



WELL INFORMATION					
MWD Run Number	100	200	300		
Date run completed	03-Apr-15	04-Apr-15	08-Apr-15		
Rig Bit Number	0100	0200	0300		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.750		
Log Start Depth (MD, ft)	926.00	6,358.00	7,081.00		
Log End Depth (MD, ft)	6,358.00	7,081.00	16,273.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	02-Apr-15 12:15	03-Apr-15 16:30	05-Apr-15 08:00		
Drill/Wipe End Date and Time	03-Apr-15 09:00	04-Apr-15 01:30	08-Apr-15 03:30		
Min Inc (deg) @ Depth (MD, ft)	0.37 @ 5,725.00	21.58 @ 6,388.00	84.91 @ 7,094.00		
Max Inc (deg) @ Depth (MD, ft)	17.26 @ 6,357.00	82.93 @ 7,017.00	93.02 @ 7,664.00		
Bit TFA(in2) / Bit Type	1.21 / PDC	1.21 / PDC	0.98 / PDC		
Flow Rate (gpm)	586.55	581.60	320.07		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Native/Spud Mud	Native/Spud Mud	Other		
Density (ppg) / Viscosity (spqt)	10.45 / 38.00	10.40 / 34.00	9.79 / 36.00		
Filtrate CL (ppm)	2,700.00	2,900.00	2,700.00		
pH / Fluid Loss (mptm)	9.00 / 6	9.50 / 0	10.70 / 5		
PV (cP) / YP (lbf2)	13 / 12.00	7 / 7.00	10 / 11.00		
% Solids / % Sand	2.6 / 0.15	4.1 / .15	7.7 / 0.15		
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A		
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		
Min Tool Temp (deg F) / S	152.10 / RPM	170.07 / RPM	251.40 / RPM		

Max Tool Temp (degF) / Source	156.13 / PCM	170.37 / PCM	251.40 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 156.13	N/A @ 170.37	N/A @ 251.40		
Lead MWD Engineer	Cody Wurdeman	Cody Wurdeman	Brian Neu		
Customer Representative	JW Irvin	JW Irvin	JW Irvin		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	0	11404272	12310753		
Insert Serial Number	11680801	11227547	11227547		
Date and Time Initialized	01-Apr-15 19:30	03-Apr-15 11:27	04-Apr-15 11:39		
Date and Time Read	03-Apr-15 12:28	04-Apr-15 06:20	08-Apr-15 16:18		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	64.00	64.00	67.00		
Software Version	6.33	6.33	6.33		
Sub Serial Number	11404272	11404272	12310753		
Sonde Serial Number	11297623	11833216	11833216		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	74.65	279.17	221.76		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	57.76	57.09	60.38		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11404272	11404272	12310753		
Insert/Sonde Serial Number	11579843	11681002	11681002		

REMARKS

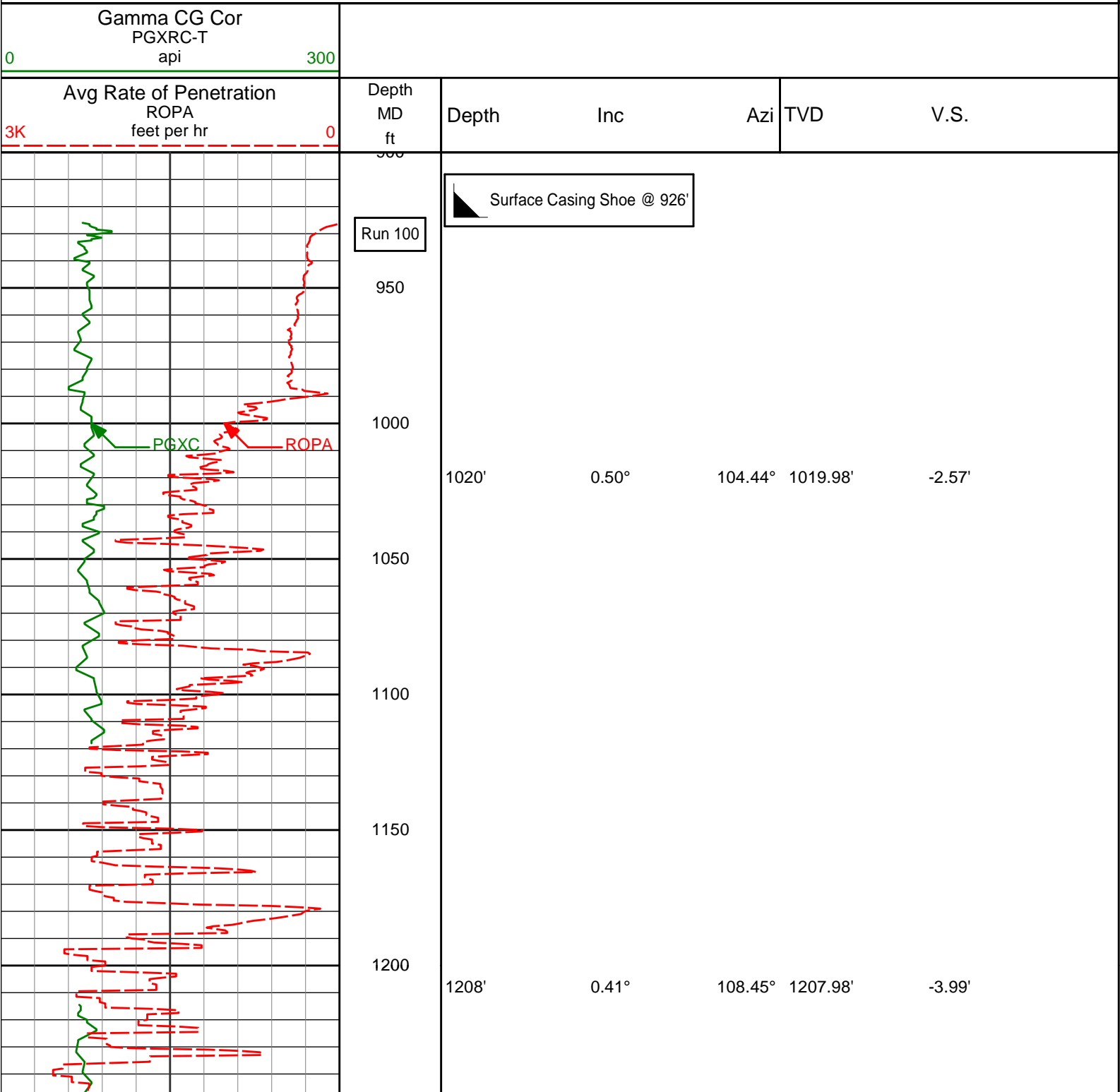
1. All depths are calibrated to driller's pipe tally and are total vertical depth from the drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. Environmental parameters used in gamma and resistance 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)

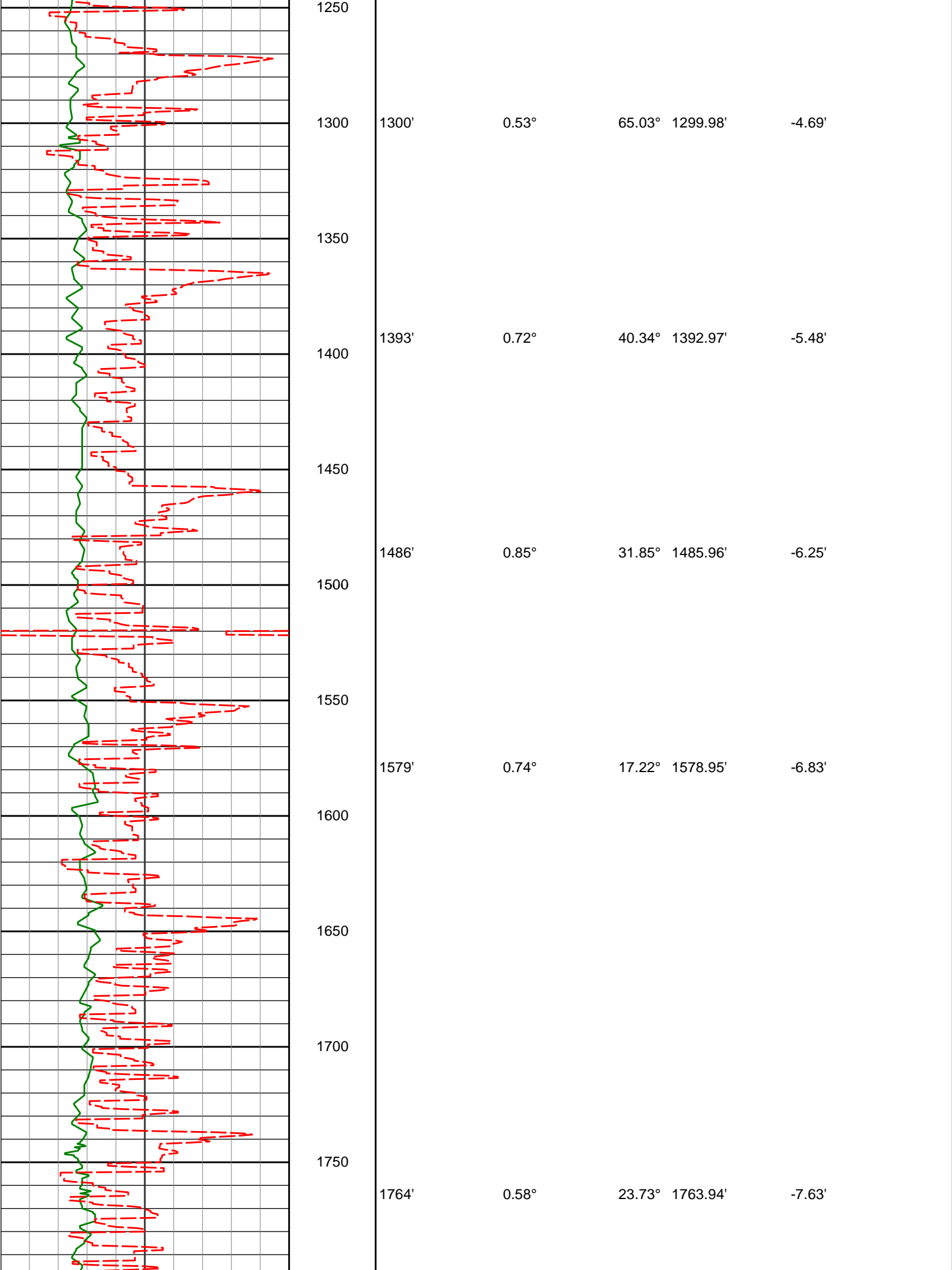
WARRANTY

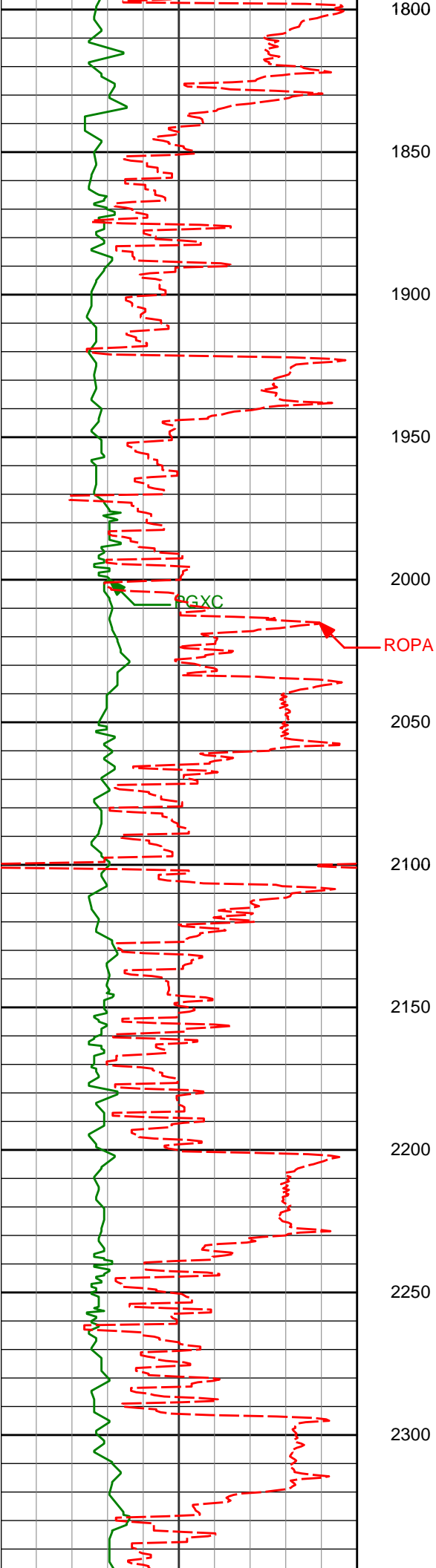
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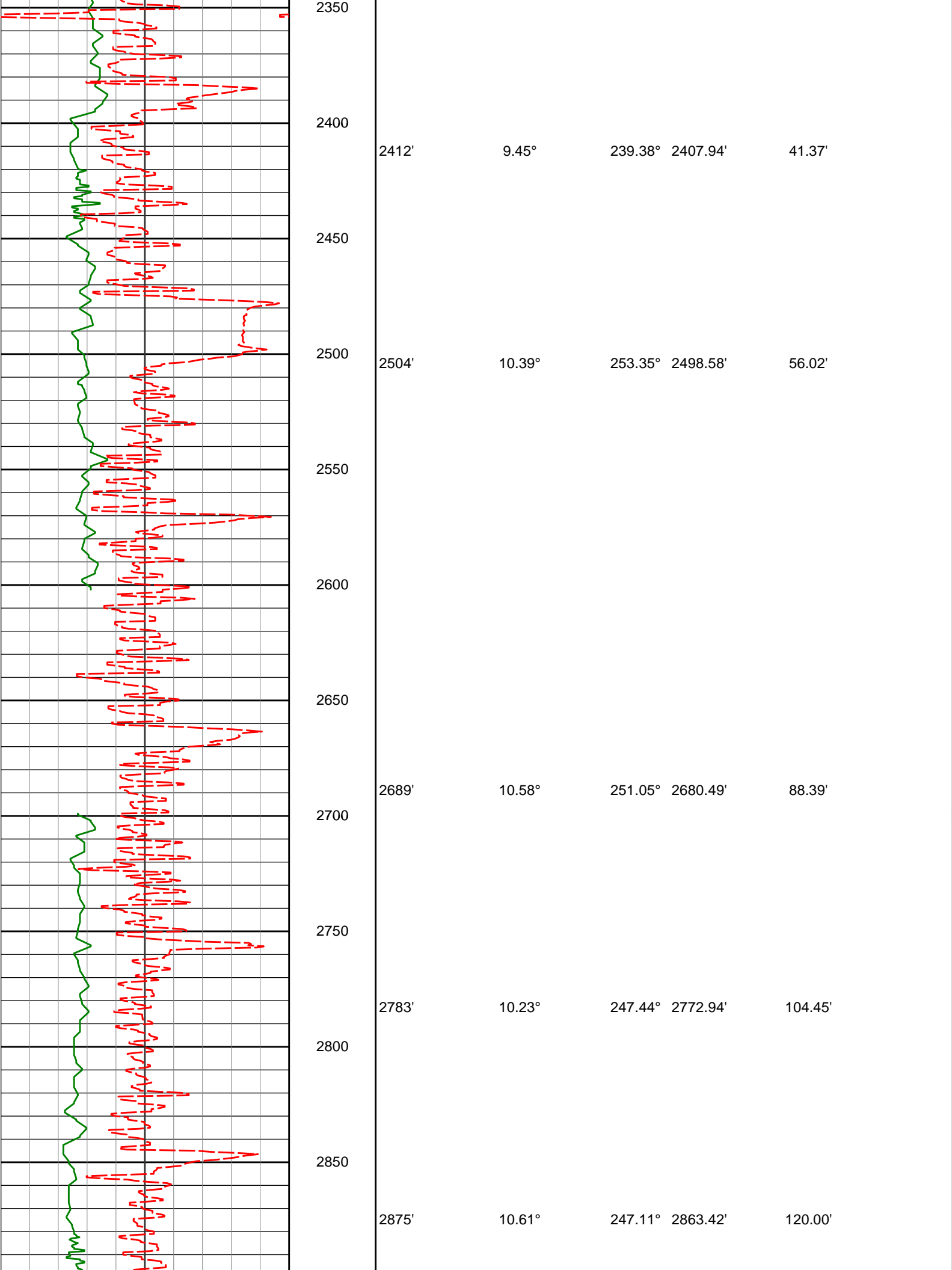
MD Detail 1:600 Scale

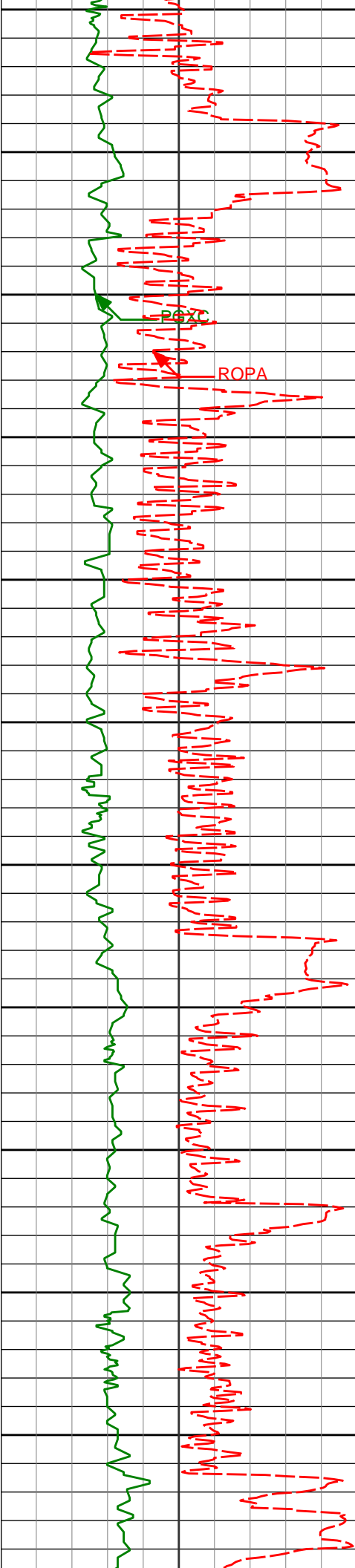






1800				
1850	1857'	2.27°	232.46°	1856.92' -6.33'
1900				
1950	1950'	4.60°	217.37°	1949.75' -2.48'
2000				
2050	2043'	6.00°	213.11°	2042.35' 2.67'
2100				
2150	2136'	5.78°	213.45°	2134.86' 8.17'
2200				
2250	2227'	7.65°	232.71°	2225.24' 15.77'
2300				
	2320'	9.54°	243.39°	2317.20' 27.82'





2900

2950

2970'

10.80°

253.33°

2956.77'

136.78'

3000

PSXC

ROPA

3050

3065'

11.00°

252.21°

3050.06'

154.10'

3100

3150

3160'

10.74°

249.40°

3143.36'

171.20'

3200

3250

3255'

9.12°

259.07°

3236.94'

187.03'

3300

3350

3351'

7.85°

260.35°

3331.88'

201.04'

3400

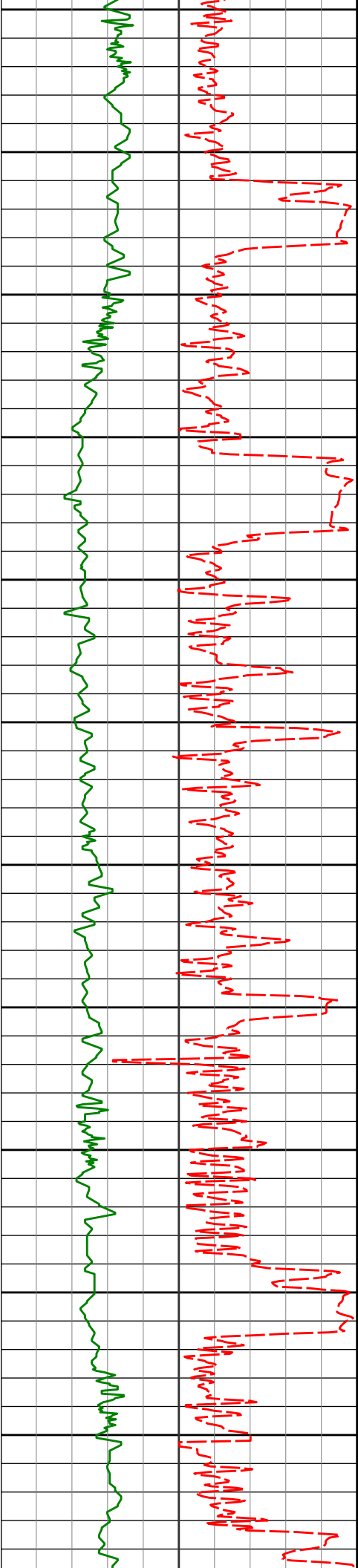
3446'

6.87°

259.09°

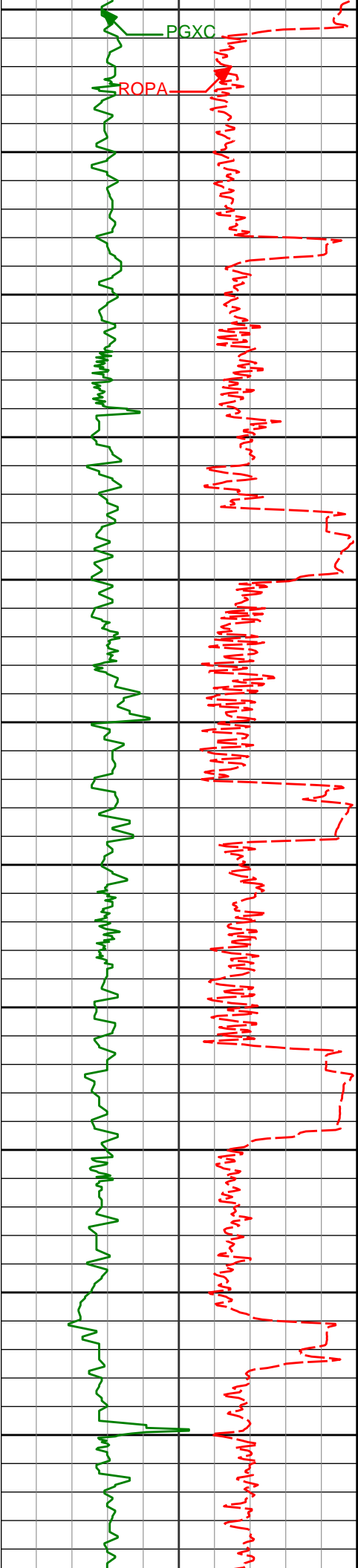
3426.10'

213.08'



3450
3500
3550
3600
3650
3700
3750
3800
3850
3900
3950

3440	6.97°	255.05°	3420.10'	219.00'
3541'	7.65°	254.11°	3520.34'	224.83'
3636'	9.57°	249.63°	3614.27'	238.45'
3731'	10.66°	248.55°	3707.79'	254.23'
3825'	11.27°	248.72°	3800.07'	271.08'
3920'	10.65°	254.80°	3893.34'	288.39'



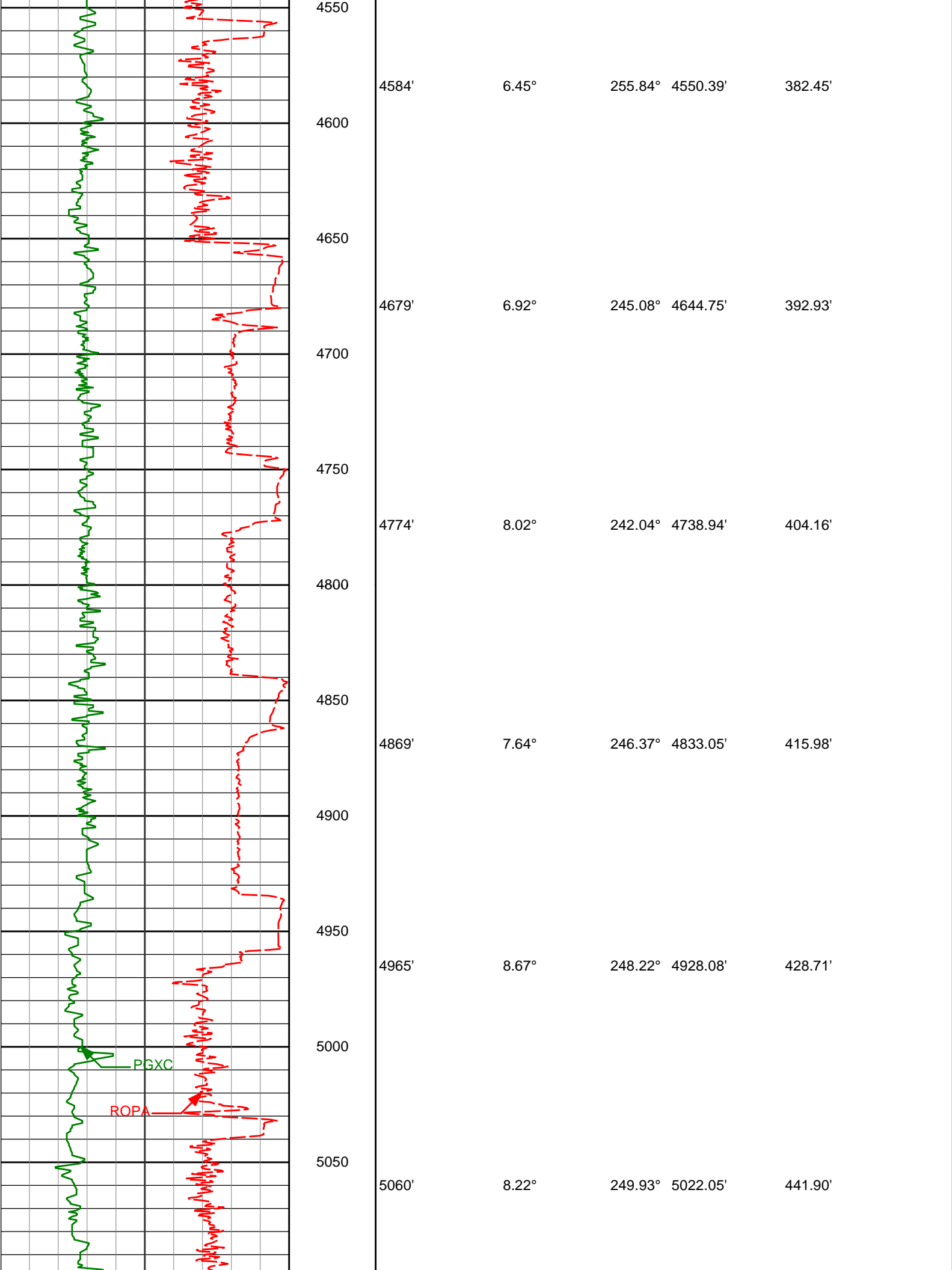
4000
4015'
4050
4100
4110'
4150
4200
4205'
4250
4300
4300'
4350
4395'
4400
4450
4489'
4500

4015'
4110'
4205'
4300'
4395'
4489'

8.43°
7.42°
7.86°
7.95°
9.21°
8.44°

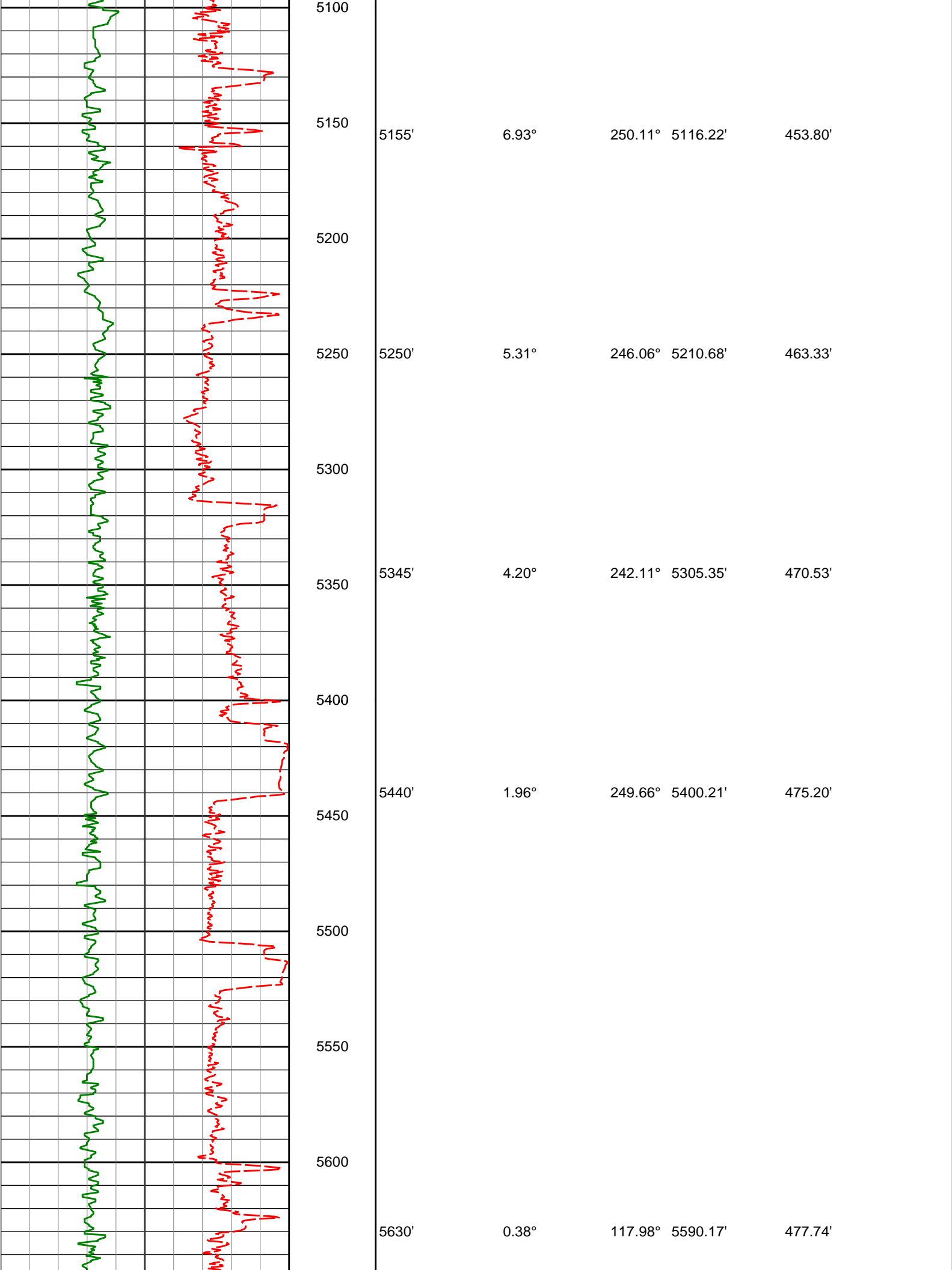
261.39° 3987.02'
263.39° 4081.12'
265.39° 4175.27'
261.68° 4269.37'
254.93° 4363.31'
254.47° 4456.19'

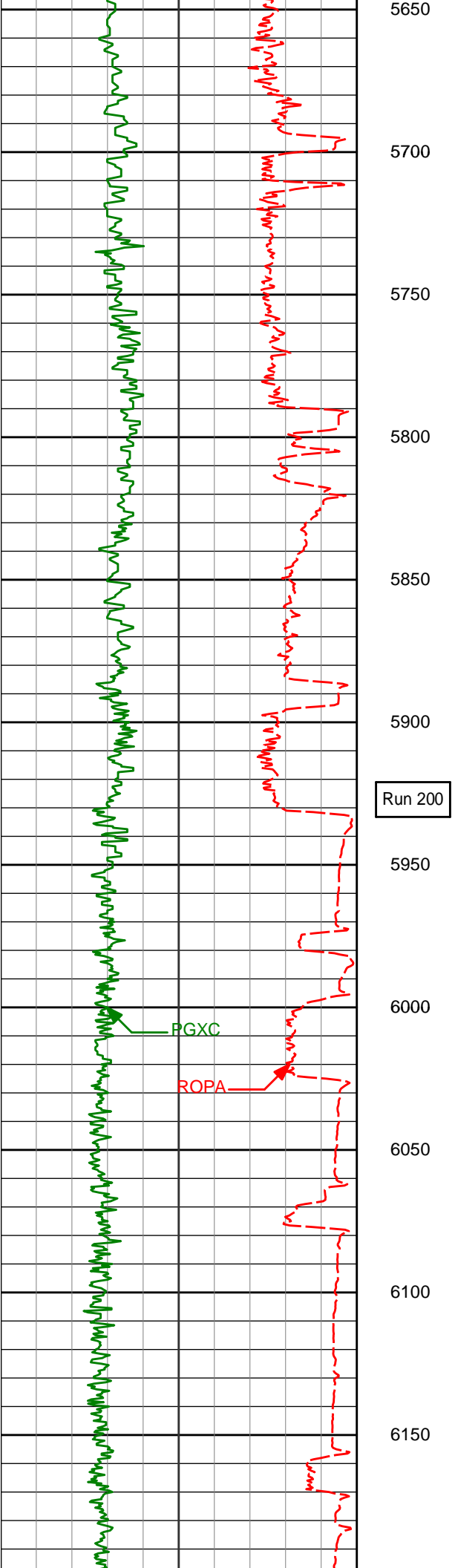
303.85'
316.88'
329.48'
342.50'
356.43'
370.46'



PGXC

ROPA





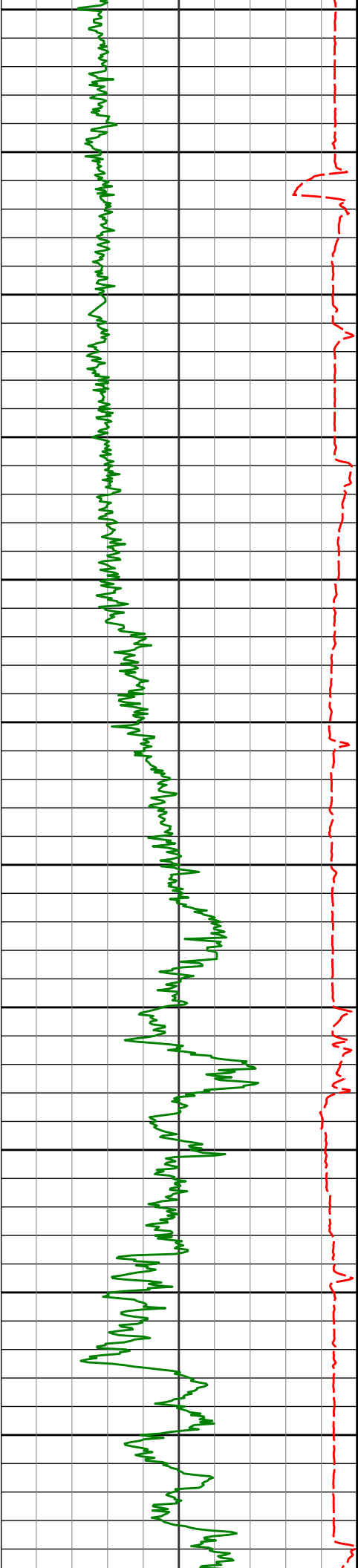
5725'	0.37°	141.23°	5685.17'	477.28'
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5915'	1.39°	132.91°	5875.14'	475.28'
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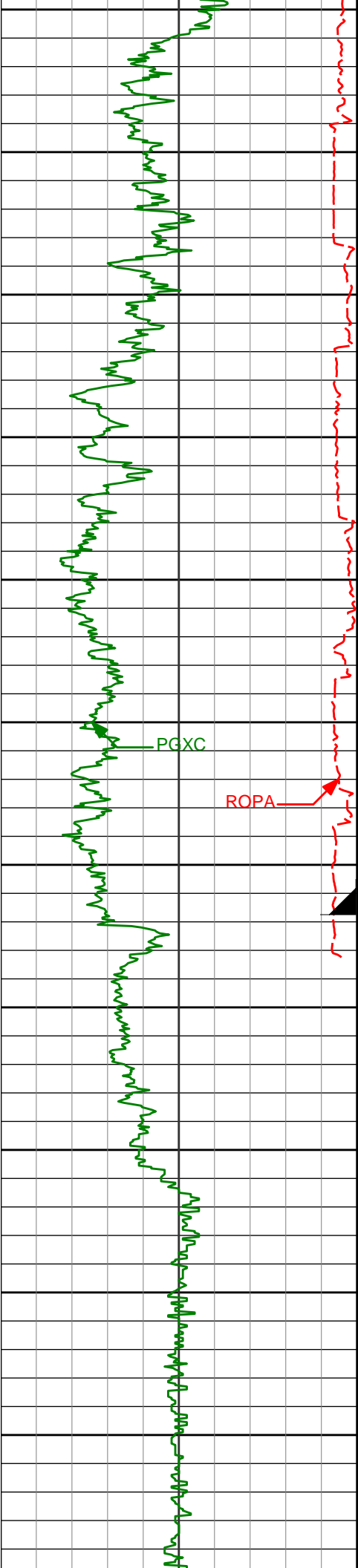
Run 200

6010'	3.64°	252.11°	5970.08'	477.36'
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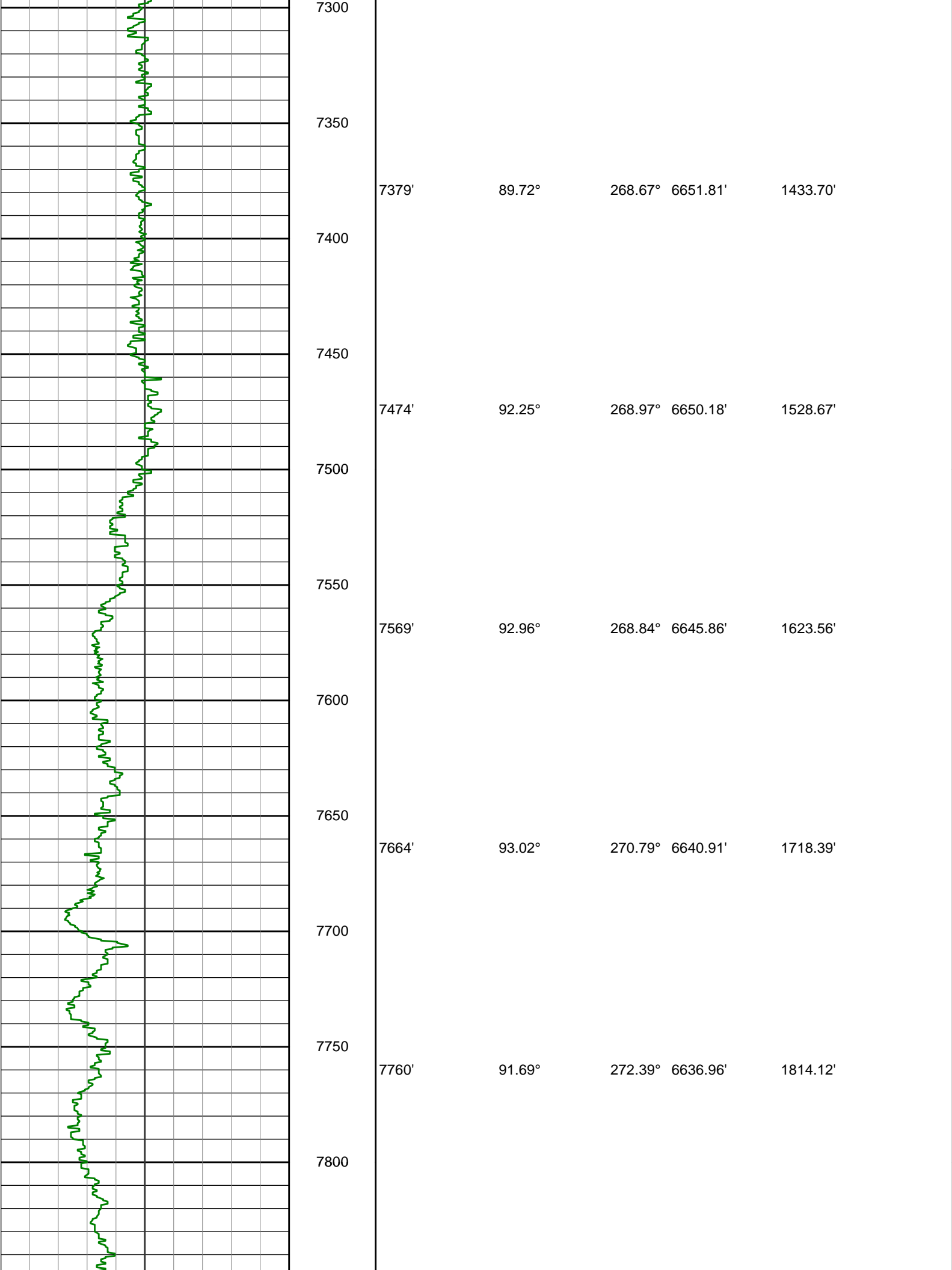
6105'	7.71°	266.02°	6064.60'	486.63'
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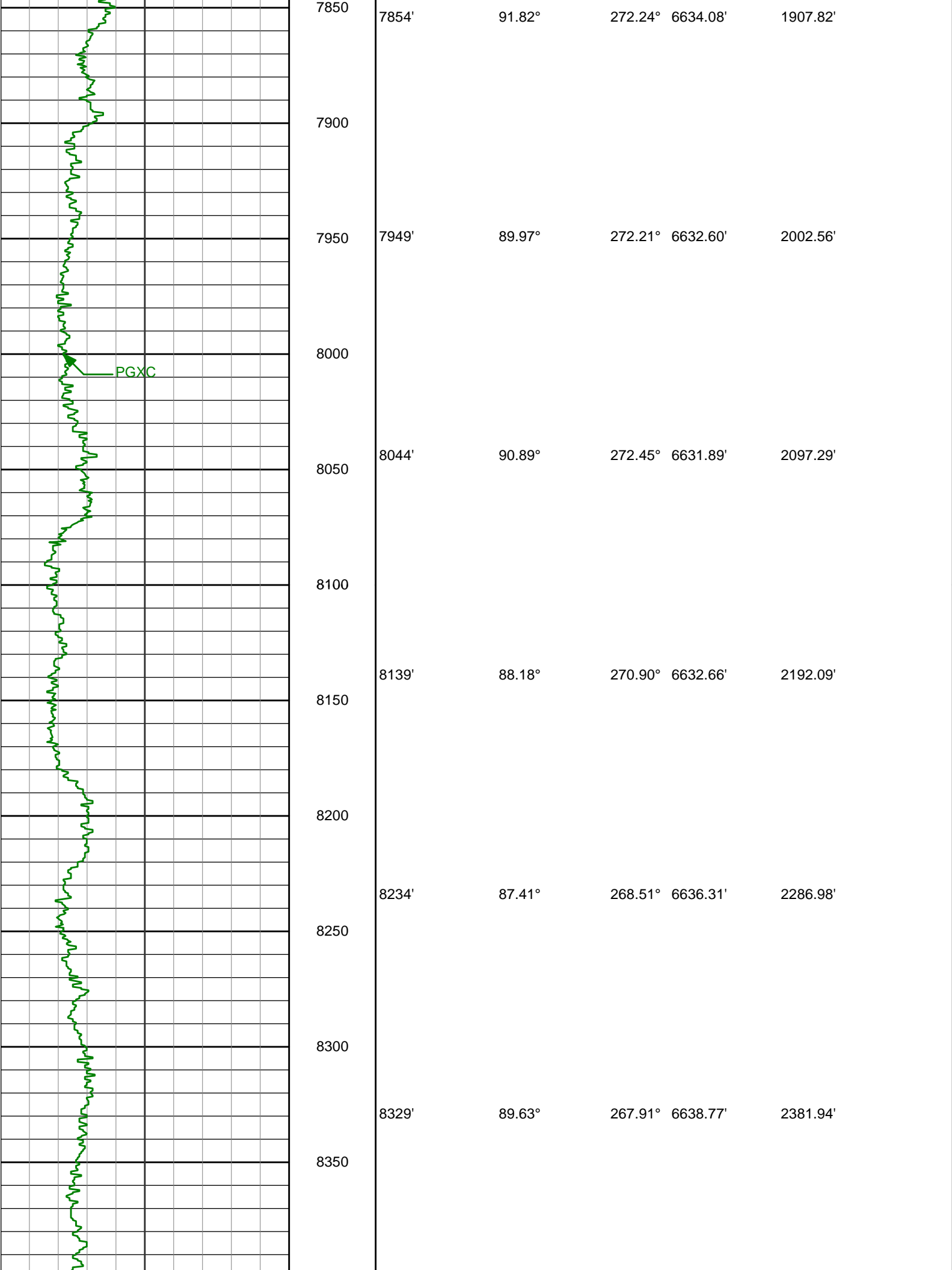


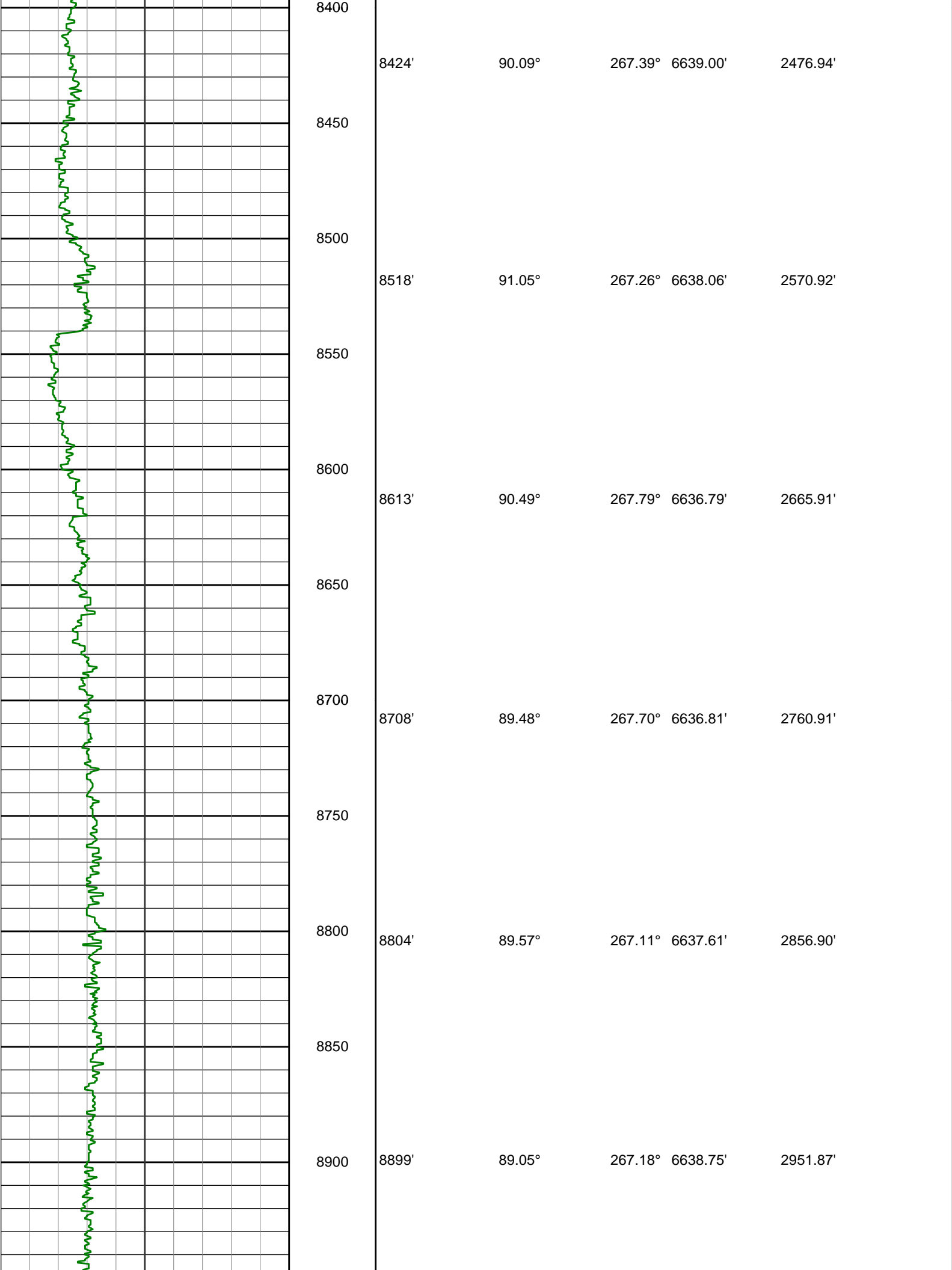
6200	6199'	10.57°	260.92°	6157.40'	501.49'
6250					
6300	6294'	14.45°	256.72°	6250.13'	521.76'
	6325'	15.47°	257.36°	6280.08'	529.62'
6350	6357'	17.26°	255.68°	6310.78'	538.45'
	6388'	21.58°	257.12°	6340.01'	548.54'
6400					
	6420'	27.70°	261.37°	6369.08'	561.72'
6450	6452'	33.91°	264.12°	6396.56'	578.03'
	6483'	40.85°	266.68°	6421.18'	596.81'
6500					
	6515'	48.59°	270.99°	6443.90'	619.30'
6550	6547'	55.59°	275.81°	6463.56'	644.40'
	6578'	59.09°	277.26°	6480.29'	670.21'
6600					
	6610'	59.48°	277.91°	6496.63'	697.35'
6650	6642'	59.09°	277.74°	6512.98'	724.46'
	6673'	58.73°	277.82°	6528.98'	750.63'
6700					



6750				
6768'	64.83°	274.75°	6573.89'	833.44'
6800				
6850				
6863'	74.08°	272.46°	6607.20'	921.89'
6900				
6950				
6958'	80.34°	270.52°	6628.22'	1014.32'
7000				
7017'	82.93°	270.32°	6636.81'	1072.64'
7050				
CSG				
Run 300				
7094'	84.91°	271.50°	6644.96'	1149.11'
7100				
7150				
7189'	88.37°	270.57°	6650.53'	1243.80'
7200				
7250				
7284'	90.18°	269.87°	6651.73'	1338.72'







8400

8424'

90.09°

267.39°

6639.00'

2476.94'

8450

8500

8518'

91.05°

267.26°

6638.06'

2570.92'

8550

8600

8613'

90.49°

267.79°

6636.79'

2665.91'

8650

8700

8708'

89.48°

267.70°

6636.81'

2760.91'

8750

8800

8804'

89.57°

267.11°

6637.61'

2856.90'

8850

8900

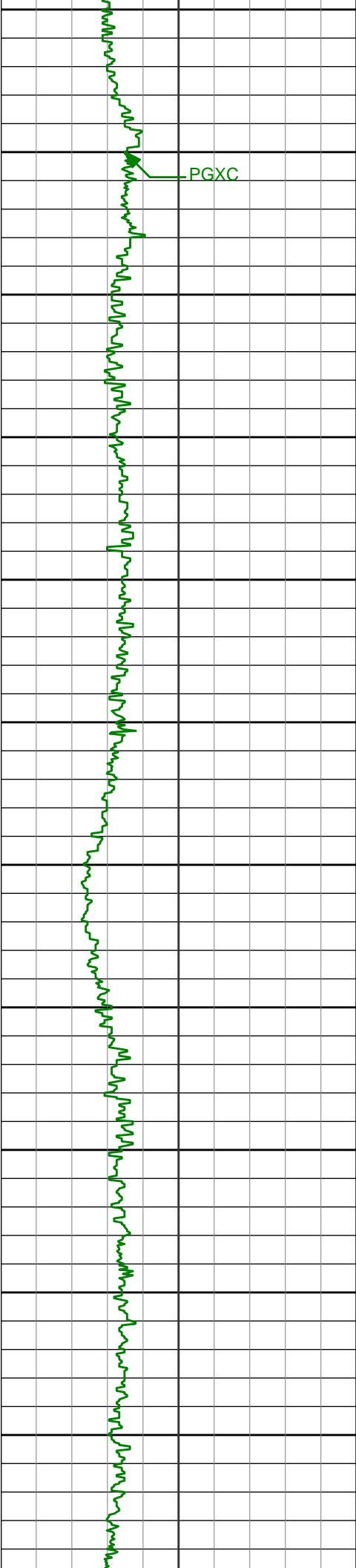
8899'

89.05°

267.18°

6638.75'

2951.87'



8950

8993'

90.12°

267.70° 6639.43'

3045.86'

9000

PGXC

9050

9088'

88.74°

267.99° 6640.38'

3140.86'

9100

9150

9183'

90.12°

267.98° 6641.32'

3235.85'

9200

9250

9278'

88.89°

267.73° 6642.14'

3330.84'

9300

9350

9373'

89.04°

267.48° 6643.86'

3425.82'

9400

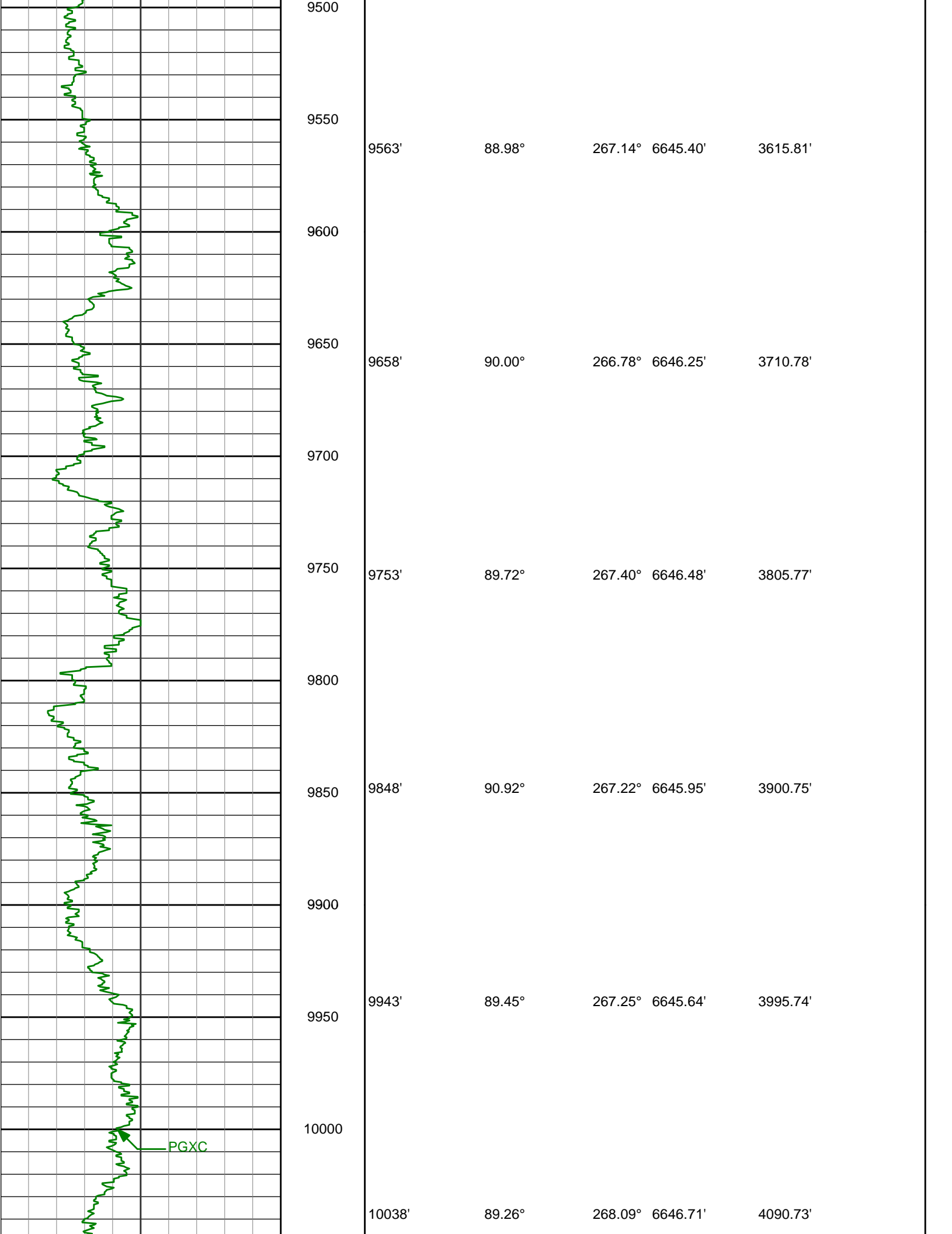
9450

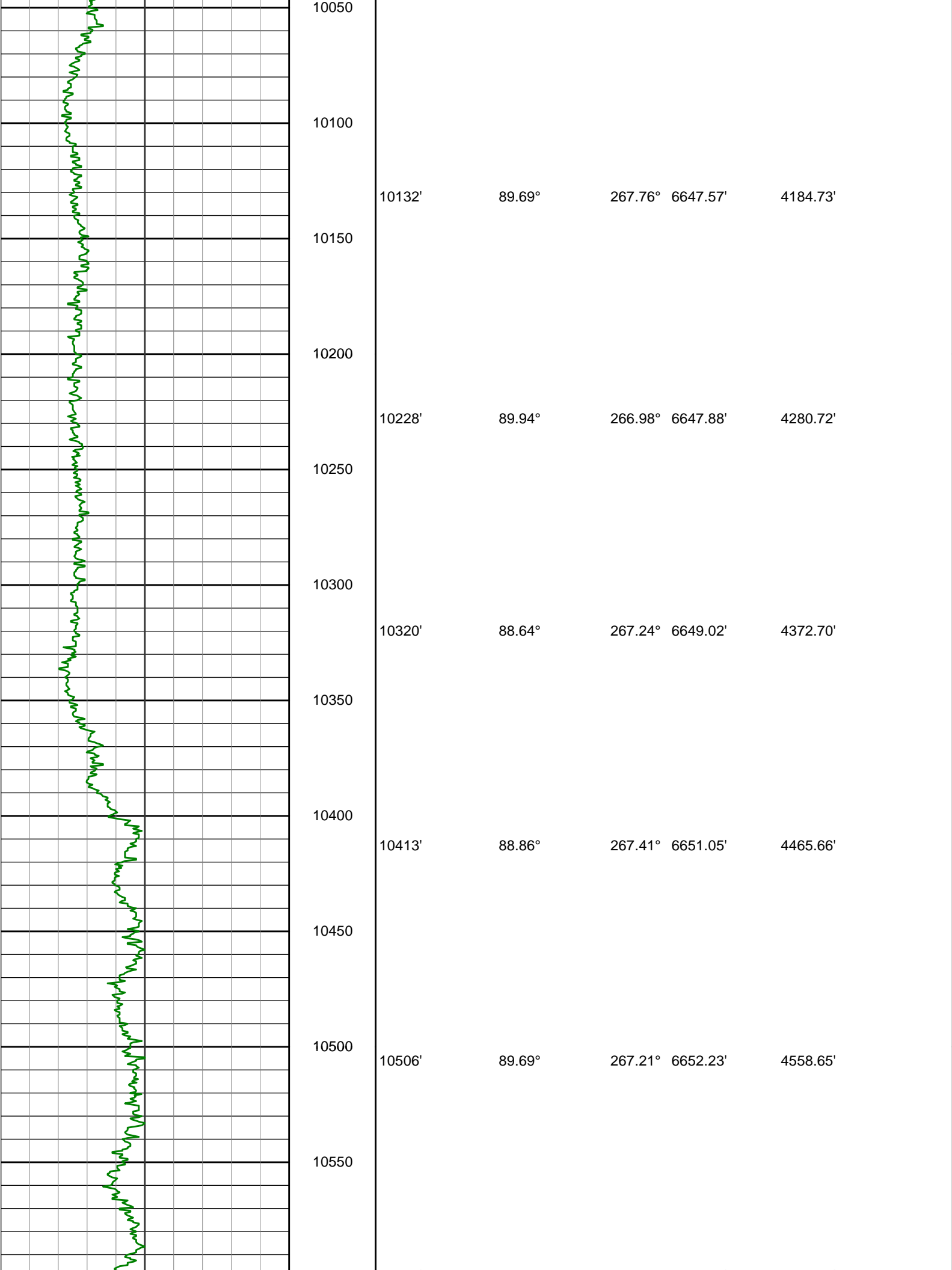
9468'

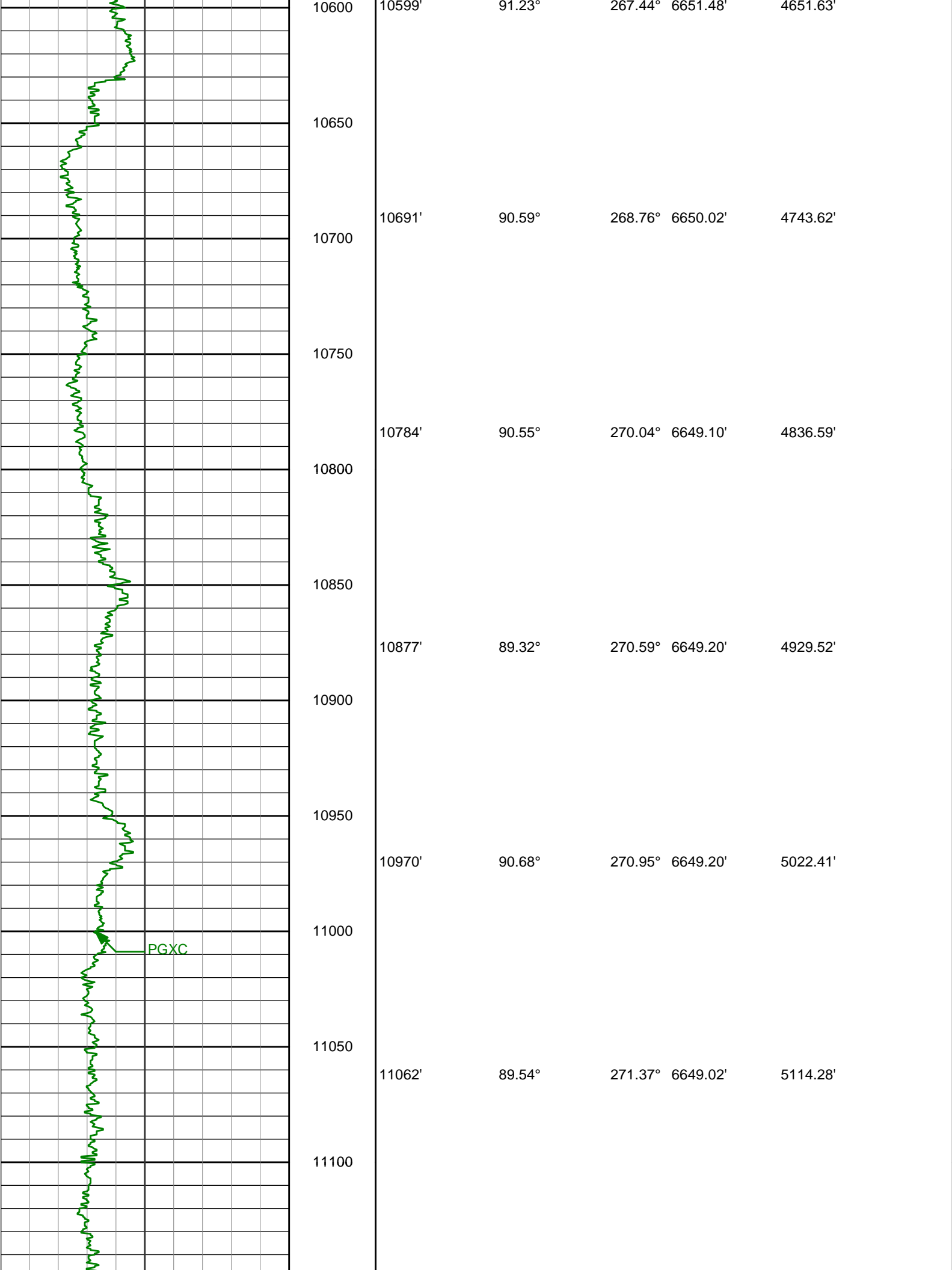
90.06°

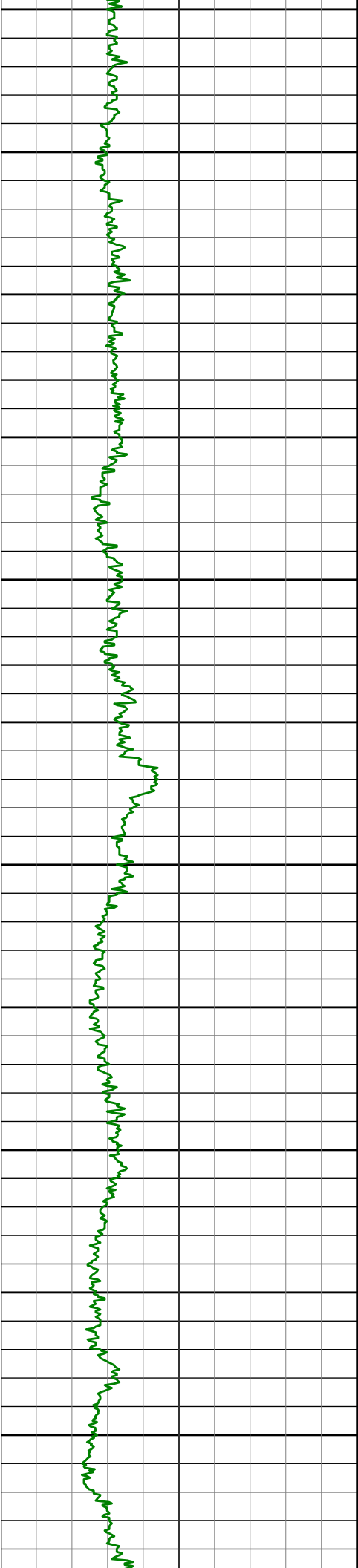
267.75° 6644.61'

3520.82'









11150

11155'

89.60°

271.18°

6649.72'

5207.13'

11200

11250

11248'

90.37°

270.59°

6649.75'

5300.02'

11300

11350

11339'

88.67°

271.90°

6650.51'

5390.87'

11400

11450

11433'

88.77°

271.77°

6652.61'

5484.65'

11500

11550

11525'

89.54°

271.65°

6653.97'

5576.46'

11600

11650

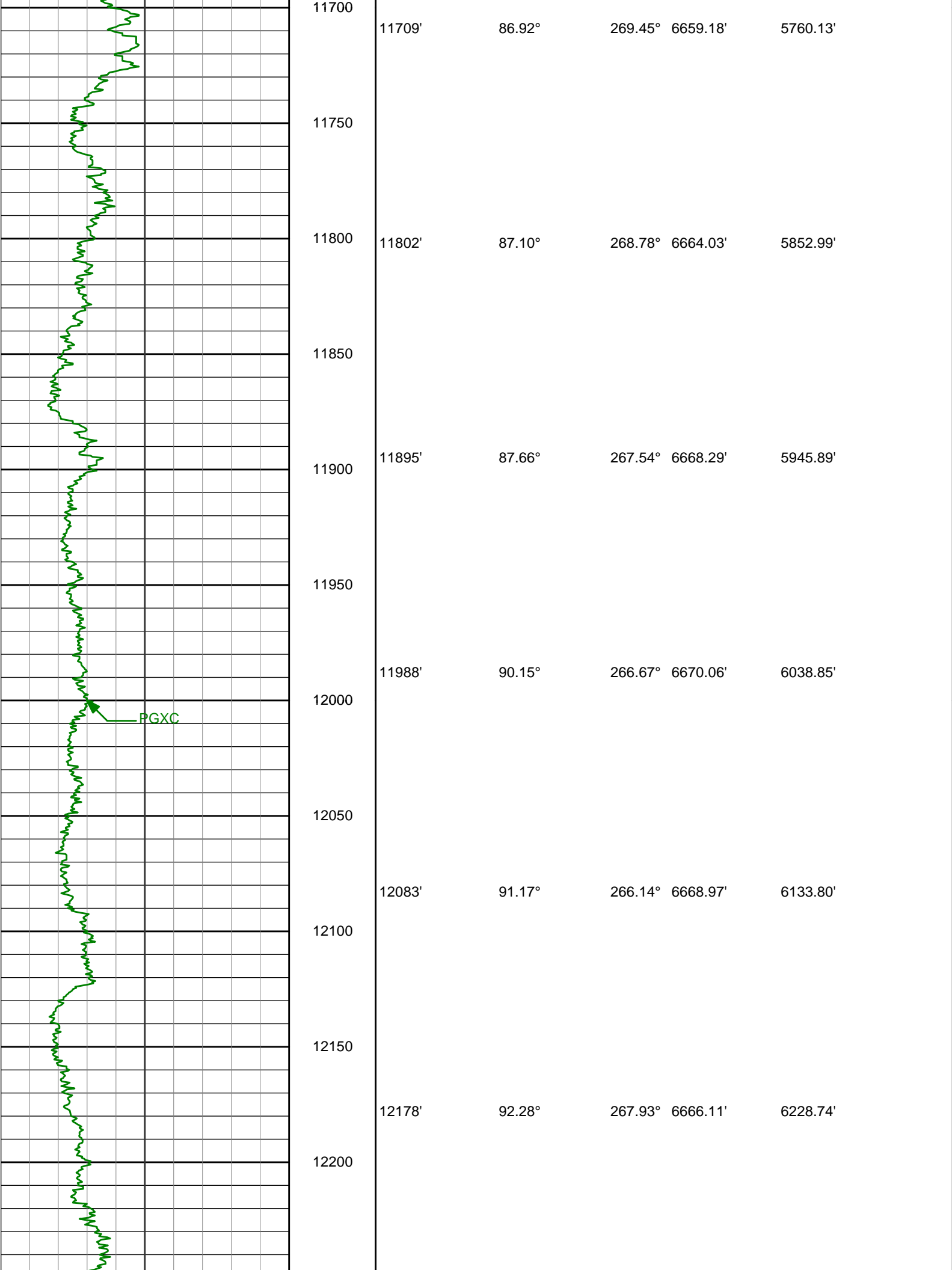
11617'

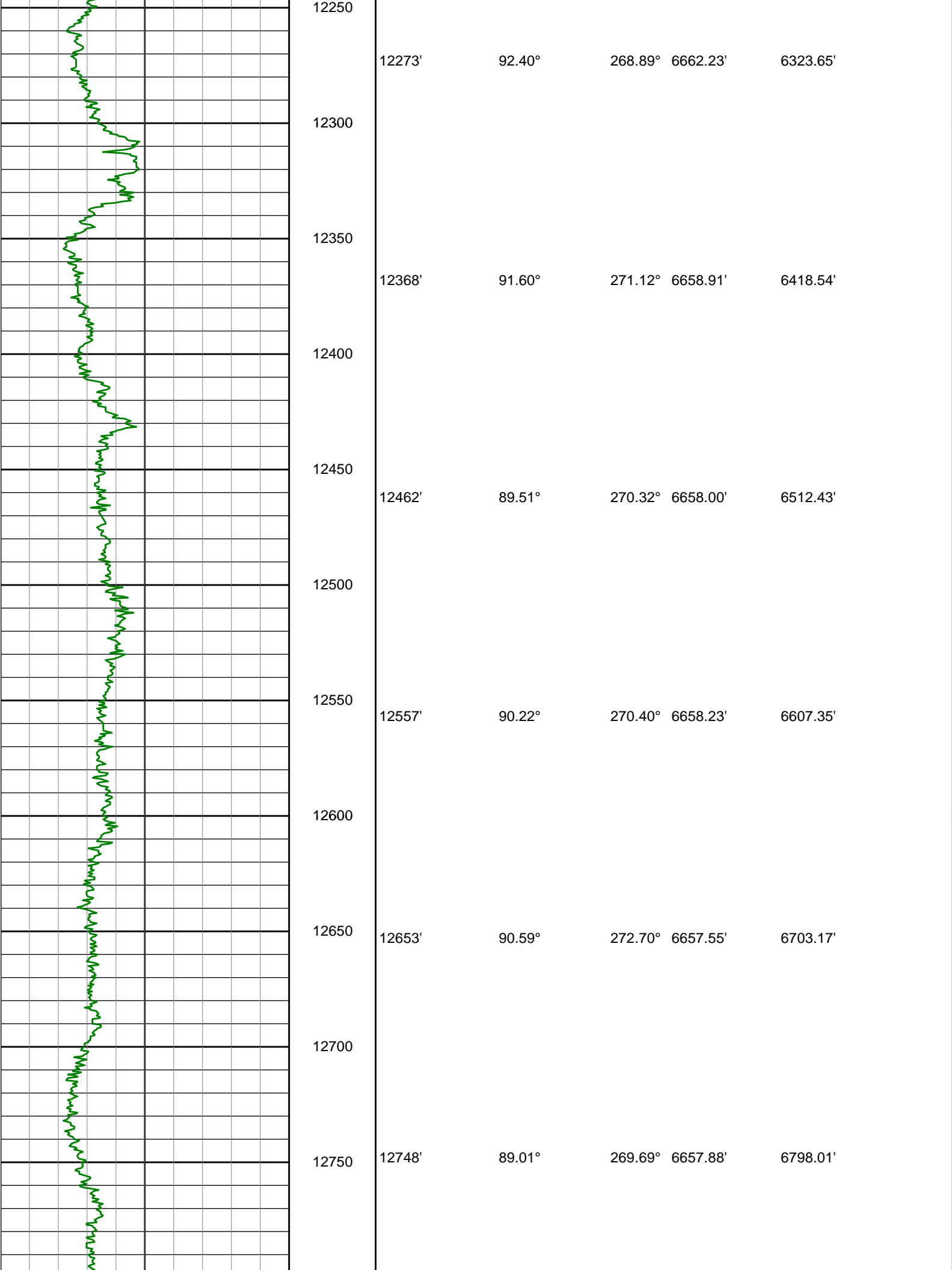
88.52°

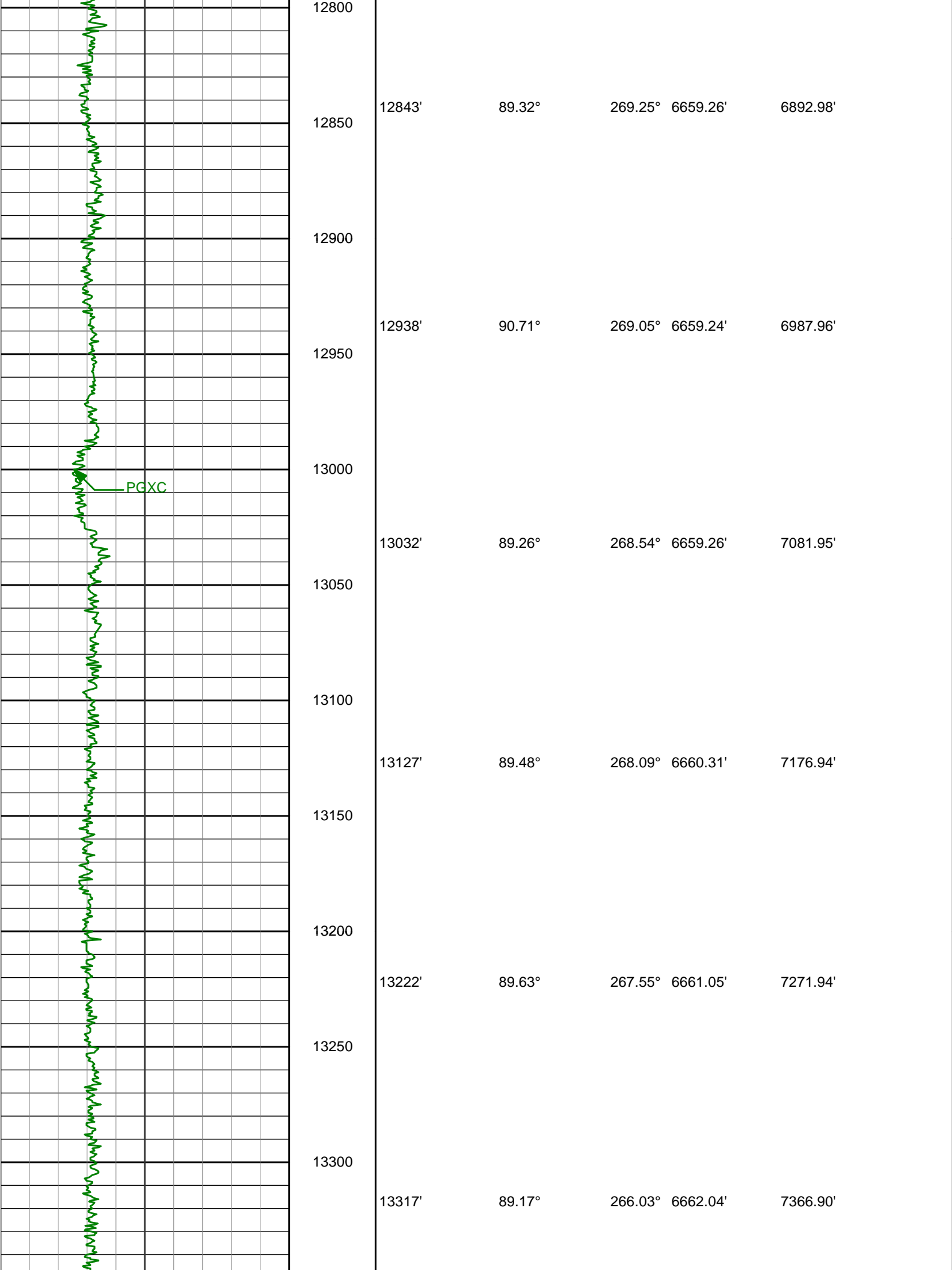
271.27°

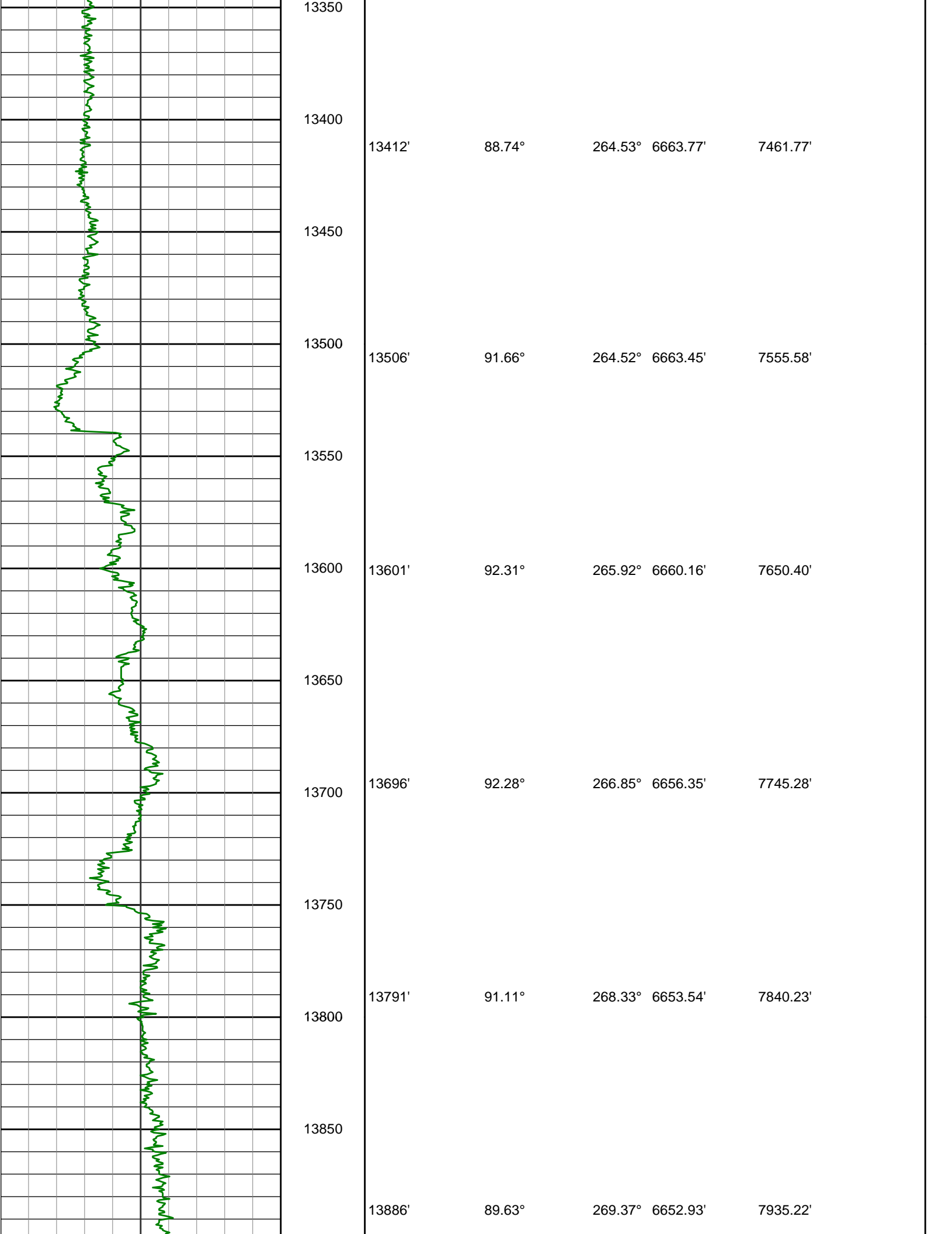
6655.52'

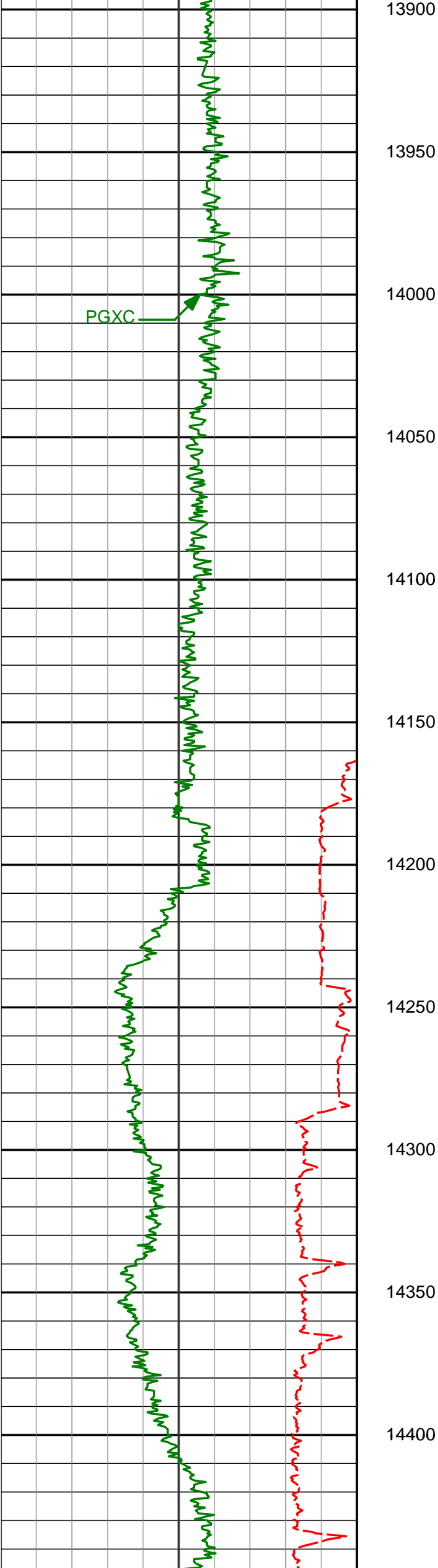
5668.28'











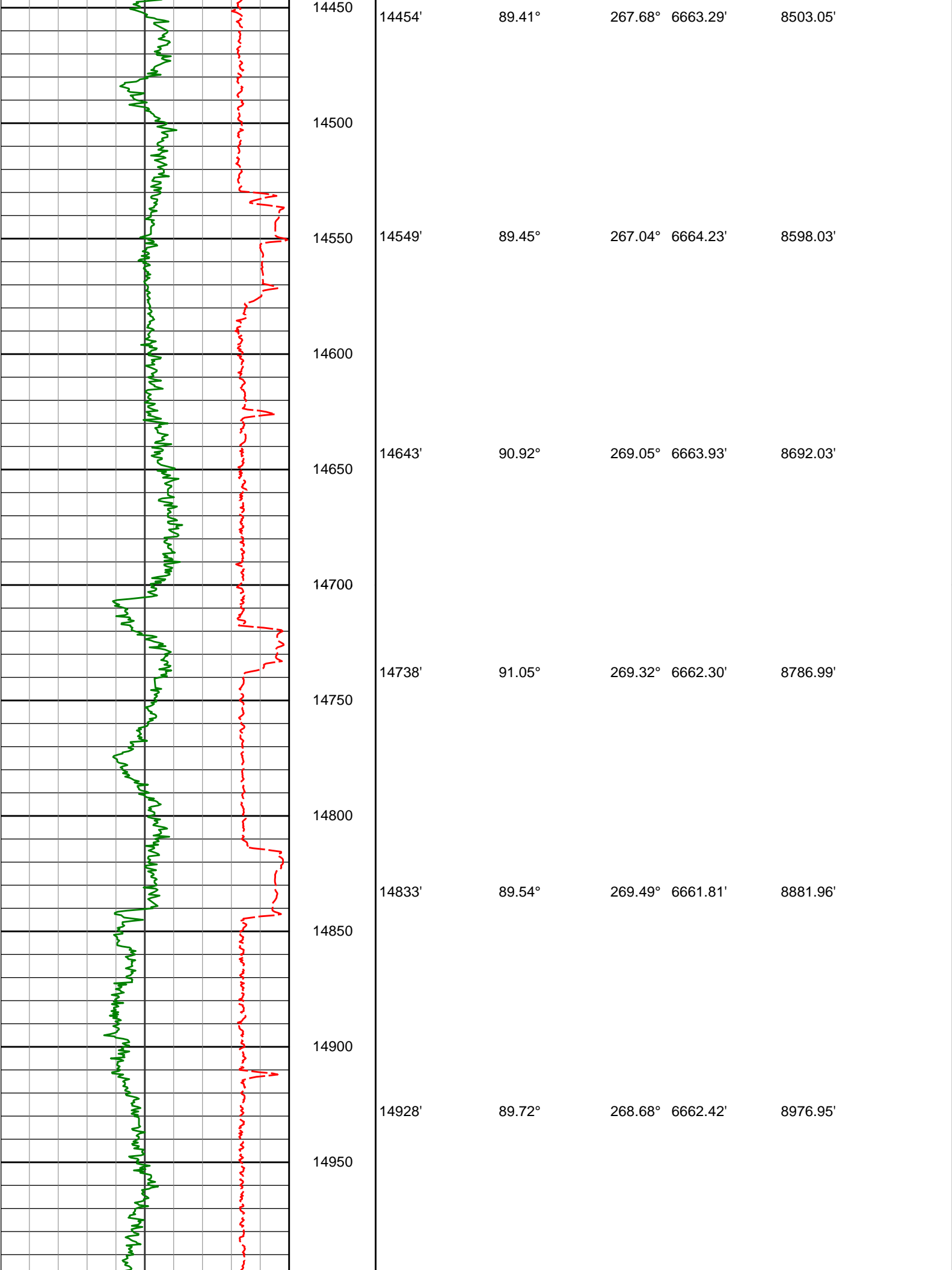
13980'	88.61°	269.81°	6654.37'	8029.17'
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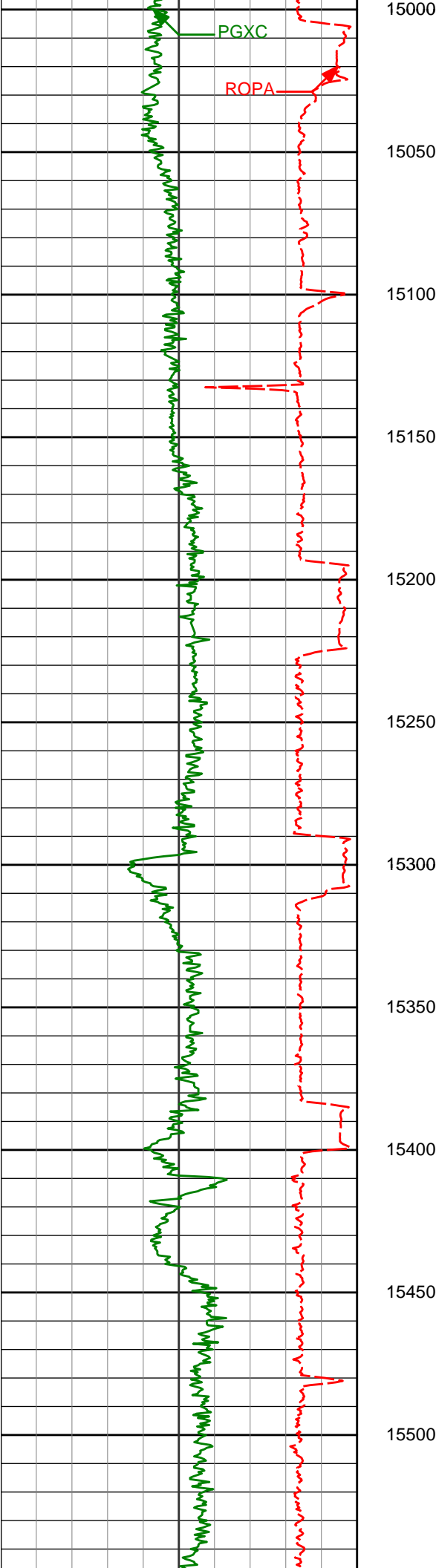
14075'	88.77°	268.98°	6656.54'	8124.12'
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14170'	88.77°	268.65°	6658.58'	8219.09'
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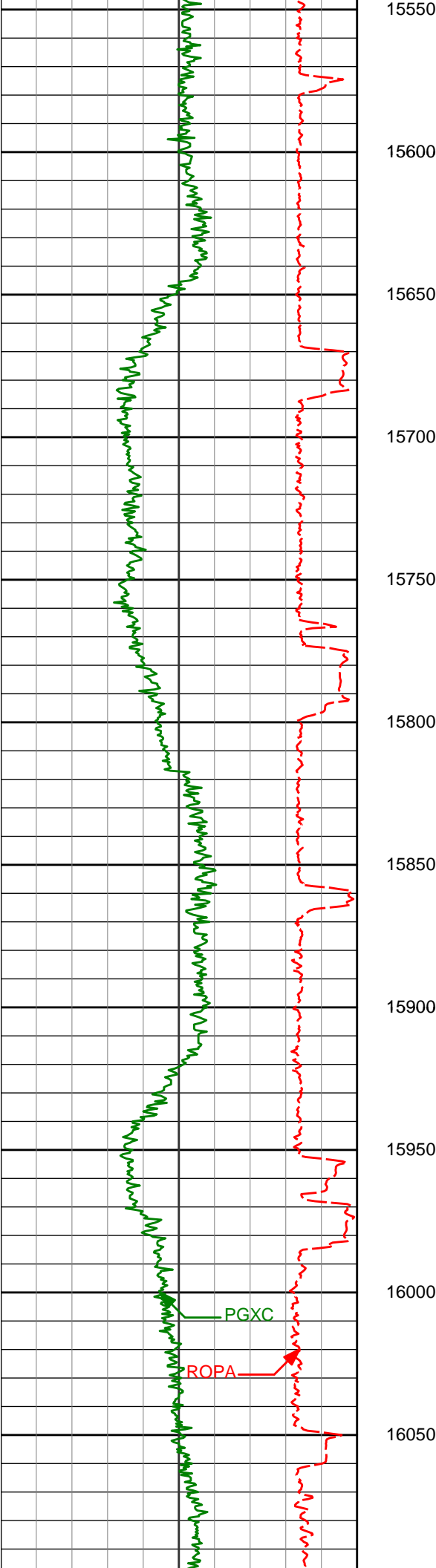
14264'	88.83°	268.22°	6660.55'	8313.07'
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14359'	89.23°	267.84°	6662.16'	8408.05'
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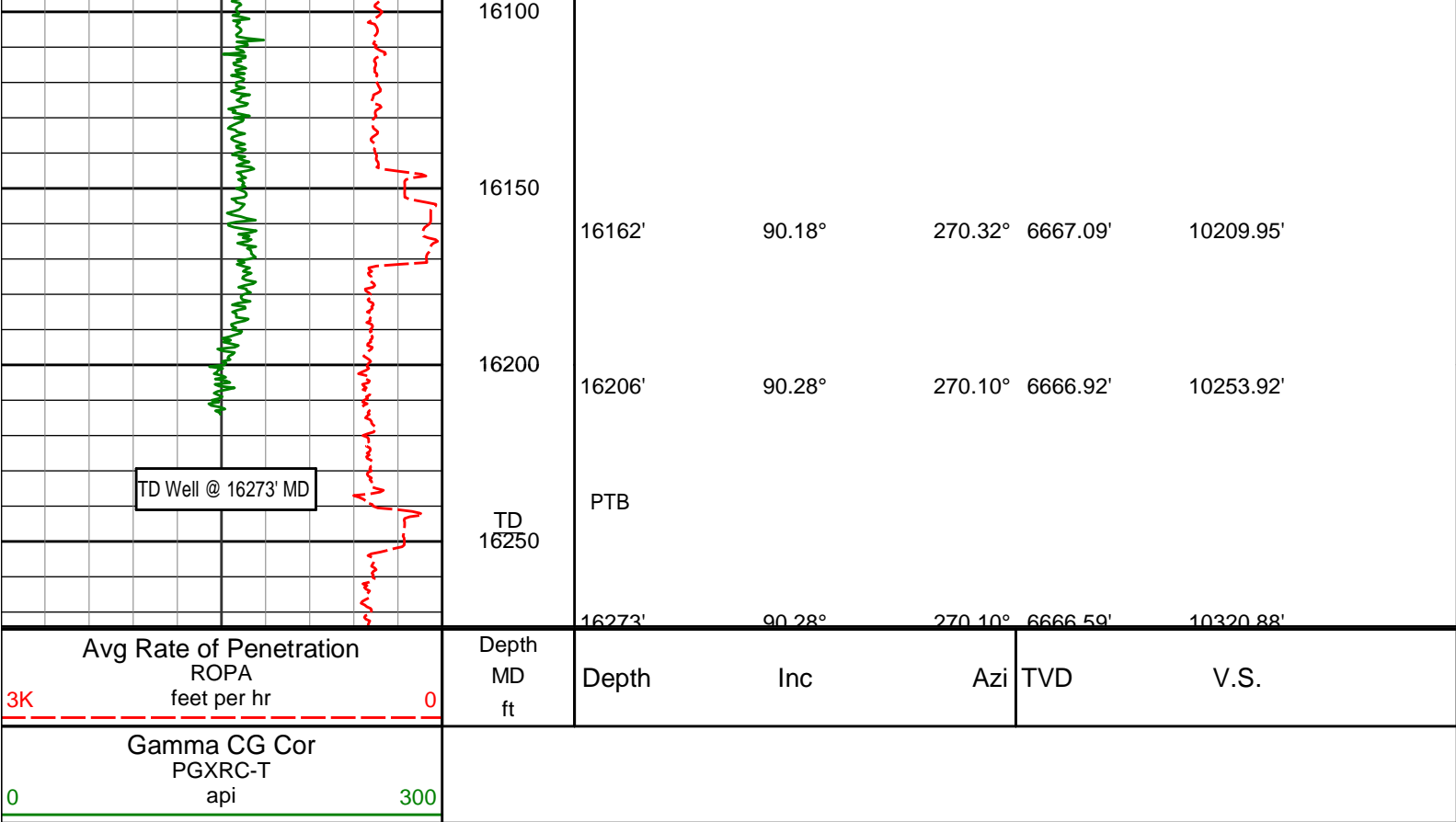




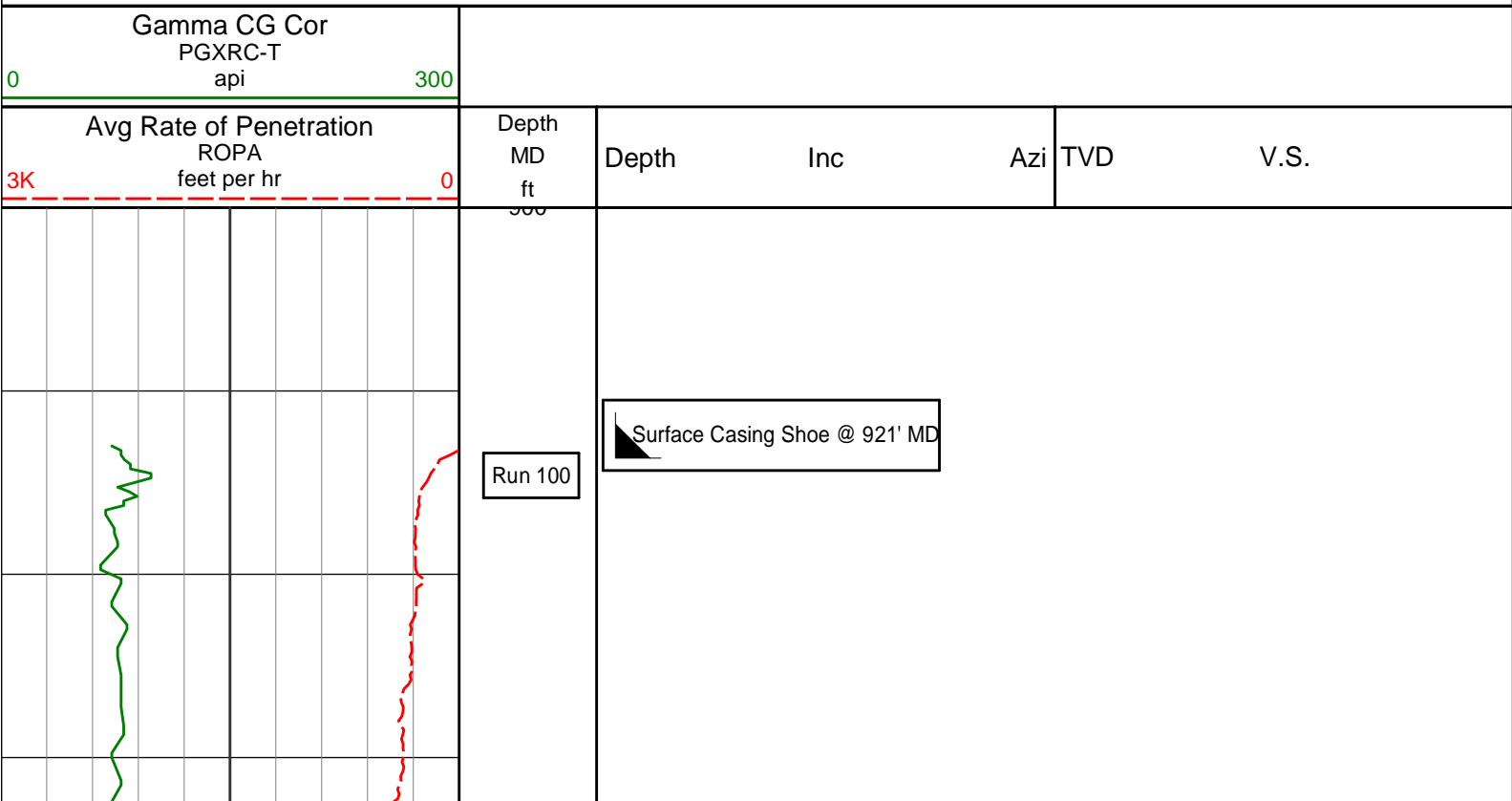
15023'	90.31°	268.55°	6662.40'	9071.94'
15118'	91.26°	268.11°	6661.09'	9166.93'
15213'	90.92°	269.86°	6659.29'	9261.90'
15308'	89.97°	270.26°	6658.55'	9356.84'
15403'	89.08°	271.00°	6659.34'	9451.74'
15498'	89.08°	270.92°	6660.86'	9546.61'

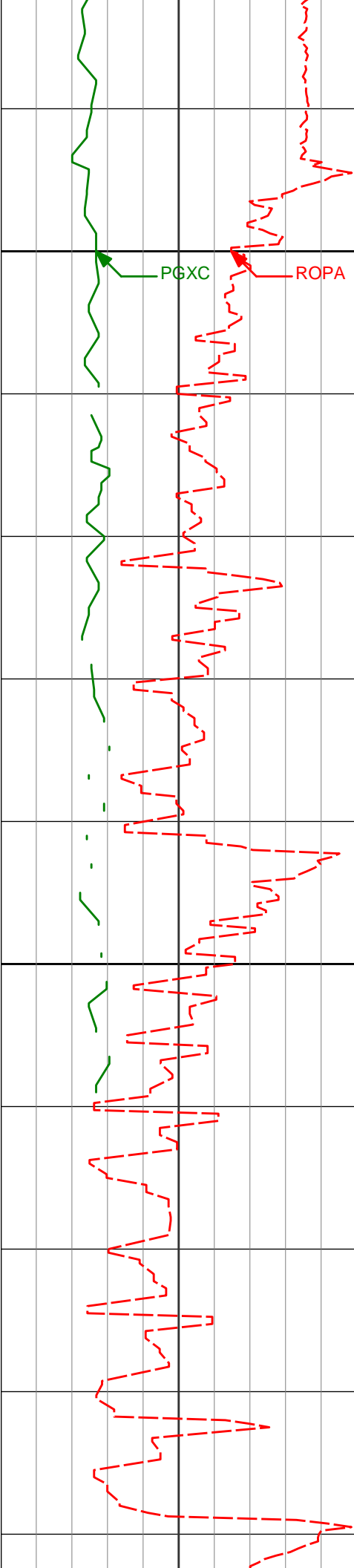


15593'	89.23°	270.72°	6662.26'	9641.49'
15688'	89.57°	270.55°	6663.26'	9736.39'
15783'	89.94°	271.28°	6663.66'	9831.28'
15878'	89.14°	270.62°	6664.43'	9926.15'
15973'	89.35°	270.12°	6665.68'	10021.07'
16068'	89.38°	269.93°	6666.73'	10116.01'



MD Detail 1:240 Scale





1000

1100

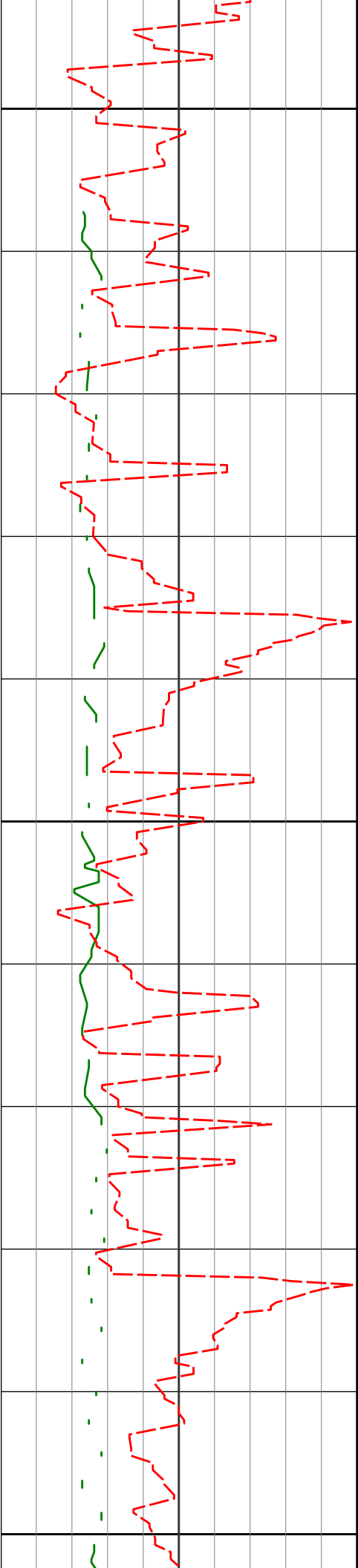
1020'

0.50°

104.44°

1019.98'

-2.57'



1200

1208'

0.41°

108.45° 1207.98'

-3.99'

1300

1300'

0.53°

65.03° 1299.98'

-4.69'

1400

1393'

0.72°

40.34° 1392.97'

-5.48'



1500

1600

1486'

0.85°

31.85° 1485.96'

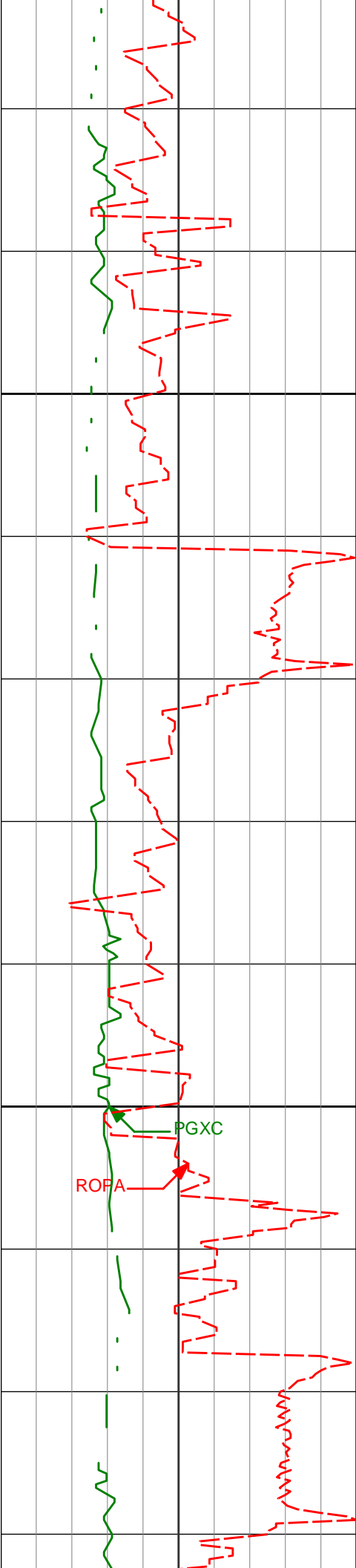
-6.25'

1579'

0.74°

17.22° 1578.95'

-6.83'



1900

2000

1857'

2.27°

232.46° 1856.92'

-6.33'

1950'

4.60°

217.37° 1949.75'

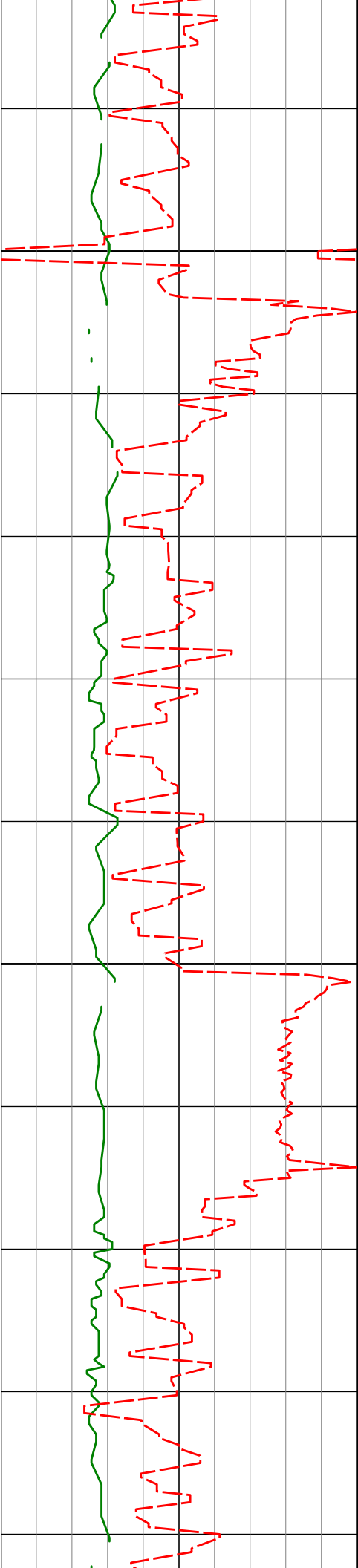
-2.48'

2043'

6.00°

213.11° 2042.35'

2.67'



2100

2136'

5.78°

213.45°

2134.86'

8.17'

2200

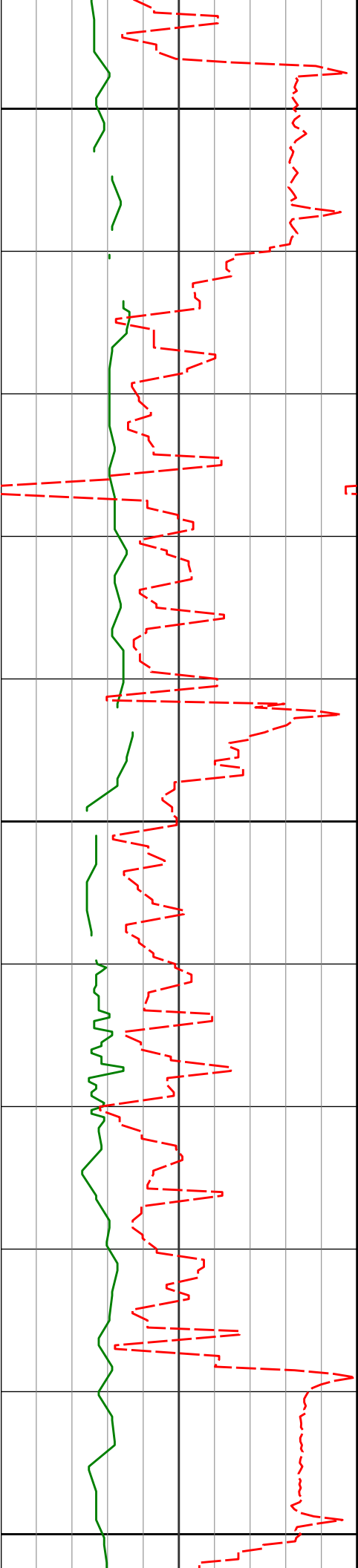
2227'

7.65°

232.71°

2225.24'

15.77'



2300

2320'

9.54°

243.39° 2317.20'

27.82'

2400

2412'

9.45°

239.38° 2407.94'

41.37'

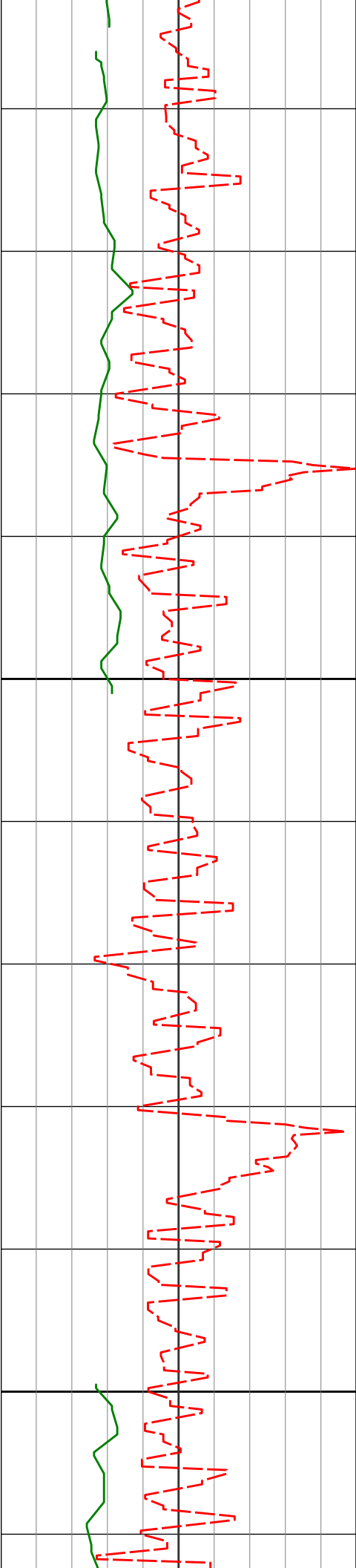
2500

2504'

10.39°

253.35° 2498.58'

56.02'



2600

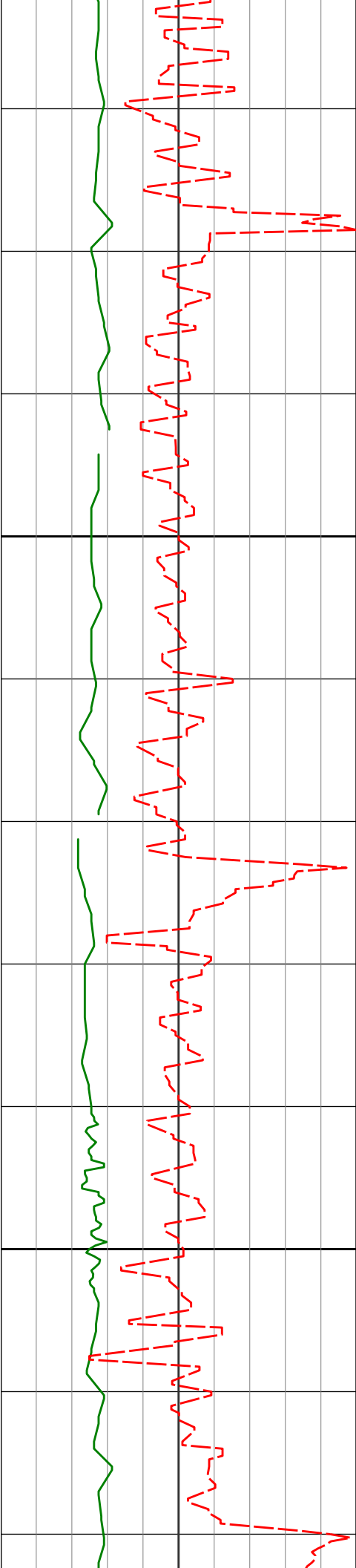
2700

2689'

10.58°

251.05° 2680.49'

88.39'



2800

2783'

10.23°

247.44° 2772.94'

104.45'

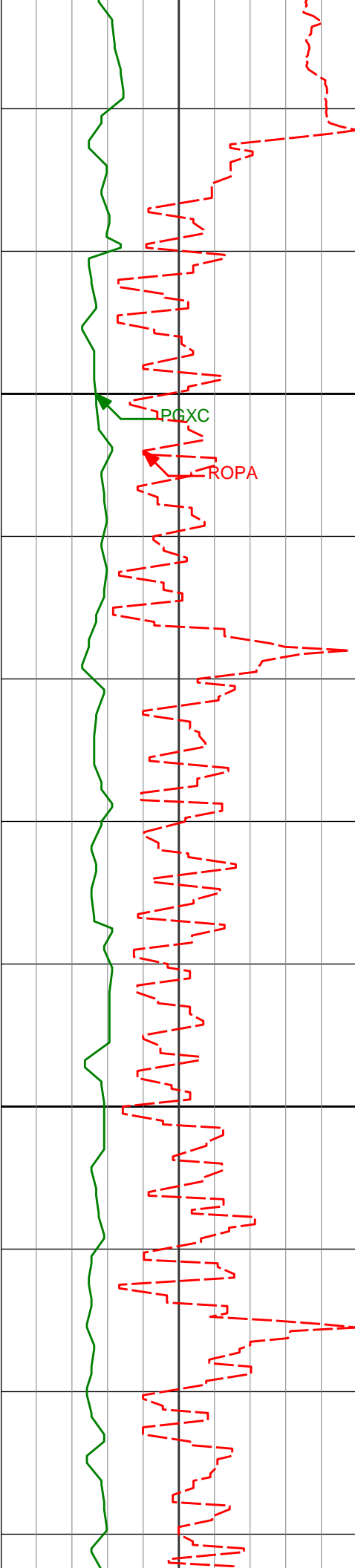
2900

2875'

10.61°

247.11° 2863.42'

120.00'



3000

2970'

10.80°

253.33° 2956.77'

136.78'

3065'

11.00°

252.21° 3050.06'

154.10'

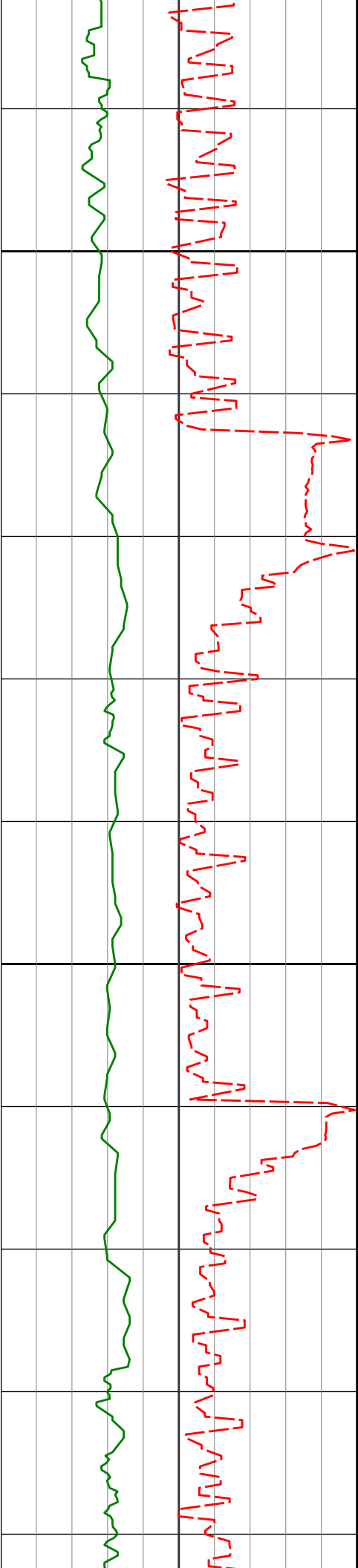
3100

3160'

10.74°

249.40° 3143.36'

171.20'



3200

3255'

9.12°

259.07° 3236.94'

187.03'

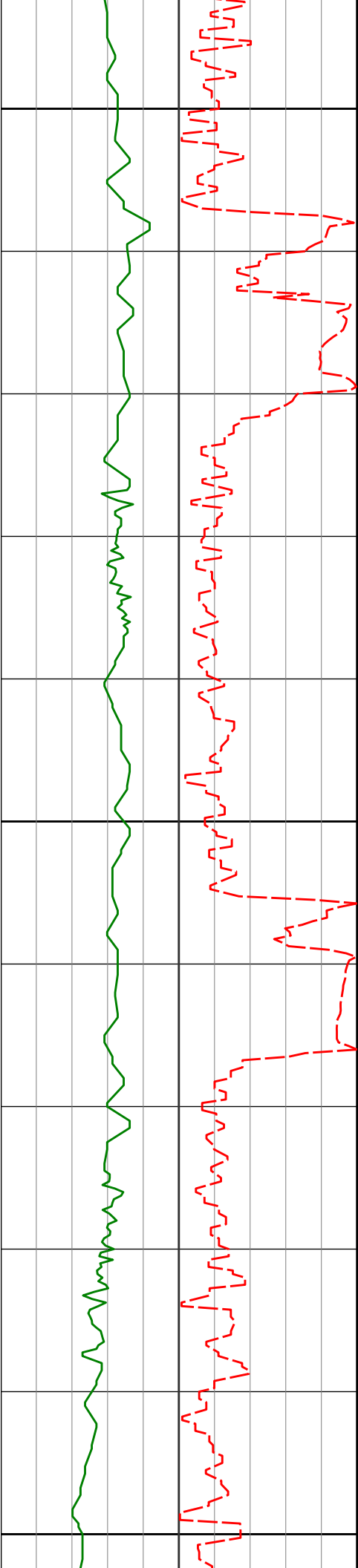
3300

3351'

7.85°

260.35° 3331.88'

201.04'



3400

3446'

6.87°

259.09°

3426.10'

213.08'

3500

3541'

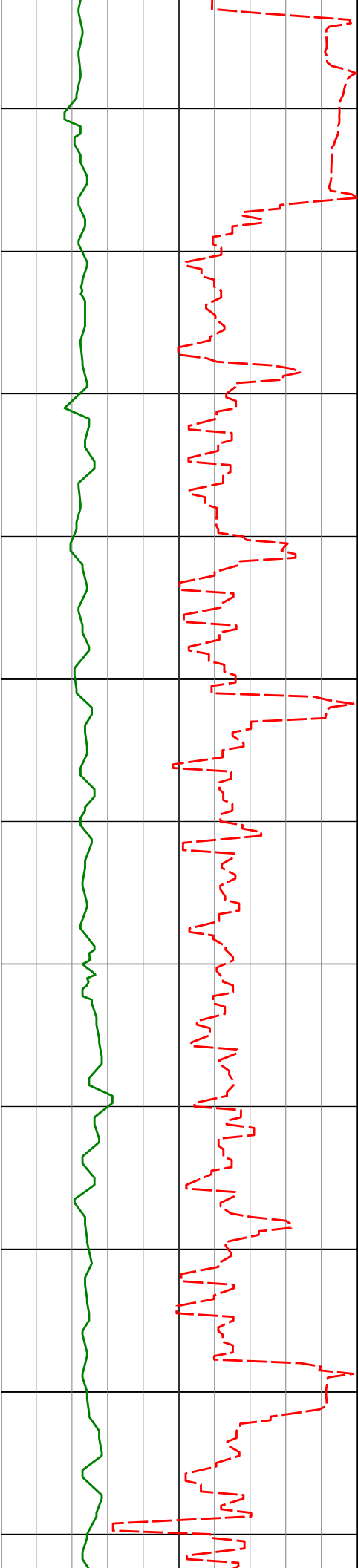
7.65°

254.11°

3520.34'

224.83'

3600



3636'

9.57°

249.63°

3614.27'

238.45'

3700

3731'

10.66°

248.55°

3707.79'

254.23'

3800

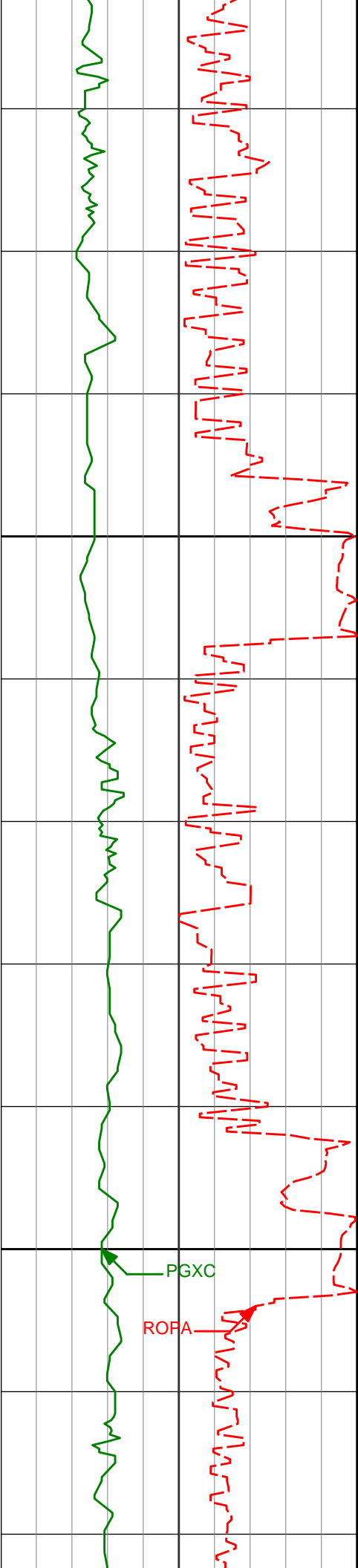
3825'

11.27°

248.72°

3800.07'

271.08'



3900

3920'

10.65°

254.80°

3893.34'

288.39'

4000

PGXC

ROPA

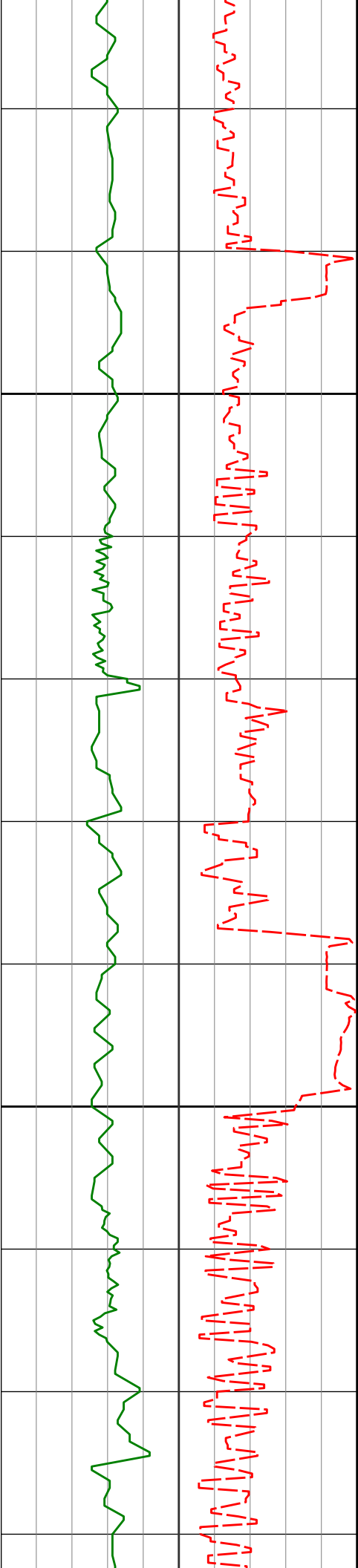
4015'

8.43°

261.39°

3987.02'

303.85'



4100

4110'

7.42°

263.39° 4081.12'

316.88'

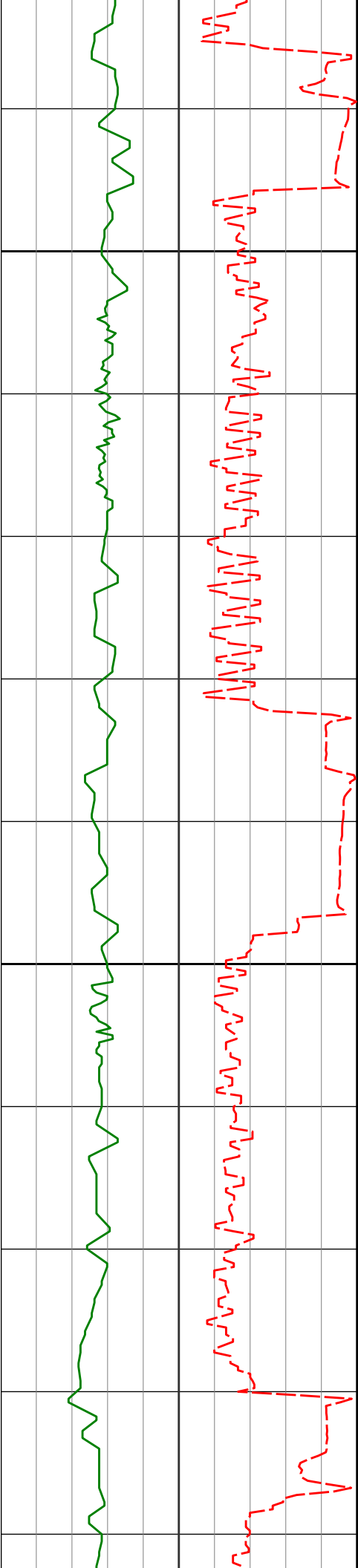
4200

4205'

7.86°

265.39° 4175.27'

329.48'



4300

4300'

7.95°

261.68° 4269.37'

342.50'

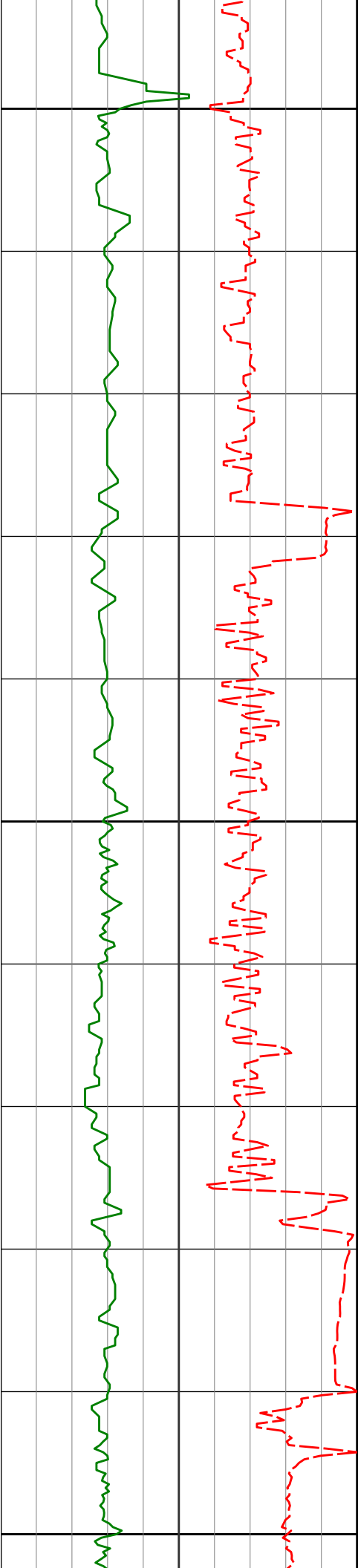
4400

4395'

9.21°

254.93° 4363.31'

356.43'



4500

4600

4700

4489'

8.44°

254.47° 4456.19'

370.46'

4584'

6.45°

255.84° 4550.39'

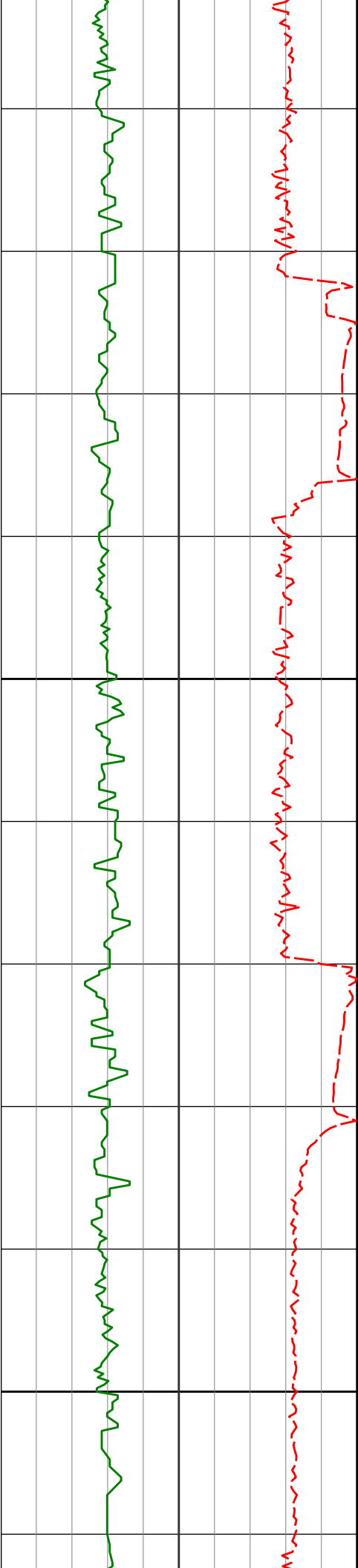
382.45'

4679'

6.92°

245.08° 4644.75'

392.93'



4800

4774'

8.02°

242.04° 4738.94'

404.16'

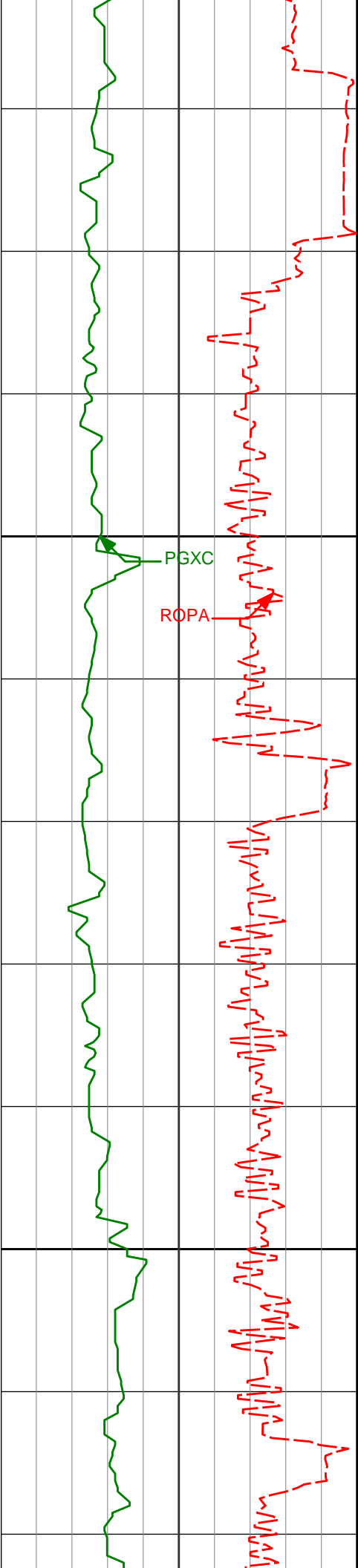
4869'

7.64°

246.37° 4833.05'

415.98'

4900



5000

5100

4965'

8.67°

248.22° 4928.08'

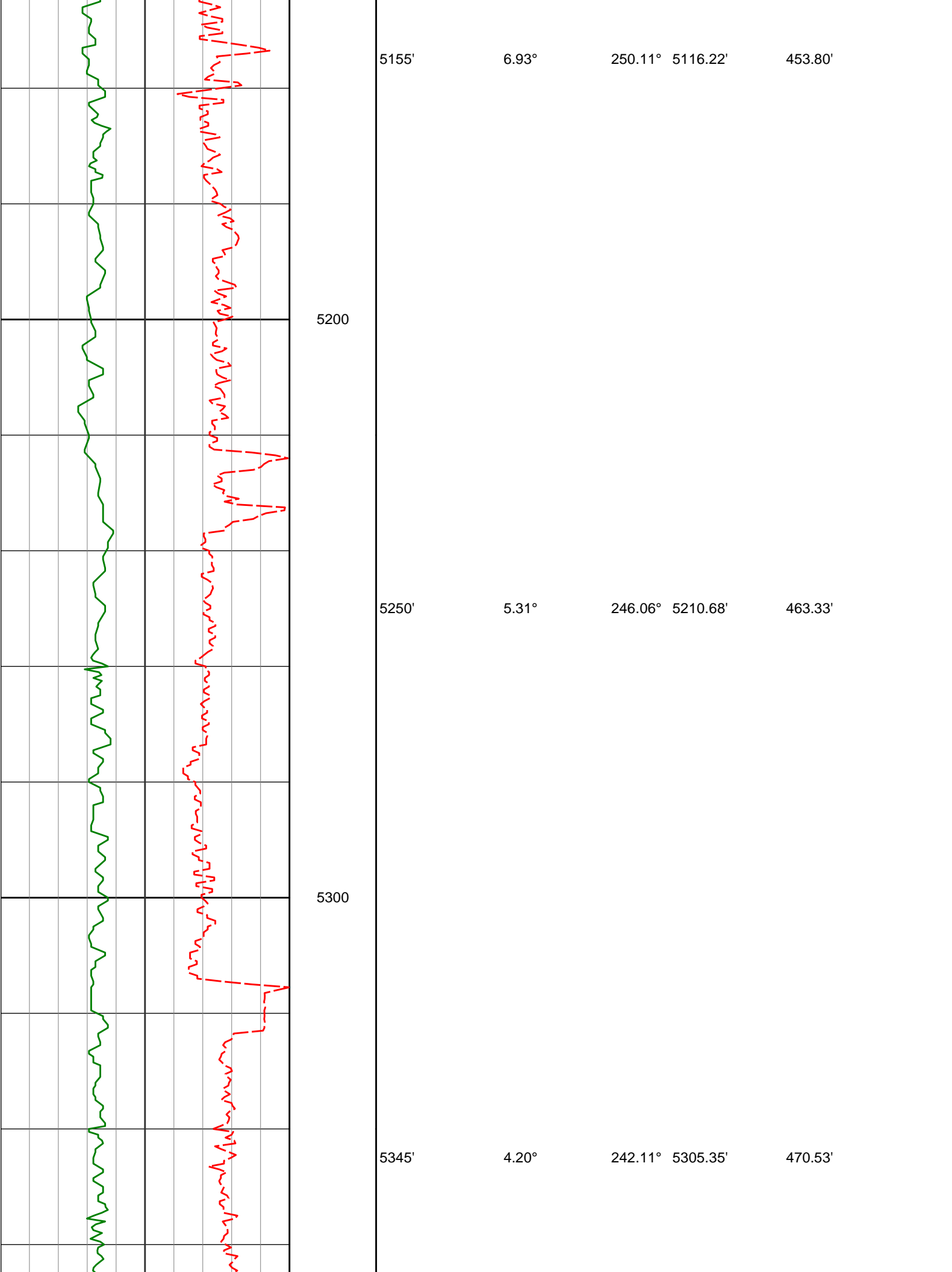
428.71'

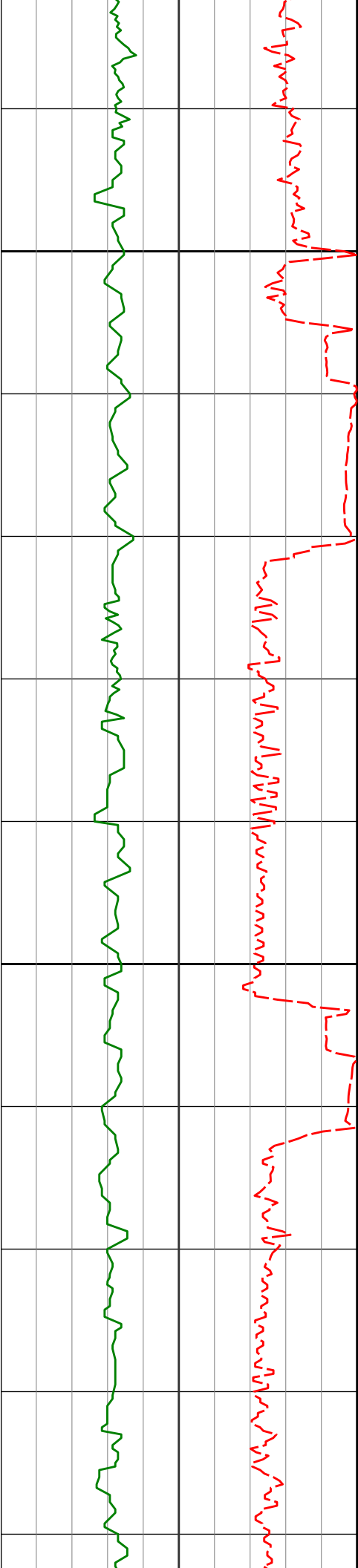
5060'

8.22°

249.93° 5022.05'

441.90'





5400

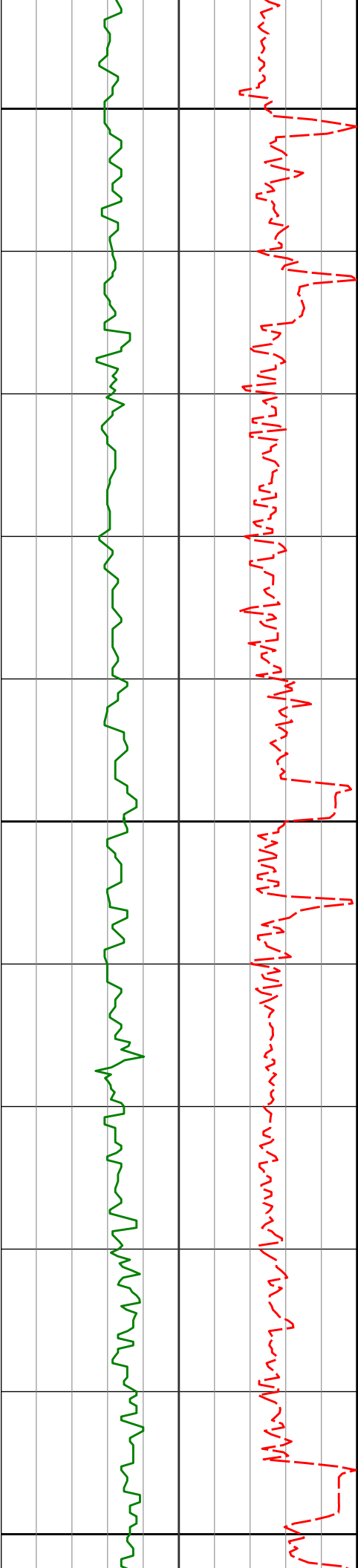
5440'

1.96°

249.66° 5400.21'

475.20'

5500



5600

5630'

0.38°

117.98° 5590.17'

477.74'

5700

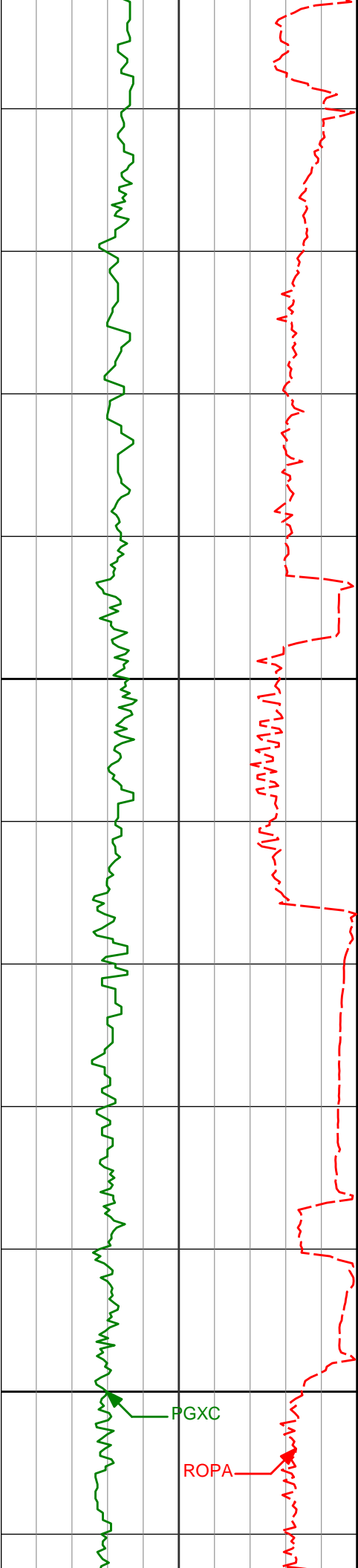
5725'

0.37°

141.23° 5685.17'

477.28'

5800



5900

5915'

1.39°

132.91° 5875.14'

475.28'

Run 200

6000

PGXC

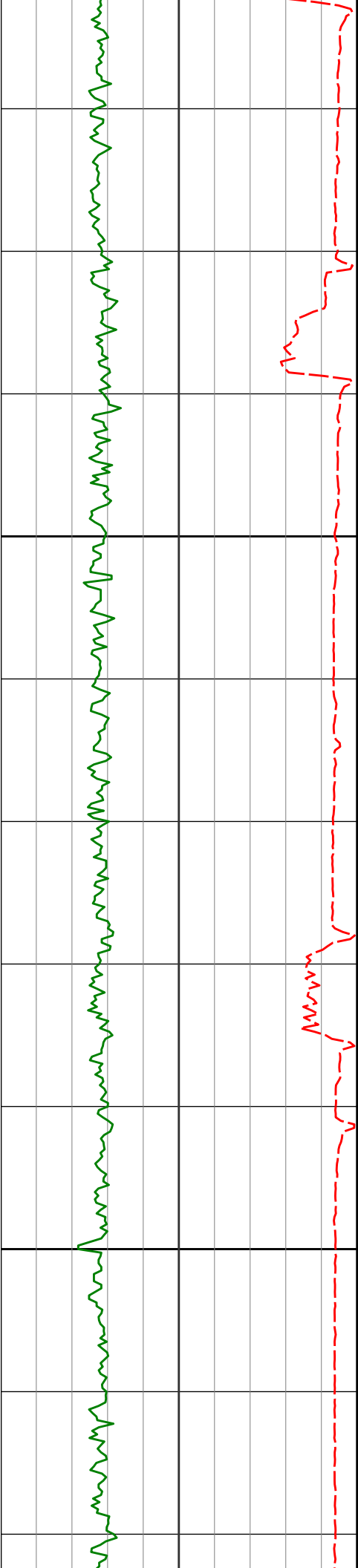
ROPA

6010'

3.64°

252.11° 5970.08'

477.36'



6100

6105'

7.71°

266.02°

6064.60'

486.63'

6200

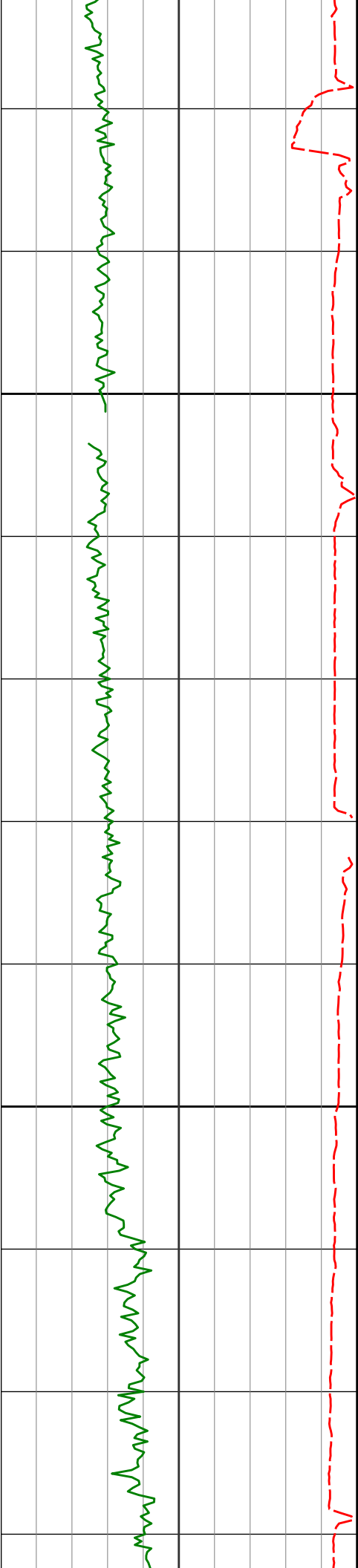
6199'

10.57°

260.92°

6157.40'

501.49'



6300

6294'	14.45°	256.72°	6250.13'	521.76'
-------	--------	---------	----------	---------

6325'	15.47°	257.36°	6280.08'	529.62'
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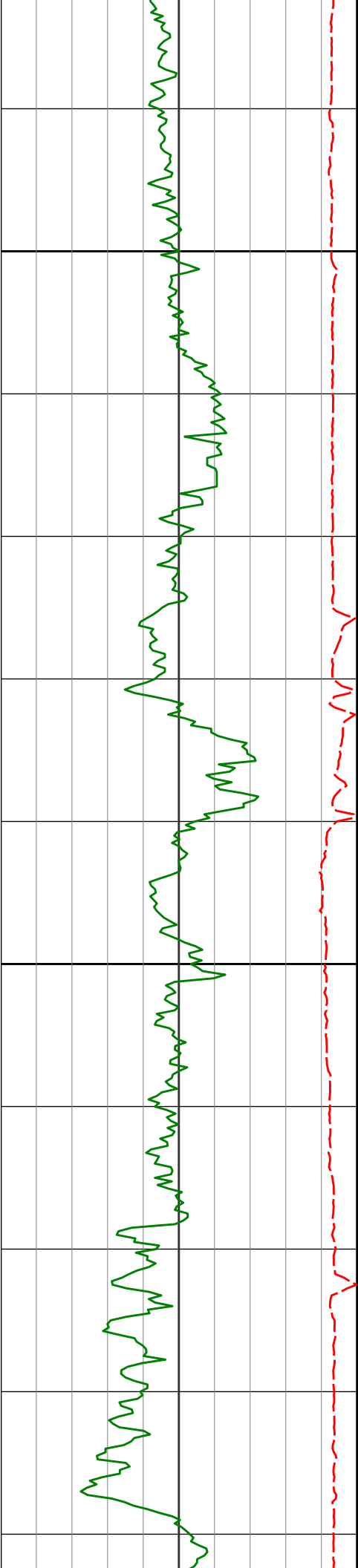
6357'	17.26°	255.68°	6310.78'	538.45'
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6400

6388'	21.58°	257.12°	6340.01'	548.54'
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6420'	27.70°	261.37°	6369.08'	561.72'
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6452'	33.91°	264.12°	6396.56'	578.03'
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6500

6483' 40.85° 266.68° 6421.18' 596.81'

6515' 48.59° 270.99° 6443.90' 619.30'

6547' 55.59° 275.81° 6463.56' 644.40'

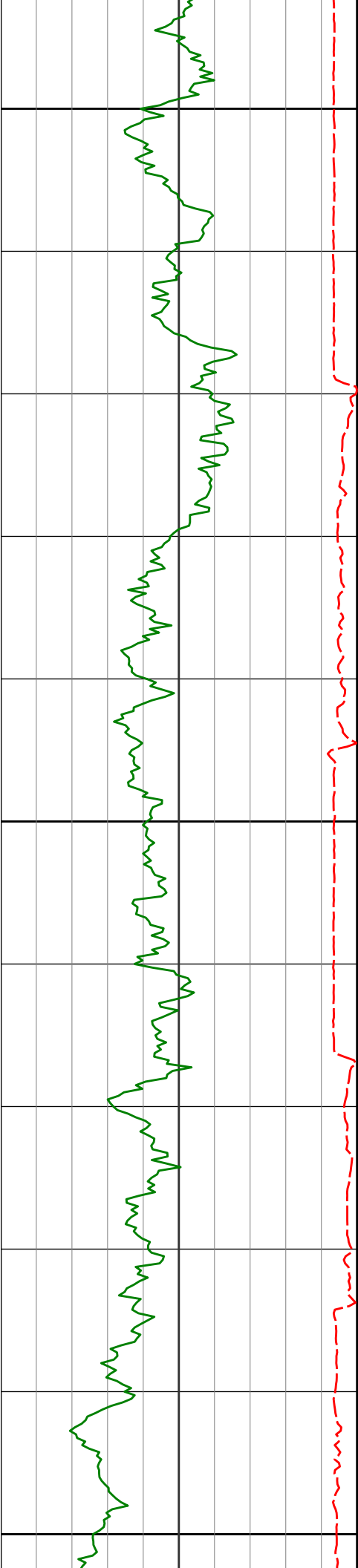
6578' 59.09° 277.26° 6480.29' 670.21'

6600

6610' 59.48° 277.91° 6496.63' 697.35'

6642' 59.09° 277.74° 6512.98' 724.46'

6673' 58.73° 277.82° 6528.98' 750.63'



6700

6768'

64.83°

274.75° 6573.89'

833.44'

6800

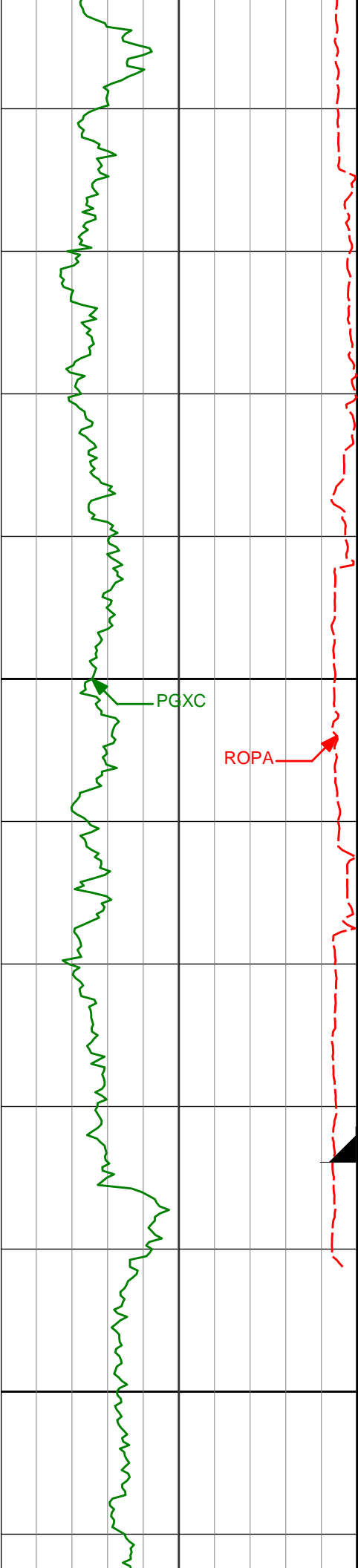
6863'

74.08°

272.46° 6607.20'

921.89'

6900



6958' 80.34° 270.52° 6628.22' 1014.32'

7000

PGXC

ROPA

7017' 82.93° 270.32° 6636.81' 1072.64'

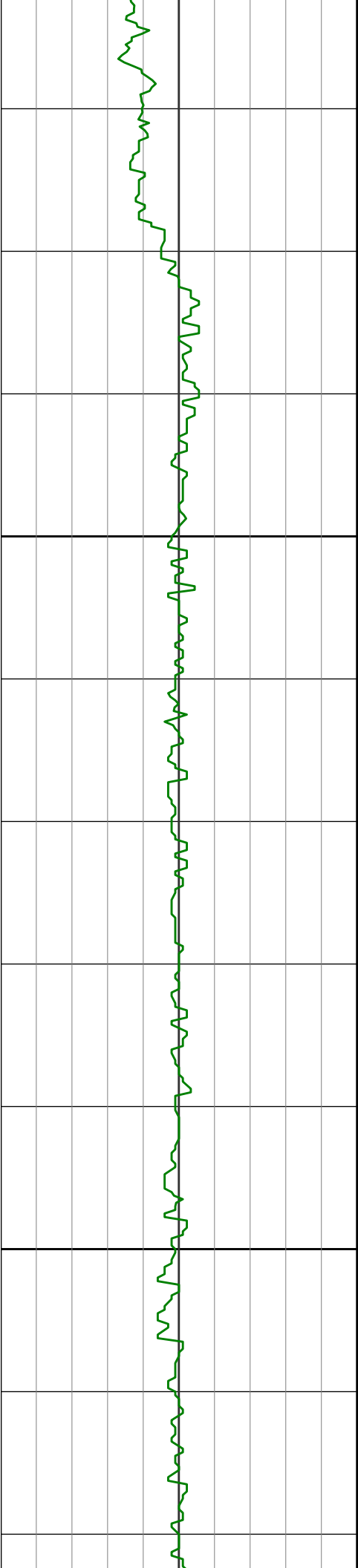
CSG

Casing Shoe @ 7068'

Run 300

7094' 84.91° 271.50° 6644.96' 1149.11'

7100



7200

7189'

88.37°

270.57°

6650.53'

1243.80'

7300

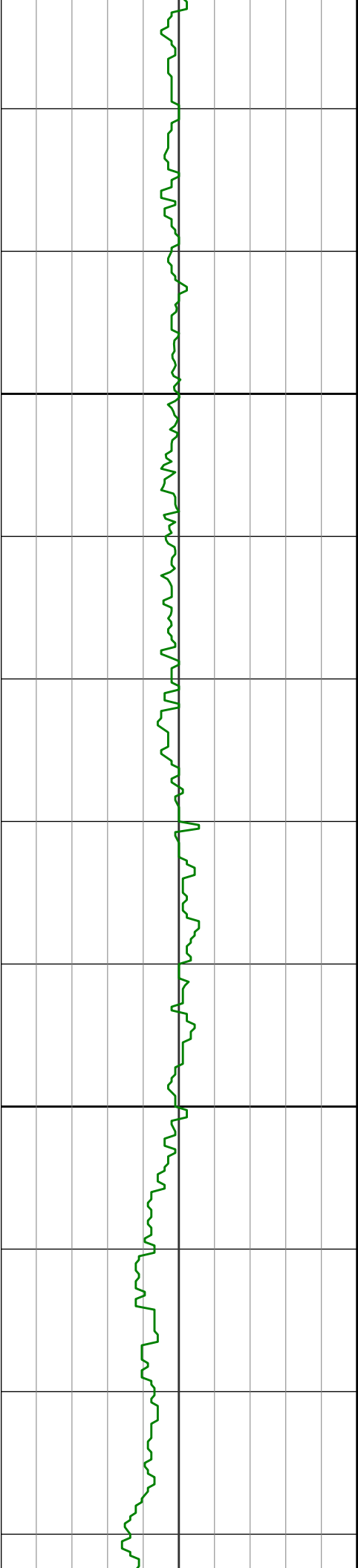
7284'

90.18°

269.87°

6651.73'

1338.72'



7400

7379'

89.72°

268.67° 6651.81'

1433.70'

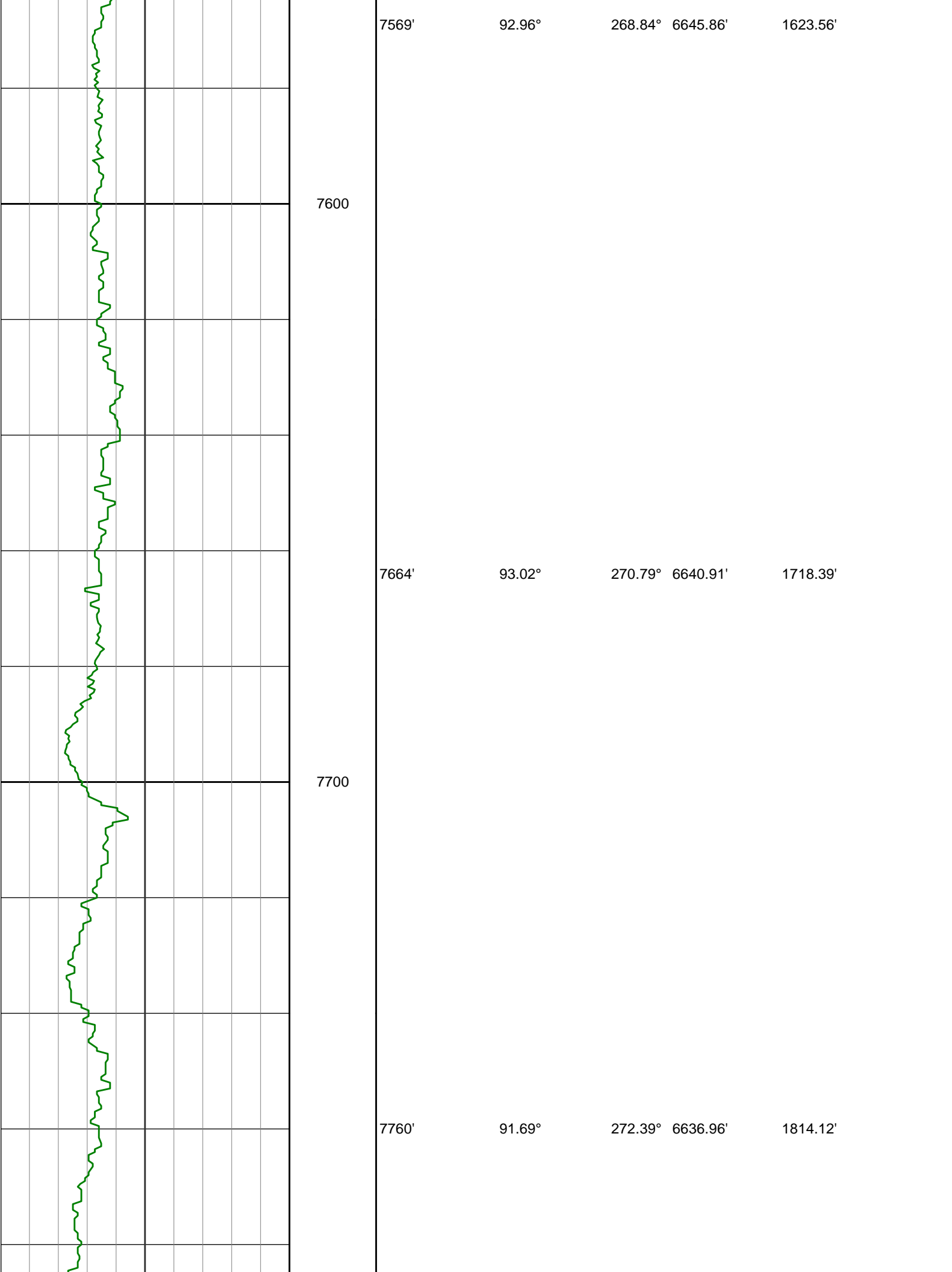
7474'

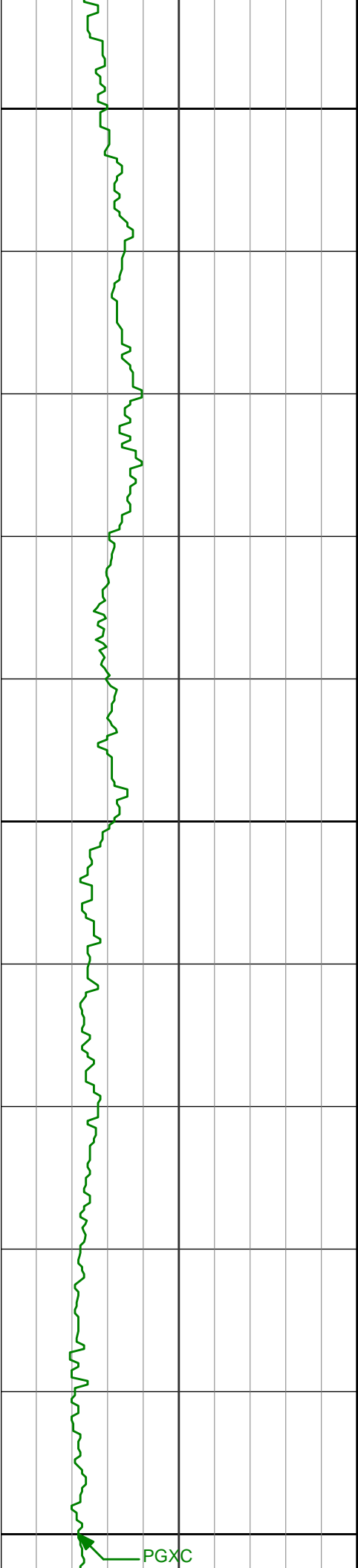
92.25°

268.97° 6650.18'

1528.67'

7500





7800

7854'

91.82°

272.24° 6634.08'

1907.82'

7900

7949'

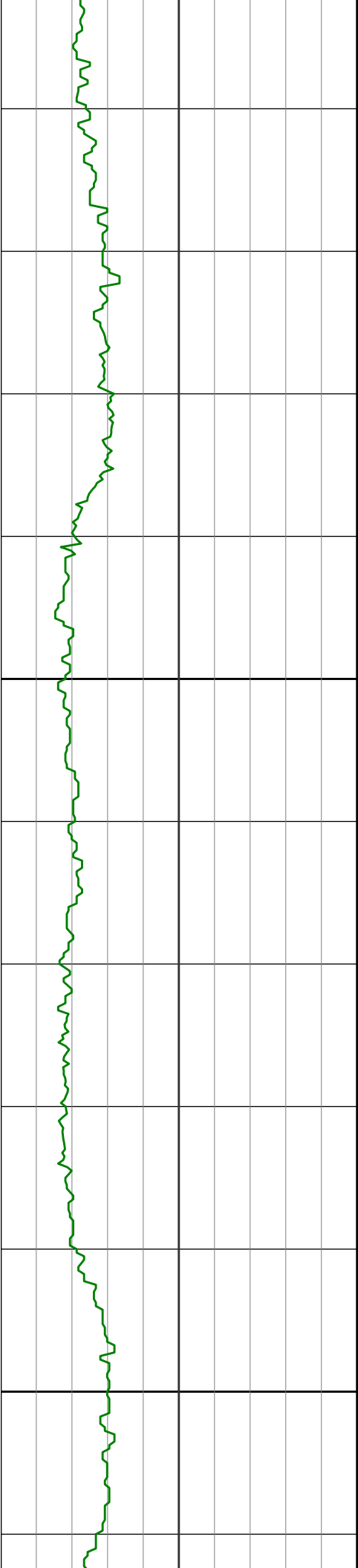
89.97°

272.21° 6632.60'

2002.56'

8000

PGXC



8100

8044'

90.89°

272.45° 6631.89'

2097.29'

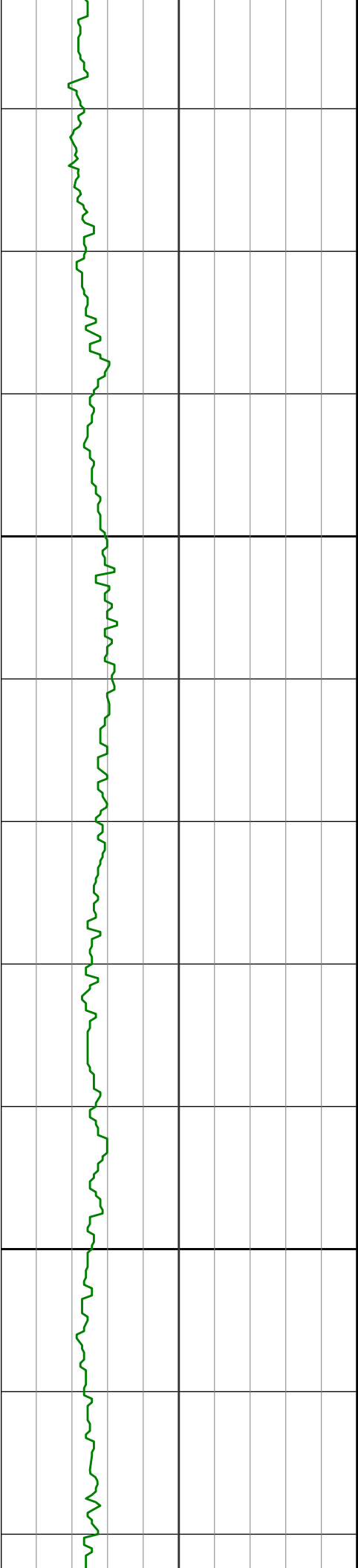
8139'

88.18°

270.90° 6632.66'

2192.09'

8200



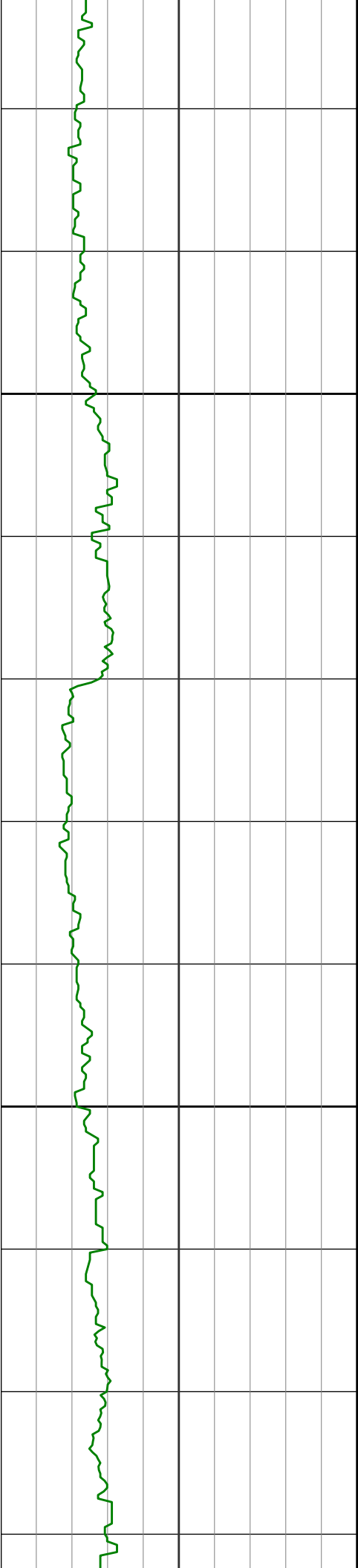
8300

8234' 87.41° 268.51° 6636.31' 2286.98'

8329' 89.63° 267.91° 6638.77' 2381.94'

8400

8424' 90.09° 267.39° 6639.00' 2476.94'

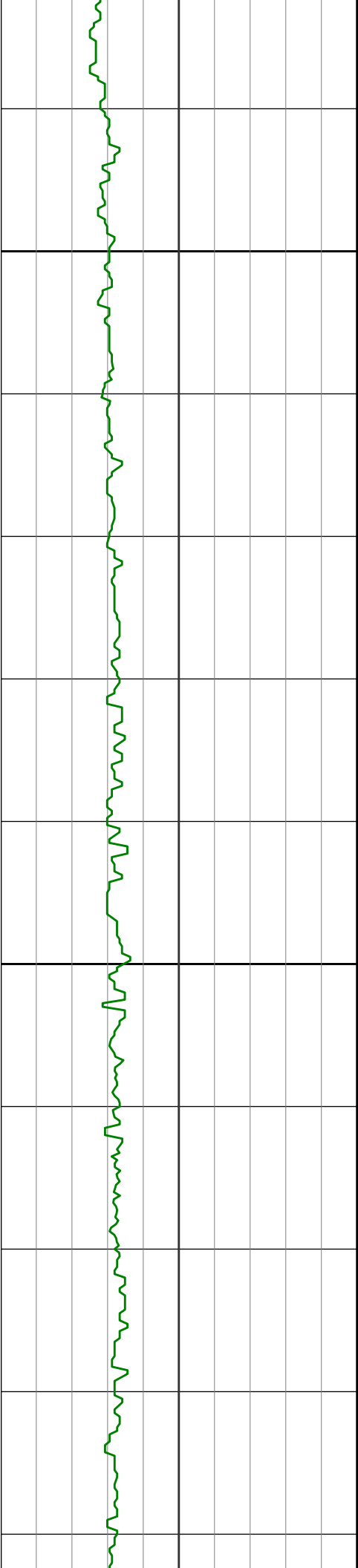


8500

8518' 91.05° 267.26° 6638.06' 2570.92'

8600

8613' 90.49° 267.79° 6636.79' 2665.91'



8700

8708'

89.48°

267.70° 6636.81'

2760.91'

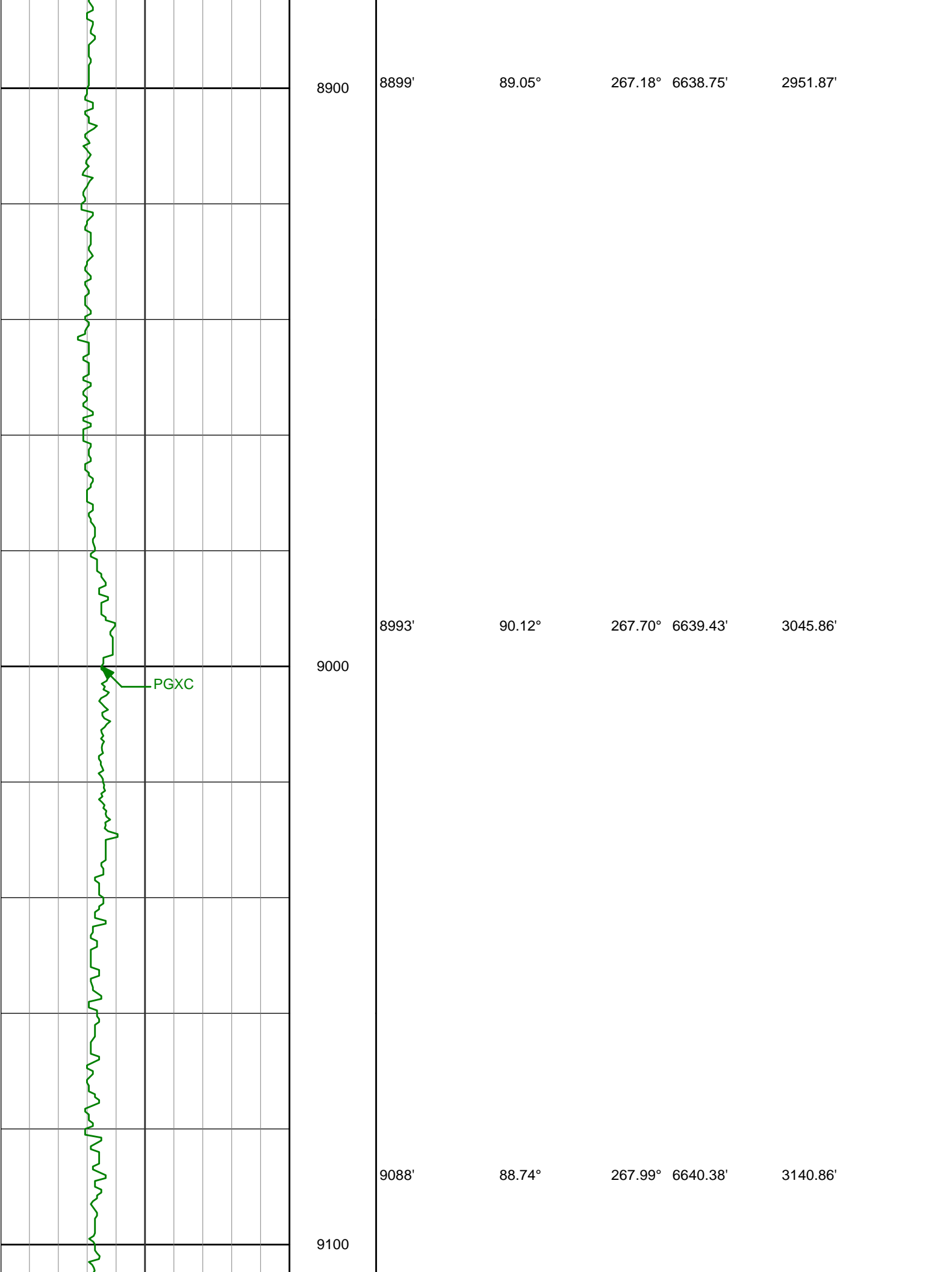
8800

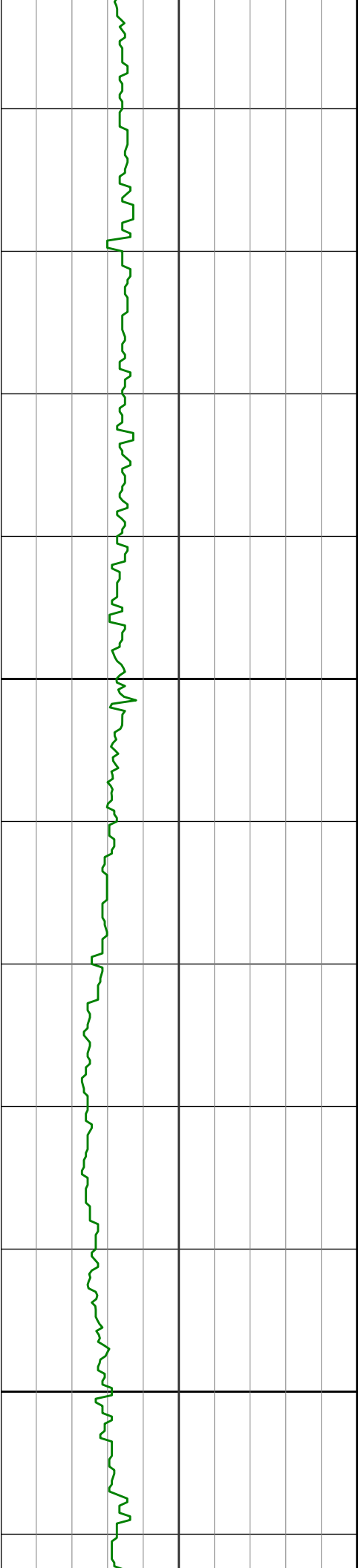
8804'

89.57°

267.11° 6637.61'

2856.90'



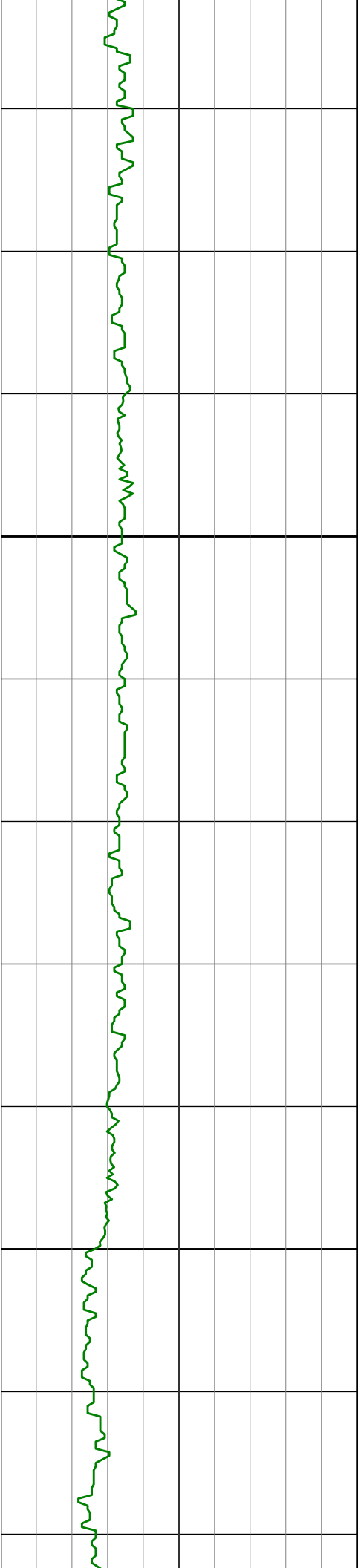


9200

9183' 90.12° 267.98° 6641.32' 3235.85'

9300

9278' 88.89° 267.73° 6642.14' 3330.84'



9400

9373'

89.04°

267.48°

6643.86'

3425.82'

9500

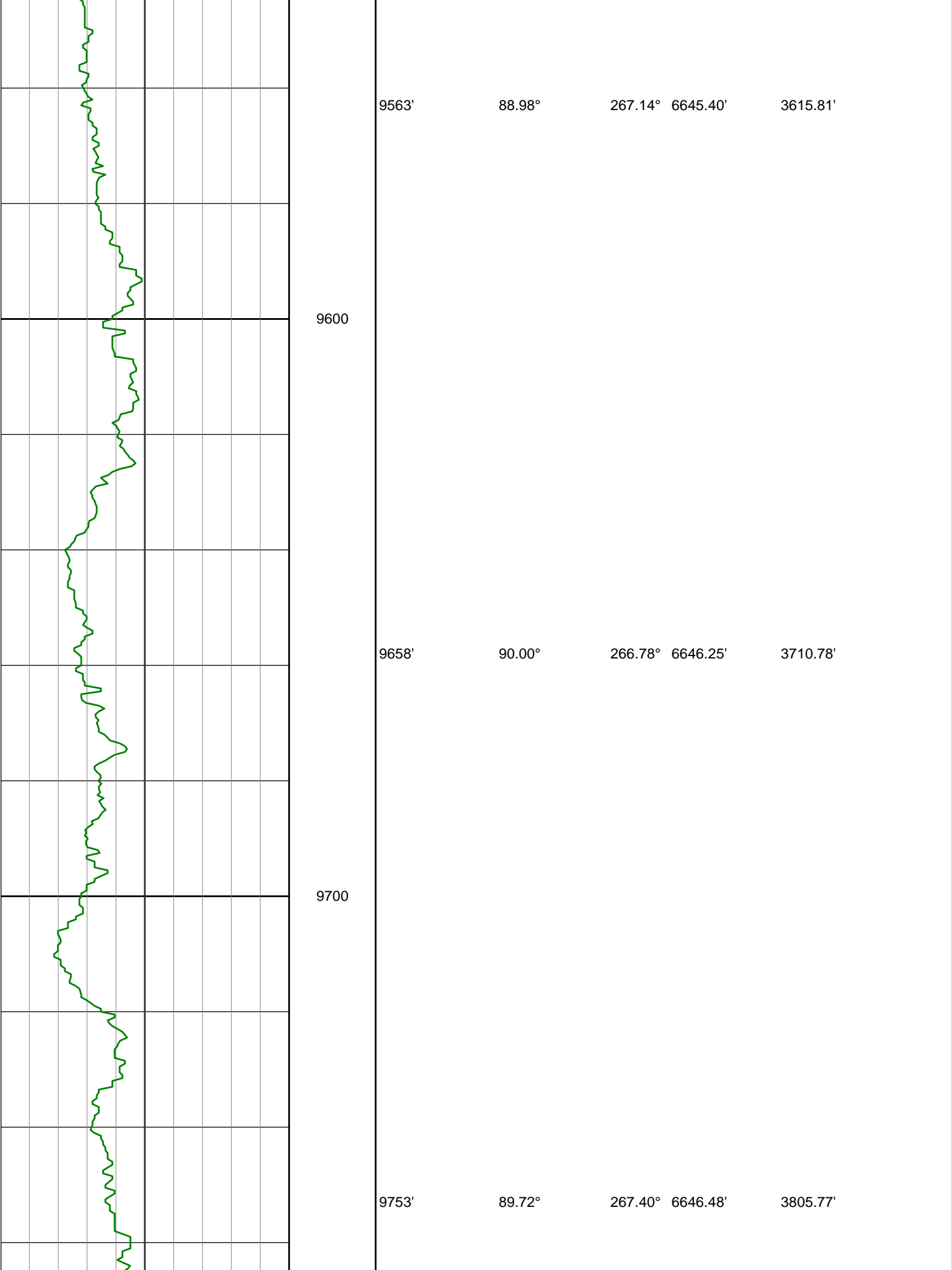
9468'

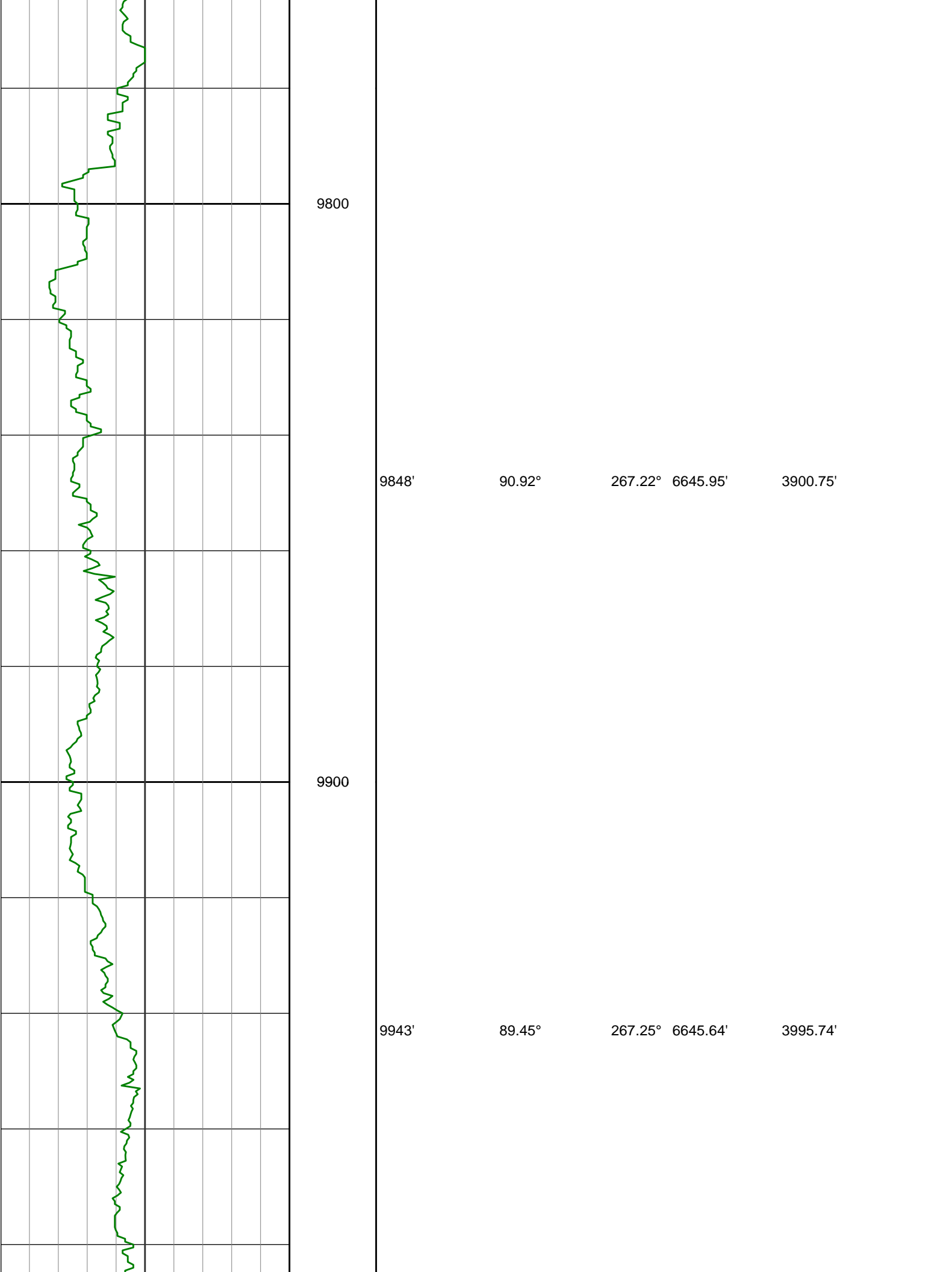
90.06°

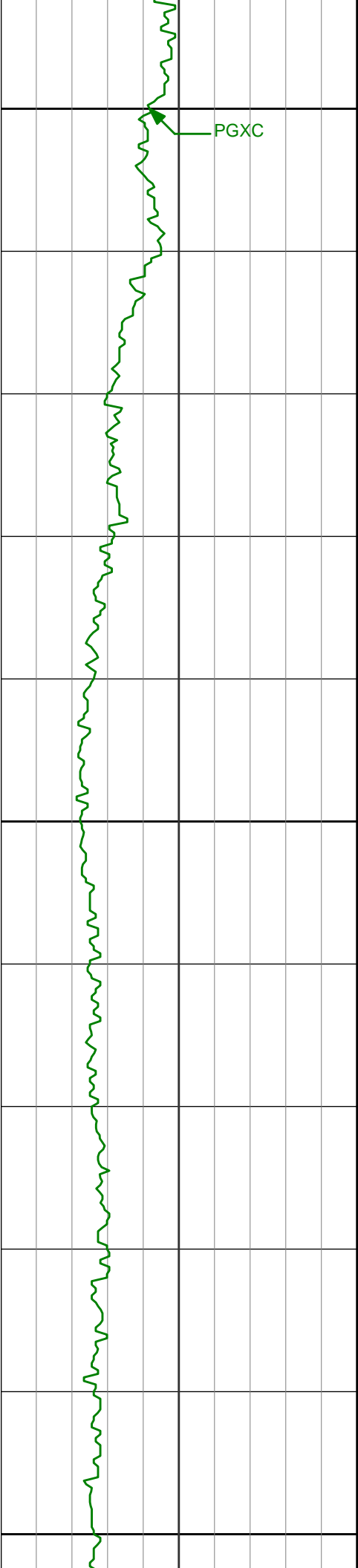
267.75°

6644.61'

3520.82'







10000

PGXC

10038'

89.26°

268.09° 6646.71'

4090.73'

10100

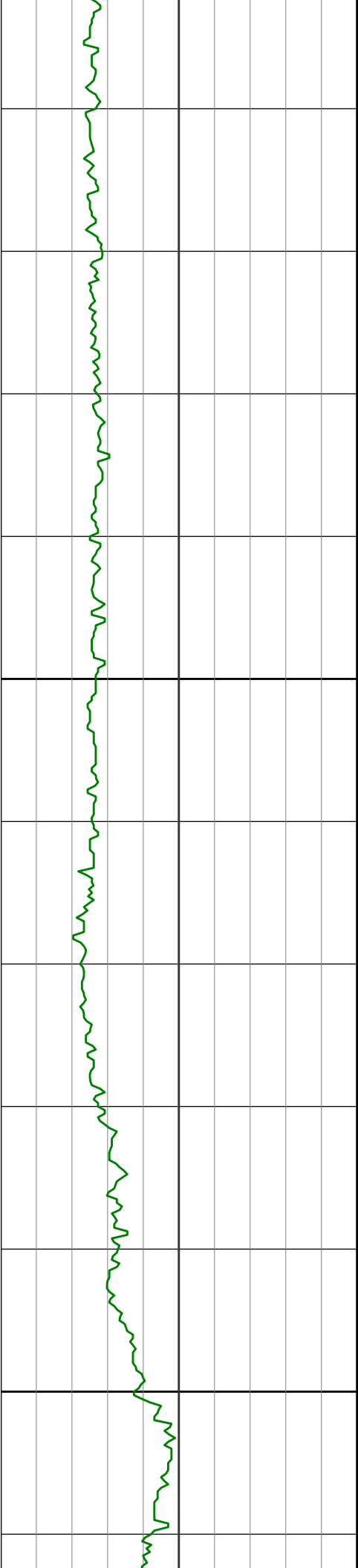
10132'

89.69°

267.76° 6647.57'

4184.73'

10200



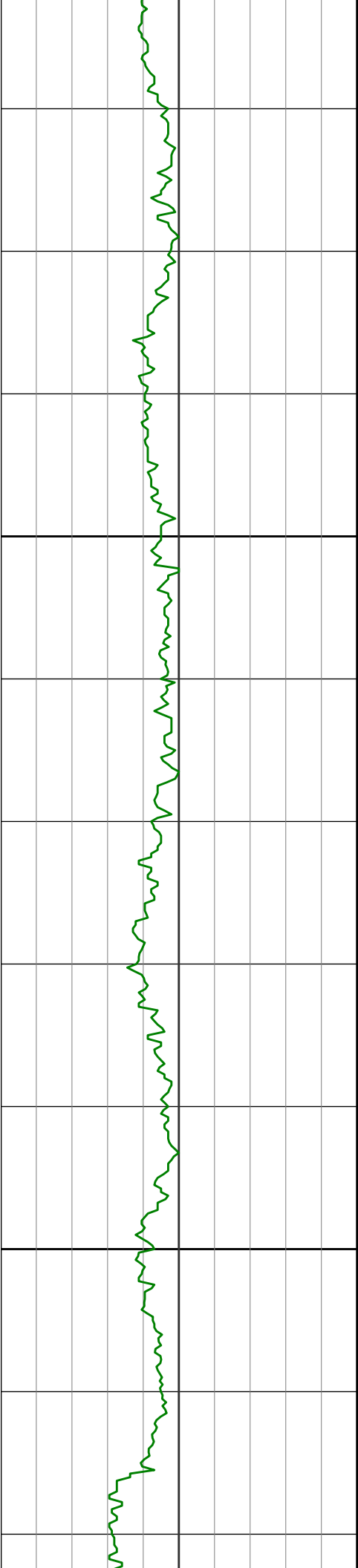
10228' 89.94° 266.98° 6647.88' 4280.72'

10300

10320' 88.64° 267.24° 6649.02' 4372.70'

10400

10413' 88.86° 267.41° 6651.05' 4465.66'



10500

10506'

89.69°

267.21° 6652.23'

4558.65'

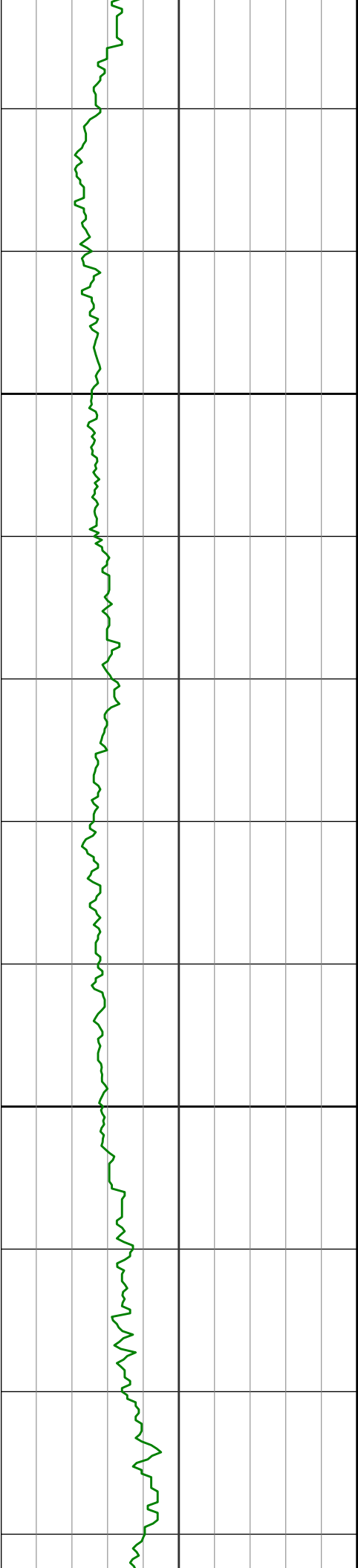
10600

10599'

91.23°

267.44° 6651.48'

4651.63'



10700

10691'

90.59°

268.76° 6650.02'

4743.62'

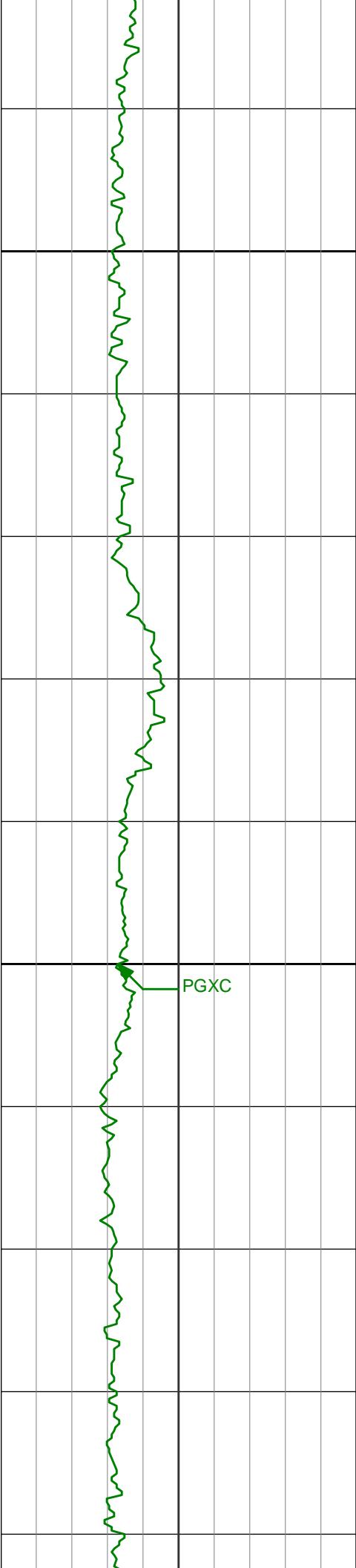
10800

10784'

90.55°

270.04° 6649.10'

4836.59'



10877'

89.32°

270.59° 6649.20'

4929.52'

10900

10970'

90.68°

270.95° 6649.20'

5022.41'

11000

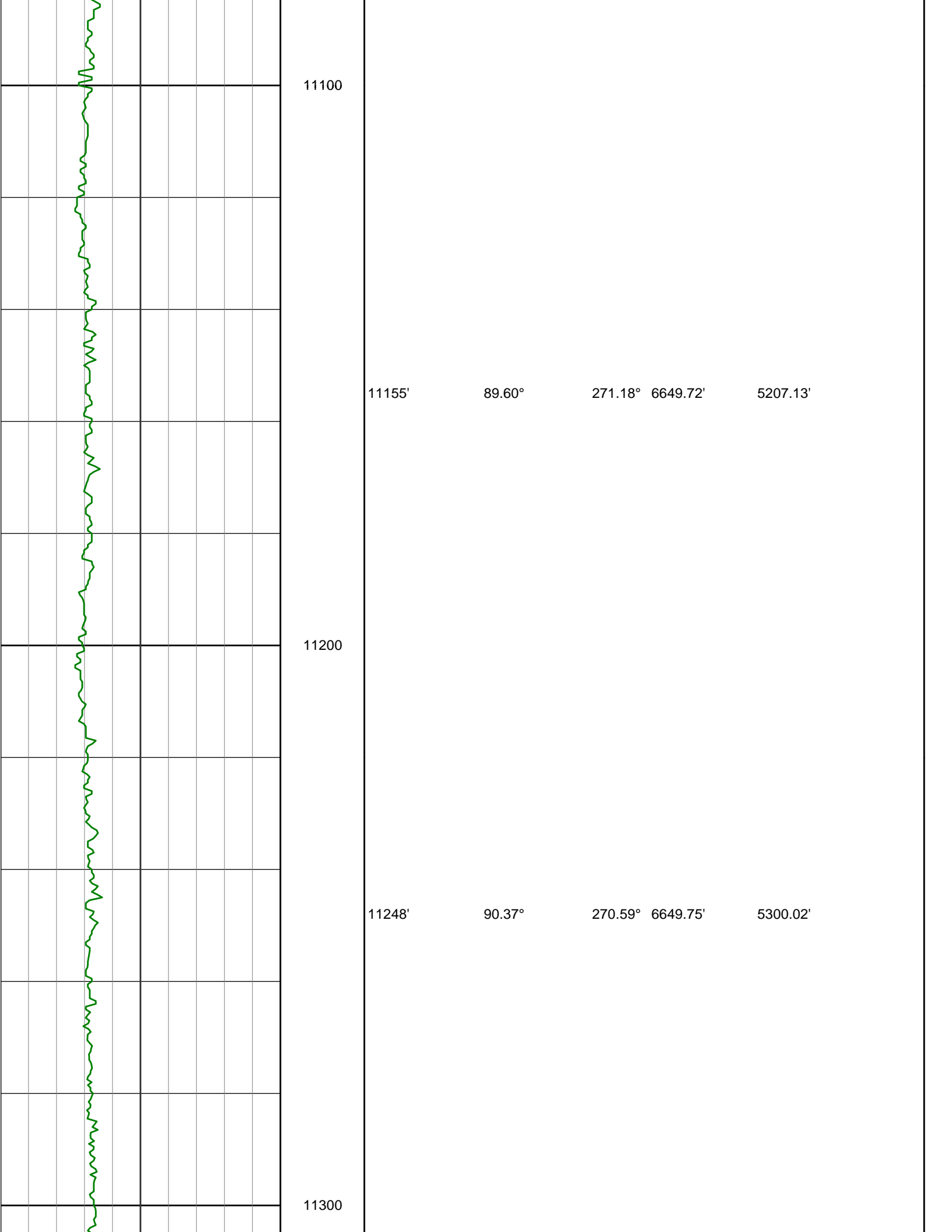
PGXC

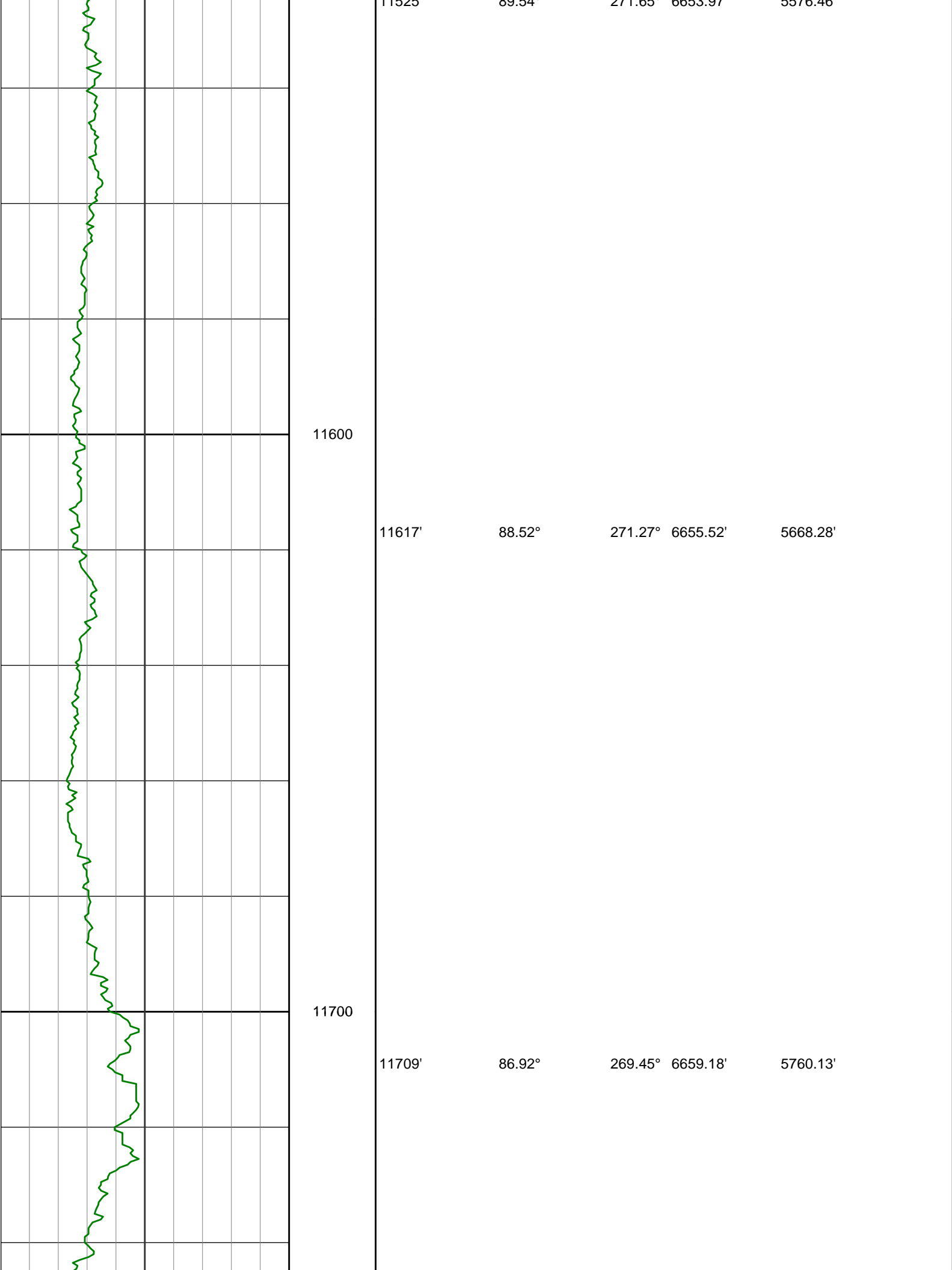
11062'

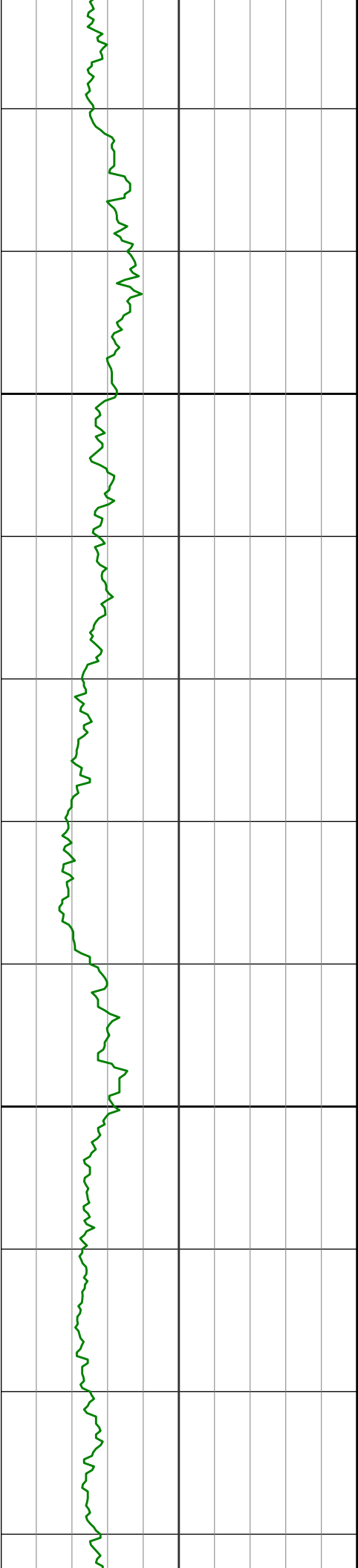
89.54°

271.37° 6649.02'

5114.28'







11800

11802'

87.10°

268.78° 6664.03'

5852.99'

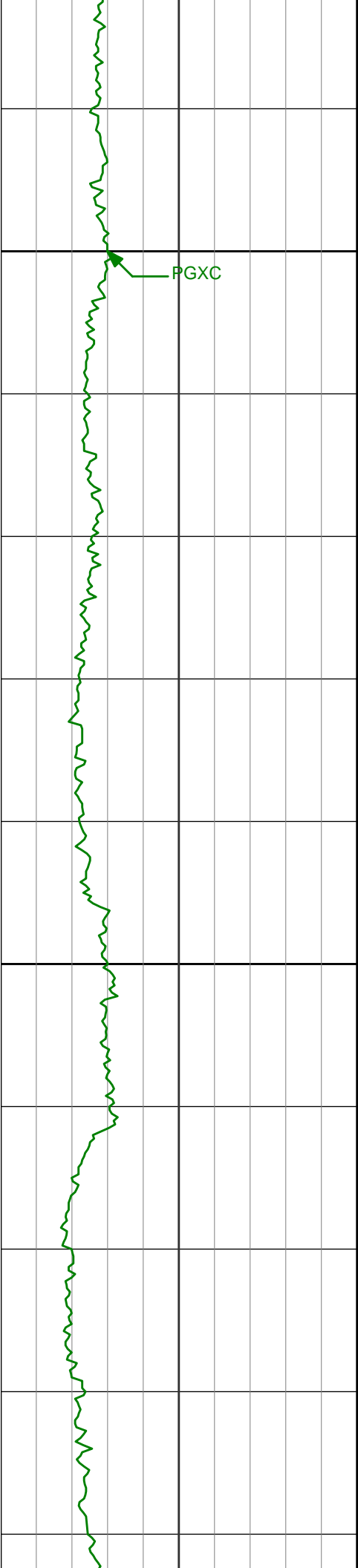
11900

11895'

87.66°

267.54° 6668.29'

5945.89'



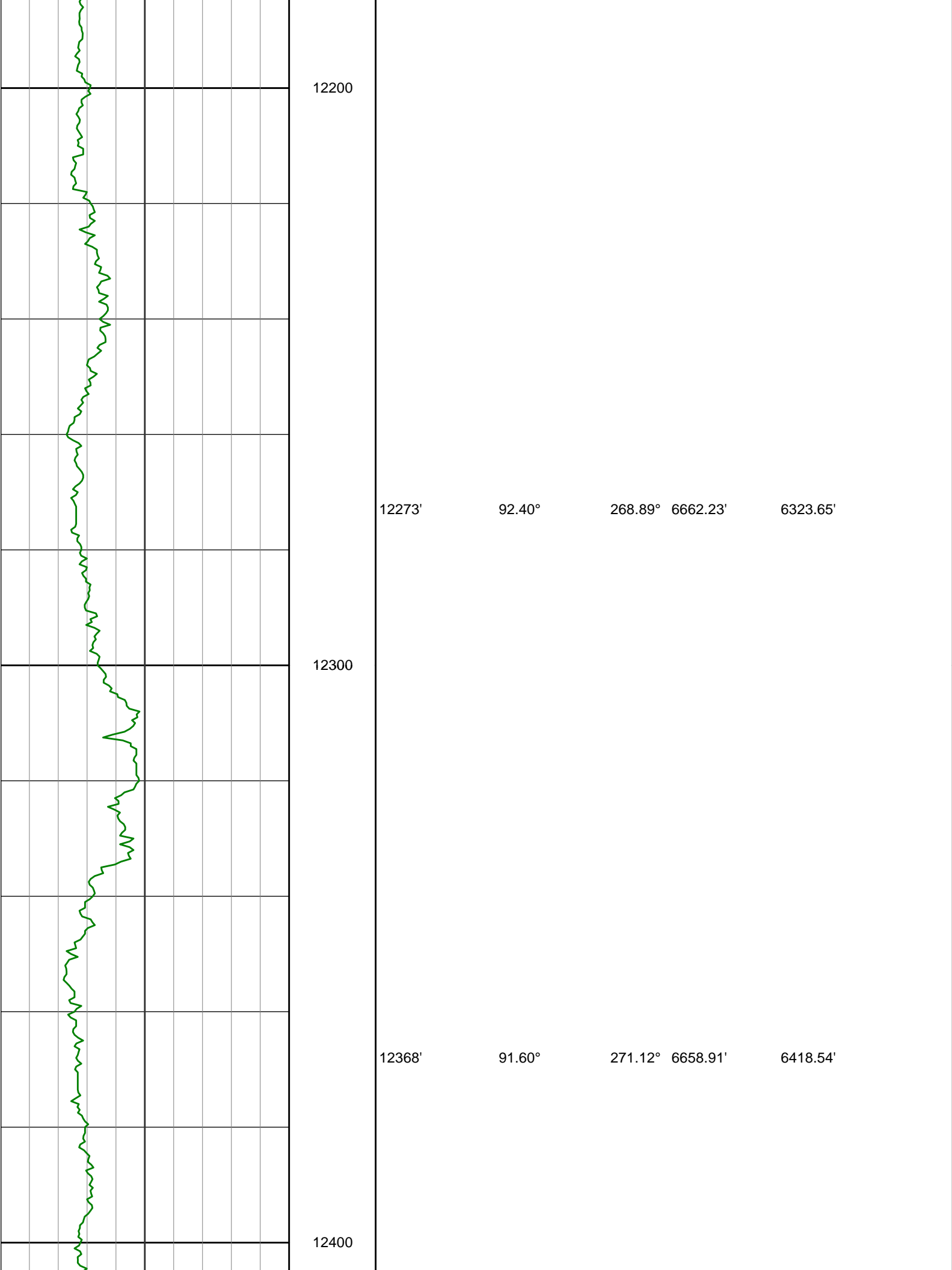
12000

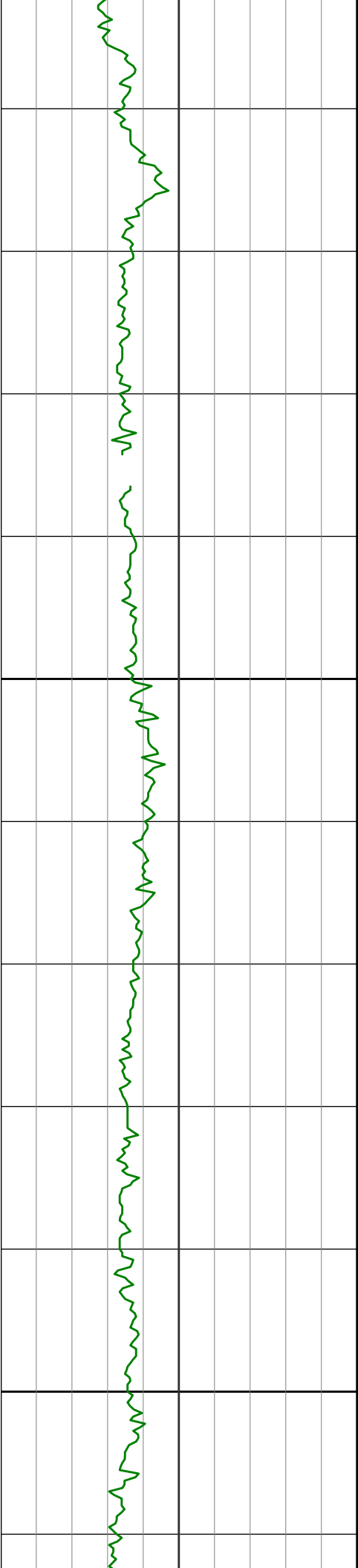
11988' 90.15° 266.67° 6670.06' 6038.85'

12100

12083' 91.17° 266.14° 6668.97' 6133.80'

12178' 92.28° 267.93° 6666.11' 6228.74'



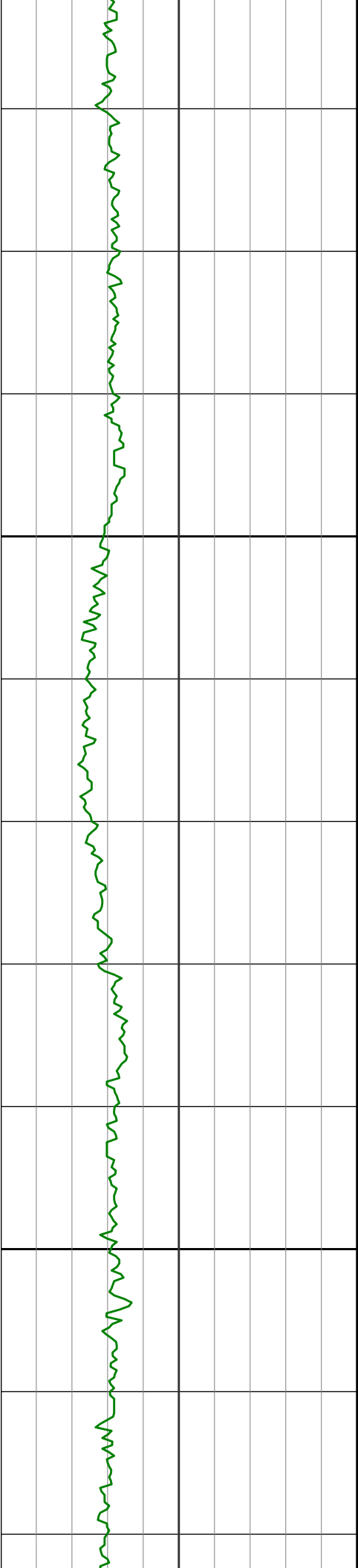


12500

12462' 89.51° 270.32° 6658.00' 6512.43'

12557' 90.22° 270.40° 6658.23' 6607.35'

12600



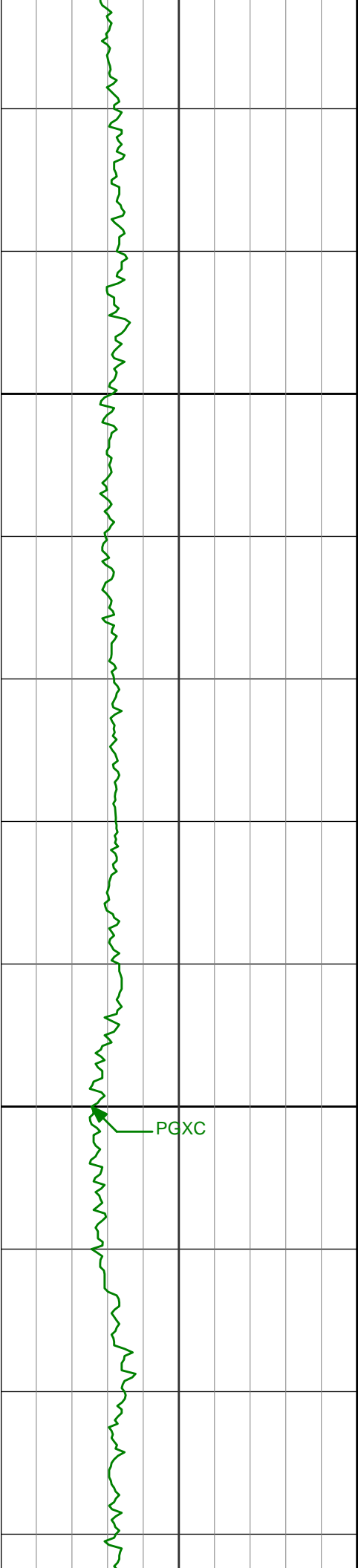
12700

12653' 90.59° 272.70° 6657.55' 6703.17'

12748' 89.01° 269.69° 6657.88' 6798.01'

12800

12843' 89.32° 269.25° 6659.26' 6892.98'



12900

12938'

90.71°

269.05° 6659.24'

6987.96'

13000

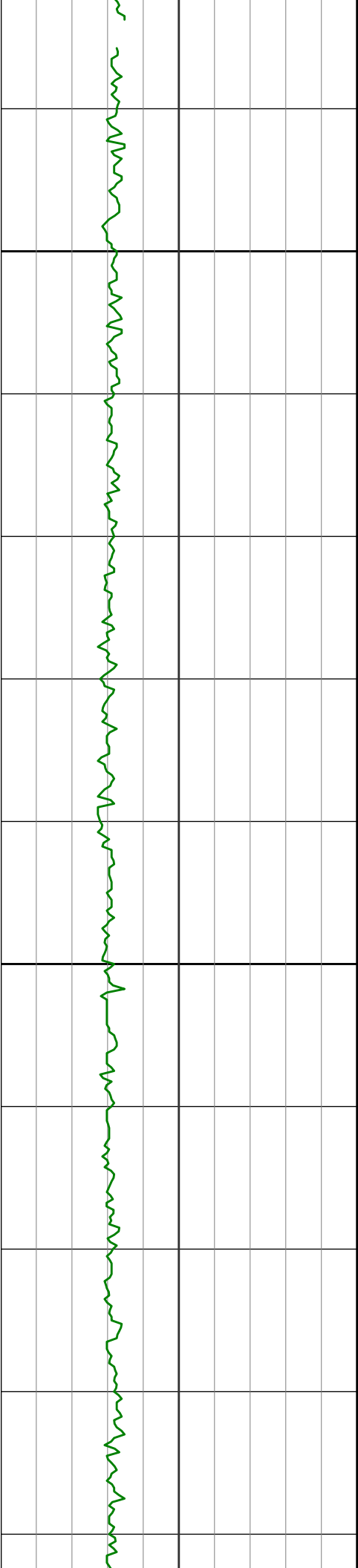
PGXC

13032'

89.26°

268.54° 6659.26'

7081.95'



13100

13127'

89.48°

268.09° 6660.31'

7176.94'

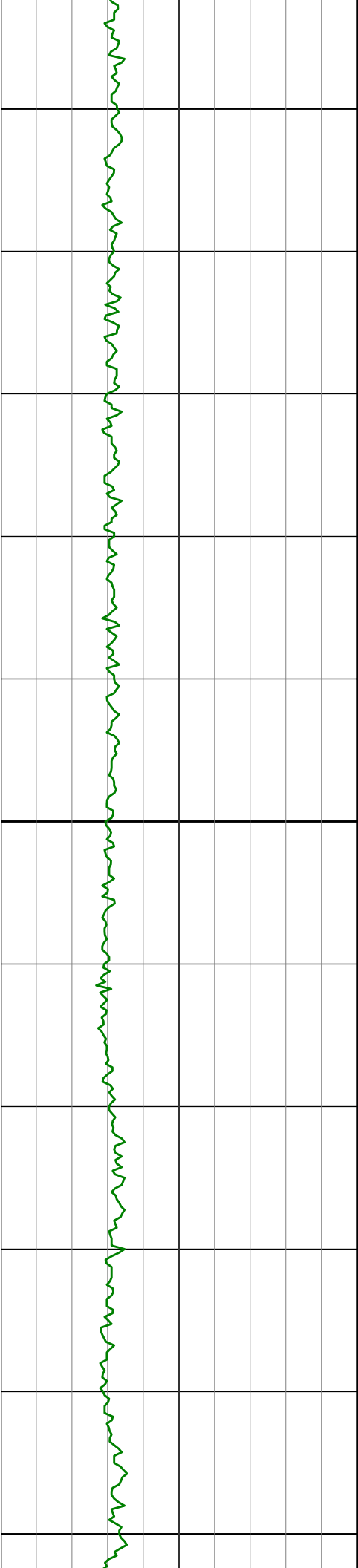
13200

13222'

89.63°

267.55° 6661.05'

7271.94'



13300

13317'

89.17°

266.03° 6662.04'

7366.90'

13400

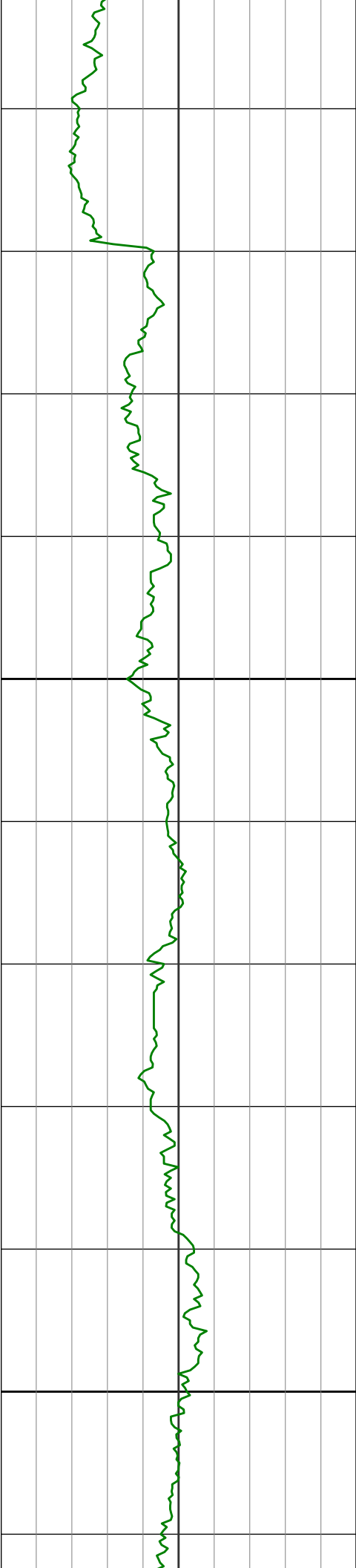
13412'

88.74°

264.53° 6663.77'

7461.77'

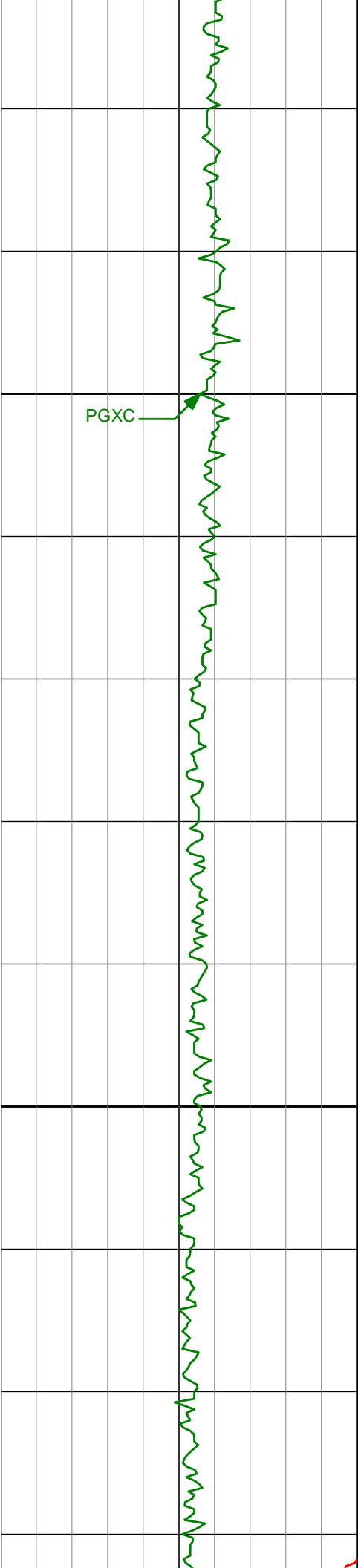
13500



13600

13700

13506'	91.66°	264.52°	6663.45'	7555.58'
13601'	92.31°	265.92°	6660.16'	7650.40'
13696'	92.28°	266.85°	6656.35'	7745.28'



14000

14100

13980'

88.61°

269.81° 6654.37'

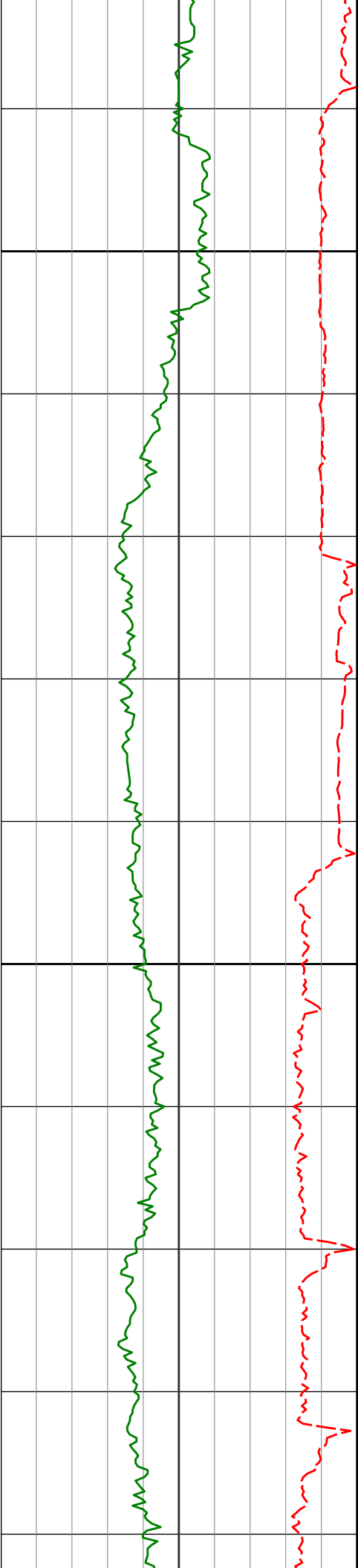
8029.17'

14075'

88.77°

268.98° 6656.54'

8124.12'



14170'

88.77°

268.65° 6658.58'

8219.09'

14200

14264'

88.83°

268.22° 6660.55'

8313.07'

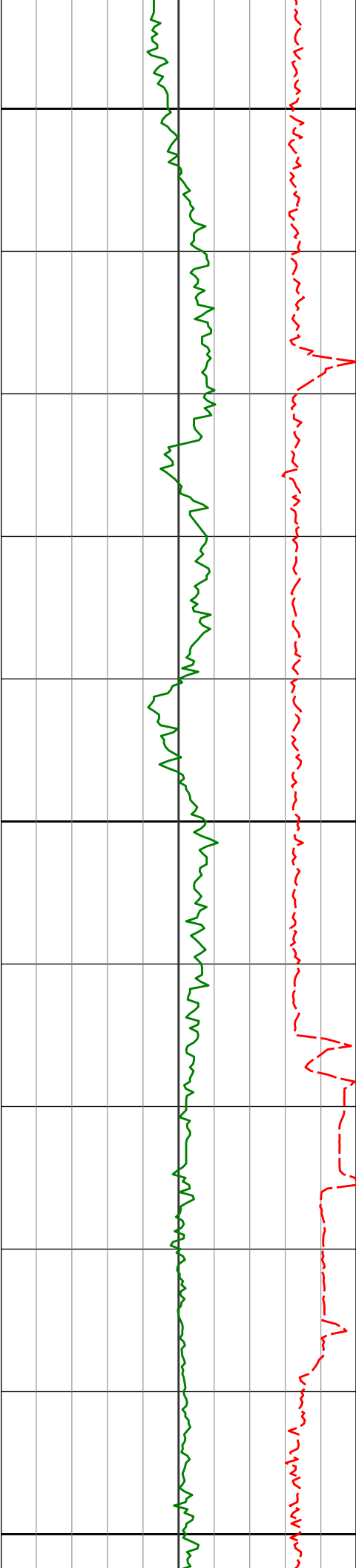
14300

14359'

89.23°

267.84° 6662.16'

8408.05'



14400

14454'

89.41°

267.68° 6663.29'

8503.05'

14500

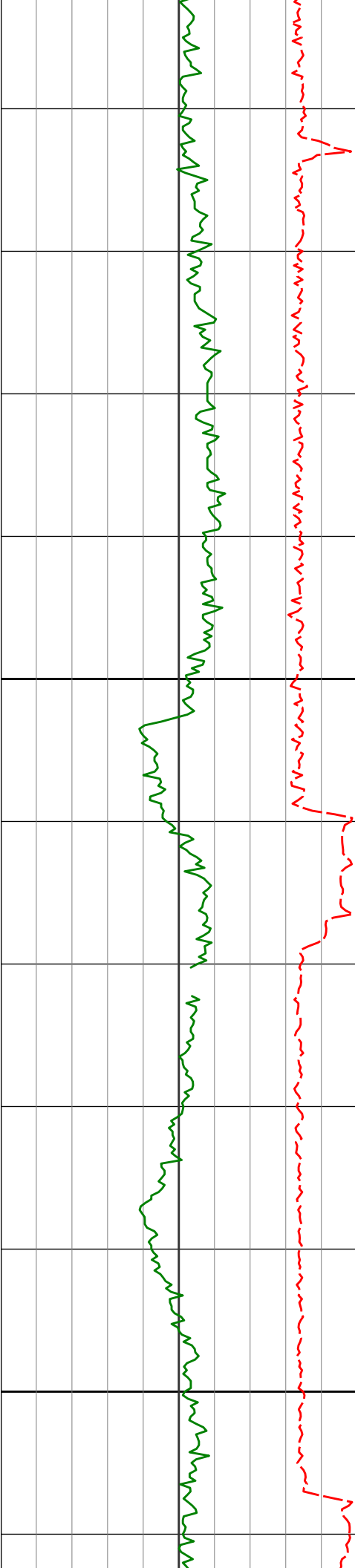
14549'

89.45°

267.04° 6664.23'

8598.03'

14600



14700

14800

14643'

90.92°

269.05° 6663.93'

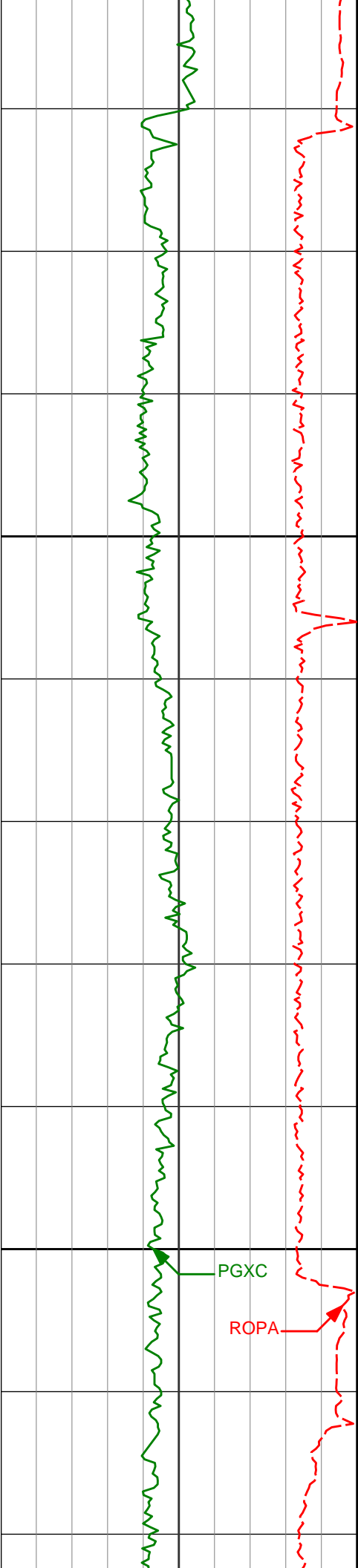
8692.03'

14738'

91.05°

269.32° 6662.30'

8786.99'

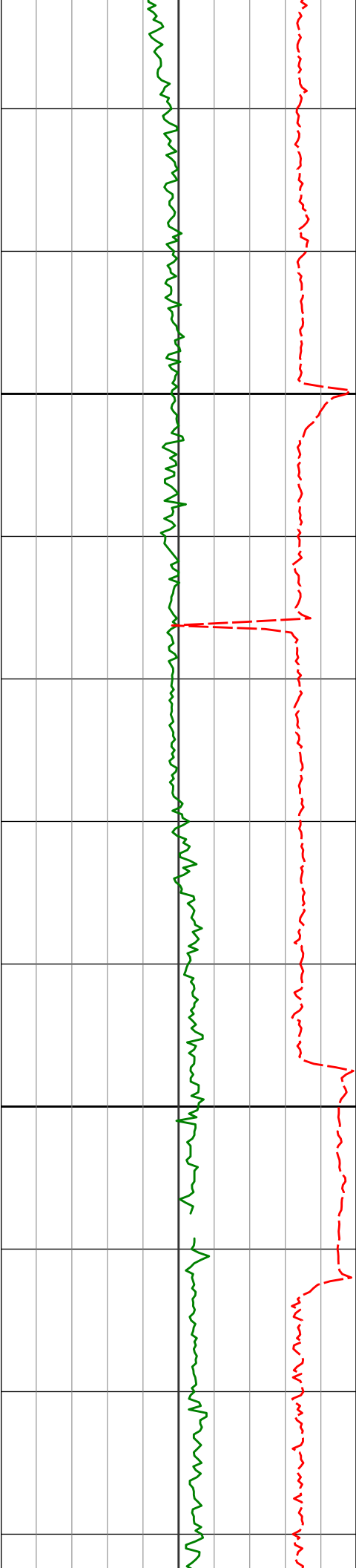


14900

15000

PGXC

ROPA



15100

15118'

91.26°

268.11° 6661.09'

9166.93'

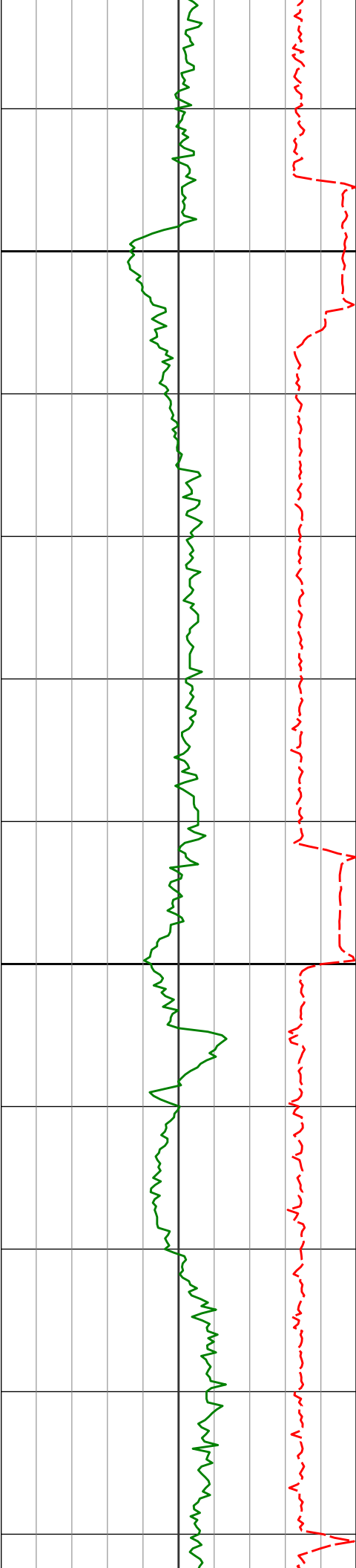
15200

15213'

90.92°

269.86° 6659.29'

9261.90'



15300

15308'

89.97°

270.26° 6658.55'

9356.84'

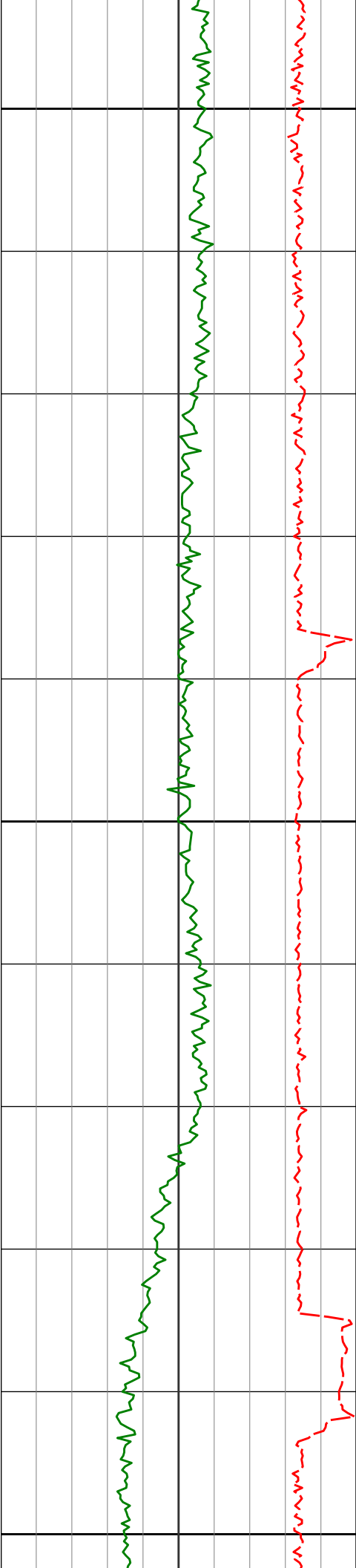
15400

15403'

89.08°

271.00° 6659.34'

9451.74'



15500

15498'

89.08°

270.92° 6660.86'

9546.61'

15600

15593'

89.23°

270.72° 6662.26'

9641.49'

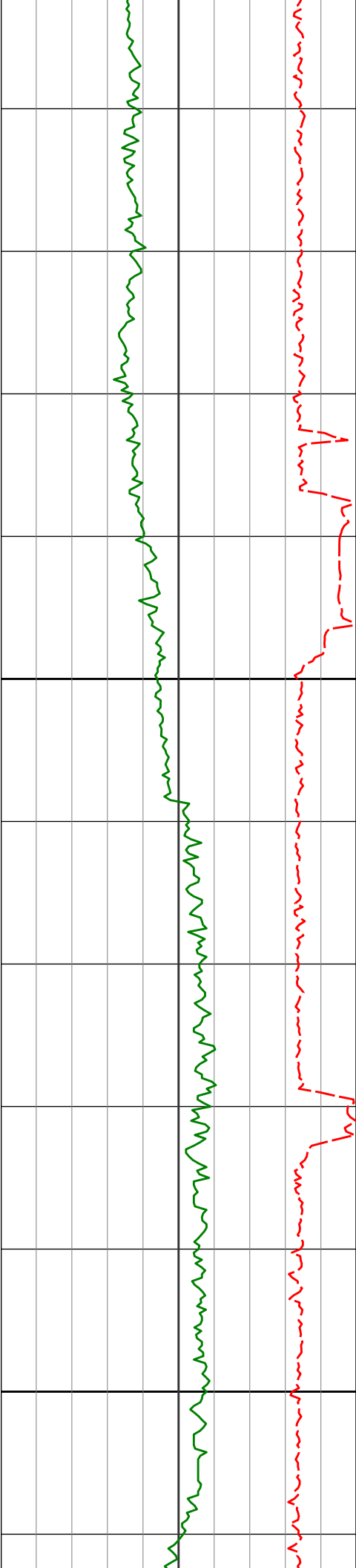
15700

15688'

89.57°

270.55° 6663.26'

9736.39'



15800

15900

15783'

89.94°

271.28° 6663.66'

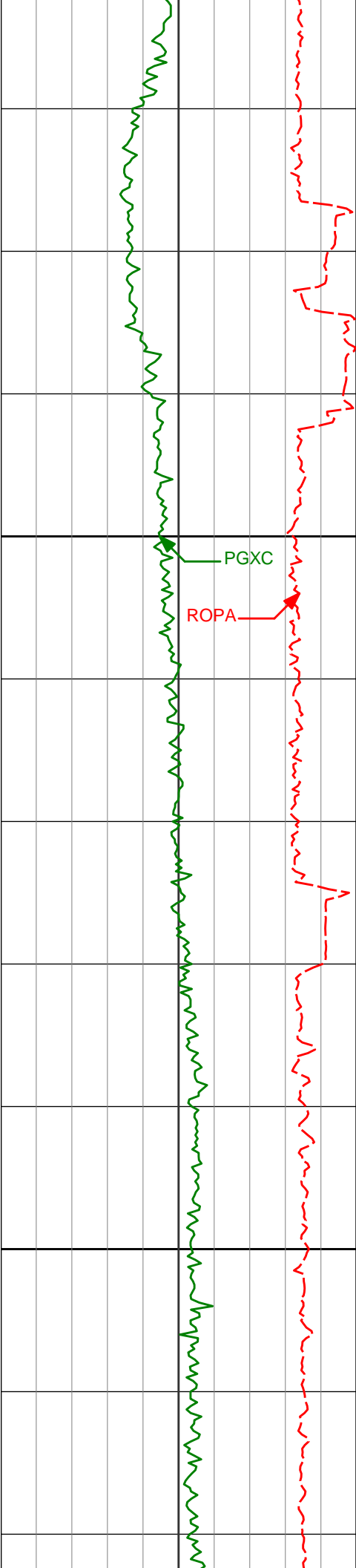
9831.28'

15878'

89.14°

270.62° 6664.43'

9926.15'



16000

16100

15973'

89.35°

270.12°

6665.68'

10021.07'

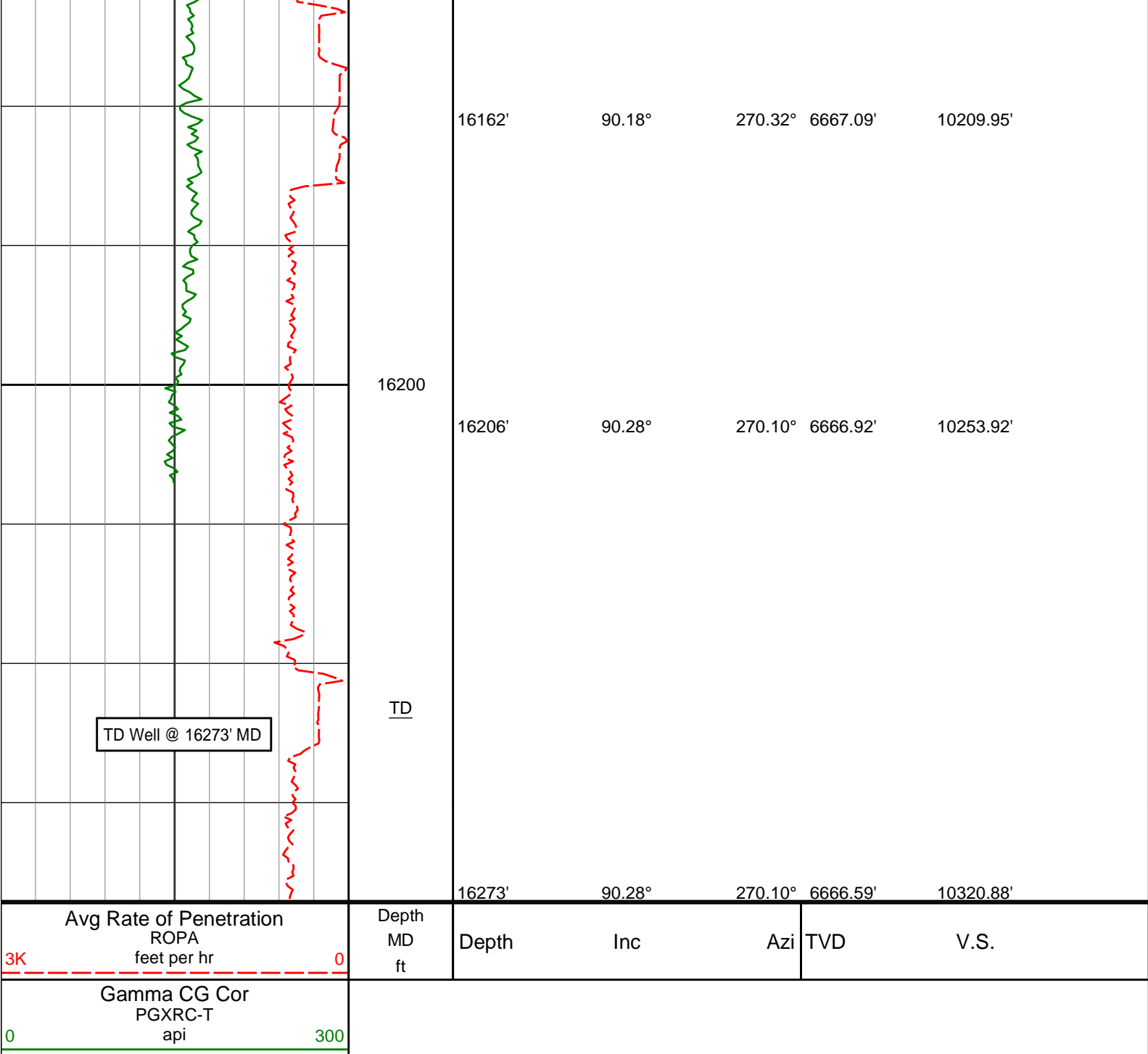
16068'

89.38°

269.93°

6666.73'

10116.01'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Colt A13-655
Wattenburg
Weld Colorado
USA
CA-XX-0902181677
First two surveys were provided by HP.

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
374.00	0.40	6.30	374.00	1.30 N	0.14 E	-0.19	0.11
652.00	0.40	159.93	651.99	1.35 N	0.58 E	-0.63	0.28
1020.00	0.50	104.44	1019.98	0.26 S	2.58 E	-2.57	0.12

1208.00	0.41	108.45	1207.98	0.67 S	4.01 E	-3.99	0.05
1300.00	0.53	65.03	1299.98	0.60 S	4.71 E	-4.69	0.40
1393.00	0.72	40.34	1392.97	0.03 N	5.48 E	-5.48	0.35
1486.00	0.85	31.85	1485.96	1.06 N	6.22 E	-6.25	0.19
1579.00	0.74	17.22	1578.95	2.22 N	6.76 E	-6.83	0.25
1764.00	0.58	23.73	1763.94	4.22 N	7.49 E	-7.63	0.10
1857.00	2.27	232.46	1856.92	3.53 N	6.22 E	-6.33	3.00
1950.00	4.60	217.37	1949.75	0.56 S	2.50 E	-2.48	2.67
2043.00	6.00	213.11	2042.35	7.60 S	2.42 W	2.67	1.56
2136.00	5.78	213.45	2134.86	15.57 S	7.66 W	8.17	0.24
2227.00	7.65	232.71	2225.24	23.07 S	15.01 W	15.77	3.19
2320.00	9.54	243.39	2317.20	30.27 S	26.82 W	27.82	2.65
2412.00	9.45	239.38	2407.94	37.53 S	40.14 W	41.37	0.73
2504.00	10.39	253.35	2498.58	43.76 S	54.59 W	56.02	2.80
2689.00	10.58	251.05	2680.49	54.05 S	86.63 W	88.39	0.25
2783.00	10.23	247.44	2772.94	60.06 S	102.51 W	104.45	0.79
2875.00	10.61	247.11	2863.42	66.49 S	117.85 W	120.00	0.42
2970.00	10.80	253.33	2956.77	72.44 S	134.44 W	136.78	1.23
3065.00	11.00	252.21	3050.06	77.77 S	151.59 W	154.10	0.31
3160.00	10.74	249.40	3143.36	83.65 S	168.51 W	171.20	0.62
3255.00	9.12	259.07	3236.94	88.19 S	184.19 W	187.03	2.44
3351.00	7.85	260.35	3331.88	90.73 S	198.12 W	201.04	1.34
3446.00	6.87	259.09	3426.10	92.90 S	210.10 W	213.08	1.05
3541.00	7.65	254.11	3520.34	95.70 S	221.76 W	224.83	1.05
3636.00	9.57	249.63	3614.27	100.18 S	235.25 W	238.45	2.14
3731.00	10.66	248.55	3707.79	106.15 S	250.83 W	254.23	1.16
3825.00	11.27	248.72	3800.07	112.66 S	267.48 W	271.08	0.65
3920.00	10.65	254.80	3893.34	118.33 S	284.60 W	288.39	1.38
4015.00	8.43	261.39	3987.02	121.67 S	299.96 W	303.85	2.60
4110.00	7.42	263.39	4081.12	123.42 S	312.94 W	316.88	1.10
4205.00	7.86	265.39	4175.27	124.65 S	325.51 W	329.48	0.54
4300.00	7.95	261.68	4269.37	126.12 S	338.48 W	342.50	0.55
4395.00	9.21	254.93	4363.31	129.05 S	352.32 W	356.43	1.70
4489.00	8.44	254.47	4456.19	132.85 S	366.23 W	370.46	0.82
4584.00	6.45	255.84	4550.39	136.03 S	378.13 W	382.45	2.10
4679.00	6.92	245.08	4644.75	139.74 S	388.49 W	392.93	1.41
4774.00	8.02	242.04	4738.94	145.26 S	399.54 W	404.16	1.23
4869.00	7.64	246.37	4833.05	150.90 S	411.17 W	415.98	0.74
4965.00	8.67	248.22	4928.08	156.14 S	423.74 W	428.71	1.11
5060.00	8.22	249.93	5022.05	161.13 S	436.77 W	441.90	0.54
5155.00	6.93	250.11	5116.22	165.41 S	448.54 W	453.80	1.36
5250.00	5.31	246.06	5210.68	169.15 S	457.95 W	463.33	1.76
5345.00	4.20	242.11	5305.35	172.56 S	465.04 W	470.53	1.22
5440.00	1.96	249.66	5400.21	174.75 S	469.64 W	475.20	2.39
5630.00	0.38	117.98	5590.17	176.17 S	472.13 W	477.74	1.17
5725.00	0.37	141.23	5685.17	176.56 S	471.66 W	477.28	0.16
5915.00	1.39	132.91	5875.14	178.61 S	469.58 W	475.28	0.54
6010.00	3.64	252.11	5970.08	180.32 S	471.61 W	477.36	4.72
6105.00	7.71	266.02	6064.60	181.69 S	480.84 W	486.63	4.49
6199.00	10.57	260.92	6157.40	183.49 S	495.65 W	501.49	3.16
6294.00	14.45	256.72	6250.13	187.59 S	515.80 W	521.76	4.19
6325.00	15.47	257.36	6280.08	189.38 S	523.60 W	529.62	3.33
6357.00	17.26	255.68	6310.78	191.49 S	532.36 W	538.45	5.79
6388.00	21.58	257.12	6340.01	193.90 S	542.38 W	548.54	14.02
6420.00	27.70	261.37	6369.08	196.33 S	555.48 W	561.72	19.90
6452.00	33.91	264.12	6396.56	198.36 S	571.73 W	578.03	19.89
6483.00	40.85	266.68	6421.18	199.84 S	590.48 W	596.81	22.94
6515.00	48.59	270.99	6443.90	200.24 S	612.97 W	619.30	25.97
6547.00	55.59	275.81	6463.56	198.69 S	638.14 W	644.40	24.88
6578.00	59.09	277.26	6480.29	195.71 S	664.06 W	670.21	11.96
6610.00	59.48	277.91	6496.63	192.08 S	691.33 W	697.35	2.13
6642.00	59.09	277.74	6512.98	188.34 S	718.58 W	724.46	1.30
6673.00	58.73	277.82	6528.98	184.74 S	744.89 W	750.63	1.18
6768.00	64.83	274.75	6573.89	175.65 S	828.05 W	833.44	7.02
6863.00	74.08	272.46	6607.20	170.12 S	916.73 W	921.89	9.99
6958.00	80.34	270.52	6628.22	167.73 S	1009.29 W	1014.32	6.88
7017.00	82.93	270.32	6636.81	167.30 S	1067.65 W	1072.64	4.40
7094.00	84.91	271.50	6644.96	166.08 S	1144.21 W	1149.11	2.99
7189.00	88.37	270.57	6650.53	164.37 S	1239.01 W	1243.80	3.77
7284.00	90.18	269.87	6651.73	164.01 S	1334.00 W	1338.72	2.04
7379.00	89.72	268.67	6651.81	165.22 S	1428.99 W	1433.70	1.35

7474.00	92.25	268.97	6650.18	167.17 S	1523.95 W	1528.67	2.68
7569.00	92.96	268.84	6645.86	168.99 S	1618.83 W	1623.56	0.76
7664.00	93.02	270.79	6640.91	169.29 S	1713.70 W	1718.39	2.05
7760.00	91.69	272.39	6636.96	166.63 S	1809.57 W	1814.12	2.17
7854.00	91.82	272.24	6634.08	162.84 S	1903.45 W	1907.82	0.21
7949.00	89.97	272.21	6632.60	159.15 S	1998.36 W	2002.56	1.95
8044.00	90.89	272.45	6631.89	155.29 S	2093.28 W	2097.29	1.00
8139.00	88.18	270.90	6632.66	152.51 S	2188.23 W	2192.09	3.29
8234.00	87.41	268.51	6636.31	153.00 S	2283.15 W	2286.98	2.64
8329.00	89.63	267.91	6638.77	155.96 S	2378.06 W	2381.94	2.42
8424.00	90.09	267.39	6639.00	159.86 S	2472.98 W	2476.94	0.73
8518.00	91.05	267.26	6638.06	164.25 S	2566.87 W	2570.92	1.03
8613.00	90.49	267.79	6636.79	168.35 S	2661.78 W	2665.91	0.81
8708.00	89.48	267.70	6636.81	172.09 S	2756.70 W	2760.91	1.07
8804.00	89.57	267.11	6637.61	176.43 S	2852.60 W	2856.90	0.62
8899.00	89.05	267.18	6638.75	181.16 S	2947.47 W	2951.87	0.55
8993.00	90.12	267.70	6639.43	185.36 S	3041.38 W	3045.86	1.27
9088.00	88.74	267.99	6640.38	188.94 S	3136.30 W	3140.86	1.48
9183.00	90.12	267.98	6641.32	192.28 S	3231.24 W	3235.85	1.45
9278.00	88.89	267.73	6642.14	195.83 S	3326.16 W	3330.84	1.32
9373.00	89.04	267.48	6643.86	199.80 S	3421.07 W	3425.82	0.31
9468.00	90.06	267.75	6644.61	203.75 S	3515.98 W	3520.82	1.11
9563.00	88.98	267.14	6645.40	207.99 S	3610.88 W	3615.81	1.31
9658.00	90.00	266.78	6646.25	213.03 S	3705.74 W	3710.78	1.14
9753.00	89.72	267.40	6646.48	217.85 S	3800.62 W	3805.77	0.72
9848.00	90.92	267.22	6645.95	222.31 S	3895.51 W	3900.75	1.28
9943.00	89.45	267.25	6645.64	226.89 S	3990.40 W	3995.74	1.55
10038.00	89.26	268.09	6646.71	230.75 S	4085.31 W	4090.73	0.91
10132.00	89.69	267.76	6647.57	234.16 S	4179.24 W	4184.73	0.58
10228.00	89.94	266.98	6647.88	238.56 S	4275.14 W	4280.72	0.85
10320.00	88.64	267.24	6649.02	243.20 S	4367.02 W	4372.70	1.44
10413.00	88.86	267.41	6651.05	247.54 S	4459.89 W	4465.66	0.30
10506.00	89.69	267.21	6652.23	251.90 S	4552.78 W	4558.65	0.92
10599.00	91.23	267.44	6651.48	256.24 S	4645.67 W	4651.63	1.67
10691.00	90.59	268.76	6650.02	259.29 S	4737.61 W	4743.62	1.59
10784.00	90.55	270.04	6649.10	260.27 S	4830.60 W	4836.59	1.38
10877.00	89.32	270.59	6649.20	259.76 S	4923.59 W	4929.52	1.45
10970.00	90.68	270.95	6649.20	258.51 S	5016.58 W	5022.41	1.51
11062.00	89.54	271.37	6649.02	256.64 S	5108.56 W	5114.28	1.32
11155.00	89.60	271.18	6649.72	254.57 S	5201.54 W	5207.13	0.21
11248.00	90.37	270.59	6649.75	253.14 S	5294.52 W	5300.02	1.04
11339.00	88.67	271.90	6650.51	251.16 S	5385.49 W	5390.87	2.36
11433.00	88.77	271.77	6652.61	248.15 S	5479.42 W	5484.65	0.17
11525.00	89.54	271.65	6653.97	245.41 S	5571.37 W	5576.46	0.85
11617.00	88.52	271.27	6655.52	243.06 S	5663.33 W	5668.28	1.18
11709.00	86.92	269.45	6659.18	242.48 S	5755.25 W	5760.13	2.63
11802.00	87.10	268.78	6664.03	243.92 S	5848.11 W	5852.99	0.75
11895.00	87.66	267.54	6668.29	246.90 S	5940.96 W	5945.89	1.46
11988.00	90.15	266.67	6670.06	251.60 S	6033.82 W	6038.85	2.84
12083.00	91.17	266.14	6668.97	257.55 S	6128.62 W	6133.80	1.21
12178.00	92.28	267.93	6666.11	262.47 S	6223.45 W	6228.74	2.22
12273.00	92.40	268.89	6662.23	265.10 S	6318.33 W	6323.65	1.02
12368.00	91.60	271.12	6658.91	265.09 S	6413.26 W	6418.54	2.49
12462.00	89.51	270.32	6658.00	263.91 S	6507.25 W	6512.43	2.38
12557.00	90.22	270.40	6658.23	263.31 S	6602.24 W	6607.35	0.75
12653.00	90.59	272.70	6657.55	260.72 S	6698.20 W	6703.17	2.43
12748.00	89.01	269.69	6657.88	258.74 S	6793.16 W	6798.01	3.58
12843.00	89.32	269.25	6659.26	259.62 S	6888.15 W	6892.98	0.57
12938.00	90.71	269.05	6659.24	261.02 S	6983.14 W	6987.96	1.48
13032.00	89.26	268.54	6659.26	263.00 S	7077.11 W	7081.95	1.64
13127.00	89.48	268.09	6660.31	265.79 S	7172.07 W	7176.94	0.53
13222.00	89.63	267.55	6661.05	269.41 S	7266.99 W	7271.94	0.59
13317.00	89.17	266.03	6662.04	274.73 S	7361.84 W	7366.90	1.67
13412.00	88.74	264.53	6663.77	282.54 S	7456.50 W	7461.77	1.64
13506.00	91.66	264.52	6663.45	291.51 S	7550.06 W	7555.58	3.11
13601.00	92.31	265.92	6660.16	299.42 S	7644.67 W	7650.40	1.62
13696.00	92.28	266.85	6656.35	305.41 S	7739.40 W	7745.28	0.98
13791.00	91.11	268.33	6653.54	309.40 S	7834.27 W	7840.23	1.99
13886.00	89.63	269.37	6652.93	311.31 S	7929.25 W	7935.22	1.90
13980.00	88.61	269.81	6654.37	311.98 S	8023.23 W	8029.17	1.18
14075.00	89.77	268.08	6656.54	313.08 S	8118.20 W	8124.13	0.89

14073.00	88.77	268.98	6658.54	312.98 S	8118.20 W	8124.12	0.89
14170.00	88.77	268.65	6658.58	314.95 S	8213.16 W	8219.09	0.35
14264.00	88.83	268.22	6660.55	317.51 S	8307.10 W	8313.07	0.46
14359.00	89.23	267.84	6662.16	320.78 S	8402.03 W	8408.05	0.58
14454.00	89.41	267.68	6663.29	324.49 S	8496.95 W	8503.05	0.25
14549.00	89.45	267.04	6664.23	328.87 S	8591.85 W	8598.03	0.67
14643.00	90.92	269.05	6663.93	332.07 S	8685.78 W	8692.03	2.65
14738.00	91.05	269.32	6662.30	333.43 S	8780.76 W	8786.99	0.32
14833.00	89.54	269.49	6661.81	334.41 S	8875.75 W	8881.96	1.60
14928.00	89.72	268.68	6662.42	335.93 S	8970.74 W	8976.95	0.87
15023.00	90.31	268.55	6662.40	338.22 S	9065.71 W	9071.94	0.64
15118.00	91.26	268.11	6661.09	340.99 S	9160.66 W	9166.93	1.10
15213.00	90.92	269.86	6659.29	342.68 S	9255.62 W	9261.90	1.88
15308.00	89.97	270.26	6658.55	342.58 S	9350.62 W	9356.84	1.09
15403.00	89.08	271.00	6659.34	341.53 S	9445.61 W	9451.74	1.22
15498.00	89.08	270.92	6660.86	339.94 S	9540.58 W	9546.61	0.08
15593.00	89.23	270.72	6662.26	338.58 S	9635.56 W	9641.49	0.26
15688.00	89.57	270.55	6663.26	337.53 S	9730.55 W	9736.39	0.40
15783.00	89.94	271.28	6663.66	336.01 S	9825.54 W	9831.28	0.86
15878.00	89.14	270.62	6664.43	334.44 S	9920.52 W	9926.15	1.09
15973.00	89.35	270.12	6665.68	333.82 S	10015.51 W	10021.07	0.57
16068.00	89.38	269.93	6666.73	333.78 S	10110.50 W	10116.01	0.20
16162.00	90.18	270.32	6667.09	333.58 S	10204.50 W	10209.95	0.95
16206.00	90.28	270.10	6666.92	333.42 S	10248.50 W	10253.92	0.55
16273.00	90.28	270.10	6666.59	333.30 S	10315.50 W	10320.88	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 268.09 DEGREES (GRID)
A TOTAL CORRECTION OF 7.41 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16273.00 FEET
IS 10320.88 FEET ALONG 268.15 DEGREES (GRID)**

Final survey is a straight line projection to TD.