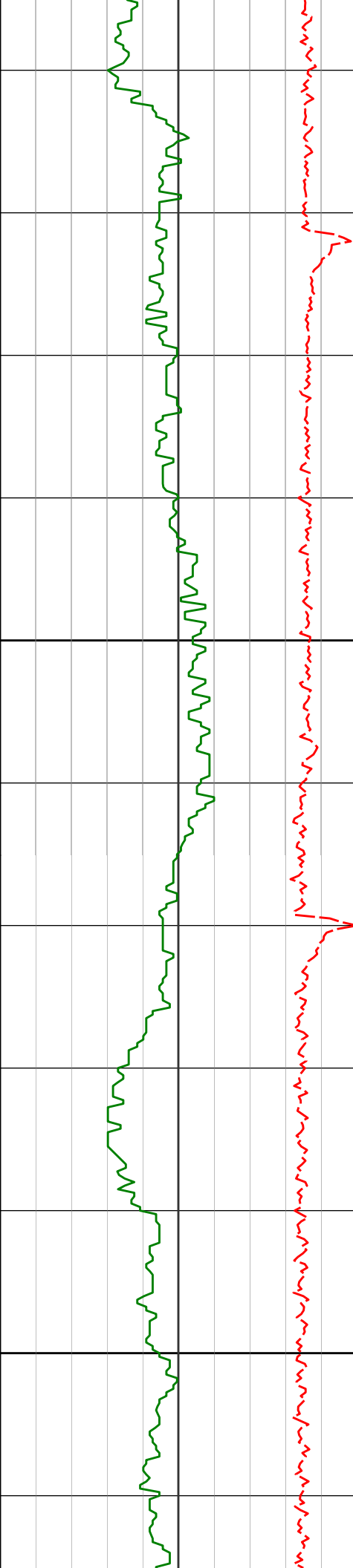
13275'

89.97°

269.35° 6664.95'

6633.93'

13300



13370'

89.63°

269.07° 6665.28'

6728.85'

13400

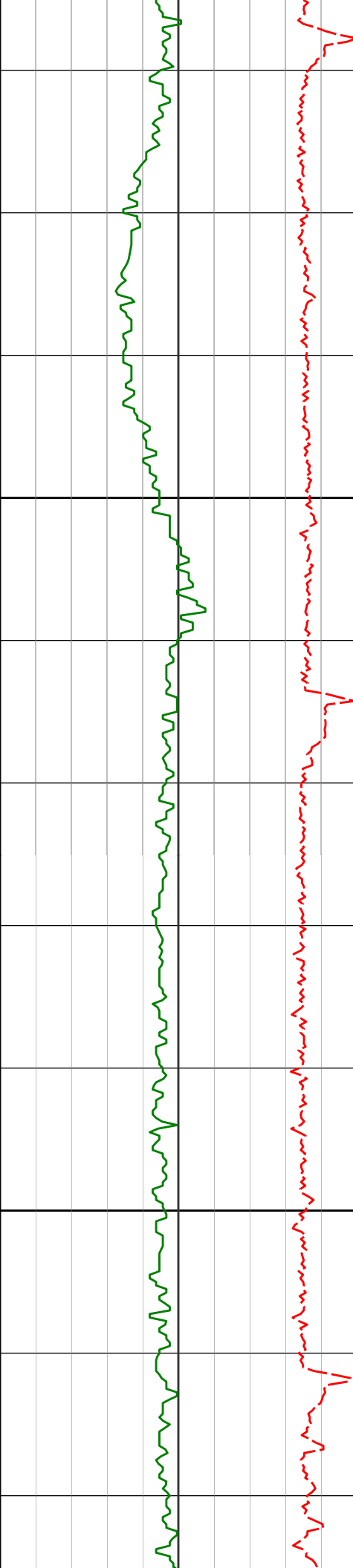
13464'

89.66°

268.78° 6665.87'

6822.79'

13500



13600

13700

13559'

89.54°

267.97° 6666.53'

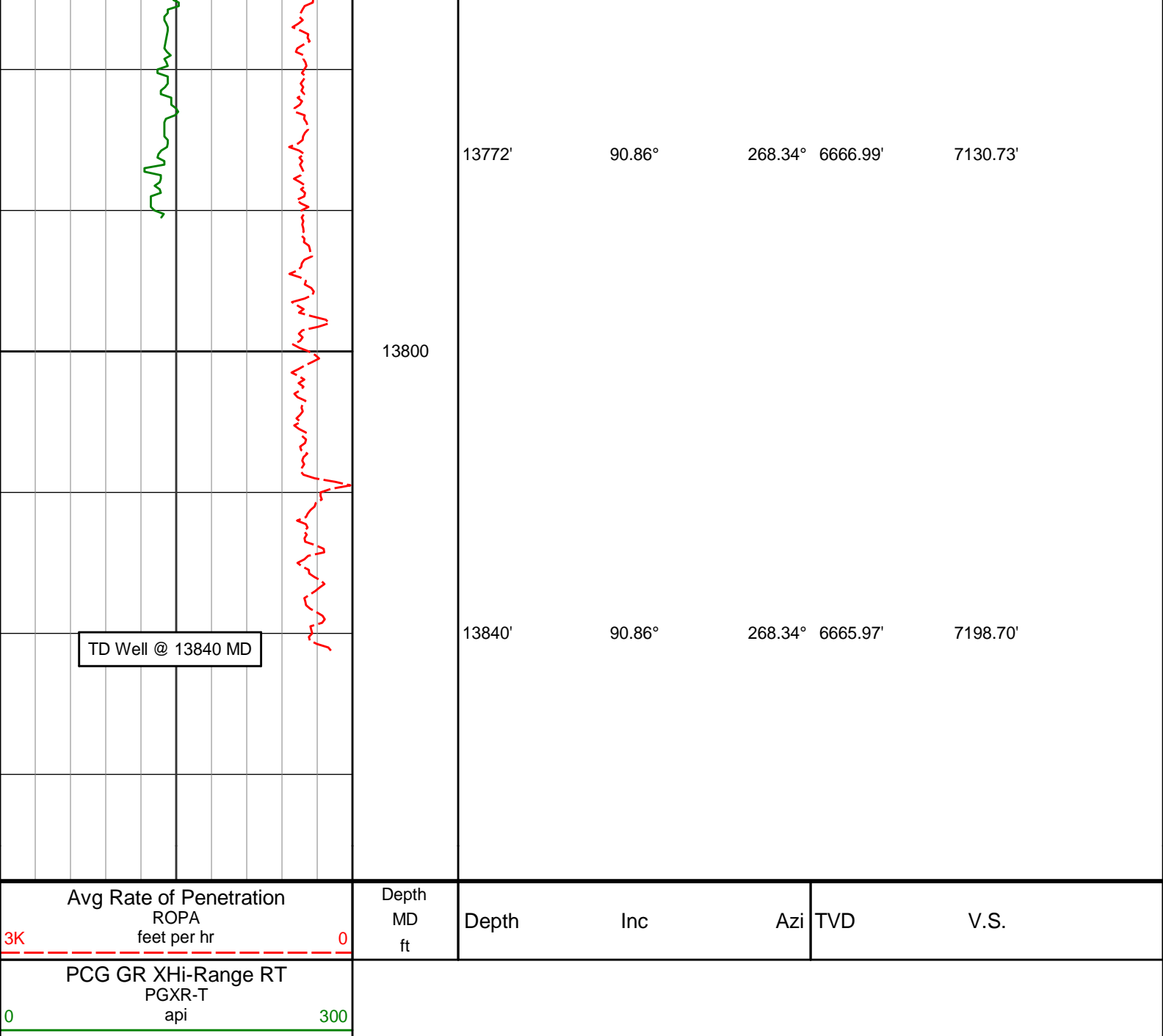
6917.76'

13654'

89.48°

267.44° 6667.34'

7012.75'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Well Ranch AA11-615
Wells Ranch
Weld Colorado
USA
CA-XX-0902255388

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
638.00	0.18	286.61	638.00	0.29 N	0.99 W	0.97	0.03
733.00	0.22	316.24	733.00	0.47 N	1.26 W	1.23	0.12
828.00	0.58	313.19	828.00	0.94 N	1.74 W	1.69	0.38
922.00	0.56	298.87	921.99	1.48 N	2.49 W	2.41	0.15
1017.00	0.59	303.33	1016.99	1.98 N	3.31 W	3.20	0.06

1111.00	0.66	317.57	1110.98	2.64 N	4.08 W	3.93	0.18
1204.00	0.50	334.77	1203.98	3.41 N	4.61 W	4.42	0.25
1296.00	0.38	311.62	1295.97	3.97 N	5.01 W	4.79	0.23
1390.00	0.29	313.03	1389.97	4.34 N	5.42 W	5.18	0.09
1483.00	0.35	299.92	1482.97	4.65 N	5.84 W	5.58	0.10
1575.00	2.71	188.15	1574.94	2.63 N	6.39 W	6.24	3.11
1668.00	5.58	161.41	1667.69	3.84 S	5.26 W	5.46	3.64
1760.00	6.71	144.44	1759.17	12.45 S	0.71 W	1.37	2.31
1853.00	7.56	140.45	1851.45	21.59 S	6.34 E	-5.19	1.06
1946.00	8.63	133.17	1943.52	31.08 S	15.33 E	-13.65	1.60
2039.00	7.67	129.17	2035.58	39.77 S	25.23 E	-23.08	1.21
2131.00	9.07	129.56	2126.60	48.27 S	35.58 E	-32.96	1.53
2222.00	10.11	130.67	2216.33	58.04 S	47.16 E	-44.01	1.16
2314.00	9.79	124.50	2306.95	67.73 S	59.73 E	-56.05	1.21
2407.00	9.12	118.79	2398.69	75.76 S	72.72 E	-68.58	1.24
2500.00	8.54	123.18	2490.58	83.09 S	84.95 E	-80.41	0.96
2593.00	7.98	119.98	2582.62	90.10 S	96.32 E	-91.39	0.78
2686.00	8.71	138.74	2674.65	98.62 S	106.56 E	-101.16	3.02
2778.00	8.81	145.26	2765.58	109.64 S	115.17 E	-109.17	1.09
2870.00	8.67	140.00	2856.51	120.75 S	123.64 E	-117.04	0.88
2965.00	9.03	153.44	2950.39	132.90 S	131.58 E	-124.32	2.20
3060.00	9.46	151.65	3044.16	146.44 S	138.62 E	-130.63	0.54
3155.00	8.85	148.08	3137.95	159.51 S	146.19 E	-137.50	0.87
3249.00	8.26	141.63	3230.90	170.94 S	154.21 E	-144.89	1.20
3344.00	9.75	145.65	3324.73	182.93 S	162.98 E	-153.02	1.70
3438.00	8.64	135.88	3417.53	194.57 S	172.38 E	-161.79	2.03
3533.00	8.26	129.69	3511.50	204.05 S	182.60 E	-171.48	1.04
3628.00	9.23	141.52	3605.40	214.37 S	192.59 E	-180.91	2.14
3722.00	10.45	141.93	3698.02	226.98 S	202.54 E	-190.17	1.30
3817.00	10.85	157.65	3791.40	242.03 S	211.25 E	-198.07	3.08
3911.00	11.61	159.12	3883.60	259.05 S	217.99 E	-203.89	0.86
4006.00	10.43	158.30	3976.85	275.98 S	224.57 E	-209.57	1.25
4101.00	7.25	159.08	4070.71	289.57 S	229.89 E	-214.16	3.35
4195.00	7.06	144.74	4163.98	299.83 S	235.34 E	-219.06	1.91
4290.00	5.15	120.57	4258.46	306.76 S	242.39 E	-225.72	3.33
4354.00	3.50	123.22	4322.27	309.29 S	246.50 E	-229.69	2.59
4478.00	1.91	89.13	4446.14	311.34 S	251.74 E	-234.81	1.77
4573.00	2.36	357.72	4541.09	309.36 S	253.24 E	-236.42	3.23
4668.00	2.74	331.33	4636.00	305.42 S	252.08 E	-235.47	1.29
4763.00	2.41	312.72	4730.91	302.07 S	249.52 E	-233.10	0.94
4857.00	2.45	309.60	4824.82	299.45 S	246.53 E	-230.24	0.15
4952.00	2.75	301.07	4919.73	296.98 S	243.01 E	-226.86	0.52
5047.00	3.17	289.22	5014.60	294.94 S	238.57 E	-222.54	0.78
5141.00	1.17	268.61	5108.53	294.11 S	235.16 E	-219.18	2.25
5236.00	0.45	177.97	5203.52	294.50 S	234.21 E	-218.21	1.32
5330.00	0.89	141.09	5297.52	295.44 S	234.68 E	-218.63	0.64
5425.00	0.90	120.18	5392.50	296.40 S	235.79 E	-219.69	0.34
5520.00	1.05	126.11	5487.49	297.28 S	237.14 E	-220.99	0.19
5614.00	1.07	122.40	5581.47	298.26 S	238.58 E	-222.37	0.08
5709.00	1.39	200.08	5676.46	299.83 S	238.93 E	-222.64	1.65
5803.00	1.55	185.22	5770.43	302.17 S	238.42 E	-222.01	0.44
5898.00	1.67	171.72	5865.39	304.82 S	238.51 E	-221.95	0.42
5992.00	1.66	163.25	5959.35	307.49 S	239.10 E	-222.40	0.26
6087.00	7.42	244.07	6054.06	311.50 S	233.97 E	-217.07	7.72
6182.00	13.07	256.13	6147.52	316.76 S	218.01 E	-200.85	6.33
6276.00	18.84	261.17	6237.86	321.64 S	192.68 E	-175.29	6.30
6371.00	26.96	265.16	6325.31	325.82 S	156.00 E	-138.44	8.70
6466.00	35.62	267.35	6406.42	328.92 S	106.81 E	-89.16	9.20
6560.00	47.53	268.97	6476.61	330.81 S	44.58 E	-26.91	12.72
6655.00	57.77	274.65	6534.19	328.17 S	30.75 W	48.16	11.77
6750.00	64.33	273.00	6580.15	322.66 S	113.64 W	130.65	7.07
6844.00	70.04	270.03	6616.59	320.42 S	200.21 W	216.98	6.74
6939.00	77.87	267.44	6642.84	322.48 S	291.41 W	308.15	8.65
6965.00	81.65	267.70	6647.46	323.56 S	316.97 W	333.73	14.57
7069.00	85.19	270.85	6659.38	324.86 S	420.24 W	436.93	4.54
7164.00	86.45	268.90	6666.30	325.06 S	514.98 W	531.55	2.44
7258.00	88.83	269.96	6670.17	326.00 S	608.89 W	625.37	2.77
7353.00	89.66	269.77	6671.42	326.22 S	703.88 W	720.24	0.90
7447.00	90.99	269.53	6670.89	326.80 S	797.88 W	814.13	1.44
7542.00	91.48	269.89	6668.84	327.28 S	892.85 W	909.00	0.64
7636.00	89.85	270.70	6667.75	326.79 S	986.84 W	1002.83	1.94
7731.00	90.59	270.84	6667.39	325.52 S	1081.83 W	1097.62	0.79
7825.00	90.40	271.57	6666.57	323.54 S	1175.81 W	1191.36	0.80
7918.00	89.75	271.45	6666.45	321.09 S	1268.77 W	1284.06	0.71
8011.00	89.75	271.27	6666.86	318.88 S	1261.75 W	1276.78	0.10

8011.00	89.75	271.27	6666.86	318.88 S	1361.75 W	1376.78	0.19
8104.00	91.36	272.77	6665.96	315.60 S	1454.68 W	1469.41	2.37
8197.00	89.38	268.94	6665.36	314.22 S	1547.64 W	1562.17	4.64
8289.00	89.60	269.17	6666.18	315.73 S	1639.63 W	1654.11	0.35
8382.00	89.72	268.48	6666.73	317.64 S	1732.61 W	1747.05	0.75
8474.00	90.12	269.16	6666.86	319.54 S	1824.59 W	1839.00	0.86
8567.00	89.63	269.14	6667.06	320.92 S	1917.58 W	1931.93	0.53
8660.00	90.40	269.01	6667.03	322.42 S	2010.56 W	2024.87	0.84
8753.00	90.49	268.32	6666.31	324.58 S	2103.53 W	2117.82	0.75
8845.00	89.91	268.65	6665.99	327.02 S	2195.50 W	2209.79	0.73
8936.00	90.80	268.82	6665.43	329.03 S	2286.48 W	2300.74	1.00
9028.00	89.32	269.12	6665.33	330.68 S	2378.46 W	2392.68	1.64
9121.00	89.85	268.67	6666.00	332.47 S	2471.44 W	2485.63	0.75
9214.00	90.46	268.52	6665.75	334.75 S	2564.41 W	2578.59	0.68
9307.00	92.37	270.42	6663.46	335.61 S	2657.37 W	2671.46	2.90
9400.00	91.79	270.83	6660.08	334.60 S	2750.30 W	2764.21	0.76
9492.00	90.62	269.90	6658.15	334.01 S	2842.28 W	2856.02	1.62
9584.00	89.88	269.74	6657.75	334.30 S	2934.27 W	2947.91	0.82
9679.00	89.94	268.99	6657.89	335.36 S	3029.27 W	3042.82	0.79
9774.00	88.00	268.37	6659.60	337.54 S	3124.22 W	3137.76	2.14
9868.00	88.34	268.29	6662.60	340.28 S	3218.13 W	3231.68	0.37
9963.00	88.06	267.63	6665.59	343.66 S	3313.03 W	3326.62	0.75
10057.00	87.84	267.75	6668.95	347.45 S	3406.89 W	3420.55	0.27
10152.00	88.24	270.80	6672.20	348.65 S	3501.82 W	3515.41	3.24
10247.00	89.48	271.60	6674.09	346.66 S	3596.77 W	3610.12	1.55
10341.00	89.57	271.10	6674.87	344.45 S	3690.74 W	3703.84	0.54
10436.00	89.78	271.90	6675.41	341.96 S	3785.71 W	3798.54	0.87
10531.00	90.12	272.08	6675.49	338.66 S	3880.65 W	3893.17	0.40
10626.00	89.35	272.48	6675.93	334.88 S	3975.57 W	3987.76	0.91
10720.00	90.22	271.21	6676.28	331.86 S	4069.52 W	4081.41	1.64
10815.00	89.51	268.86	6676.51	331.80 S	4164.51 W	4176.27	2.58
10909.00	89.69	270.59	6677.16	332.25 S	4258.51 W	4270.15	1.85
11004.00	91.11	271.01	6676.50	330.92 S	4353.49 W	4364.93	1.56
11099.00	91.36	270.35	6674.45	329.79 S	4448.46 W	4459.71	0.74
11193.00	90.96	269.19	6672.55	330.17 S	4542.44 W	4553.57	1.31
11288.00	90.59	269.75	6671.27	331.05 S	4637.43 W	4648.47	0.71
11383.00	91.85	269.82	6669.24	331.41 S	4732.40 W	4743.33	1.33
11477.00	90.96	269.73	6666.94	331.78 S	4826.37 W	4837.19	0.95
11572.00	89.51	267.87	6666.55	333.77 S	4921.35 W	4932.13	2.48
11667.00	89.32	266.61	6667.52	338.34 S	5016.23 W	5027.13	1.34
11761.00	90.00	265.87	6668.08	344.50 S	5110.02 W	5121.12	1.07
11856.00	90.83	266.82	6667.39	350.56 S	5204.83 W	5216.11	1.33
11951.00	91.69	267.96	6665.30	354.89 S	5299.70 W	5311.08	1.50
12045.00	90.74	268.03	6663.31	358.17 S	5393.62 W	5405.04	1.01
12140.00	91.57	268.22	6661.39	361.28 S	5488.55 W	5500.00	0.90
12234.00	90.71	268.92	6659.52	363.63 S	5582.50 W	5593.94	1.18
12329.00	89.14	268.36	6659.65	365.88 S	5677.47 W	5688.90	1.75
12424.00	89.48	268.64	6660.79	368.37 S	5772.43 W	5783.85	0.46
12518.00	89.54	268.40	6661.59	370.80 S	5866.40 W	5877.82	0.26
12613.00	89.97	267.83	6662.00	373.92 S	5961.34 W	5972.80	0.75
12708.00	89.17	269.86	6662.71	375.84 S	6056.32 W	6067.73	2.30
12802.00	89.35	270.49	6663.93	375.55 S	6150.31 W	6161.58	0.70
12897.00	89.54	270.22	6664.85	374.96 S	6245.30 W	6256.41	0.35
12991.00	89.78	269.56	6665.40	375.14 S	6339.30 W	6350.28	0.75
13086.00	90.03	269.97	6665.56	375.53 S	6434.30 W	6445.16	0.51
13180.00	90.37	269.96	6665.23	375.59 S	6528.30 W	6539.03	0.36
13275.00	89.97	269.35	6664.95	376.16 S	6623.29 W	6633.93	0.77
13370.00	89.63	269.07	6665.28	377.47 S	6718.28 W	6728.85	0.46
13464.00	89.66	268.78	6665.87	379.23 S	6812.27 W	6822.79	0.31
13559.00	89.54	267.97	6666.53	381.93 S	6907.22 W	6917.76	0.86
13654.00	89.48	267.44	6667.34	385.73 S	7002.14 W	7012.75	0.56
13772.00	90.86	268.34	6666.99	390.08 S	7120.06 W	7130.73	1.40
13840.00	90.86	268.34	6665.97	392.05 S	7188.02 W	7198.70	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 266.95 DEGREES (GRID)
A TOTAL CORRECTION OF 7.38 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.

HORIZONTAL DISPLACEMENT(CLOSURE) AT 13840.00 FEET
IS 7198.71 FEET ALONG 266.88 DEGREES (GRID)

Final survey is a straight line projection to TD.

Date Printed:03 June 2015